683-0240
PD-AAS-520-B1
ISN 24000/201

VOLUME I

2

UNCLASSIFIED

PROJECT PAPER

NIGER

NIAMEY DEPARTMENT

DEVELOPMENT PROJECT

PHASE II

683-0240

USAID/NIGER

AGENCY FOR INTERNATIONAL DEVELOPMENT

UNCLASSIFIED

28 APR 1981

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU: ES

FROM: AA/AFR (Acting) W. Haven North

SUBJECT: Niamey Department Development II (683-0240)

Problem: To resolve issues bearing on the authorization of the subject project.

Discussion: In our review with you of the subject project, discussion focused upon three concerns, viz., the matter of price supports to agricultural inputs (subsidies), the inadequacy of the Logical Framework in reflecting qualitative institutional elements prominent in the project and the need to adjust the Evaluation Plan to permit recognition and measurement of desired institutional development. We believe we have now addressed these concerns and herewith re-submit the project authorization package for your approval.

With respect to the later two concerns, we are in the process of modifying the Logical Framework (Annex A of Project Paper) and amending the Evaluation Plan to stress the degree and quality of institutional development to be achieved.

Regarding the input subsidies question, we propose to make this concern the subject of an exchange of letters at the time of the signing of the Project Agreement rather than a covenant or condition precedent spelled out in the Project Authorization and Project Agreement. We are recommending this approach in view of: (a) the danger of serious harm to the implementation of this season's program if signing of the Project Agreement is delayed (Phase I is out of funds and the growing season is just starting); (b) the fact that Agriculture Production Support, a larger project and one that is national in scope, is a more appropriate vehicle for addressing the input subsidy issue (It will be ready for your authorization this summer in preparation for early FY 82 obligation.); and (c) the desirability of avoiding unnecessary strain on the USG/GON bilateral relationship that might arise as a result of any further delays of Phase II related to the introduction of a new issue.

We propose that the Ambassador or Mission Director sign a letter which: (a) states A.I.D.'s concern that there be a phased reduction of subsidies on agricultural inputs in order to insure that the spread and continuance of improved farming practices is not dependent on the continued availability of government and donor funding for this purpose: and (b) advises that we intend to include a covenant in the Project Agreement for the forthcoming national Agricultural Sector Production Support project whereby the GON would undertake to carry out a plan for the elimination of agricultural input subsidies and review progress in realizing that plan annually with A.I.D.

CC 23452

The letter will also indicate the need for the GON to undertake a review of subsidies to agricultural production inputs for the purpose of establishing criteria and identifying the conditions under which the government could periodically reduce such subsidies in the project zone. This review is to be completed prior to the signing of the Agriculture Sector Production Support Project Agreement. A.I.D. would be prepared to participate in or assist with that review and will wish to discuss progress in dealing with the inputs subsidy question within the framework of the Niamey Department Technical Committees' review of the Annual Report. The GON will be asked to acknowledge in writing its agreement with the intent of the letter prior to signing the Niamey Department II Project Agreement.

Recommendation: That you (a) approve the approach outlined above to resolving the outstanding issues and (b) sign the attached Project Authorization.

Approved: M. A. L

Disapproved: _____

Date: April 28, 81

Attachment:

Project Authorization Package

Clearances:
AFR/SWA:JBierke JB Date 4-28-81
AFR/DR/SWAP:GSlocum (draft)
GC/AFR:TBork (draft)
DA/AID, JWheeler

AFR/DR/SWAP:JRMcCabe:AFR/SWA:FGilbert:ck:4/28/81:X26639

19 MAR 1981

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU: ES

THRU: Acting AA/PPC, Charles Paolillo

FROM: Acting AA/AFR, W. Haven North

SUBJECT: Niamey Department Development - Phase II (Project No. 683-0240)

Problem: Your approval is required to execute a grant of $13,582,000 (FY 81 = $2,000,000) from the SH appropriation to the Government of Niger for the Niamey Department Development Project - Phase II (project number 683-0240). Your approval is also required to authorize the requested waivers.

Discussion: This five year (1981-85) project is the second Phase of a long-range program of rural development in the Niamey Department of Niger. The second Phase will build upon and expand the successful results of the first Phase (1978-80) which received $4,698,000 in AID funding. It is intended that Phase II will firmly establish a system of technical service delivery which will create the conditions necessary to increase the capacity of farmers for greater food production on a self-sustaining basis. The project will train villagers selected by their local cooperative organizations by the use of an extension system which will primarily operate out of ten farmer couple training centers. Emphases will be placed on the extension of improved agricultural practices and the efficient distribution of required agricultural inputs to the farmers located in the project zone. This zone covers about 67% of the Niamey Department (approximately 45,000 sq. kilometers).

Phase I of the project initiated and tested a number of promising development activities, and established an institutional basis for local government services and village organizations. Phase I was evaluated twice, in May 1979 and in 1980. The recommended changes to the project resulting from these evaluations have been incorporated in the design of Phase II. Phase II will further strengthen the capacity of the rural service institutions to provide support to a greater number of the rural inhabitants of the zone (farmer credit, village cooperative organizational support, agricultural input delivery and marketing services). The target group comprises members of Niger's vast rural poor majority who have an average per capita cash income under $100 per year.

At the end of this five year Phase, it is expected that some 740 farmer couples will have received long-term training at the farmer couple training centers, that some 1,160 other farmers will have participated in short-term training at the village level and that both of these groups will be using the improved agricultural practices recommended by the project. It is also anticipated that some 4,000 additional farmers will be receiving the agricultural credit and production inputs required for the adoption of the improved practices after having been instructed at the village level by the farmers trained by the project. Other project beneficiaries are the approximately 8,000 villagers who will directly

benefit from training in literacy, cooperatives, blacksmithing, on-farm cattle fattening, etc. There are also nearly 60,000 other farm families (420,000 people) living in the project area who will benefit indirectly from the spread effect of introduced innovations and strengthened government services.

A five-person technical assistance team will be provided to assist with the implementation of the project. One of these technical assistants will be responsible for undertaking a major program of applied agricultural research and another will direct the project's component of increasing women's access to development resources. Also, the Peace Corps will furnish two volunteers to each of the farmer couple training centers. All these technicians will receive U.S. institutional backstopping through the Niger Cereals Research Project (683-0225), which will be designed and implemented by Purdue University. Additional assistance will be afforded by DS/AGR and DS/RAD through their Title XII contracting arrangements. Both of these offices have assisted with the design of this project.

This project is the fourth in a series of seven regional development projects Niger has devised as part of its national strategy for the development of its rainfed cultivated zone and the accomplishment of its goal of food self-sufficiency. The World Bank, Germany, France, Canada and the European Economic Community are financing the other six projects.

The project has been determined by the Mission to be economically, financially and technically feasible. The Government of Niger agencies responsible for project execution, in conjunction with project provided technical assistance, are judged adequate to provide the administrative capability required for project implementation.

An Initial Environmental Examination established a negative determination. The project has been designed to meet the requirements of U.S. pesticide regulations.

The project is in conformance with, 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 $13,582,000, of which $3,350,000 (25%) will be for local costs. The estimated grant budget is as follows:

	First Year FY 1981	LOP.	($000)
Technical Assistance Personnel			
Long term	296	1,940	
Short term	-	544	
Local	13	63	
Training	28	422	
Commodities	1,211	5,056	
Construction	400	2,308	
Other Costs	-	1,222	
Contingencies	52	400	
Inflation	-	1,627	
	2,000	13,582	

The Government of Niger will contribute $7,700,000 or 36% of the total project cost of $21,282,000. It is expected that $5,640,000 of this will be in the form of cash payments for operational costs and subsidy payments to the project's credit fund account.

USAID/Niger and the Government of Niger have collaborated closely in the implementation of Phase I and the design of this Phase II of the project. The Project Paper for Phase II was submitted to AID/W along with the Government of Niger's official request for assistance on December 29, 1980.

The Mission has requested that a waiver be granted in the project authorization document for the AID Geographic Code 935 procurement of 30 village grinding mills ($150,000) and $650,000 of construction commodities. Justification for this waiver is included in Annex F of the Project Paper.

The first year amount requested is the same as presented in the FY 1981 Congressional Presentation; therefore, a Congressional Notification is not required for the first year obligation.

The Project Review was held on January 28. John W. Koehring, AAA/AFR/DR, chaired the Africa Bureau Executive Committee for Project Review (ECPR), which met on February 6. 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 G to the Project Paper. 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 that will be responsible for the project are: Michael Huffman AFR/DR/SWAP and Mark Wentling, USAID/Niger.

Recommendation: The Executive Committee for Project Review recommends that you sign the attached Project Authorization, and thereby approve (1) the proposed grant of $13,582,000 (FY 81 = $2,000,000) for the implementation of the second phase of the Niamey Department Development Project and (2) the requested waivers.

Clearances:
GC,J.R.Bolton JRB Date 3/27/81
AAA/PPC/PDPR,J.Eriksson TH Date 3/25

Drafted by:USAID/Niger:MWentling;AFR/DR/SWAP:MGHuffman:fn:3/3/81:Ext.29339

Attachments:
1. Summary of Project Processing Dates
2. Draft Press Release
3. Original Copy of Project Paper and Annexes

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D.C. 20523

PROJECT AUTHORIZATION

COUNTRY : Republic of Niger

PROJECT : Niamey Department Development - Phase II

PROJECT NUMBER : 683-0240

1. Pursuant to Part I, Chapter I, Section 121 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorize the Niamey Department Development Project - Phase II for the Republic of Niger (the "Cooperating Country") involving planned obligations of not to exceed Thirteen Million Five Hundred Eighty Two Thousand United States Dollars ($13,582,000) in grant funds over a five year period from date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to assist in financing certain foreign exchange and local currency costs for the Project.

2. The Project consists of financing technical assistance, commodities and related services, and operating costs to assist the Cooperating Country in developing the following:

A. A System of Technical Service Delivery.

Farmer-couple training centers will be created to provide training in improved agricultural practices and to provide extension support to farmers in the project zone. Village literacy, reforestation, animal husbandry, health, blacksmith and leadership training will be supported with the aim of increasing the villagers' capacity for self-managed and self-sustaining development.

B. A System of Self-Managed Village Organization.

Villages will be organized into cooperatives, cooperative warehouses will be constructed, and local cooperative officials will be trained.

C. System of Credit Delivery.

A farmer credit program will be developed with the provision of agricultural inputs.

D. System of Agricultural Input Delivery.

A system which will assure the timely and reliable delivery of requested agricultural inputs to farmers and their cooperatives will be instituted.

E. Systems to Increase Women's Access to Development Activities.

A special effort to address the role of women in the agricultural system as food producers, processors and consumers will be undertaken. Intensive training programs of selected village women in improved agriculture techniques, literacy, livestock, nutrition and health education will be supported. Cereal grinding mills will be installed to assist women, and credit for agricultural inputs will be provided to them.

F. System to Test and Evaluate Proposed Technology.

A monitoring and evaluation office will be established within the Project Management Unit to collect the data necessary to measure the impact of the project (especially the spread-effect success), provide information needed by project policy makers and to carry out adaptive agricultural and pesticide research at the farm level.

G. Coordination and Management System for the Project Zone.

A Project Management Unit will be established and given responsibility for the management of project inputs, the coordination and implementation of project activities and the analysis of project success.

3. The Project Agreement, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

A. Source and Origin of Goods and Services: Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in countries included in A.I.D. Geographic Code 941 and the Cooperating Country, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Grant shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States or the Cooperating Country.

B. Condition Precedent

Prior to any disbursement, or the issuance of any commitment under the Project Agreement, the Cooperating Country will provide evidence that a Project Director, a Technical Director and that at least two of the four District Coordinators have been assigned to project management, and that the Project Director has been delegated all necessary authorities required to implement the project. Assignments of these personnel shall be, except in case of force majeure, for a minimum of three years.

C. Covenants

The Cooperating Country shall covenant the following:

(1) To deposit or cause to be deposited into the project's credit fund account by November 30 of each year of the life of the project, funds sufficient to cover the difference between the cost of farm inputs procured for the project and the price at which such inputs are made available to farmers in the project area, as well as additional amounts as may be required to prevent decapitalization of the credit fund. The amount of such annual deposits will be established by mutual agreement by May 31 of each year. The first year deposit requirement will be 22,000,000 CFA francs.

(2) To replenish the project's operation account at the National Treasury by November 30 of each year on the basis of a cash needs request

submitted by project management to the Ministry of Rural Development by May 31 of each year. The first year deposit requirement will be 116,000,000 CFA francs.

(3) That all plant protection activities conducted in the project zone shall be conducted by adequately trained Ministry of Rural Development personnel. No project resource, including personnel, buildings, vehicles, equipment or funds, shall be utilized for the purchase, transport, handling, storage or use in any manner of pesticides not accepted by AID for the project, except as AID may otherwise agree in writing in the event of imminent emergency requiring the prompt use of non-approved pesticides.

D. Waiver:

Notwithstanding paragraph 3A above, and based upon the justification set forth in Annex F of the Project Paper, I hereby:

Approve a commodity origin waiver from AID Geographic Code 941 to Geographic Code 935 authorizing the procurement of 30 millet grinding mills, the cost of which shall not exceed $150,000, and roofing, reinforcing steel and miscellaneous construction supplies, the cost of which shall not exceed $650,000; and certify that exclusion of procurement of the above described commodities 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.

M. Peter McPherson
Administrator

April 28, 81
Date

Clearances:
GC:JRBolton Date: 3/30/81
Acting AA/AFR:WHNorth Date: 3/19/81
Acting AA/PPC:CPaolillo Date: 3/31/81

Drafted by:GC/AFR:TBork:fn:3/3/81:Ext.29218

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A = Add, C = Change, D = Delete — Amendment Number

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Niger

3. PROJECT NUMBER: 683-0240

4. BUREAU/OFFICE: AFR — 06

5. PROJECT TITLE (maximum 40 characters): Niamey Department Development II

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 86

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY 81 B. Quarter 2 C. Final FY 85

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

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	1443	557	2000	10231	3351	13582
(Grant)	(1443)	(557)	(2000)	(10231)	(3351)	(13582)
(Loan)	(-)	(-)	(-)	(-)	(-)	(-)
Other U.S. 1. Peace Corps		Not Costed				
Other U.S. 2.						
Host Country	124	790	914	1569	6131	7700
Other Donor(s)						
TOTALS	1567	1347	2914	11800	9482	21282

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) SH	210	240		-	-	2000	-	13582	-
(2)									
(3)									
(4)									
TOTALS				-	-	2000	-	13582	-

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 220 | 210 | 241 | 242 | 245

11. SECONDARY PURPOSE CODE: 243

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

A. Code	BS	BR	COOP			
B. Amount	13582	13582	914			

13. PROJECT PURPOSE (maximum 480 characters)

To institutionalize a process of rural development through the establishment of self-managed village organizations capable of assisting farm families with the achievement of increased food production on a self-sustaining basis.

14. SCHEDULED EVALUATIONS

Interim MM 11 YY 82 MM 11 YY 84 Final MM 08 YY 86

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☒ 941 ☒ Local ☐ Other (Specify)

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

17. APPROVED BY

Signature: [signature]

Title: Mission Director, USAID/Niger

Date Signed: MM 12 DD 19 YY 80

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (8-79)

Currency Equivalents

U.S. $1.00 = CFA 200

CFA 1,000 = U.S. $5.00

Weights and Measures

1 kilogram (kg)	:	2.20 Pounds
1 Metric Ton (T)	:	0.98 Long Tons
1 Hectare (ha)	:	2.47 Acres
1 Kilometer (km)	:	0.62 Miles
1 Liter (l)	:	1.0567 Liquid Quarts

Acronyms and Abbreviations

AAPC	Afro-American Purchasing Center (New York)
AFN	Association des Femmes Nigeriennes
CA	Centre d'Approvisionment (Input Supply Center)
CDARMA	Centre de Developpement de l'Artisanat Rurale et du Machinisme Agricole (Development Center for Rural Artisans and Agricultural Mechanization)
CEC	Centre d'Education de Cooperative (Cooperative Education Center)
CFJA	Centre de Formation des Jeunes Agriculteurs (Young Farmer Training Center)
CNCA	Caisse Nationale de Credit Agricole (National Agriculture Credit Bank)
COTEAR	Comité Technique d'Arrondissement (District Technical Committee)
COTEDEP	Comité Technique Departmental (Department Technical Committee)
CPT	Centre de Perfectionement Technique (Farmer Couple Training Center)
GON	Government of Niger
INRAN	Institut National de Recherche Agronomiquedu Niger (National Agriculture Research Institute)

MDR	Ministère du Developpement Rural (Ministry of Rural Development)
MP	Ministère du Plan (Ministry of Plan)
OPVN	Office des Produits Vivriers du Niger (Food Marketing Board of Niger)
PAID	Pan African Institute for Development
PID	Project Identification Document
PES	Project Evaluation Summary
PMSU	Project Management Support Unit
REDSO/WA	Regional Economic Development Support Office/ West Africa (Abidjan)
SONARA	Société Nationale d'Arachide (National Peanut Company)
UNCC	Union Nigerienne de Credit et de Cooperation (National Credit and Cooperative Union)

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A. Initial Environmental Examination
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E. Suggested Guidelines for IPM - Oriented Extension Work
F. Plant Protection in Niger
G. Pesticide Specifications
H. Crop Pests in Niger

I. Recommendations and Summary

A. Grant $13,582,000

B. Waivers

a) From Geographic Code 941 (Selected Free World) to Code 935 (Special Free World) for roofing materials, reinforcing steel bars and miscellaneous construction hardware.
b) For authorization not to advertise for construction serices in the U.S.
c) From Geographic Code 000 to Code 935 for diesel powered millet grinding mills.

C. Summary Findings

A grant in the amount of $13,582,000 over a five year period beginning in the second quarter of FY 1981 should be authorized to the Government of Niger for the execution of the second phase of the Niamey Department Development Project as described in the following section of this Project Paper. The GON contribution to the project will amount to a U.S. dollar equivalent of $7,700,000, or 36% of the total project cost (21,282,000). $5,640,000 of the $7 million are cash payments for operational costs and subsidy payments to the credit fund account. The remainder represents in-kind contributions, primarily in the form of GON-paid local personnel.

All of the issues raised at the AID/W-PID review were satisfactorily resolved during final project design. The project has been determined to be economically, financially and technically feasible and the GON agencies responsible for project execution, in conjunction with project provided technical assistance, are adequate to provide the necessary administrative capability for project implementation.

The USAID/Niger Mission Director attests that sufficient planning and analysis have been performed to provide a reasonably firm cost estimate to the U.S. Government and that a determination should be made that the requirements of Section 611 (a) of the Foreign Assistance Act of 1961, as amended, have been met. An Initial Environmental Examination has been completed and a negative determination has been recommended. This project has been designed to meet the requirements of U.S. pesticide regulations.

The project is in conformance with and supports both the GONs Development Plan and the Mission's Country Development Strategy Statement. The immediate beneficiaries of this project are the rural people of the Niamey Department who are among the poorest in the world. As a consequence, this project also conforms with the Congressional Mandate.

The project meets all other applicable statutory criteria with the exceptions listed above in Section B, for which waivers are being requested. The statutory checklist can be found in the Annex G.

D. Summary Project Description

This project is the second phase of a long range program of rural development in the Niamey Department of western Niger. It is intended to firmly establish an extension system which will create the conditions required to increase the farmer's capacity for greater food production on a self-sustaining basis. The project will train villagers selected by their cooperatives using an extension system which will primarily operate out of ten farmer couple training centers. Emphasis will be placed upon the extension of an improved agricultural package and the efficient distribution of the required inputs to the farmers located in a project zone which covers about 67% of the Niamey Department (approx. 45,000 square kilometers).

Phase I of the project initiated and tested a number of promising development activities in the area and established an institutional basis for local government services and rural organizations, particularly cooperatives, upon which this Phase II project will be built. A credit and cooperative structure was created to provide the vehicle through which the Nigerien government could gain access to a significant number of villagers to whom extension, demonstration, input delivery and marketing services could be channeled. As a result of the success of Phase I in accomplishing its primary objectives and achieving the project outputs, Phase II has been designed to build upon and expand its predecessor's successful elements. The development of rural service institutions to furnish credit and cooperative support will be further strengthened. A new component has been added which will attempt to begin providing resources to village women who have heretofore been largely neglected in Niger's development activities. The project has also been slightly expanded geographically to include the western portion of Say Arrondissement, a relatively underpopulated area to the south-west of the city of Niamey.

A five person technical assistance team will be required to carry out the project and a major program of applied research willbe undertaken. The project will construct seven new farmer couple training centers throughout the Department as well as other necessary infrastructure including a headquarters building, garage and warehouse in Niamey. The project will furnish agricultural inputs (such as fertilizer, animal traction equipment, seeds, and livestock) to rural producers on credit through a revolving fund established by the project and replenished by farmer repayments, interest charges (10%), and GON financial support. The project will also provide material support to the agricultural extension services for these farmers. The Peace Corps will furnish two volunteers to each farmer couple training center.

At the end of five years, it is expected that some 740 farmer couples who have received long term training at the CPTs and that some 1, 160 other farmers who have participated in short term training at the village level will be using the improved agricultural practices recommended by the project. It is also anticipated that some 4,000 additional farmers will receive agricultural credit and production inputs required for the adoption of the improved practices as a result of the multiplier effect produced by the farmers trained by the project. Other project beneficiaries are the approximately 8,000 villagers who will directly benefit from literacy, cooperative, blacksmith, on-farm fattening and other programs. There are also nearly 60,000 other farm families (420,000 people) living in the project area who will benefit indirectly from the spread effect of introduced innovations and strengthened government services.

E. General Project Strategy

This project will constitute a second five year phase (1981-85) of a long range rural development program in Niger's Department of Niamey. Similar rural development programs are being supported in Niger's other departments by other donors. The collective implementation of these regional development projects represents Niger's national strategy for the development of its rainfall cultivated zone, and reflects its policy of decentralizing the responsibility for development activities.

Niger has recognized that the successful application of these general development strategies and policies requires village level organizations capable of self-managed development. Therefore Niger has adopted a village level development strategy which aims to eventually organize most of Niger's rural farming communities into cooperative associations. This project has pursued this strategy during the three years phase I (1978-80) of the project with the initial organization of 42 cooperative associations (grouping 201 villages with a total population of 133,736 and will continue reinforcing during this 5 year second phase these fledgeling cooperatives while at the same time creating 16 new associations grouping some 100 villages.

In practice the application of this strategy by the project means training villagers who have been selected by their villages to manage their cooperative. This cooperative is in reality a multi-purpose village development organization and all project activities aimed at the village level are carried out under the auspices of this cooperative organization. Therefore this approach is consonant with general development theory in that if fully involves the participation of the villagers who have final decision making power overall those project activities which concern their village.

Given the priority need of all villages to become self-sufficient in food production, this phase of the project will focus this village level organization strategy on increasing the production of major food staples, millet and cowpeas. Most importantly this focus will require that the village cooperatives concentrate on developing reliable systems of obtaining

on credit those inputs required by the "yield raising" improved agricultural practices being introduced by the project. Linked with the establishment of this input delivery system is an agricultural extension and farmer training program which will assist farmers with the rational utilization and efficient use of these inputs. The success of this approach will depend upon the efficiency and growth rate of the GON district, departmental and national level cooperative support, credit and agricultural services. Thus part of the project strategy will necessarily require its involvement with these different levels in order to provide the support needed to ensure that permanent operational links are forged between each level.

An important element of the project strategy will be the continued maintenance of that amount of flexibility required to assure that its implementation plans will neither exceed the capacity of those parties responsible for carrying out project activities nor create needs among the beneficiaries which cannot be satisfied. In this sense, the incremental design of the project which plans for the project to extend credit and agricultural services to specific numbers of additional farmers each year for an approximate total of 6,000 farms at the end of this five year phase is more a planning guideline than a hard and fast target which must be accomplished at all cost. The success of the project should not be judged solely on the numbers of farmers involved with project activities but by the quality, in terms of efficiency and effectiveness, of project extension work.

F. Relationship to Overall AID and GON Goals

AID objectives in Niger as stated in the 1980 CDSS concentrate on the rural area in agriculture and livestock production, health and human resource development. The long-range goals are self-sufficiency in basic cereals grains, improved range management and livestock production, improved management of natural resources, and improved health and well-being for the rural population.

As detailed in the CDSS, USAID/Niger's strategy over the next five years period will be to address the development constraints facing Niger by reenforcing and up-grading the human resource and physical infrastructure of the GON's rural development services, undertaking selected actions which are within the assessed capability of the GON's administrative capacity and the rural farmers' rate of response to development interventions. This strategy will continue those actions designed to encourage an increase in this response rate through the introduction of new technology, informal education and cooperative structures, and establish a planning, research and implementation capability for the protection of natural resources.

Although the majority of AID's efforts will be directed at the national level, intensive actions at the village level will continue to be concentrated in Niamey Department following the GON strategy of departmentally

focused "Productivity" projects. This project was specifically included within the Niger CDSS and follows the strategy outlined within that approved document.

The project is designed to be complementary to USAID/Niger's overall country program and will transfer the improved seeds and technics developed under the national level programs down to the village through a production input distribution system receiving support at both levels.

The project will address the identified human resource constraint by concentrating on technical training of rural farmers, management training of cooperative leaders and informal literacy training of the general population. Women's needs will be addressed through the inclusion of wives in the expanded technical training programs and the creation of women's activities section within the project management structure.

In the pursuit of its major objectives the project will work in close coordination and complementarity with USAID/Niger's Agricultural Production Support Project (683-0234) which will be providing the critical technical and institutional support to the GON services responsible for credit and agricultural inputs supply at the national level. In addition the project will directly benefit from the activities undertaken by other AID financed projects. These include: the improved seed and production techniques developed under the Niger Cerals Research Project (683-0225); the technical and material assistance provided by the Forestry and Land Use Project (683-0230) in the implementation of the project's soil conservation and tree planting activities; the support provided by the Rural Health Improvement Project (683-0208) to the project's effort to introduce at the young farmer couple training centers instruction on first aid and nutrition; the increased effectiveness of the project's literacy program which will result from the efforts of the Literacy Service Project (683-0237); and the Niger Feeder Roads Project (683-0231) which will concentrate its assistance on satisfying the priority road needs of the NDD project zone.

G. Alternative Project Strategies and Structures

The general strategy described above for this project is based on the experiences and knowledge gained during phase I. This strategy, in accordance with Niger's development priorities, is designed to increase food production and to institutionalize a process of rural development at the village level. Although alternatives to this basic strategy have been considered, they have been rejected for the reasons presented in the following discussion.

The strategy chosen for increasing food production is the widespread introduction of improved cultivation practices with the aim of gaining their adoption by a significant number of farmers. The current application of this strategy requires the acquiring of agricultural inputs which, for the most part, are imported. The major objective of this project is to establish

at the village level organizations which are capable of receiving, delivering and rationally using these inputs.

Exclusive use of alternative packages or "yield raisers" which do not rely upon imported inputs have been considered. These include packages which rely primarily on the use of animal manure, Niger's rock phosphates, soil conservation measures and/or leguminous crop rotation schemes. It was concluded that, although all these options should continue to be integrated and introduced along with those practices relying on imported inputs, none of these options could achieve the kind of widespread, large scale crop production increases that can be obtained by the use of imported inputs. A sufficient quantity of the elements (e.g. manure) required for the widespread adoption of these options is just not available and, in the case of optimum leguminous crop rotation, the consumption preferences of Niger's population currently prohibits rapidly increasing the land surface devoted to these kinds of crops.

The GON is very much aware of the problems created by adopting packages which rely heavily on imported, manufactured inputs and it supports efforts to minimize this reliance by adopting to the extent possible optional packages which use local inputs; however, it has concluded after much study and experience that the food production levels it desires can only be achieved through the increased use of imported inputs. Thus there does not seem to be any acceptable alternative to achieving the crop production increases needed to attain Niger's goal of food self-sufficiency.

A major alternative to concentrating project resources on the establishment of a new institutional network which will increase the number of villages capable of managing their own development and allow for the harmonicus coordination of a rational program of departmental development is a total concentration on the reinforcement of the existing development delivery structures which have served Niger in the past. These structures are based on the French administrative model and they could perhaps be made effective in spite of the difficulties involved in adopting this model to the needs of a developing country like Niger. One approach might be to divide the project components among the appropriate GON services and provide them with the resources to implement them. This would allow the services to strengthen their own capacities and prepare them for the day when they may have to take over the responsibility for the management of the activities initiated by the project. This may be a viable alternative but it is one that runs counter to the current Nigerien development philosophy and the experience of phase I suggests that it will be a long time before the GON services will be capable of reaching efficiently a significant number of villagers. Thus, it is believed that the best strategy is one which first attempts to develop the village's capacity and secondly strives to involve the GON services according to their ability to meet the expressed needs of the villagers. In this way the number of beneficiaries is increased and they become the major recipients and the eventual implementators and not just minor recipients at the end of a long development chain.

There are a host of other strategies which the project has considered as complementary or alternative ways of achieving its objectives. These include: organization of villages into more efficient, communal farm units; small tractors and other mechanized farming implements; intense use of herbicides for weed control; and the introduction of new crops. All these strategies were judged inappropriate in view of Niger's current stage of development.

H. 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 continuing dialogue with the GON throughout the life of the 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. Subsidies on Agricultural Inputs

Current GON national strategy for meeting ever increasing food requirements is based largely on extending improved agricultural practices which require the use of animal traction equipment and imported agricultural chemicals. However, due to budgetary limitations, the GON policy of heavily subsidizing these inputs poses a serious obstacle to their use on a sufficiently wide-spread basis to attain the needed increases in food production. It is therefore evident that the maintenance of the current GON policy has broad implications for rural development in Niger.

Over the past couple of years USAID/Niger has had many discussions with the GON on this issue and it appears that the GON is beginning to accept the need to modify its policies. USAID/Niger intends to continue to encourage the GON to undertake a thorough review of its subsidy policy and to offer any assistance Niger might require to do this. Although it is expected that, as a result of these efforts and financial pressures, the current subsidy policies are likely to be revised in the near future, the present project design can, of course, only take into account those subsidy policies which exist at present. Consequently, an agreement has been reached with the GON whereby it will pay all subsidies on inputs purchased with project funds and any other funding shortfalls required to prevent the decapitalization of the project's credit/input fund. The exact amount of these payments will be established by an annual bi-lateral review of the subsidy policy. These reviews will consider such related issues as farm gate prices, increased crop yields obtained by participating farmers, availability of GON subsidy funds and farmer demand for inputs. USAID/Niger believes that this approach will eventually lead to the establishment of sound subsidy policies which can be applied on a nationwide basis.

2. Pesticide Use

In the past, the GON has used all available insecticides to minimize crop damage caused by insects. Many of the insecticides used by the GON do not have the approval of the U. S. Environmental Protection Agency (EPA). Current EPA statutes prohibit the use of unapproved pesticides in projects funded by the U. S. Govenment. Therefore, the IEE in this paper recommends that the project undertake actions to identify and test approved insecticides which would be appropriate for use in the project zone.

This issue has been thoroughly discussed with the GON and it agrees to a proposed covenant in the grant agreement which places restrictions on the use of unapproved pesticides within the framework of the project. (See Part VI, Conditions and Covenants.)

3. Project Credit Fund

A total of approximately $3,123,300 in AID funds will be provided to procure agricultural inputs which will be offered to farmers through their local cooperative organizations on a credit basis. All farmer loan repayments will be returned to the project's revolving credit fund and be used to purchase more inputs. The efficient operation of this fund will be a key factor in the successful implementation of this project.

Limited credit fund operations were initiated during phase I but sufficient time has not elapsed to allow for an adequate evaluation of this activity. However, available information on the operation of such funds by Niger's other regional development projects indicates that their experience has been satisfactory. Also the current nationwide repayment rate for input loans of near 88% is encouraging.

In any event, any possible decapitalization of the project's credit fund caused by loan defaults, or any other events beyond the control of the project, will be avoided by including a covenant in the grant agreement which requires that the GON agree to fund any shortfalls in cash flow. In addition, repayment problems will be addressed by the adequate training of loan administrators, credit fund managers and cooperative leaders. Also an efficient system of monitoring which will be instituted will provide for greater control of credit operations by project management. (See Annex O for more detail on the credit fund.)

4. Recurrent Costs

During recent years there has been considerable concern expressed as to whether or not Niger and other Sahelian countries can eventually support the recurrent cost burden produced by donor financed projects. In view of current high inflation rates, shrinking real incomes and the vulnerability of the Sahel to periodic drought this concern is rapidly growing.

In spite of these concerns, our experience in Niger has been good. Uranium revenues have allowed the GON to provide higher than usual monetary backing to its policy of giving priority support to its agricultural development programs. During phase I the GON made an impressive cash contribution to the project of over 2.2 million dollars, representing nearly 32% of total LOP costs. It is significant to note that a large part of this amount was unsolicited. This kind of support clearly reflects the GON's strong commitment to its regional "productivity" projects.

In spite of plummeting uranium revenues, the major source of Niger's investment income, the GON will again exceed the minimum contribution of 20% accorded Sahelian countries by contributing 36% of the total cost of this five year phase II of the project. Approximately, 30% of this amount will be in cash. Further information on the significance of this contribution is provided in the following section.

5. Budgetary Constraints

An estimated total LOP cost of $11,300,000 was provided in the PID for this project. Since the submission of the PID several events have occurred to make this original projected total insufficient. First, at the time the PID was conceived a much smaller project in terms of young farmer training centers and ultimate beneficiaries was envisioned. Subsequently, further negotiations with the GON revealed that in order to minimally keep abreast with the pace of development taking place in its other strategically related regional "productivity" projects that the number of centers and farmer beneficiaries would have to be increased. It was believed at the time that with the expected GON cash contribution of 50% of LOP costs and by increasing AID's originally planned contribution by 10%--from $11,300,000 to $12,600,000--that this program expansion could be managed without requesting additional funds. However, the sudden decline in Niger's uranium revenues forced the GON to inform the mission in September 1980 that it could now only support close to 30% of total LOP costs. Although this 30% cash contribution (currently estimated at near $5,640,000) is still very significant and clearly indicates Niger's desire to participate to the maximum of its financial possibilities, it is evident that this reduction in the planned GON contribution has placed considerable budgetary constraints on the project.

In addition to this reduction in the GON contribution, the construction of an essential animal traction equipment manufacturing center was not financed by the Liptako-Gourma project as expected. Originally, it was planned that Liptako-Gourma would finance the cost of constructing and equipping this center and the project--as the primary beneficiary of this center--would only assist with the management of the center. Now that the Liptako-Gourma project is unable to finance this center it is incumbent upon the project to seek the $2,000,000 in additional funding required

for this. It is therefore proposed, in view of the overwhelming importance of this center to the project and GON wishes, that AID be requested to provide these additional funds.

The above briefly describes why it was not possible to stay within the budgetary limits projected at the PID stage in the final design of this project. The current total LOP cost of $13,582,000 represents the amount of funding which the mission considers necessary for a minimally acceptable level of project activity. Those elements which were eliminated because of current budgetary ceiling for this project are presented in annex K and it is requested that consideration be given to providing additional funds as indicated in this supplementary budget. The re-incorporation of these elements into the project would bring the project up to an optimal level of activity and would bring AID's total contribution up near that being contributed by other donors to Niger's other regional development projects.

Although the funds required for the creation of an animal traction production center are presented in annex K along with the other supplementary budget item requirements, it is believed that the amount of funding needed and the complexity of such an undertaking suggests that this item would be best funded as a separate, but clearly related, project entity.

II. Description of the Project

A. Program Goal

The Niamey Department Development Phase II project is designed to contribute to Niger's goal of self-sufficiency in food production leading to improvements in the rural standard of living. This primary goal, which is explicitly stated in the current Five Year Development Plan, is defined as the ability of local cereals production to meet the food requirements of the population in both average and drought years without resorting to or being dependent upon imports. It is usually expressed in terms of achieving a 250 kilogram per capita annual cereals production plus 25 kilograms of per capita meat production per year.

The two principal strategies for increasing cereals production will be the development of (1) traditional rainfed agriculture; and (2) irrigated agriculture, complemented by the establishment of an "equilibrium" between agriculture and livestock. This expression of goals in the recently published Plan has been interpreted as placing an increased emphasis upon rainfed agriculture as compared to earlier planning efforts. The Plan recognizes that rainfed agriculture is the primary occupation and source of food for the Nigerien population and will continue to be of primary importance for at least 20 to 25 years. It is therefore, necessary to increase rainfed cereals production to meet the needs of a growing population and, if possible, establish buffer stocks for drought years and increase per capita consumption. These goals will necessitate the doubling of present cereals production by the end of the century.

The Plan established further guidance for increasing food production. Strategies for the improvement of rainfed agriculture are to be (1) mass oriented, (2) diversified to suit regional variations in soil and climate, and (3) cautiously introduced, since present techniques represent a long experience in adaptation to a particularly harsh and delicate environment. This project was designed with these explicit GON guidelines foremost in mind.

Following the famine caused by the Sahel drought in 1968-74, a series of so-called productivity projects, of which this is one, was devised as the instrument for transforming rainfed agriculture. Niger's cultivated areas were divided into seven productivity zones, each encompassed within one department. Each of these zones has become the object of a similar but separate project receiving assistance from one donor. The European Economic Commission is supporting the Badeguichiri and Zinder Department Projects, now entering their second phase; France has supported Phase I of the Dosso Department Project; the World Bank is funding Phase I and II of the Maradi Project and is planning to fund Phase II of the Dosso Project; Canada is expected to support the

Diffa Project, and Germany, the Tahoua Project and, for the past three years, AID has supported Phase I of the Niamey Department Development Project (683-0205).

B. Overview and Relevance of the Project

Phase I of this project constituted a preliminary trial period during which essential experience and knowledge was obtained for the planning of a more intense application of development resources in Phase II. More importantly, Phase I was designed to test the ability of the GON to execute a large scale project of this nature. Phase I experience demonstrated that this ability was diminished by administrative deficiencies in existing GON development management structure at the department and arrondissement levels. Thus, Phase II will carefully build upon those successful activities initiated during Phase I while at the same time undertaking efforts to create a more efficient and effective administrative structure. A major effort has been made in designing the project to assure that the tasks assigned the GON agencies responsible for projects administration correspond with their capacity to execute them reliably and on time.

Phase I demonstrated that the chronic shortages of agricultural inputs and lack of technical advice are the major constraints to increasing crop production, and that it will be difficult or even impossible to achieve the GON's goal of self-sufficiency in cereals production without removing these constraints. Consequently, Phase II will emphasize establishing and nurturing village-level and district-level support organizations which can satisfy farmers' needs for credit, agricultural supplies, and technical advice. Such an orientation of project activities is fully in accord with Niger's expressed policy of decentralizing the responsibility for developmental activities and corresponds to the realities of the lack of managerial capacity in rural areas. The speed at which the project progresses will then depend directly upon the rate at which this village capacity for self-management evolves.

During Phase II, the geographical zone of the project will be expanded to include the 96 traditionally settled villages (pop, 27,470) of the western portion of Say Arrondissement of the Niamey Department. Originally, it had been planned that development activities in these villages would be included in a separate project for Say Arrondissement (Proj. 683-0209). The major objective of that project was to create new villages and to resettle people from overpopulated areas of Niger into the villages. However, the GON has decided that the resettlement scheme cannot be initiated until further studies are carried out. The studies have been delayed and it may be some time before they are completed. Consequently, the GON has decided that it was unfair to the existing villages of Say Arrondissement to await the completion of lengthy resettlement studies before any development activities could

take place. Thus, the GON has requested that certain village activities in Say Arrondissement be undertaken within the context of this project. These activities are similar to those being carried out in the rest of the project zone and will entail no increase in GON technical staff in Say beyond those already in place. Finally, it is significant to note that the higher rainfall and richer soils of Say hold much promise for potentially higher agricultural yield.

For reference purposes the major results of phase I are summarized in a chart presented as annex P. This chart compares actual output magnitudes with the end of project (EOP) output targets established in the phase I project paper. A quick review of this table reveals that the project was highly successful in terms of accomplishing an impressive quantity of outputs. The project made satisfactory progress in 31 of the 34 EOP output targets listed in the project paper logframe and, in addition to this, progress was made in several output areas that were not listed in the project paper.

C. Project Purpose

The purpose of this project is to institutionalize a process of rural development through the establishment of self-managed village organizations and participating individual farmers who, as a result will be capable of achieving increased food production on a selfsustaining basis. The project initiated this approach during the three years of phase I with the organization of 41 cooperative associations grouping some 200 villages, the establishment of three farmer couple training centers (CPT) and the reinforcement of government extension, agricultural credit and input supply services within the project zone. Phase II will intensify this activity with an increasing emphasis to be place upon the participation of villagers. In practice, the application of such a strategy means training villagers (including women)who have been selected by their villages, in higher yielding food production techniques, cooperative management, literacy and hygiene. Given Niger's priority need to become self-sufficient in food production, the project will focus this village level organization strategy on increasing the production of the food staples, millet, cowpeas and sorghum, as well as some livestock production. Such a focus will require that the village cooperatives concentrate on developing reliable systems of obtaining credit for those inputs necessitated by the yield-rasing agricultural packages being introduced by the project. Linked to the establishment of the input delivery system are the agricultural extension and farmer training programs, both to function through the farmer couple training centers. Thus, the success of this approach will not be entirely dependent upon the efficiency of the arrondissement, departmental and national level agricultural

support services but instead will rely upon the initiative and energies of the beneficiaries themselves, i.e., the basic food producers in the project zone.

The project will try to be flexible in order to assure that implementation plans will neither exceed the capacity of those parties responsible for carrying out project activities nor create needs among the beneficiaries which cannot be satisfied. In this sense the incremental approach of the project design which plans for the project to extend credit and services to a specific number of additional farmers each year for a total of 6,000 farmers at the end of five years is more a planning guideline than a hard fast target which must be reached at all cost. The accomplishments of the project should be measured in terms of having established a selfsustaining development process rather than in terms of a specific number of farmers reached.

By the end of the five year life of this project it is anticipated that some 740 farmer couples will have been trained at the CPTs and some 1,160 farmers in nearly 300 villages will have been reached by the extensive training components of the project. Intensive program activities cover those farmers who have undergone training at the CPTs and are being closely monitored in their villages by CPT personnel; the extensive program includes those farmers who become adopters of the improved practices without having attended a CPT and who are being followed systematically by the project's extension program. It is anticipated that this extensive group of farmers will also include some 4,000 additional farmers who will have adopted the improved practices as a result of the multiplier effect produced by the above mentioned "trained" farmers. Other project beneficiaries are the approximately 8,000 villagers who will directly benefit from literacy, cooperative, blacksmith, on-farm fattening and other programs. The indirect beneficiaries will be the remaining 60,000 farm families (420,000 people) living in the same 300 project villages and in 600 neighboring villages who are expected to benefit from the spread effect of the introduced innovations and strengthened government services. All beneficiaries are members of Niger's vast rural poor majority. It is estimated that annual cash income per capita for the average farmer in the project zone ranges from $40 to $70.

D. Project Outputs

There are seven major output components which can be expected to follow from coordinated AID/GON efforts within the project zone. These outputs are described below in some detail and, where appropriate, their modification as a result of phaseI experience is briefly discussed.

1. A System of Technical Service Delivery Established and Functioning in the Project Zone

Phase I of this project supported an approach to rural development

in which the various technical services of the GON advocated programs that reflected their particular skills and experience but which were not necessarily based on a comprehensive analysis of the demand of the social and physical environment in which they were operating. These circumstances led to an overall program that was sectorially compartmentalized, reflected a top-down type of approach, and has a limited impact upon the development of village institutions. The tactics used in phase I rested on two principal elements: (1) the reliance upon widely dispersed and relatively ineffective paid auxiliary extension workers and, (2) the massive use of demonstration plots carried out by these same extension workers.

In phase II the extension mechanism will be tied much more closely to the production of the farm units in the zone. Demonstrations will no longer be carried out by extension workers but by the farmers themselves on their own land. The farmer couple technical training centers (CPT) will no longer be considered as simply training centers for farmers but will function as technical support units to the village cooperatives. In order to effect this change, the CPTs will have have, in addition to their on-site training activities, two other functions built into their structure. These functions are extension support and credit/logistical support. The training units at the CPTs will be expanded beyond offering training at the center to include short term training programs at the village cooperative level.

The extension system proposed for phase II will function at two different levels of intensity which, for convenience sake, are designated as intensive and extensive. The purpose of the intensive level is to provide a core of farmers thoroughly trained and equipped to serve as a model and reference point for the extension service, and to provide adequate control and feedback to test, evaluate and modify the overall extension program. The participating farmer group (the pilot farmers) in the intensive program will be composed almost exclusively of farmers who have successfully completed a training cycle of nine months at one of the farmer training centers and who are committed to applying the techniques prescribed in the training program on their own farms. The emphasis at this level is on commitment, quality of execution, follow-up, and documentation, rather than numbers. The ratio of pilot farmers to target farm population for the second phase will be one to eight. The attainment of this final total will be by annual increments, with numbers increasing significantly as more CPTs are put into operation.

The purpose of the extensive level program is similar to that of the intensive level one, with exception that its primary function rather than being one of demonstration will be one of increasing production

to the greatest possible extent. It is planned that approximately 5,160 farmers will be reached by this extensive level program and that 1,160 of these farmers will have participated in a one to two week village level training program. Given that some of the techniques being introduced do not require additional physical inputs (e.g. spacing), a particular level of available inputs should not necessarily result in a rigidly fixed number of farmers who adopt in some measure the improved practices. Thus it can be expected that a number of untargeted farmers in the project zone will also adopt some of the recommended practices.

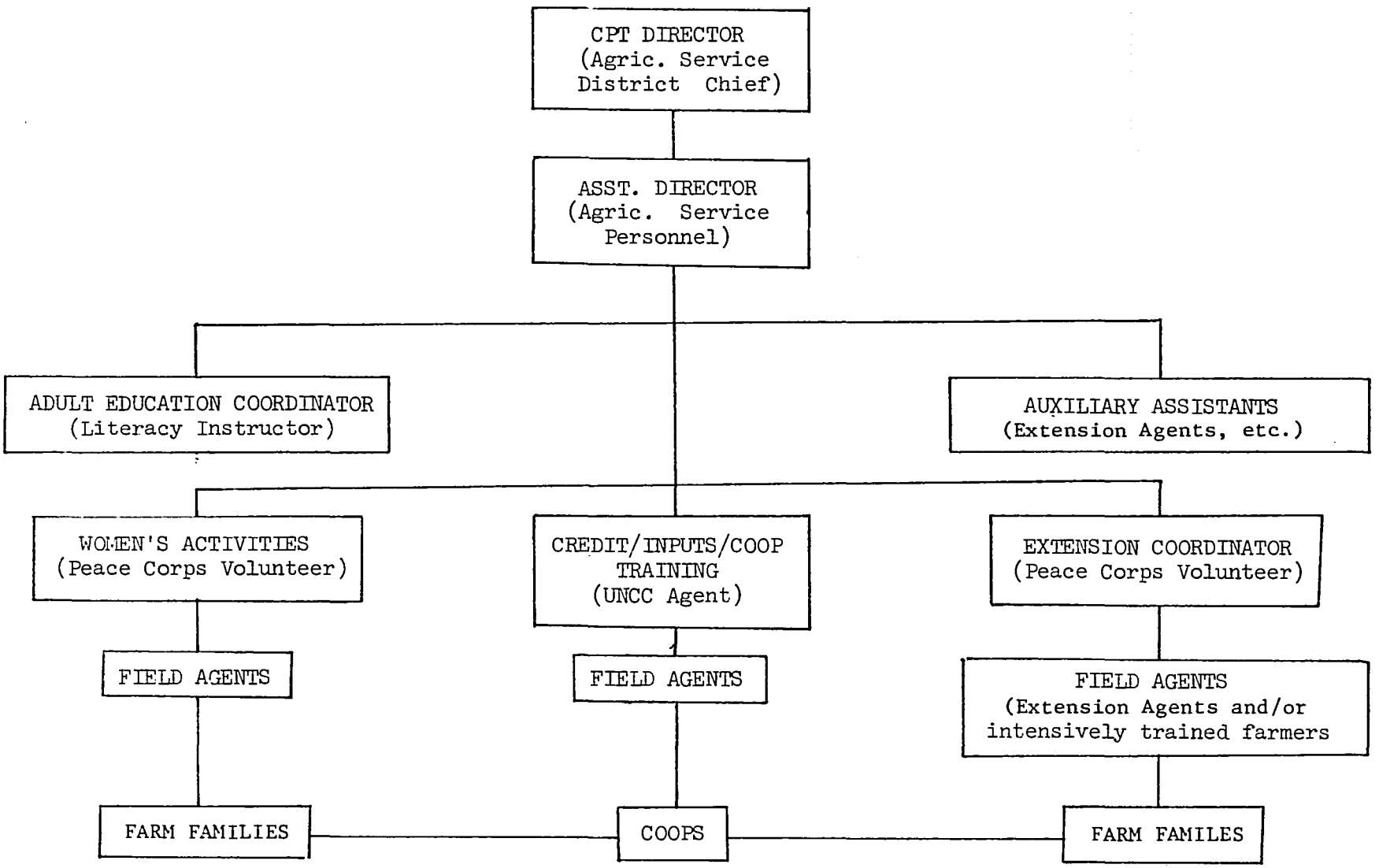
Seven new farmer couple training centers will be created in phase II for a total of 10 CPTs in the project zone or roughly one for every agricultural district. An agricultural district is analogous to and often exactly congruous with the canton which is the political and administrative district of an arrondissement. Patterned after similar training centers is the Maradi and Zinder Departments, each center has the capacity to train 20 couples during a full growing season (April-October). The farmer couples are given a complete program in the use of the improved technical practices, including animal traction and fertilizer, for millet, cowpeas and sorghum. They are then equipped on a credit basis with all the supplies necessary for the application of these techniques on their own farms. Training is also provided in literacy, reforestation, animal husbandry, garden crops and health practices. The infrastructure necessary for the centers is relatively modest, consisting of 40 hectares fenced with barbed wire, one permanent classroom/office building, thatched huts for each trainee family, animal enclosure and, in a few cases, staff housing. The personnel required for the operation of a single CPT are indicated on the following organizational chart.

The project will also support literacy training efforts to the degree that the villagers themselves manifest a desire for it. Some 65 village literacy centers will be created and supported by the project. Centers will be opened by cooperative request and upon demonstration of its willingness to provide a sheltered site and sufficient numbers of willing students. There will be no construction expense by the project involved in this component. Project support will consist of local language materials development, stipends for instructors and teacher training. (For further information see annex N.)

Input Requirement

In order to establish a functioning system of technical services delivery, the following inputs are required. The major components financed by the U. S. include the construction of seven CPTs throughout the Niamey Department; 36 person-months of long-term technical assistance services; eight person-months of short-term consultant services; commodities and equipment for the CPTs and agricultural services (including livestock, seeds, animal traction equipment, fencing, office supplies and equipment, vehicles and 10 millet grinding mills); counterpart, third country

CPT ORGANIZATIONAL CHART



and in-country training; and some of the general operating costs of the CPT's including 2-wheel vehicle transportation for extension personnel. The GON will finance the bulk of the operating costs at the CPT's including salaries for all local supporting personnel and trainee allowances, as well as $367,000 for local cost commodities, supplies and services.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	801.1	794.0	393.3	109.1	65.1	2,169.6
GON	216.3	465.6	579.4	557.5	561.1	2,397.9
TOTAL	1,024.4	1,259.6	972.7	666.6	626.2	4,549.5

2. A System of Self-managed Village Organizations Established and Functioning

During Phase I of the project, some 41 cooperatives encompassing two hundred villages were organized. During the second phase approximately 100 additional villages in Say Arrondissement will be formed into 16 cooperatives.

The organization of cooperatives is carried out by the national cooperatives service agency (UNCC). It entails explaining the purpose and functioning of cooperatives to the farm population, helping them organize elections, and training the elected officers in cooperative philosophy and management procedures. Local cooperative officers designated for specific tasks such as marketing agent, bookkeeper, etc., are given specialized training to help them fulfill their duties.

Cooperatives originated in Niger in the early sixties when farmers in the areas that produced large quantities of cashcrops (primarily peanuts) were organized to assume the responsibilities of marketing profits previously gained by traders. Cooperatives were subsequently organized in the areas where irrigation schemes were being developed in order to furnish the structure necessary to their management. They have since been organized throughout the country and the government has a stated goal of organizing as many villages and tribal groups (in the case of nomads) as possible in order to have the organizational structure necessary for addressing itself to the development problems facing Niger.

The village-level units are called Groupement Mutualiste Villeageois (GMV) which in turn belong to a cooperative. The cooperatives are then sometimes grouped into several Unions of Local Cooperatives (ULC).

The intent of the project is to encourage the local cooperatives to become more active in defining their development problems and acting to resolve them. The project is fully cognizant of the weaknesses in the present cooperative structure. Cooperatives within the project zone are in reality only nascent village organizations which have yet to achieve a full realization of the potential for cooperative action. One of the basic purposes of the project is to assist these organizations to become truly functional units by involving them more actively in the planning and execution of project activities. The cooperatives will therefore play a counterpart role to the CPT in implementing the project outputs in the villages.

Input Requirement

In order to establish a functioning system for self-managed village organizations, the following inputs are required. THE U.S. will finance the construction of 12 coop office/warehouse buildings for the distribution of agricultural inputs at the village level; 84 person-months of long-term technical assistance plus 8 person-months of short-term consulting services; and counterpart and third country training plus cooperative agent training. The GON will finance the salaries and support of cooperative agents and personnel from UNCC; vehicles, office equipment, furniture and supplies for the UNCC; and vehicle and building maintenance.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	39.4	642.9	110.6	82.6	38.6	914.1
GON	238.0	265.7	310.7	243.9	243.9	1,302.2
TOTAL	277.4	908.6	421.3	326.5	282.5	2,216.3

3. Systems of Credit Delivery Established and Functioning

During Phase I of the project, a credit fund account was opened at the Caisse Nationale de Credit Agricole (CNCA - National Agricultural Credit Bank). The purpose of the fund was to provide the means to

procure the inputs needed to make short and medium term in-kind agricultural input loans to the farmer-members of the cooperatives established by the project. It was intended that the account would be a revolving fund in that the farmers would repay (on a cash basis, with interest) their loans and that the proceeds recovered would be returned to the fund for the further procurement of agricultural inputs which could again be used to make loans. This plan was initially frustrated due to the lack of timely availability of agricultural inputs from abroad and the fact that the GON was required to reimburse the difference between the purchase price of the input and its sales price to the farmer. Given that the cost to the farmer is only 40-50% of the actual purchase price of the inputs, the fund would quickly be depleted. The credit delivery system was thus dependent upon the prompt deposit by the GON of subsidy funds into the credit account fund.

Because of the situation described above, the creation of the Phase I credit fund was delayed until February 1979, some 13 months after the project began. At that time AID deposited an initial amount of $168,000. An additional $70,000 was deposited in May 1979 for the on-farm livestock fattening program. Due to further administrative delays, no withdrawals were made from the credit fund until Spring 1980. This late start means that none of the repaymets on the agricultural input loans are yet due. Consequently, it is still too early to fully judge the Phase I credit fund experience.

Although this description of the Phase I credit experience may appear to be insufficient to justify the expansion of such a fund under Phase II, Mission and GON officials are convinced that once the modifications in the management of the fund have been fully implemented, the fund will serve its purpose as originally planned. The experience of the more advanced, other donor financed, productivity projects in Niger supports this conclusion. Certainly, in terms of promoting the adoption of technical packages which will raise crop yield there are few alternatives to establishing a farmer credit and input supply system. Consequently, Phase II is obliged to provide for the expansion of this fund and for measures which will insure its future efficient and effective operation.

The successful operation of the Phase II credit fund will require that the various GON organizations work closely to ensure that the project's credit/input delivery targets are achieved as scheduled. These institutions are described in the next section below and in the institutional analysis. The focus of the collaborative effort will be on adherence to planning schedules which allow sufficient lead time to acquire the needed financial resources and to distribute the requested inputs to the farmer in a timely, reliable fashion.

Only members of cooperatives that are organized under the auspices of this project are eligible to receive loans from the credit

fund. The current annual interest rate is 10%. Repayment plans vary according to the purpose of the individual loan but are normally arranged on a monthly or quarterly installment basis after a certain grace period or at a stipulated time such as at the harvest season. In all cases it is stipulated that the entire cooperative has the collective responsibility for repaying loans obtained by its members. If at any time this repayment delinquency rate reaches 10% on the total number of loans made to any given cooperative, the national cooperative service can block any further loans to the delinquent cooperative until the rate falls below 10%. This rule is largely responsible for the 88% overall repayment rate on small farmer loans recorded in Niger for the past three years.

The amount deposited by AID in the project's credit fund during Phase I, and which has not yet been totally disbursed, will be increased during Phase II to permit the project to provide the agricultural inputs required by the targeted number of farmers. The value of the AID contribution will be increased from $238,000 to approximately $3,123,300. This AID contribution will not be in the form of a direct cash deposit but will be represented by the value of U.S.-financed fertilizer and other agricultural imports plus the cost of locally procured animal traction equipment. The GON contribution to the credit fund will consist of a direct deposit required to cover the subsidized portion of the inputs delivered to the farmers. It will be equal to the difference between the cost of the inputs delivered to the farmer and the amount that the farmer is required to repay. The exact amount of the subsidy on any given input item depends upon the GON policy in effect at the time the loan is made. Thus the lower the subsidy, the less the Government of Niger will be required to pay.

The AID contribution to the credit fund will be as follows:

	FY 81	FY 82	FY 83	FY 84	FY 85*	TOTAL
Fertilizer	80.0	240.0	440.0	860.0	-	1,620.0
AN Trac. Equip	127.1	179.4	192.8	264.0		763.3
Other Inputs	118.1	244.1	166.1	136.1	75.6	740.0
TOTAL	325.2	663.5	798.9	1,260.1	75.6	3,123.3

During Phase II it is estimated that the funding amounts required for subsidies from the GON will be as follows:

FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
110.0	402.0	656.0	1,249.5	-	2,417.5

The covenant section of the Project Paper includes a clause requiring the annual deposit of subsidies. Additional clauses will require that the GON keep all receipts from project zone farmers' cash purchases, down payments, repayments and interest payments, and maintain the accountability of project funds on deposit in the credit account. There will also be a covenant requiring the GON to pay any shortfall in funds due to non-payment by farmers and/or to input price changes resulting directly from GON policy decisions. (See annex O for more detailed description of the project's credit operations.)

Input Requirements

In order to establish a functioning system of credit delivery the following inputs are required. The U.S. will finance 84 person-months of long-term technical assistance and 8 person-months of short-term consultant services; counterpart, third country and in-service cooperative agent training; and the bulk of the agricultural inputs to be distributed under replenishing revolving fund systems. $1.62 million will be for fertilizer imports. The GON will purchase some $575,000 of locally procured agriculture inputs such as oxen, donkeys and livestock feed for the fattening program; vehicles and office supplies ($110,000); and costs of local personnel ($176,000). The U.S. will also purchase $350,000 of EPA-approved pesticides to be used in the project zone.

	FY 81	Fy 82	FY 83	FY 84	FY 85	TOTAL
AID	309.8	666.5	805.2	1,277.6	165.6	3,224.7
GON	186.1	138.8	221.8	274.0	49.0	869.7
TOTAL	495.9	805.3	1,027.0	1,551.6	214.6	4,094.4

4. System of Agricultural Input Delivery Established and Functioning

Closely related to the previous output is that of the establishment of a system which will assure the timely delivery of agricultural inputs to farmers in the project zone. The GON Development Plan places great stress upon the need for all inputs--improved seed, fungicides and pesticides, fertilizer and animal traction equipment--to be made available in a regular and reliable manner, with financing resolved well in advance. The Union Nigerien de Credit et Cooperation (UNCC), the organization charged with cooperative development, was given sole responsibility in 1978 for supplying all imported inputs. These functions are carried out through the UNCC's Central d'Approvisionnement (CA) which is the national input supply and distribution center for Niger. To date, however, the CA lacks administrative structure, storage capacity and transportation of its own, and has to rely on existing UNCC resources. Moreover, the subsidization policy has placed in the past a constraint upon Niger's ability to acquire and distribute inputs on a consistent, timely basis.

A major effort will be made by the project to overcome past difficulties and to substantially improve the system of delivering agricultural inputs. The success of this effort will require a particularly close working relationship between the UNCC, CNCA and project management. The focus of this collaborative effort will be on the adherence to planning schedules which allow sufficient lead time to acquire needed financial resources and to distribute on a reliable basis the inputs required to satisfy farmer demand. A key factor here will be the timely deposit by the GON of subsidy funds as required by grant agreement covenants. (See annex O for more complete information on this subject.)

Besides providing a significant quantity of agricultural inputs, financed under the credit component output, AID will furnish a credit/commodity specialist at the department level under this project. In addition, AID will be supporting a large program of input supply assistance on the national level under the Agricultural Production Support Project, 683-0234.

Input Requirement

In order to establish a functioning system of agricultural input delivery, the following inputs will be required. The U. S. will finance 48 person-months of a credit and commodities specialist services; 10 person-months of short-term consultant services; 6 8-ton trucks, 4 other vehicles, vehicle and truck maintenance. The GON will pay local personnel costs of $250,000 of which $150,000 is for truck driver salaries.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	295.0	877.0	529.0	139.0	100.0	1,940.0
GON	50.1	50.1	50.1	50.1	50.1	250.5
TOTAL	345.1	927.1	579.1	189.1	150.1	2,190.5

5. System to Increase Women's Access to Development Activities Established and Functioning

The integration of women into development activities in the Sahel is often a slow and frustrating process. Nevertheless, the brief experience of Phase I has demonstrated that a number of potential interventions are possible if handled with tact and patience.

It has been noted that resistance to the participation of women at the village level is often less than that encountered among those responsible for making resources available on the national or departmental level. In general, men in the project area do not appear to be opposed to women's participation in village affairs and, in fact, they may even welcome a limited women's role in the cooperative. In any event, their agreement is a prerequisite for any project intervention involving women and their cooperation is an absolute necessity for implementation.

This Phase II of the project will address the role of women in the agricultural system--as food producers, processors, and consumers. A two-pronged approach to meeting women's needs is proposed: (1) the intensive training of some 740 women at the CPT's in agriculture, literacy, livestock, and nutrition/health education and, (2) the organization and training of village women through the use of labor-saving devices, such as grinding mills, and income-generating activities, such as poultry, livestock raising and gardening.

At the CPT's, women will receive training in livestock, literacy, nutrition/health, in addition to receiving much of the same training as men in agricultural techniques, especially the use of fertilizers and improved seeds. The project will also help to initiate a system for the delivery of extension services to women in the villages. This will require that the project make a special effort to ensure that women have access to the project's credit fund through their local cooperative. In this regard it is planned that a specific amount of project credit resources (approx. $50,000) will be earmarked for use by women.

Input Requirement

In order to establish a functioning system to increase women's access to development resources, the following inputs will be required. The U.S. will finance 48 person-months of long-term technical assistance; 30 additional millet mills (10 of these mills will be placed at the CPT's and are being financed under output No. 1); and short term training courses for women's representatives. The GON will finance local personnel costs for women's activities including village animatrices.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	95.7	240.7	95.0	95.0	5.0	531.4
GON	33.6	33.6	43.6	43.6	43.6	198.0
TOTAL	129.3	274.3	138.6	138.6	48.6	729.4

6. System to Test and Evaluate Proposed Technology Established and Functioning

Rural development projects are generally characterized by a large degree of complexity in operations, uncertainties regarding the social variables, and intricate economic and political forces at work among the individuals and groups concerned. Phase I of this project was no exception and a program of evaluation and research was planned as an integral part of the on-going activities so that required strategy modifications could be identified and incorporated into the framework of the project. The lessons learned from this Phase I process have been included in the overall design of Phase II. In particular, it has been realized that project management must have a reliable and continuous source of data concerning the nature and consequences of project operations. The Monitoring and Evaluation Unit, created during Phase I, will be continued and expanded significantly. The Unit will be responsible for determining, in collaboration with project management, USAID and the GON, the data requirements for project decision making, identifying pre-existing data sources, undertaking original research where necessary, designing studies to be carried out by other research organizations or individuals, and establishing an orderly means of retrieving data relevant to project activities. This unit will be responsible for preparing routine and periodic reports as required by project management, the GON and USAID.

Also an adaptive research office will be established within the Montoring and Evaluation Unit to carry out on-going evaluation and testing of promising agricultural practices which could be recommended by the project. This office will also be responsible for implementing a systematic program of pesticide research. The CPTs will serve as the major work sites for these adaptive research activities.

Input Requirement

In order to establish a system to test and evaluate proposed technology, the following inputs will be required. The U.S. will finance 48 person-months of long-term technical assistance and 10 person-months of short-term consultancies; some $12,000 in experimental pesticides for testing under controlled conditions at the CPT's; equipment and supplies to evaluate different agricultural practices; and $100,000 for aerial or satellite photography for soils, vegetation and land use mapping. This component will draw upon personnel and resources from other parts of the project in oder to carry out research on CPT's and in farmer's fields. Personnel will work closely with other research projects which impact upon the Niamey Department such as the cereals, forestry, and Tapis Vert research projects.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	72.5	403.0	173.0	158.0	85.0	891.5
GON	24.0	24.0	24.0	10.0	10.0	92.0
TOTAL	96.5	427.0	197.0	168.0	95.0	983.5

7. Coordination and Management System for the Project Zone Functioning Effectively

As with Phase I, the Project Management Unit is considered an output since continuing development in the project zone will require a permanent organization at the departmental level to manage inputs, to carry out necessary research and to coordinate the activities of all of the various technical services involved. In contrast to the other regional productivity projects, the Niamey Department Development Project is tightly integrated into the existing ministerial structure. No "parallel" organization is being created which would duplicate, at least in theory, operations and programs offered by the regular GON technical services. Thus, not only will the project considerably enhance GON's

ability to plan, manage and implement an integrated rural development effort, but it is expected to lead to an orderly assumption of responsibility for the recurrent cost burden of this project on a long-term sustainable basis.

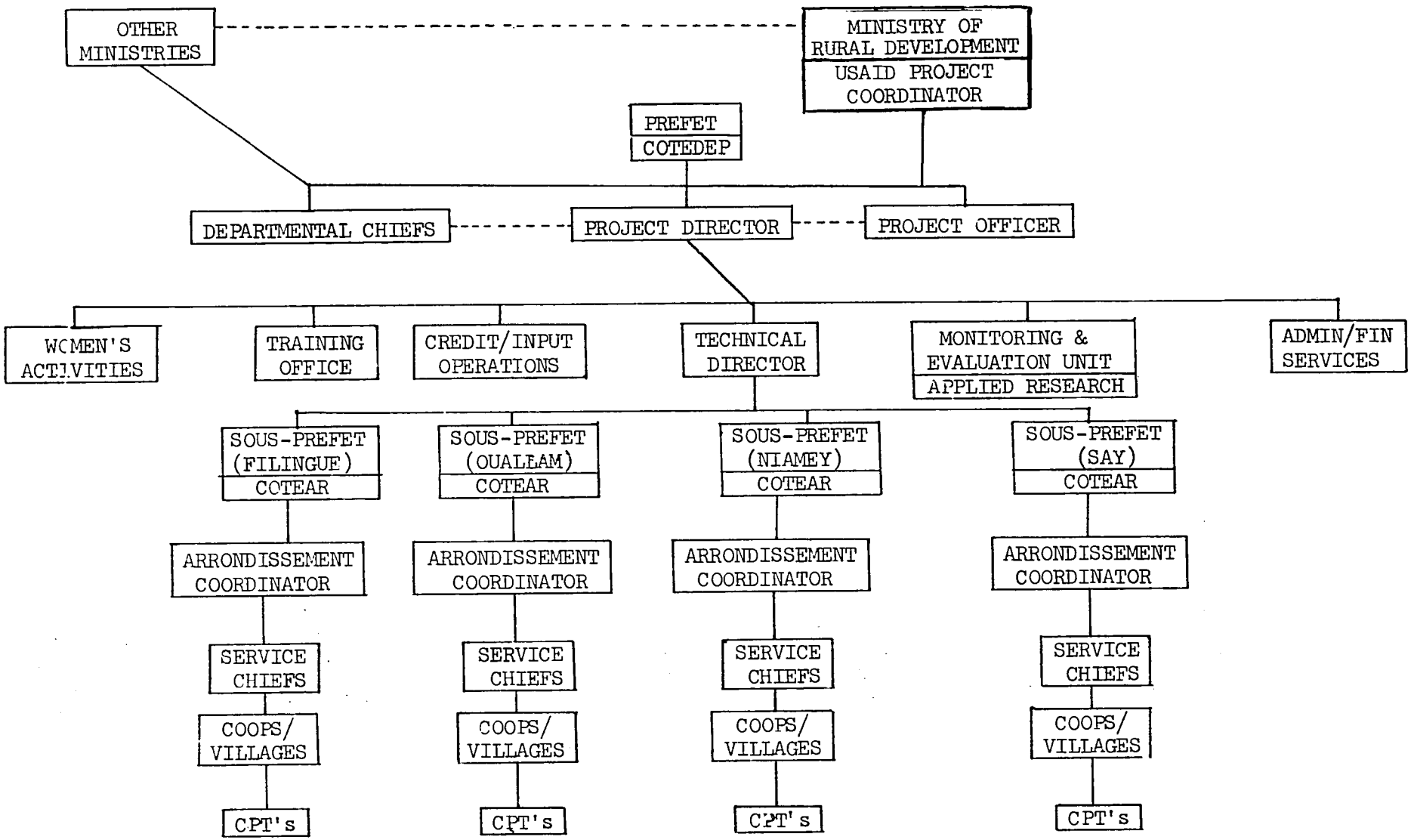
Phase I experience has also lead to a restructuring of project authority in which (1) the Project Director will now exercise direct control over the technical services' personnel at the arrondissement level when they are engaged in project responsibilities and (2) four arrondissement coordinators will be responsible to the Project Director for all project activities within their geographical areas. These two modifications in the project structure should provide project management with a more effective control and coordination over activities in the field. In all cases, the implementation of project activities will have priority over all other tasks assigned to arrondissement level GON service personnel. (See management unit organizational chart on following page.

Input Requirement

In order to establish a functioning coordination and management system for the project zone, the following inputs will be required. The U.S. will finance 48 person-months of long-term technical assistance and 12 person-months of short term consultancies; the construction in Niamey of a headquarters office and support unit (garage and warehouse); 16 vehicles with spare parts, tools and equipment; counterpart, third country and in-country training; and support for vehicle and garage operations, rents and utilities. The GON will finance the project management personnel at the departmental level.

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
AID	324.0	811.0	430.0	218.0	100.0	1,883.0
GON	106.1	134.6	126.6	127.6	127.6	622.5
TOTAL	430.1	945.6	556.6	345.6	227.6	2,505.5

PROJECT ADMINISTRATIVE STRUCTURE



III. Project Analyses

A. Technical Analysis

1. Description of the Project Zone

During Phase I, the project zone covered a triangular area north of Niamey bounded on the southwest by the Niger River and on the east by the ancient riverbed impression known as the Dallol Bosso. This zone lies within three of the six arrondissements in the Niamey Department, namely Ouallam, Filingue and Niamey. Given the project emphasis on rainfed agriculture, the pastoral zones in the extreme north (all the area more or less north of 14' 30") and the irrigation perimeters along the Niger River were excluded from project coverage. During Phase II, the western portion of a fourth arrondissement, Say, in the administrative department of Niamey will be added to the project zone. This new area lies just south of Niamey and extends to the Upper Volta border. The addition of Say Arrondissement will increase the land area of the project zone from 35,000 square kilometers to approx. 45,000 square kilometers (about the size of Delaware and Maryland combined).

The climate varies from Sahelian in the north, where average annual rainfall is not more than 400 mm, concentrated in a 100 day period, to 850 mm/year over 130 days in the south. However, rainfall records reveals that the 400mm isohyte, which is normally considered the northern limit for cultivation has descended south by 50 kms. in the last 12 years. Consequently, project agricultural activities in the northern part of the zone in the districts of Ouallam and Filingue have been severely compromised. This area has not had an average rainfall which attained 400 mm/year since 1967. The average for the 1967-1979 period was approximately 350 mm while the average for the period 1943-1966 was approximately 400 mm. It is unknown whether this trend is cyclic over the long term and thus there is no basis upon which to predict a return to a higher rainfall pattern in this zone which is increasingly suffering from desertification.

Radiation, temperature and sunlight hours peak in April-May, with temperatures regularly attaining 40°C daily, and are at their lowest in August when dull overcast conditions are common. Potential evapo-transpiration is highest in the north, averaging 7 mm/day in May and falling to 4 mm/day in August. In December and January the Harmattan, an intensely drying wind from the Sahara, brings about a distinct drop in temperature, falling to a yearly low of 15° - 16°C. This cooler weather facilitates vegetable production where permanent water sources are available.

Topography and Soils

The area consists mostly of a monotonous plateau of sandy soils, 200-290 meters above sea level, broken by flat-topped escarpments rising 50 meters or more in parts of the northern area and by the dry, ancient river valley of the Dallol Bosso in the east which stretches north-south across Niger for over 400 kilometers. The zone is also broken by the approximately 5 km. wide bank of the Niger river valley which cuts through western Niger from northwest to sourheast.

The cultivable area of the zone is estimated at 27,000 km. (this includes the doubtful northern band of 50 km.) of which an estimated 3,650 km. is actually cultivated. Four main soil types can be distinguished: (1) plateau soils which account for the vast majority of the soils in the cultivable area and which are sandy, frequently shallow with numerous laterite outcroppings, (2) terrace soils which are found at the foot of the escarpments between the higher plateaus and the Dallol and thus are low-lying water collection areas. These soils are usually composed of sandy clays that agriculturally have usually been fully exploited for years, (3) sandy dallol soils which are deeper soils, mainly of ancient alluvial origin. They have a low exchange rate and the content of loan and clay rarely exceeds 10%. These soils are also heavily exploited and, consequently, soil fertility is very low. Crop yields achieved in the past in these more densely populated dallol areas can only be maintained with the introduction of improved cultivation techniques. Both terrace and sandy dallol soils have a higher potential for rainfed farming than indicated by rainfall levels because, being low-lying they receive surface runoff and sub-surface water infiltration; (4) hydromorphic dallol soils which are gray, often contain up to 10% organic matter and generally have high potential. However, in continuously cropped areas magnesium and other deficiencies have been observed as well as signs of increased sodium content.

Water and Vegetation

Excluding the Niger River, there are no permanent courses of water in the project area. On the plateau, ground water is generally found at depths of 50 meters or more. The requirement to dig through laterized sandstone strata to reach this water impedes settlement and cultivation of many areas of the zone. By contrast, water in the dallol areas can be reached at only a few meters and therefore is readily accessible by hand-dug wells for both domestic livestock and small-scale irrigation purposes. Scattered about the entire zone are numerous seasonal and some permanent ponds (mares). In the dallol, the shallow aquifier frequently comes to the surface, creating countless small ponds.

The vegetation varies from arid savannah with very sparse tree cover in the north, to heavily wooded savannah in the south. Throughout the zone there are important tree populations of Acacia albida, which are used for dry-season forage and are prized by the farmers for their seemingly beneficial effects on the soil, and Arbre de cochon (Balanites augustifolia) which has many uses.

Demography

The total population of the four arrondissements in which the project will be operating is 618,157 The population of the project

zone itself is about 442,504 divided as follows:

Ouallam	132,953
Filingue	194,990
Niamey	82,361
Say	27,200

The total surface area of the four arrondissements is about 67,700 km., yielding an average pouplation density of 9.1/km^2.. About 10% of this total population is located in the pastoral zone where the population density is about 4.1/km^2 and another 13% is located in the south (Say district) which also has a low population density of 5.1/km^2. About 25% of the total population lives along the river where the average population density is 20.2/km^2. The highest population density is found in the Dallol areas of the Filingue Arrondissement where it is around 40/km^2. 73% of the population of Filingue and 27% of the total population of the four arrondissements live in the Dallol area which covers about 4,000 km^2 of the project.zone. The capital city of Niamey, outside the project zone, reports a permanent population of 225,314 and a density of about 665/km^2.

Excluding Niamey and the river zone there are only four large population centers in the project zone which exceed 3,000 inhabitants. These are: Ouallam 4,100; Bankoukou 5,000; Filingue 6,900; and Itchinguine 3,100. The average village size of the four arrondissements is nearly 600 although approximately 70% of the villages are smaller than this. Growth rates in the larger towns are estimated at 4 to 6% per year as compared to an overall population increase of 2.7% per year.

The People

The major ethnic groups in the project zone are the Djerma, Housa, Fulani, Tuareg and Gourmantche, respectively representing 57%, 30%, 7%, 5%, and 1% of the population in the zone. The Djerma live primarily concentrated in the central and northern part of the Filingue Arrondissement. The semi-sedentarized Fulani are scattered throughout the zone but with important sedentarized groups in Western Say. The sedentarized and nomadic Tuareg are primarily located in the east-central and southern parts of the Filingue arrondissement. The Gourmentche reside in the sourthern-most part of the Say Arrondissement near the Upper Volta border. (See the Social Soundness Analysis for a complete description of the ethnic groups, their social structure, land tenure systems, production activities, etc.)

Roads and Communications

Outside of Niamey and excluding 100 kms. of National Road No.1 which transverses the Niamey arrondissement, there are no paved roads in the project zone. There are major all-season laterite roads which link Niamey with all the major administrative centers in the project zone. The most important of these roads are: Niamey-Ouallam-Tondikirvindi, 116 kms. north of Niamey; Niamey-Filingue, 190 kms. northeast of Niamey; Baleyara (95 kms. east of Niamey) to Bankbangou, 146 kms. north of Baleyara; Niamey-Say, 56 kms. south of Niamey; and Niamey-Upper Volta border, 118 kms. southwest of Niamey. As most of the villages are not along these major arteries, much of the project's work is carried out over roadless, rough sandy terrain which requires the use of four-wheel drive vehicles. The paving of the Niamey-Filingue road and the Niamey-Upper Volta international road is planned under Niger's Current Five Year Development Plan (1979-83).

Telephone and/or telegraph communications between Niamey and the major administrative centers are possible, but often difficult. Also bus and truck services offer frequent trips daily to each of these centers. At the village level, horses, camels and foot are the major means of transportation. All of the arrondissement centers have post offices with regular postal service. Filingue and Ouallam have unimproved air-strips.

Power, Water Supply, Health Services and Schools

Filingue is the only arrondissement center (excluding Niamey) which has a permanent diesel generator for electric power. The Say arrondissement has a limited generation capacity and a generator is currently planned for Ouallam. All the centers have a limited running water system. Wells and permanent ponds remain the primary water source for most people. A 1978 survey reported that there were 597 village wells in the project zone.
There are 25 health dispensaries in the zone with a total staff of 61 people. This means about one dispensary to 23,000 people and 9,400 people per medical agent. Over 40% of the population is more than 40 kms. from any health service. To offset the scarcity of trained staff, a village health worker training program has been set up and there were 194 unpaid paramedical workers in the zone in 1979. The AID-financed Rural Health Improvement Project is providing on a national basis the resources to improve and augment this paramedical program. The major national hospital and the many private and governmental clinics in Niamey also serve the population of the zone.

There were 171 primary schools (440 classrooms) with total enrollment of 17,854 in 1978. The average primary school enrollment rate for the zone is 16.3%. There are secondary schools at each of the arrondissement centers with a total enrollment of 970 students

(excluding Niamey) in 1978. Also in 1978 there was 92 classes receiving solar powered televised instruction. There is an active local language adult literacy program being carried out throughout the zone.

2. Extension Methodology

The extension approach in Phase II is based on the technology tested during the first phase. It will be continuously updated as a result of the research to be carried out by the expanded Monitoring and Evaluation Unit.

A guiding concern in the development of the extension methodology has been to avoid the sectorialization of activities experienced during the first phase. The concentration of responsibility for extension at the training center will better integrate all of the project components and make them more relevant to increasing the productivity of each individual farm unit.

Extension methods for this phase have shifted from the use of project supported demonstration plots, supervised by auxiliary field agents, to the use of intensive training and follow-up in the field by personnel from the farmer training centers, and the use of pilot farmer activities for demonstration purposes. All extension staff including the auxiliary agents trained in the first phase will be linked to the farmer couple training centers which will offer support to the farmer and cooperative in the three major areas of agricultural extension, training, and credit and supply organization. The expansion of the role of the farmer training centers to include extension support in the field will enhance and facilitate the implementation of project activities and increase the interface between the technical services and the farmer and cooperative.

The design of the extension activities has been done with Niger's limited number of trained agriculturalists in mind and the high recurrent costs involved in hiring lower level auxiliary agents. The extension design thus relies more on farmer participation, and the overall management design and scope of work has been defined in terms which should facilitate use of lower and middle level agricultural agents in the majority of positions.

Multiplier Methodology

In Phase I, the CPTs(farmer training centers) were established primarily as a training institution where farmers learned new crop production methods and the use of animal traction. Farmers' wives also received minimal instruction in health and nutrition and some agricultural techniques. Under Phase II these training activities will be continued and expanded with the establishment of seven new CPT's. In addition the CPT's will take on a broader role in agricultural extension within their respective agricultural districts.

It is obvious that the CPT's cannot have a significant impact on agriculture production in the project zone unless new farming techniques become commonly used by a much greater number of farmers than the CPT's graduates. Therefore, the project will attempt to utilize the CPT graduates as a conduit through which a broader extension program can operate. The first step is to be certain that the CPT graduates use the techniques on their own farms that they have been taught at the CPT. This will be accomplished by placing extension agents in villages in the zone that can visit graduate farmers on a regular basis. This will be especially critical in the first year after farmers have attended the CPT.

The graduates will also be expected to work with other farmers in their village to encourage them to use the new techniques. This should be facilitated by the results on graduates' own fields, which will act as pilot demonstration farms. These "second generation" farmers will be the key to any multiplier effects that may occur. Thus it will be necessary for extension agents as well as CPT graduates to aid these farmers until they have learned the new techniques. The number of agents needed will depend on the number of graduates, the number of "second generation" farmers and the frequency of visits required. Due to the distances and the difficulty of travel it is assumed one extension agent can cover up to about five villages. Frequency of visits should be initially set for a maximum of two week intervals.

The multiplier effects of technology diffusion can only be assumed at this stage. The degree of acceptance by farmers will be largely a function of relative yield increases and cost. These in turn will be influenced by the ability of the extension service to demonstrate the merits of the new technology.

For general planning purposes a conservative one to two ratio of new adopters to trained farmers has been assummed. With 740 farmers trained at the CPT level and 1,160 trained at the village level this ratio yields a new adopter figure of 3,800. Thus altogether it can be expected that phase II activities will result in 5,700 farmers using improved agricultural practices in the year 1985. Add to this the farmers who adopted the practices during phase I and the total number of users will be well over 6,000.

It is important to note here that project management will make an effort to ensure that farmers from all ethnic and sub-ethnic groups, geographical areas and economic levels are equitably selected for training at the CPT's. Attention will especially be given during the selection process of a fair number of farmers who have less than the average size farm.

The use of animal traction is taught at the CPTs. However, animal traction equipment will only be provided to those farmers who possess the amount of cultivatible land required to make the use of animal traction economically viable. All other improved practices can be used independently of animal traction (e.g. spacing, fertilizer application, etc.) and therefore can be adopted by even the smallest land holders. (See annex Q for more information on recommended agricultural practices.

Past performance of extension service has been less than fully satisfactory. This has been due to the inadequacy of training of agents and low motivation. These problems are compounded by the fact that extension agents are poorly supervised in the field. To overcome these problems the project will center extension in the CPT's which will supervise and control agents in the CPT district. The project will utilize CPT graduates as pilot farmers in their respective villages as the base of the extension system. These will be regularly visited by extension agents who will be chosen either from the present aide-encadreurs or the better pilot farmers who will be responsible for 4-5 villages. These agents will be supervised by extension agents from the CPT and will report to them. In turn the CPT staff will report to the project through the coordinators at the arrondissement level.

Actual knowledge of the extension system required to insure the multiplier is unknown. Therefore, the above system will have to be closely monitored to determine the staffing needs. It may be that extension agents can be largely eliminated in a village where several farmers are using the new technology. Or even greater density of extension agents may be necessary, especially in the early stages.

Finally, the rate of technology diffusion will be directly dependent upon the availability of inputs, such as fertilizer, and the price of farm products. The farmer is dependent on government distribution systems and GON subsidy policy. The latter is a national policy question. The price and subsidy questions are beyond the project control. The distribution system is being addressed either by the project or by related projects and institutions.

Extension of Improved Agricultural Practices

The extension of improved agricultural technical practices for millet and cowpeas production remains the primary function of the agricultural extension service. This technical "package" is the result of roughly fifteen years of research and has been extended successfully by other projects throughout Niger. It is considered by the GON to be the best possible technology available at this time and their strategy for increased food production is based upon the practices advocated therein. The physical components of the package have remained essentially unchanged from the one extended during the first phase with the exception of the recommended millet variety P3 Kolo which has been replaced by the higher yielding CIVT. More research, however, remains to be done.

Experience with and analysis of the recommended technical practices during the first phase shows that they are easily assimilated by the farmer. Farmers chosen to do demonstrations plots were able to master the necessary techniques with limited training. Return on investment and labor is usually sufficient to motivate their adoption. Different components of the package offer different rates of return. The ensemble of the recommended practices interact to give optimum yields. The recommended practices can be modified and/or broken down into subcomponents for extension according to rainfall, input availability and the financial means at the farmers disposal. Farmer receptivity of the improved practices, as indicated by a strong and ever increasing demand for the inputs necessary to their application, is high. Some of the practices such as correct spacing, seed treatment, etc., require little in the way of physical inputs and can be adopted readily. Training and demonstration efforts will stress this point and hopefully some of the practices will be extended beyond the target group.

The increased productivity anticipated from the application of the improved practices should also increase the by-products available for animal feed thus permitting more intensive animal husbandry practices such as beef fattening. Over the long run this will contribute to increased soil fertility and water-holding capacity through the greater use of manure.

It is fully intended that technical practices will and should change over time. Concommitant to the extension of the current technical package is the educational experience acquired by the farmer and the extension worker in adapting and evaluating new technology to their specific circumstances, and the institutionalization of this process which will permit its continuation after the life of the project. It is also intended that the project, in collaboration with the National Agronomic Research Institute, will carry out trials to refine the recommended technical practices and better adapt them to the different areas within the zone.

3. The Technical Package of Agricultural Inputs

As stated above, the priority and design of this project is based primarily on reaching the target pouplation with the improved agricultural input package which can be broken down into three basic groups:

i. Supplies necessary for applying the basic agricultural package (50 kg urea and 34 kg triple super/ha, treated seed, weeding with animal traction) on the target farms.

ii. Fertilizer for optional fertilization practices of a soil building dose of super triple and increased use of urea where rainfall permits.

iii. Provision of animal drawn carts. The exact quantities and type of equipment to be furnished will depend upon farmers demand and the size and type of farm units to be served.

The equipment and supplies necessary for the application of the recommended practices could be satisfied with a donkey, hoe, spacing implements, the minimum maintenance quantities of fertilizer, fungicide and improved seed. Some inputs are designed to go beyond this and comments explaining this additional potential are as follows:

Animal Traction

No donkeys are included in the projected credit package. Experience in the first phase has indicated that almost all farmers either own or have access to a donkey. Thus we would prefer not to tie up credit funds for the purchase of donkeys. In the event that we find this is not to be the case, credit for donkeys is not excluded. If this proves to be so on a wide basis adjustments will be made in the overall projections. The basic agricultural package designed for the first phase was designed around the use of donkey traction. This was based on a lower cost to the farmer than beef traction and the fact that most of the soils in the project zone are light enough to permit cultivation with a single animal. The proposed input supply is based upon 1/3 use of oxen and 2/3 use of donkeys. Experience in the first phase has revealed a strong preference for oxen by many of the farmers and agricultural agents. This is based on the value that oxen have when they are too old to work (a donkey has almost none), the increased manure production, and the fact that the oxen cultivation equipment, having several blades, can cover two to three times the amount of land that a donkey hoe can in the same amount of time. The principal disadvantages to oxen traction are the large amounts of credit necessary to equip the farmers with a team and the greater maintenance costs. Single oxen traction could perhaps be an alternative solution to the two above but not enough experience has been gained with it. The feasibility of the single oxen approach will be tested during this second phase of the project.

Carts

The carts are not essential to the basic technical package, however, there is a strong farmer demand for them for rental use to gain extra income, and as a labor serving device on the farm. They particularly facilitate hauling of manure to outlying fields, transport of fertilizer from distribution points, and transport of the harvested crops from the field to the village and from the village to market. Experience gained with the young farmers trained at the CPT and other training institutions has shown that the revenue gained by hauling (usual water or firewood) represents an important extra source of farmer income.

4. Animal Husbandry

More intensive husbandry and more integration of livestock production into sedentary farm units will be the principal objectives of program activities in the second phase.

Extension activities will be oriented toward increasing feed production and storage and penning of animals to collect manure. The animal traction and animal fattening programs will be focal points around which both of these activities will be developed.

a. Animal Fattening. As in Phase I, credit will continue to be made available through the cooperatives for the animal fattening program and the technical support given for buying, health control, and marketing by the veterinary service via the CPT's and coops will be essentially the same as that offered in the first phase. At the rate of two fattening programs per year, it is planned to buy, fatten and sell 2,000 animals over the five year life span of the project.

b. Poultry. The major activities for improvement of chicken production will be the following:

- Training in improved feeding and health practices.
- Work on development of feeding rations from products available in the village.
- Improvement of the local breeds through the diffusion of imported roosters.

The rooster program was found to be during Phase I a more effective way of increasing the quality of local breeds than trying to set up chicken projects for raising pure blooded imported breeds. In order to develop this program on a more self-sustaining basis, farmers will be required to sell or exchange the equivalent value in local roosters to meet the costs of obtaining the imported breeds. Poultry husbandry will be included in the CPT curriculum.

c. Guinea Fowl. Guinea fowl offer a potential for increased farm revenues which is often overshadowed by chicken programs. The guinea fowl particularly is a highly resistant species that on a seasonal basis produces large numbers of eggs. The project will explore the possibilities of improving guinea fowl production.

Relatively less technology has been developed for the improvement of guinea fowl husbandry. However, hardiness, its regular though seasonal egg production, the fact that it produces more meat than local chickens, and its popularity in the local diet make it an attractive prospect for increasing farmer revenues, particularly for women. Technology proposed for improvement includes increasing flocks by incubation and improving feeding practices.

5. Soil and Water Conservation and Forestry

The primary purpose of this activity will be to integrate soil and water conservation practices into the farming methods currently used in the zone, to increase crop productivity and to encourage reforestation and production of wood and wood products. Stress will be placed upon uniting the efforts of the different technical services to produce a coherent conservation and forestry package.

a. Soil and Water Conservation. This program will be developed by the various technical services concerned through the CPT's and extended to the villages by CPT extension agents and pilot farmer leaders. It will be based on the elaboration of technical package of conservation methods to complement the basic technical package. The program will be incorporated into the curriculum of the CPTs.

In addition, the program will reinforce the importance of dry plowing and frequent cultivations and stress water conservation techniques. It should include such techniques as contour plowing, incorporation of organic matter to increase soil water holding capacity, and methods for reducing evaporative water loss and wind damage to seedlings. In combination with the animal husbandry program an effort will be made to find forage species that can be grown for feed and as a cover crop on lands that are unsuited for cropping.

b. Tree Planting. This program is intended to furnish the means and motivation to the farmers and their cooperatives to undertake tree planting for the multitude of benefits that can result from increased tree production. It can include such activities as:

- Wind breaks (including shrubs).
- Wood production.
- Shade trees
- Gao (*Acacia albida*).
- Fruit trees
- Trees and shrubs for feed and forage production.

The village wood lot program undertaken during the first phase proved to be relatively costly and has shown poor results. High mortality rates have raised the originally high cost per tree even further. The program was conducted with salaried labor and little or no village involvement and relative productive land was taken out of crop production for the unique use of the tree plantations. It is with these shortcomings in mind that conservation and forestry activities for the second phase must be considered.

The methodology for tree planting has changed radically from the state run plantations used in first phase. Ideally the project would provide farmers with small stipends as an incentive to actively participate in reforestation project and their cooperatives would be given authority over the collective woodlots established in this way, but without the additional funds requested under annex K the implementation of these activities will not be possible.

6. Cooperative Blacksmith Shops

This activity will provide maintenance and repair facilities for animal traction equipment, fabrication of agricultural tools and encourage the development of cottage industry in the project zone. The program was begun in the first phase with the receipt of the tools necessary for the equipping of 41 cooperative blacksmith shops and the commencement of blacksmith training.

During the second phase, fifty-eight shops will be completely installed. This will necessitate the ordering of equipment for 16 additional forges. Training of blacksmiths will be continued. Sixteen additional blacksmiths will receive the basic three month training program. In addition to the 41 trained during the first phase, all blacksmiths will receive periodic short term training (approximately 2 one-week sessions during the life of the project) to upgrade their skills.

The blacksmith shop will be run as a cooperative enterprise. The blacksmith will charge fees for their work and pay a fee to the cooperative for the use of the equipment.

The extension support unit of the CPTs in collaboration with the UNCC agricultural equipment section (DARMA) will provide follow-up to the blacksmiths through periodic visits. They will assist the blacksmith in obtaining supplies, and give technical guidance when needed. The project's credit and supply unit will assist the cooperatives in elaborating the agreements for the use and maintenance of the shops.

7. Grinding Mills

Experience gained in the first phase indicates that women are highly receptive to the use of grinding mills as a time and labor saving device, particularly during the cropping season. The importance

that the population attaches to this program has been witnessed by their willingness to collect funds and build the buildings to house the grinding mill installations.

The attempt will be made to extend the installation of grinding mills throughout the project zone by providing credit and an administrative framework for their purchase and operation. The Women's Coordinator will be responsible for assisting village women organize a program for the purchase, maintenance and operation of these mills. The cooperatives will be required to furnish a building for the mill, and all operating costs will be supported by the women of the village. A credit fund will provide for the purchase and financing of 20 mills over the life of the project. Moreover, there will be a grinding mill placed in operation at each CPT for demonstration purposes.

8. School Gardens

During the first phase, the project gave financial support to the school gardens program in the project zone. This support has enabled approximately 46 primary schools in the zone to make gardening a viable part of their school curriculum. The program has been entirely administered by the Ministry of Education. Execution and reporting have been well done and the program has required little technical or administration supervision from the project. It has enabled the participating schools to teach cooperative principles, basic gardening techniques and nutrition to their students and has provided funds for school supplies. In the second phase the project will continue providing this support to the elementary schools in the expanded project zone if supplementary funds requested under annex K are received.

B. Economic Analysis - Summary

The Economic analysis performed for the Niamey Department Development Phase II project design utilizes an internal economic rate of return analysis. This type of analysis compares the benefits "with" the project to the benefits "without" the project, the cost and benefit of capital investment.

Cost streams include all of the projected costs for the life of the project as budgeted in the financial plan. They also include all recurrent costs estimated throughout the life of the project. Thus the costs for the initial 5 year period are estimated at $18 million. Recurrent costs are estimated to rise from $3 million per year after the project financing period to over $8 million per annum in the later years.

Gross benefits are anticipated to rise from a negative $200,000 in year 1 to about $2 million by 1985 and continue to expand to a

maximum of $23 million per year in the last half of the analysis period. Thus the cash flow will be negative for the first 4 years of the project but will rapidly rise in years 6-10 and shortly thereafter reach maximum net benefits (cash flow) of approximately $14 million.

If costs and benefits are realized as projected, the project will yield an internal economic return of over 24%. Even anticipating cost overruns or benefit shortfalls the internal economic return will be positive. Sensitivity analysis indicates that costs could rise 40% holding benefits as projected, or benefits could fall 40% holding costs as projected and yield of 12% can still be attained. (See annex B for the complete economic analysis presentation.)

C. Social Soundness Analysis: Summary

The distribution of human populations within the Niamey Department Development, much like rainfall distribution, roughly follows a north-south gradient with population densities decreasing as one moves from the southern regions of the Department to its northern areas. Factors which influence population densities are rainfall distribution, soil quality, availability of groundwater, etc. The population of the project zone relies heavily on rain-fed agriculture for sustenance. Herding, crafts, wage-work outside the project zone and cultivation of low-lying lands are important as supplemental sources of income. Given the fact that rainfed agriculture in the project zone is difficult even in good years, and the area has suffered many food shortages over the last century, the project's goals--improving the productivity of rainfed agriculture--are indubitably appropriate for the region.

A look at cultivation practices in the project zone suggests that the components of the project's basic technical package can be incorporated into the farming system without seriously disrupting it. Farmers in many parts of the project zone already use manure and household refuse on intensively cultivated fields and gardens. It is likely that many more would use fertilizer if it were available to them. Farmers already grow a number of millet varieties and will probably try out and use the improved ones to the extent that these new varieties prove themselves. Some farmers already grow niebe (cowpeas) in pure stands. Since many fields are used for dry-season pasture, protecting the traditional, long-season niebe varieties from animals can be difficult. Shorter season varieties will ease this problem, and remove at least one source of dispute betwen owners of fields and owners of herds. Finally, the basic package of techniques can be used on farms of any size.

The case for animal traction equipment is somewhat more complex. A recent survey of animal traction projects in West Africa (Sargent et al) found several common characteristics. Where farm income was increased as a result of using animal traction equipment, the increase was due partly to an increase in yield that ranged from 20-25%, and partly to an increase in cultivated area that ranged from 20-30%. Thus, areas where animal traction was widely adopted were usually areas where farmers had access to additional uncultivated land. It appears that most farmers in the project zone do have this access.

Because the cost of equipment, of animals, and of feeding and caring for the animals is relatively high, Sargent et al, suggested the minimum farm size for using ox traction equipment would be roughly 6 hectares, and that a minimum farm size for using donkey-traction equipment would be roughly 4 hectares. A 1977 study of the NDD project zone had estimated average farm sizes near these threshold figures, but a preliminary estimate from data collected in a 1979 survey of the project zone showed that a substantial majority of farms fell below these threshold figures. It is possible that the 1979 study underestimates farm size; indeed, the Nigerien Agricultural Statistics Service intends to remeasure and verify the data before publishing definitive results. However, examining the data sheets from the two surveys suggests that the 1979 survey was more carefully supervised and better managed than the 1977 study. In order to suit the technical package to the resources available to participants in the intensive training course, NDD is measuring the farm size of participants, and will recommend that some participants buy only part of the equipment available (for example, donkey equipment rather than ox equipment). NDD is also collecting data on the uncultivated land available to its pilot farmers.

A third finding of the Sargent study was that support services were critical in determining the project's success. Late deliveries are especially harmful, since the farmer has to keep the traction animals over the year without having been able to use them fully in cultivation. Phase I was plagued by late deliveries of equipment and by the lack of repair shops for the equipment. Phase II includes measures to strengthen the UNCC's Centrale d'Approvissionement (in order to improve delivery of inputs). Blacksmith training programs for the repair of traction equipment and other tools began in the final months of Phase I and will be expanded in the second phase. As support services for farmers improve, and as the CPT's begin to tailor equipment purchases to individual farm needs, adapters will increasingly be able to profitably and correctly apply the CPT's recommendations to their own farms.

Phase II of NDD will rely on the CPT's for much of the intensive training program and on the village level cooperative groups (GM's) for much of the extensive, short term training of a larger number of farmers. The trainees for both of these groups will be selected by their respective village cooperatives. It is intended that once the management capacity of the cooperatives sufficiently developed that they will be given full responsibility for all decisions concerning the operation of the CPT's and village level training activities. A key factor requiring close attention in this endeavor will be the meshing of the new cooperative programs with the local social structure in a beneficial fashion.

Many of the problems encountered during Phase I by the village cooperative groups involved difficulties with the timely distribution of agricultural inputs. Improvements in the input delivery system planned under Phase II

are designed to overcome these difficulties. Also the GON cooperative statutes of 1978 and 1979 allow for greater local control over returns from marketing operations, and this increased autonomy may help coops to realize their potential as self-sustaining organs of rural development.

Under Phase I of NDD, the benefits that women experienced were indirect and there was little explicit effort to reach women during their time at the CPT's or through village-wide cooperatives. Phase II will strengthen CPT training for women, concentrating on gardening, poultry, health and nutrition. Trained GON staff, under CPT guidance, will work in selected villages to encourage women's participation in village decision-making, teach women the basic principles of credit, introduce labor-saving devices, and provide technical assistance in livestock raising. The success of these activities will be enhanced by the establishment within the project management unit of a women's activities coordinator position.

With respect to literacy training, Phase II on NDD proposes to continue intensive literacy training at the CPT's, with efforts to make pedagogy more active and more locally responsive, to improve the follow-up and evaluation of CPT literacy activities, and to increase the CPT's capacity to prepare and produce literacy materials.

The extensive literacy training of Phase I will be somewhat scaled down in Phase II, in order to provide greater efficacy. A limited number of experimental continuing education centers (CED's) for men, and a smaller number for women will be established. The program at the CEC's will focus on introduction to cooperative principles and organization and on local production of teaching materials that draw on students' experience.

In conclusion, Phase II of NDD incorporates many of the lessons learned in Phase I by relying on trained farmers rather than auxiliary extension agents, by adapting animal traction recommendations to farmers' individual needs, and by making a significant commitment to provide assistance to women. (See annex G for social soundness analysis presentation.)

D. Administrative Analysis

1. Coordination

As in Phase I, the Ministry of Rural Development is assigned the overall authority for organizing and managing this project on behalf of the Government of Niger. The MRD has delegated the responsibility for project implementation within the project zone to the Prefect of the Niamey Department who in turn has delegated the responsibility for project operations to the Project Director nominated by the MRD. The GON project director has full responsibility for all activities of the Niamey Department Development Project. The Director, assisted by his staff described below, will form the Project Management Unit which

will be the focus of project administration. The project management unit will have several components: A Credit/Commodity input unit, a Monitoring and Evaluation Unit, a Technical Operations Unit, a Women's Activities Unit and four arrondissement coordinators.

Although the PMU will have essentially the same functions as in Phase I, a number of modifications have been made which will permit a more effective control and coordination of activities in the field. Most importantly, the Director will have direct control over the technical services' personnel at the arrondissement level when they are engaged in project responsibilities. Secondly, four arrondissement coordinators will be responsible to the Director for all project activities within their geographical areas. Moreover, the implementation of project activities will now have priority over all the other tasks assigned to arrondissement level GON service personnel.

At the departamental level, coordination will be exercised by the Niamey Department Technical Committee, or COTEDEP. This permanent committee under the chairmanship of the Prefect provides a long-run coordinating function for all development activities in the department. The COTEDEP membership includes the arrondissement sub-prefects, representatives of traditional chiefs and all departmental level technical service chiefs from the various ministries, including Rural Development, Education, Plan, Health, etc. The departmental chiefs are the heads of such technical services as literacy, livestock, extension, rural engineering, health, etc. A major weakness of this system is that the Departmental Service heads are subject to directives from both their superiors in the ministries and in the Prefect's office. The Project Director is also a member of the COTEDEP and his role is to serve as a "coordinator" to assure that the various technical services are properly supporting the project.

At the arrondissement level, development activities are kept under review by an equivalent committee, called the COTEAR, chaired by the sub-prefect. The COTEAR is composed of all the arrondissement administrative and technical service chiefs, important village chiefs and cooperative association representatives. It meets regularly, usually once a month, to discuss important issues and to be informed of activities in the arrondissement. Under Phase I, the local coordinator for the project was chosen from among the arrondissement service chiefs. This person exercised his functions on a part-time basis and usually put the priorities of his regular ministerial position first. In Phase II, the coordinators at this level will be full-time project employees independent of the service employees whose project activities he will coordinate.

Unlike the COTEDEP, the COTEAR has some modest budget authority due to its access to arrondissement tax revenue allocations. The arrondissements are divided into cantons governed by a traditional chief who receives a government allowance; thus the canton is a point of contract between modern government and traditional authority.

The agriculture, forestry, livestock and rural engineering services are well, although not adequately represented in the department. Besides, these government rural development services, the National Agricultural Research Institute (INRAN) operates a research station, created in 1979 under the AID-financed Niger Cereals Project. They are carrying out a program of applied research in northern Filingue in the Chikal area under the Tapis Vert project which itself, began in 1977 with an AIP grant to the sponsoring donor, Catholic Relief Services. The project collaborates actively with these two research efforts. Also at Hamdallaye, 35 kms north of Niamey, a seed multiplication center was established under the Niger Cereals Project. This center will supply the project with most of its improved seeds.

2. The Cooperative and Extension Program

The cooperative program was first started in 1955. During the 1960's, cooperative efforts were limited essentially to the peanut growing areas in the eastern regions of Niger, and directed primarily at organizing the marketing of local cash crop production the experience with those early cooperative efforts has lead the government in designing rural development programs to place great reliance upon the organization and use of local farmer organizations and cooperatives as instruments for change. It is only since the commencement of the project in 1977 that the UNCC (National Cooperative Service) has made an effort to establish village cooperatives in the project zone. There were 41 cooperatives grouping 201 villages organized during Phase I. During Phase II, 16 cooperatives grouping 96 villages in Say arrondissement will be added to this group.

The government has decided upon an approach to extension which it calls "auto-encadrement". This term could be translated into English as "self-help or self-taught extension". Rather than relying exclusively on such devices as demonstrations undertaken by extension personnel, reliance is now placed upon the cooperative to conduct demonstrations and to introduce improved farming practices among its members. By providing training directly to the rural producers, the Farmer Couple Training Centers (CPT) will also contribute to this new approach to extension. Moreover, the CPT couples are chosen by their cooperative which are intended to eventually exercise management authority over the CPT's.

The more classical approach to extension in Niger which will remain in place outside the project zone for the time being can be described as follows: The Agricultural Service of the Ministry of Rural Development has a departmental agricultural service (extension service) headed up by a qualified agriculturalist serving as Department Chief. Under him there is an agriculture service in each arrondissement. The arrondissement service chiefs are also trained technicians (conducteurs

des travaux agricoles or conseillers agricoles.) They, in turn, supervise agricultural field agents, called agents techniques or moniteurs, located in each one of the several farming districts which make up an arrondissement. These farming districts are usually congruent with the administrative cantons. Given the lack of field agents in general, the GON has resorted to the use of "aide-encadreurs" or assistant field agents. These are young men recruited locally, provided with a limited amount of training and assigned to work under the direction of the field agents on a ratio of about one aide-encadreur per cooperative. It is this undertrained aide-encadreur who is expected to work directly with the farmer. Quite often the farmer knows considerably more about traditional and improved farming practices than does the aide-encadreur.

The above pattern of organization of the agricultural services is paralleled by the national cooperative organization, the Union Nigerienne de Crédit et de Cooperative (UNCC) which maintains Department and arrondissement "delegates" and below them "monitors" who are equivalent in training and experience to the aide-encadreur. The monitors are cooperative field agents who work on the organizing of cooperatives and on the marketing, credit and supply functions of the coops. The cooperatives established following the 1955 Cooperative Decree, were in the classic Western tradition in the sense that individuals joined by purchasing shares of stock. By 1965, there were perhaps 30 cooperatives and 100 village mutual groups in existence. In 1966, a "new system" of cooperatives was established with the objective of expanding the movement and better adapting the cooperative to traditional structures. The "new system" was based on villages rather than individuals joining, with a village collectively deciding at a meeting whether to form a cooperative mutual group. There was to be no further purchasing of shares.

The cooperative structure in Niger has remained essentially unchanged since 1966. In 1978 decrees giving the cooperatives legal status were promulgated. These decrees establish a foundation for the progressive self-management of the cooperatives by their members as well as the eventual elimination of the UNCC.

The Groupement Mutualiste (GM) is the basic cooperative unit at the village level. Each unit is made up of the heads of households in the village. Only one Groupement Mutualiste per village or tribe of less than 100 producers in permitted. In chooses 5 members as officers to represent the GM at the next highest level.

The Cooperative consists of 5-10 villages willing to collaborate and market their produce together. It chooses officers as well as demonstration farmers and candidates for the CPT. The cooperative offers its members' stocks as collateral for agriculture loans.

The Unions Locales de Cooperatives (ULC) are formed in those regions where the market is sufficiently large to allow a cooperative

union. They are composed of 5-10 cooperatives and have been prevalent in the peanut zone.

After the new system of cooperatives was introduced in 1966, rapid expansion of the cooperative movement occurred. In 1968 there were 1,888 GM's and 177 cooperatives. By 1974 there were 2,467 GM's and 235 cooperatives. In 1978, 6,754 GM's and 622 cooperatives had come into existance. These increases were largely the consequence of a government policy to extend the coverage of cooperatives to areas of cereals production as well as the peanut and cotton crop zones. The cooperative groups, however, are not all uniformly active. Marketing remains the principal activity of the cooperatives, and in some cases, the only activity. The goal of multi-functional cooperatives has not truly been attained as yet. Moreover, cooperative distribution by department continues to be uneven. Diffa and Agadez are less well organized while Maradi and Zinder continue to have the largest number of cooperatives, with Niamey Department falling somewhere in between but growing fast. In 1978 there were some 405 GM's and 78 cooperatives in the Niamey Department. There were no ULC's in the Department. Much of the differences between departments can also be explained by relative population densities.

The number of heads of households in the GM's was 985,000 in 1978 representing some 2,615,000 people. This population in the GM's represented 59 per cent of the people who are considered Niger's food producers. If nomad numbers are included with the farmer families, the cooperative system is reaching about 51% of the producer and nomad population in rural Niger.

Besides providing legal status to the cooperatives, the 1978 decree legally establishes the cooperative principles. These principles are: voluntary membership; each member has one vote; and each member's vote is equal; officers are democratically elected; no one but delegates can interfere in the operation of the cooperative; interest rates for members shall not exceed the current discount rate; any possible net surplus is to be distributed to members according to each member's activity or use of the cooperative; funds are to be established by the cooperative for education of its leaders and the general public; each cooperative will join with other cooperatives at higher levels; members are to be entrepreneurs and users of the cooperative; and members have the right to disolve the cooperative.

This new law encourages the self-management of cooperatives and prohibits interference from others like government officials. Each cooperative formulates its own rules, committees, special committees, elects its officers and elects its delegates to the next higher cooperative.

The decision-making body of the cooperative is the General Assembly. The law specifies which actions may not be delegated to the Administrative

Council of the cooperative. The law also specifies the responsibilities of the Administrative Council. Accounting procedures, conflicts of interest, voting majority, and the establishment of social capital funds are specified. All cooperatives established before these recent decrees must reorganize in two years or by January 1981.

The sponsoring authority of the cooperative system is the UNCC until the UNC (Union National Cooperative) is established. A goal of three years has been established for this conversion of the UNCC to the UNC.

3. Marketing Institutions

The OPVN (Office de Produits Vivriers du Niger) is the national government organization responsible for buying and selling food grains, and maintaining grain reserves at strategic locations. The OPVN maintains 32 warehouses scattered throughout the project zone. The project's rural market study shows that the OPVN makes 90% or more of its purchases in the three months following harvest. These purchases are made at a pre-established official price and are usually made for the OPVN through licensed merchants, UNCC agents, cooperative officials and traditional village chiefs. In the 1978-79 season the OPVN purchased 2,060 tons of millet in the three districts covered by Phase I at the official price of 40 CFA ($.19) per kilo. In the same period this price was always below the prevailing open market price which averaged 52 CFC ($.25) per kilo. However, the OPVN sold millet at 50 CFA ($.24) per kilo and this was substantially lower than the average 89 CFA ($.42) per kilo open market selling price which prevailed during the 1979 peak demand season (June-September). In October of 1980 the selling price for millet was raised to 60 CFA/kg, providing a margin of 20CFA/kg to the government. In any event, OPVN sales fall far short of satisfying demand, and in terms of total volume of grain sales in the project zone, OPVN accounts for only 10%-20% of the total grain sold or exchanged.

SONARA (Societé Nigerienne de Commercialization de l'Arachide) provides to a lesser extent in the project zone a collection service for the purchase of cowpeas and peanuts. With the assistance of UNCC agents, SONARA intervened at the cooperative level to purchase about 545 tons of cowpeas in the zone during the 1978-79 season. While this is a rather small amount there are indications that the Filingue district could become an important producer of cowpeas for export. SONARA exports almost all of its cowpeas purchases to Nigeria.

There are 80 traditional market places in the project zone which are active on a once per week basis. Sixteen of these are classified as large markets which serve an important role in inter-departmental and even international trade. This role of these large markets is particularly significant in the livestock marketing area. It is in

this area that the major market places of northern Ouallam and central and northern Filingue predominate. At these markets there is an important livestock export trade with neighboring countries. Livestock trading is also important for the inhabitants of the Niger River valley and the Say arrondissement who have access to year round forage. The livestock from these areas is primarily sold on the Niamey market. It is evident from the volume and value of livestock trading that it is a very important activity in the project zone.

4. Credit Institutions

In 1967, the credit functions were removed from the UNCC and established in a separate entity known as the Caisse Nationale de Credit Agricole (CNCA). Its purpose is to make short, medium and long term loans to public and private individuals or groups involved in rural sector activities. Although CNCA is a separate legal entity, the UNCC remains the vehicle for providing agricultural credit to farmers since it acts as the agent for CNCA which is not represented below the departmental level. In fact, in the Niamey Department, the CNCA is not represented at all at the arrondissement level and relies completely on UNCC personnel to carry out its functions.

The CNCA makes two types of loans, (1) short and medium-term production loans and, (2) marketing loans to SONARA, OPVN, UNCC and the cooperatives to enable these institutions to purchase agricultural products at harvest time. Marketing loans have historically constituted half to two-thirds of all CNCA lending. These loans involve low risk, have a rapid turnover and appear to be the backbone of CNCA's activities. Total loan volume was 4,500 million CFA ($22.5 million) in 1977 of which the production loans amounted to some 934 million CFA ($4,670,000).

These production loans allow farmers to acquire the inputs to improve their productivity. These loans, in turn, are divided between cooperative loans and individual borrowers and were either short term (6 months to one year) or long term (18 months to 5 years). Collective short term loans are generally utilized by GM's and cooperative to buy seed, fertilizer, insecticides and hand tools. Collective medium term loans are generally used to buy animal traction equipment and oxen. The most recent interest rates have been 9.5% and 10.0%.

The production loan system works in the following way. Production loans to farmers are made in the form of inputs; cash loans are not made. The UNCC organizes the cooperatives and GM's to apply for loans. Loan applications must be approved at the arrondissement and department levels before they can be submitted to CNCA If the loan is approved, CNCA issues a loan certificate, and UNCC then supplies the inputs called for in the certificate. There is no deposit required on

short term loans, but agricultural products are to be marketed through cooperative channels if CNCA production loans were utilized for their cultivation. At marketing time, UNCC collects cash to repay the loan to CNCA. The collective loan system has enabled CNCA to maintain recovery rates that are fairly high; it has also pursued a policy of not granting loans to cooperatives in arrears, except when default is the consequence of natural disaster.

Loan activity is seasonal, with peaks between June and September. Since CNCA will only lend to farmers for directly productive purposes and the cooperative system precludes loan diversion, all other credit needs must be obtained from the private sector. Two factors (other than the volume of CNCA's capital) limit the amount of credit that is extended to farmers; first, since all inputs are subsidized, the amount of funding for subsidies annually made available to CNCA, and second, the capacity of UNCC to handle the procurement, storage and timely delivery of the agricultural inputs.

The major problem in the past has been a lack of adequate loan resources. The GON has made an attempt to address this issue by increasing CNCA's capital, and it is also pursuing an active policy of decentralizing CNCA's activities. In the future, it will need to review its input subsidization policies to ensure that these policies do not restrict availability of credit and/or inputs to farmers.

E. Engineering Analysis

The facilities to be constructed will be located at remote sites, scattered throughout the Niamey Department. The major elements are as follows:

		Total Cost
1.	Seven CPT classroom, 90 m^2 each	$ 378,000
2.	Seven CPT houses, 75 m^2 each	322,000
3.	Twelve cooperative warehouse, 140 m^2 each	1,068,000
4.	One project management unit complex, 550 m^2	350,000
5.	One agricultural service complex (including 1 warehouse (160 m^2), 1 office (72 m^2) and 1 house (75 m^2)	190,000
	GRAND TOTAL	$2,308,000

Total Square meters: 3,692

Cost estimates were made assuming that the buildings would be constructed utilizing the standard building techniques employed throughout Niger and much of West Africa. Currently, local construction costs are running an average of about $600 per square meter, which is expensive relative to construction costs for similar structures in the U.S. This is to be expected however, due to the high costs of materials and transportation in landlocked Niger where there is a limited number of skilled technical personnel, and where currently there is a high demand for construction services, tending to steepen construction costs: All this was considered in making cost estimates and in establishing contingencies.

With regard to future selection of contractors for this project it should be kept in mind that during Phase I, the project engaged the services of three small indigenous firms to undertake much of the construction work. These Nigerien-owned firms satisfactorily completed some 56 buildings throughout the Niamey Department project zone. The Mission would like to continue to encourage the strengthening of local private entreprise that this effort represents. Under Phase II preference will again be given to reputable, competent and competitive Nigerien firms over the European owned construction firms for the required construction work. Construction supervision will continue to be provided by the Rural Engineering Service (Genie Rural) of the Ministry of Rural Development. (See Annex E for a more detailed analysis of the project's construction program.)

F. Environmental Analysis (Pesticides)

The Initial Environmental Examination (IEE) submitted by the Mission with the PID recommended a negative determination for everything except pesticde use. This negative determination was approved and AID/W assisted with the recruitment of a specialist to do an environmental assessment of the planned use of pesticides under the project. This specialist provided the Mission with the following IEE for pesticides and other important reports which are presented along with the original IEE in the special environmental annex to this paper.

Initial Environmental Examination (Pesticides)

As indicated on the attached Impact Identification and Evaluation Form this Project will have few impacts upon the natural environment except for those which are invariably associated with programs designed to increase food crop production. This increased food production can be expected to contribute to the nutritional status and longevity of the population which in turn will result in net increases in the total populations. Since the GON's strategy for food self-sufficiency is predicated on gains in productivity of presently cropped land there will be little or no land clearing associated with this project. Soil fertility, water-holding capacity and levels of soil organic matter are low over much of the project area, and decreasing soil productivity is a recognized problem. Fertilizer use is coupled with closer spacing of plants, and causes increased weed growth. Increased plant cover means that less rainfall percolates away uncaptured by the vegetation and that wind and water erosion are minimized; more organic matter will be returned to the soil, improving its composition and fertility. Thus fertilizer use can help halt the processes of soil degradation. The relatively low level of use of agricultural pesticides envisaged for this project will have relatively little effect on the chemical composition of the ground and surface water and its ecological balance, and upon chemicals in the atmosphere. Since the core of the program is the extension to the farmer of a package of improved agricultural practices for growing millet and cowpeas with the necessary inputs plus credit to purchase them, their adoption will slightly dilute cultural traditions for growing crops and change economic/employment patterns with resultant changes in population and associated cultural patterns.

Planned Pesticide Use

As indicated above, certain pesticides are required for immediate use in the project for the protection of cowpeas, sorghum, millet and peanuts. These include thiram, diazinon, and malathion.

1. USEPA regulatory status of the required pesticides thiram, diazinon and malathion are all registered by the USEPA for the same or similar uses without restriction.

2. Basis for selection of the required pesticides:

a. Thiram (Arasan 50-Red) is to be used as a protective fungicide for the treatment of seeds of millet, sorghum, cowpeas and peanuts. Although thioral (a mixture of thiram and heptachlor) was originally requested by the Nigerien Agricultural Service for use in this project, virtually all U.S. registered uses of heptachlor have either been cancelled or are being phased out by EPA. Furthermore, the effectiveness of thiram (the active ingredient of Arasan) has been compared with thioral (thiram-and-heptachlor) and other seed treatment chemicals by INRAN, the Nigerien National Agricultural Research Institute, and resulted in the following ranking of the four most effective seed treatments:

1. TMTD (Thiram)
2. Orgeatrix (carboxin/maneb/lindane)
3. Cuprosan SD (copper/maneb/zineb)
4. Thioral (thiram + heptachlor)

Accordingly, thiram (Arasan 50-Red) has been selected for use in this project.

b. Diazinon was selected for use, primarily on millet, because it is the least toxic insecticide that is effective against the entire spectrum of millet pests and because it is already being bought and used in the Nigerien national plant protection program. At a cost of approximately 1000 CFA/ha., it is one of the cheaper alternatives.

c. Malathion was selected for use on all NDD II crops because it is relatively nontoxic to humans. It is effective against a broad spectrum of pests, and it has already been used in the context of the Niger government's national plant protection program.

3. The extent to which the proposed pesticide uses are part of an integrated pest management program:

At present, not enough research has been done to institute an effective IPM program for any Nigerien crop. Economic criteria for pest control have not been established; the real value of natural enemies is not known; there has been no effort to seek ecologically selective pesticides; and there is no organized systematic pest population monitoring system for any crop. A major obstacle slowing progress with IPM in Niger is the lack of properly-trained crop protection specialists. NDD II will incorporate as much IPM practice as possible under present circumstances. In the research component which has been designed into the project, these pesticides as well as others will be evaluated and compared economically and minimum effective dosages determined. Traditional nonchemical pest control methods will be evaluated and incorporated into extension recommendations. In this context the other pesticides to be evaluated for possible future use in the project are exempt from the provisions of Rule 16, The Environmental Procedures (see Para 216.3(b)(2)(iii), AID Handbook 3, APP 4B). The procedures to be followed in conducting these evaluations are extensively discussed in other documents entitled "Detailed Study of Pesticides to be Routinely Used and/or Field Evaluated for Possible Use", "Suggested Guidelines for IPM - Oriented extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides." Pest resistant crop varieties will be used when they become available; at present, no significant degree of resistance to the major pests has been bred into cowpeas, millet and sorghum.

Cultural practices that discourage pest infestations will be recommended to farmers as part of the extension package. When economic injury level information and pest population monitoring methods are developed by INRAN, IITA, ICRISAT, or the planned FAO/CILSS Sahel IPM Project, NDD II will use these techniques to plan crop protection activities. Except for cowpeas, crops will presently be treated with insecticide only when pest infestations occur.

4. The proposed method or methods of application, including availability of appropriate application and safety equipment.

Applications will be made by project personnel or by farmers who have received NDD II credit buy pesticides. Both of these groups will have had instruction in the safe use of pesticides. The materials will be applied at the rates and intervals prescribed on the manufacturer's labels.

Field pesticides will be applied with hand-pump or "Fontan" knapsack sprayers or manual dusters, depending on the insecticide formulation used and the target pest species. ULV sprayers may be considered for adoption at some future date. Sprayers will be stored at farmer cooperatives and for each sprayer, two sets of safety apparel (goggles, masks, filters, aprons, gloves, boots) will be available.

NDD II project managers will enforce, among project personnel and farmer cooperators, the use of essential protective apparel, proper storage and of pesticides and maintenance of application and safety equipment, and proper disposal of used pesticide containers and left-over pesticides. Project personnel will ensure that instructions and precautions, including statements regarding the time of re-entry into the field after pesticide application and the number of days between application and crop harvest, as specified on the product label, are enforced.

5. Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazards:

All pesticides are potentially hazardous to humans and the environment and should be treated with great caution regardless of their relative toxicity.

The pesticides required for use in NDD II - Arasan, diazinon and malathion - are used widely in the USA by farmers, homeowners, gardeners, livestock owners, and others and can be purchased and applied without restriction. Each is relatively acutely nontoxic to warmblooded animals, based on its acute oral toxicity value (LD50), and is considered to be relatively safe for use by humans if used according to the label instructions.

None of the chemicals chosen is the subject of present or foreseen USEPA regulatory action.

Diazinon and malathion are toxic to cold-blooded animals in general, and thus represent a danger to bees, other beneficial insects, and fish. High dosages may harm wild birds, livestock and game and (in the case of diazinon) may have phytotoxic effect.

All of these potential hazards can be minimized by adopting appropriate safety procedures and dosages and by applying the pesticides selectively and judiciously, based on actual need. Millet and sorghum are wind-pollinated and cowpeas and peanuts largely self-pollinated, so the proposed use patterns present little threat to bees and other pollinators and to successful setting of seed. No bush will be sprayed, and wildlife is sparse in farmed areas, so the potential impact on game is small. Permanent bodies of water are extremely few and the project area does not adjoin the Niger River (Niger's only year-around stream), so these pesticides will not contact aquatic ecosystems to any significant degree.

6. The effectiveness of the required pesticides for the proposed uses:

See para 2 above. The pesticides have been previously tested and/or used in Niger, and additional specific details concerning their recognized range of effectiveness were drawn from U.S. data where pests and cropping situations are similar to those in the project area. The pesticides will be applied according to instructions on their manufacturers' labels. Therefore, it is assumed that their use will adequately control pests unless pesticide-resistant strains are present in Nigerien pest populations. No such resistant strains have been reported thus far.

7. Compatibility of the required pesticides with target and nontarget ecosystems:

See para 5 above.

8. The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology and soils: See Project Area Description.

9. The availabililty and effectiveness of other pesticides or nonchemical control methods:

See paras 2 and 3 above, and separate documents "Plant Protection in Niger, with Special Reference to Niamey Department and NND II Project Design," and "Suggested Guidelines for IPM - Oriented Extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides."

10. The requesting country's ability to regulate or control the distribution, storage, use and disposal of the required pesticides.

See separate document. "Plant Protection in Niger, with Special Reference to Niamey Department and NDD II Project Design."

11. The provisions made for training of users and applicators:

All NDD II pesticide use will be supervised by the project agronomist and a staff or consultant entomologist. Enhanced supervision and training components have been designed into Phase II of this project, with a view, among other goals, to ensure the safe, judicious use of pesticides.

These senior staff will familiarize themselves with the appropriate safety measures for project pesticide use, and proper application procedures, and make sure that these guidelines are observed by staff and carefully extended to farmers. CPT extension staff will have attended yearly plant protection short courses given to Niamey Department/Agricultural Service staff by the Plant Protection Section. The farmer-training curriculum at CPTs will emphasize the proper use of pesticides and correct spraying techniques, including potential hazards and precautions to minimize these hazards. Stress will be laid on the proper use of safety apparel and devices and also proper procedures for disposing of used pesticide containers and leftover pesticides. It is the responsibility of project staff to see that this part of the curriculum is carefully and effectively communicated for farmers, and that any subsequent observed misuse of

pesticides be corrected.

Only farmers who have received such training at CPTs will be eligible to receive pesticide purchase credit and access to project-supplied pesticides.

12. The provisions made for monitoring the use and effectiveness of the pesticides:

An applied research component has been designed into Phase II of the NDD expressly to test the cost-effectiveness of the various components of the recommended package of improved agricultural practices, including pesticide use(s). This is fully discussed in the Project Paper and in separate documents entitled "Detailed Study of Pesticides to be Routinely Used and on Field Evaluation for Possible Use." "Suggested Guidelines for IPM - Oriented Extension Recommendations, Pesticides Safety Precautions, Equipment and Training, and UNDD II Testing of Pesticides."

Pesticides used by farmer graduates of CPTs will be observed by project extension agents during routine visits, and monitored closely as one aspect of the evaluation of the effectiveness of the project's training/extension component. A heavy emphasis on such evaluation has been designed into Phase II of the NDD. Misuse of pesticides will be noted and corrected. Senior staff will, in turn, make sure that CPT staff and extension agents are competent with reference to pesticide use, and that the proper procedures are followed by them.

V. SUMMARY AND CONCLUSION

Most impacts of project activities have been identified as significantly beneficial over the long-term. The project promises to increase agricultural production by small farmers within the project area. Potential benefits should outweight the potential negative impacts on the human environment.

IMPACT IDENTIFICATION AND EVALUATION

Impact Areas and Sub-areas

A. LAND USE

1. Changing the character of the land through:

   a. Increasing the population _____ L

   b. Extracting natural resources _____ N

   c. Land clearing _____ L

   d. Changing soil character _____ M

2. Altering natural defenses _____ N

3. Foreclosing important uses _____ N

4. Jeopardizing man or his works _____ N

5. Other factors _____ N

B. WATER QUALITY

1. Physical state of water _____ N

2. Chemical and biological states _____ L

3. Ecological balance _____ L

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

IMPACT IDENTIFICATION AND EVALUATION

C. ATMOSPHERIC

1. Air additives _____ L
2. Air pollution _____ N
3. Noise pollution _____ N
4. Other factors _____ N

D. NATURAL RESOURCES

1. Diversion, altered use of water _____ N
2. Irreversible, inefficient commitments _____ N
3. Other factors _____ N

E. CULTURAL

1. Altering physical symbols _____ N
2. Dilution of cultural traditions _____ L
3. Other factors _____ N

F. SOCIOECONOMIC

1. Changes in economic/employment patterns _____ L
2. Changes in population _____ L
3. Changes in cultural patterns _____ L
4. Other factors _____ N

G. HEALTH

1. Changing a natural environment _____ N
2. Eliminating an ecosystem element _____ N
3. Other factors _____ N

H. GENERAL

1. International impacts _____ N
2. Controversial impacts _____ N

IMPACT IDENTIFICATION AND EVALUATION

H. GENERAL (cont'd)

3. Larger program impacts _____ N _____

4. Other factors _____ N _____

IV. Cost Estimate and Financial Plan

A. Cost Projections

The budget projections for NDD II reflect the estimated cost of the inputs required to achieve the seven outputs described in the project design. The most critical factor in achieving the project purpose is the multiplier effect whereby ever increasing numbers of farmers adopt improved cropping techniques which, in turn, leads to higher production. Essential to the attainment of a multiplier effect is the diffusion of technical information throughout the project zone and the ability to sustain improved practices with adequate and appropriate inputs. These considerations are taken into account in the project budget.

Local Personnel

A total of 13,569 person-months of local personnel has been costed against project outputs. This is almost totally a GON contribution and represents only full-time GON personnel. Ministry personnel of a General and Administrative nature and part-time technical personnel are considered to be required by the Ministry with or without the project and are, therefore, not costed. Likewise, their support in transportation or housing is not included.

Adjustments both within outputs or between outputs may be necessary to achieve the project purpose. For example, if it is felt that auxiliary field agents are not as cost effective in the development of the technical service delivery system as in applied research then the necessary adjustment will have to be made by project management.

U.S. Technical Assistance

A total of 228 person-months of long-term technical assistance and 56 person-months of short-term consulting have been budgeted. The cost factors used are between $90-110 thousand per person year for the former and $10 thousand per person month for the latter. In both cases these costs are based on current cost estimates for American personnel in Niger and do not include contractor overhead. If qualified Nigerien staff can be located to replace U.S. technical assistance personnel during the course of the project, their costs may be assumed by the GON. Adjustments may also be warranted in type or duration of technical assistance during the project. In addition, 12 man-years of counterpart training have been budgeted to permit replacing foreign technical staff with local personnel later in the project.

Commodity Costs

Commodities to be procured by AID are estimated at the C.I.F. value in Niamey less taxes and duties, vehicle operations and

Maintenance costs are based on $.50 per kilometer, which is consistent with past experience and with anticipated fuel prices.

Costs of pesticides are based on the estimates of the environmentalist who participated in the project design. They also correspond closely with the actual experience of the plant protection agency operating in the project zone.

Several commodities, most notably fertilizer and animal traction units, are budgeted for revolving funds. The cost factors are based on current unit prices and expectations of farmer adoption rates for these inputs. The GON will be required to provide the difference between the cost of these commodities and the price which the farmer pays to receive them plus any additional amount necessary to prevent decapitalization of revolving fund. A covenant has been included in the Project Agreement to that effect. The current average price for U.S. fertilizer delivered in Niger is $600 a ton.

Construction

Construction costs are based on an estimate of current costs using locally procured materials and services. (USAID/Niger continues to study the feasibility of using prefabricated construction techniques in Niger and this alternative will be given full consideration when all the necessary information on this has been obtained.)

Contingencies

$400 thousand has been budgeted under AID contributions and $300,000 under GON for contingencies. These are budgeted to cover unforseen costs and construction overruns. Unforseen costs in the past have included such things as the surcharge by American flag carriers for administrative delays at coastal ports.

Inflation

A total of $3,312,500 has been budgeted for inflation, $1,627,400 of which is AID-financed and $1,685,100 is the GON's. This represents about 15.6% of total project cost. Inflation has been budgeted at a compound rate of 7% on personnel and 12% on other items. The inflation factor for the GON has been estimated at 10%.

The breakdown of local costs (L.C.) and Foreign Exchange Costs (FX) is considered from the position of the GON (i.e., FX is anything requiring the expenditure of foreign exchange as if the GON was paying all project costs). The obvious items such as vehicles are considered all foreign exchange and such commodities as cattle or feed are all local cost. For other major items the following cost factors were used:

Item	% L.C.	% F.X.
T.A.	33	67
Consultants	24	76
Vehicle O&M	10	90
Animal Traction Equipment	50	50
Construction	50	50
Local Training	100	
Counterpart Training		100
Aerial Photos	20	80

Table 1. Summary Cost Estimate and Financial Plan

($000)

	AID FX($)	AID LC	GON	Total	%
Technical Assistance Personnel:					
Long-term Personnel(19 p.y.)	1300.4	639.6	-	1940.0	9.1
Short-term Consultants(56 p.m.)	393.4	150.6	-	544.0	2.6
Local Personnel	-	62.4	3288.0	3350.4	15.7
Training	316.0	106.2	619.0	1041.2	4.9
Commodities	4714.65	341.05	1115.3	6171.0	28.9
Construction	1154.0	1154.0	70.0	2378.0	11.2
Other	800.25	421.75	622.5	1844.5	8.7
Sub Total	8678.7	2875.6	5714.8	17269.1	81.1
Contingencies	200.0	200.0	300.0	700.0	3.3
Inflation	1352.05	275.38	1685.1	3312.53	15.6
Total	10,230.75	3,350.98	7,699.9	21,281.63	100.0

Table 2. Costing of Project Outputs/Inputs

($000)

	#1	#2	#3	#4	#5	#6	#7	Total
TA Personnel:								
Long-term(228 p.m.)	100.0	247.0	247.0	146.0	360.0	440.0	400.0	1940.0
Short-term(56 p.m.)	80.0	80.0	80.0	100.0	-	100.0	104.0	544.0
Local Personnel	980.0	995.0	176.0	250.5	200.4	92.0	656.5	3350.4
Training	651.8	161.2	58.7	20.0	4.0	71.5	74.0	1041.2
Commodities	1227.2	148.1	3182.2	880.0	65.0	142.5	526.0	6171.0
Construction	960.0	534.0	-	534.0	-	-	350.0	2378.0
Other	550.5	51.0	350.5	260.0	100.0	137.5	395.0	1844.5
Sub Total	4549.5	2216.3	4094.4	2190.5	729.4	983.5	2505.5	17269.1
Contingencies	180.5	150.0	30.0	140.0	50.0	30.0	119.5	700.0
Inflation	727.96	354.07	1210.79	348.4	116.13	155.79	399.39	3312.53
Total	5457.96	2720.37	5335.19	2678.9	895.53	1169.29	3024.39	21,281.63

Output #1 - A system of technical service delivery established and functioning in the project zone.

Output #2 - A system of self-managed village organizations established and functioning in the zone.

Output #3 - A system of credit delivery established and functioning.

Output #4 - A system of agricultural input delivery established and functioning.

Output #5 - A system to increase women's access to development activities established and functioning.

Output #6 - A system to test and evaluate proposed technology established and functioning.

Output #7 - A coordination and management system for the project zone functioning effectively.

Table 3. Yearly Cost Estimates ($000)

Output #1	Year 1 U.S.	Year 1 GON	Year 2 U.S.	Year 2 GON	Year 3 U.S.	Year 3 GON	Year 4 U.S.	Year 4 GON	Year 5 U.S.	Year 5 GON	Total LOP U.S.	Total LOP GON
TA Personnel:												
Long-term (12 p.m.)	16.0	-	34.0	-	34.0	-	16.0	-	-	-	100.0	-
Short-term(8 p.m.)	-	-	20.0	-	20.0	-	20.0	-	20.0	-	80.0	-
Local Personnel	-	70.6	-	159.4	-	226.0	-	247.0	-	277.0	-	980.0
Training	15.0	38.22	33.0	87.18	33.0	124.2	43.0	126.25	25.0	126.95	149.0	502.8
Commodities	377.1	19.0	86.0	111.0	301.8	127.7	30.1	90.7	20.1	63.7	815.1	412.1
Construction	400.0	40.0	490.0	30.0	-	-	-	-	-	-	890.0	70.0
Other	-	48.5	131.0	78.0	4.5	101.5	-	93.5	-	93.5	135.5	415.0
Sub Total	808.1	216.32	794.0	465.58	393.3	579.4	109.1	557.45	65.1	561.15	2169.6	2379.9
Output #2												
TA Personnel:												
Long-term(28 p.m.)	34.0	-	71.0	-	71.0	-	53.0	-	18.0	-	247.0	-
Short-term(9 p.m.)	-	-	20.0	-	20.0	-	20.0	-	20.0	-	80.0	-
Local Personnel	-	155.8	-	209.8	-	209.8	-	209.8	-	209.8	-	995.0
Training	5.35	23.4	17.95	21.4	19.6	21.1	9.6	21.1	0.6	21.1	53.1	108.1
Commodities	-	49.8	-	25.5	-	68.8	-	2.0	-	2.0	-	148.1
Construction	-	-	534.0	-	-	-	-	-	-	-	534.0	-
Other	-	9.0	-	9.0	-	11.0	-	11.0	-	11.0	-	51.0
Sub Total	39.35	238.0	642.95	265.7	110.6	310.7	82.6	243.9	38.6	243.9	914.1	1302.2

Yearly Cost Estimates

Output #3	Year 1 U.S.	Year 1 GON	Year 2 U.S.	Year 2 GON	Year 3 U.S.	Year 3 GON	Year 4 U.S.	Year 4 GON	Year 5 U.S.	Year 5 GON	Total LOP U.S.	Total LOP GON
TA Personnel												
Long-term(28 p.m.)	34.0	-	71.0	-	71.0	-	53.0	-	18.0	-	247.0	-
Short-term(8 p.m.)	-	-	20.0	-	20.0	-	20.0	-	20.0	-	80.0	-
Local Personnel	-	32.8	-	35.8	-	35.8	-	35.8	-	35.8	-	176.0
Training	5.35	3.4	15.45	1.4	19.6	1.1	9.6	1.1	.6	1.1	50.6	8.1
Commodities	270.5	89.8	520.0	91.5	634.6	174.8	1145.0	177.0	77.0	2.0	2647.1	535.1
Construction	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	60.1	40.0	10.1	60.0	10.1	50.0	60.1	50.0	10.1	200.0	150.5
Sub Total	309.85	186.1	666.45	138.8	805.2	221.8	1277.6	274.0	165.6	49.0	3224.7	869.7
Output #4												
TA Personnel												
Long-term(16 p.m.)	17.0	-	37.0	-	37.0	-	37.0	-	18.0	-	146.0	-
Short-term(10 p.m.)	-	-	40.0	-	20.0	-	20.0	-	20.0	-	100.0	-
Local Personnel	-	50.1	-	50.1	-	50.1	-	50.1	-	50.1	-	250.5
Training	-	-	-	-	-	-	10.0	-	10.0	-	20.0	-
Commodities	278.0	-	162.0	-	420.0	-	20.0	-	-	-	880.0	-
Construction	-	-	534.0	-	-	-	-	-	-	-	534.0	-
Other	-	-	104.0	-	52.0	-	52.0	-	52.0	-	260.0	-
Sub Total	295.0	50.1	877.0	50.1	529.0	50.1	139.0	50.1	100.0	50.1	1940.0	250.5

Yearly Cost Estimates

Output #5	Year 1 U.S.	Year 1 GON	Year 2 U.S.	Year 2 GON	Year 3 U.S.	Year 3 GON	Year 4 U.S.	Year 4 GON	Year 5 U.S.	Year 5 GON	Total LOP U.S.	Total LOP GON
TA Personnel												
Long-term(48 p.m.)	90.0	-	90.0	-	90.0	-	90.0	-	-	-	360.0	-
Short-term -	-	-	-	-	-	-	-	-	-	-	-	-
Local Personnel	1.2	33.6	1.2	33.6	-	43.6	-	43.6	-	43.6	2.4	198.0
Training	2.0	-	2.0	-	-	-	-	-	-	-	4.0	-
Commodities	2.5	-	62.5	-	-	-	-	-	-	-	65.0	-
Construction	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	85.0	-	5.0	-	5.0	-	5.0	-	100.0	-
Sub Total	95.7	33.6	240.7	33.6	95.0	43.6	95.0	43.6	5.0	43.6	531.4	198.0
Output #6												
TA Personnel:												
Long-term(48 p.m.)	55.0	-	110.0	-	110.0	-	110.0	-	55.0	-	440.0	-
Short-term(10 p.m.)	-	-	40.0	-	20.0	-	20.0	-	20.0	-	100.0	-
Local Personnel	-	24.0	-	24.0	-	24.0	-	10.0	-	10.0	-	92.0
Training	-	-	35.5	-	18.0	-	18.0	-	-	-	71.5	-
Commodities	17.5	-	102.5	-	17.5	-	2.5	-	2.5	-	142.5	-
Construction	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	115.0	-	7.5	-	7.5	-	7.5	-	137.5	-
Sub Total	72.5	24.0	403.0	24.0	173.0	24.0	158.0	10.0	85.0	10.0	891.5	92.0

Yearly Cost Estimates

Output #7	Year 1 U.S.	Year 1 GON	Year 2 U.S.	Year 2 GON	Year 3 U.S.	Year 3 GON	Year 4 U.S.	Year 4 GON	Year 5 U.S.	Year 5 GON	Total LOP U.S.	Total LOP GON
TA Personnel:												
Long-term(48 p.m.)	50.0	-	150.0	-	100.0	-	100.0	-	-	-	400.0	-
Short-term(12 p.m.)	-	-	52.0	-	52.0	-	-	-	-	-	104.0	-
Local Personnel	12.0	106.1	12.0	119.6	12.0	119.6	12.0	125.6	12.0	125.6	60.0	596.5
Training	-	-	18.0	-	18.0	-	28.0	-	10.0	-	74.0	-
Commodities	262.0	-	59.0	15.0	175.0	5.0	5.0	-	5.0	-	506.0	20.0
Construction	-	-	350.0	-	-	-	-	-	-	-	350.0	-
Other	- -	-	170.0	-	73.0	2.0	73.0	2.0	73.0	2.0	389.0	6.0
Sub Total	324.0	106.1	811.0	134.6	430.0	126.6	218.0	127.6	100.0	127.6	1883.0	622.5
Total all Outputs	1944.5	854.22	4435.1	1112.38	2536.1	1356.2	2079.3	1306.65	559.3	1085.35	11554.3	5714.8
Contingencies (construction)	55.5	60.0	344.5	60.0	-	60.0	-	60.0	-	60.0	400.0	300.0
Inflation	-	-	422.29	131.24	488.43	284.8	487.0	606.43	229.71	662.63	1627.43	1685.1
Grand Total	2000.0	914.22	5201.89	1303.62	3024.53	1701.0	2566.3	1973.08	789.01	1807.98	13581.73	7699.9

B. Recurrent Costs

Recurrent costs were estimated for the project based on the projections in Tables 7, 8 and 11, 14 of the economic analysis. This assumes that certain costs will decline such as personnel requirements for cooperative development and villager training while other will rise such as personnel requirements for management and commodity input delivery, vehicle operations and agricultural inputs. Those costs are reflected in Table 15 of the economic analysis for a 20 year period. The analysis of those costs are summarized in the table below. Years 6 through 10 are estimated based on LC and FX components, and years 11 on in terms of overall annual costs. In should be noted that the FX percentage increases relative to the total due to the need for agricultural inputs and their delivery (fertilizer, pesticides, vehicles and vehicle operations) while the local cost component declines due to the discontinuance of certain activities such as training in the latter phases of the projected cost stream. The increase in FX requirements could be partially offset by the use of locally produced fertilizers (rock phosphate) or crop rotation (legumes decrease the need for nitrogenous fertilizer). Otherwise it will have to be met with agricultural exports or become a drain on overall foreign exchange. This, of course, must be weighed against the foreign exchange requirements for food imports that a "without project" situation would create. It should be pointed out that the secondary effects of the project on foreign exchange requirements have not been considered because the income elasticity of demand for imports is unknown in the project zone.

Niger-Niamey Department Development Project - Phase II

Recurrent Cost Projections Thousands 1980 U.S. $ [1]

	Years 6 - 10		Years 11-15		Years 16 - 20	
	L.C.	FX	L.C.	FX	L.C.	FX
Personnel	761		613		497	
Training	160		-		-	

	Year 6		Year 7		Year 8		Year 9		Year 10		Years 11 & annually	
	L.C.	FX	L.C.	FX	L.C.	FX	L.C.	FX	L.C.	FX	L.C.	FX
Commodities												
Trucks		360				360						288
Vehicles		510				510						174
Office Supplies		24		24		24		24		24		24
Furn& Equip	14	5	14	5	14	5	14	5	14	5	4	5
Tools	1	11	1	1	1	1	1	10	1	1	1	2
Ag Equip												
Plant Prot.		3		3		3		3		3		3
Animal Tract.		4		4		4		4		4		4
Ag Inputs-Extension	43	36	43	36	43	36	43	36	43	36	1	16
Fertilizer		838		1458		2240		3410		5075		6525[2]
Insecticides		75		125		200		300		450		450
Other Costs												
Build. Maint.	81		81		81		81		81		81	
Veh. oper. (includes fuel, oil,parts, repairs)		240		240		240		240		240		280

[1]Costs are reflected in Table 15 of Economic analysis in millions CFA converted on the basis of 200 CFA - 1 U.S. $

[2]$5,580,00 in year 11, $6,325,000 in year 12, $6,525,000 thereafter.

Source - Estimates of design team.

V. Implementation Arrangements

A. Procurement Plan

1. U.S. Technical Services

The five long-term positions will be filled utilizing host country personal service contracts. USAID and the Ministry of Rural Development have considered the advantages and disadvantages of combining these contracts into one institutional contract with an appropriate private or non-profit organization. An advantage might be that the management burden of administering one large contract would be less than that of several smaller contracts. However, these individuals will come from professionally and geographically diffuse backgrounds and the mission is aware of no organization which could find and recruit such a varied technical personnel in the timely and effective manner that the GON is expecting. Moreover, the Mission is already aware of a number of individuals willing to participate in this project on a basis which would allow them the maximum flexibility to negotiate their own work conditions, i.e., a personal service contract with the GON. Finally, the overhead rate of an institutional contract would effectively double technical assistance costs to no particular advantage to Niger. Given the close collaboration between the U.S. and Niger over budgetary matters in this project, a costly institutional contract would likely prove to be a continuous source of contention.
The mission is however, actively considering this mode in other projects where such a contract mechanism would be advantageous.

At present, an agronomist and two staff assistants constitute the U.S. technical assistance component under Phase I. The contract of the two staff assistant terminate in Spring 1981 about the time the GON is expected to sign the new Project Agreement. The contract of the agronomist terminates in August 1981. The Applied Research Coordinator will also be an agronomist, and thus, some continuity, and even some overlap, is assured. Every effort will be made to contract the credit/commodity specialist as soon after the agreement is signed as possible in order to have this key person in place before the 1981 agriculture campaign begins. While a spring 1981 placement ot the training specialist and the monitoring and evaluation coordinator are equally desirable, there is a greater likelihood that candidates for these positions will be involved in academic programs and thus not available until summer. The coordinator for Women's Activities is expected to be filled by a local American personal service contractor. The project will also contract locally for a highly qualified vehicle maintenance specialist to work at the project headquarter's garage.

A minimum of 10 Peace Corps Volunteer couples have been requested to work at the CPT's during the five year course of the project. A number of these volunteers will be placed at the CPT's early in 1981.

It is hoped to have one couple for each CPT as it comes into existence.

Job descriptions for the technical assistance personnel can be found in the annex.

2. GON Personnel

Key Nigerien project staff will include the Project Director, the Chief of Technical Operations, and four arrondissement coordinators. All these key positions will be filled by existing Nigerien government personnel and all will be named by ministerial decision. The GON will be responsible for continuing the payment to these personnel of their regular government salary. Any additional allowances or benefits which the GON decides to provide these personnel will be defined in the individual's ministerial decision and paid from the GON contribution to the project. One of the conditions precedent of this project is that all these positions will be filled by the GON before AID project funds can be disbursed and that each individual will serve for a minimum of three years.

Local personnel for the project management unit, for the CPT, and for AID's project Management Support Unit and liaison office will be financed from both AID and GON funds and engaged according to USAID mission local employees' policies and salary schedules, following MRD approval, with the exception of GON civil servants. These GON employees will be funded from Nigerien contributions to the project and will be engaged according to practices observed by the GON's Ministry of Rural Development. The total life of the project cost to the GON for the personnel is estimated at $2,060,000.

3. Commodities

The authorized source and origin for commodities financed by AID under this project are to be AID Geographic Code 941 and the host country. Locally manufactured animal traction equipment is being purchased in Niger and a waiver is being requested for 935 purchases of millet grinding mills. The Afro-American Purchasing Center (AAPC) will continue to be the Government of Niger's authorized procurement services agent in accordance with AAPC's contract with the Ministry of Rural Development. As during Phase I, the AID Project Liaison Officer (Project Manager) will assist the Nigerien Project Director with the preparation of commodity lists and other required procurement documentation. The project director will continue to be the responsible official for all project procurement.

All Geographic Code 899 (Free World) shelf-item procurement will be conducted in accordance with AID Handbook 15, Sections 11.B.3 and 11.B.4. Additional AID funds will be used for the local purchases of indigenous goods (as defined in Handbook 15, Section 11.B.2) and

petroleum products. All of these goods will be purchased through the assistance of the Mission's Project Management Support Unit in accordance with normal commercial practices followed by the GON. All goods will be purchased duty-free except for those miscellaneous, over-the-counter shelf items for which the supplier has already paid the taxes. It is intended that GON funds will be used to cover any unanticipated local procurement actions.

A major obstacle encountered during Phase I was the variability of the time required for the shipment of U.S. goods to Niger. Phase I experience indicated the following facts make it almost impossible to anticipate delivery times:

(1) U.S. suppliers are rarely able to meet the established terminal delivery dates.

(2) The availability of U.S. shipping to the West African ports serving Niger is deficient.

(3) The delays encountered moving goods through the overburdened ports vary widely.

(4) The insufficiency of transport carriers between the ports and Niamey.

(5) The poor state of sections of the inland road system.

Delivery times during Phase I for surface shipments varied from 8 to 16 months and for air freight from 4 to 6 months. Rarely does a shipment arrive that has not been pilfered or partially broken. For Phase I planning purposes, a 12-month delay from the time the order is sent for surface shipments, 5-month delay for air shipments and a 4% loss rate are being employed for all U.S. orders. It is evident from the above that the landlocked geographic position of Niger will continue to pose formidable and very expensive obstacles to project implementation during the next five years.

ROCUREMENT SCHEDULE

Year of Prg. Ordered	Source Code	Funding Source AID	GON	Comments
1st	000	375.0		Vehicles will be similar to
3rd	000	375.0		those used in phase I. Only
1st	899		95.6	U.S. vehicles considered
3rd	899		95.6	appropriate for intended project
1st	000	180.0		use will be procured.
3rd	000	180.0		
1st	000	25.0		
3rd	000	25.0		
1st	000	20.0		
1st	000	70.0		
3rd	000	90.0		
1st	000	85.4		Includes fertilizer to be
2nd	000	252.6		used on CPT's as well as that
3rd	000	458.0		distributed in the project
4th	000	878.0		zone
5th	000	18.0		
2nd	935	40.0		Waiver being requested. See
2nd	935	60.0		Annex F.
1st	000	66.5		
2nd	000	68.5		
3rd	000	70.5		
4th	000	76.5		
5th	000	79.5		
1st	000	83.2		
1st	935 (local)	126.5	.6	
2nd	"	109.0	70.4	
3rd	"	126.6	66.2	
4th	"	211.0	53.0	

JREMENT SCHEDULE (Cont'd)

Year of Prg. Ordered	Source Code	Funding Source AID	GON	Comments
1st	000	5.4		
2nd	000	33.3		
3rd	000	5.7		
1st	000/935	22.0	4.0	000 for U.S. contribution
2nd	000	63.5	19.0	935 for GON contribution
3rd	000	20.0	9.0	
4th	000	15.0	4.0	
5th	000	5.0	4.0	
1st	000	16.0		
2nd	000	21.0		
3rd	000	16.0		
1st	000	37.5		
2nd	000	3.5		
all other yrs	000	6.0		
1st	000	60.0		
2nd	000	20.0		
4th	000	20.0		
2nd	935		19.0	
3rd	935	19.0		
1st	935 (local)		41.0	
2nd	935		59.2	
3rd	"		87.1	
4th	"		127.0	
5th	"		2.0	
1st	935		17.2	
2nd	"		32.8	
3rd	"		59.3	
4th	"		59.3	
5th	"		59.3	
2nd	000	100.0		

4. Construction

Construction requirements for NDD II will be fulfilled by tapping the local construction market as done under NDD I. Local contractors, however, introduce an element of uncertainty. The timing of activity is difficult to anticipate due to the very tight booming construction market in Niger and the frequent absence of building materials on the local market. During Phase I the project was fortunate to have been able to engage at below market-rates the services of three small Nigerien firms which satisfactorily completed the 56 buildings constructed under this phase. During Phase II preference will be given to reputable, competitive Nigerien firms over European firms when firms are selected under the regular IFB process.

Phase I experience indicates that the 2-3 months should be allowed for the preparation of the IFB documentation and 3-4 months for the publication of the IFB, selection of firms and signing of contracts. These time periods assume that a good relationship exists between the responsible MDR engineering office, Genie Rural, and the project and that the project is making a major effort to push things through. Otherwise, the whole process can take considerably longer. Project management is already preparing IFB's for Phase II and they should be ready for issuance when the grant agreement is signed.

Building times vary according to the size and number of buildings, but for Phase II it is expected that the construction time for any given contract should not be over 7/8 months, Thus, work should begin on a group of buildings 7/8 months before they are required and on the IFB 15 months before the buildings are required. The above time periods can usefully serve as a general "rule of thumb" for planning purposes but in reality, the Nigerien construction market and the overburdened GON engineering services, indicates that the project implementor should be prepared to encounter wide variances with the rule and with construction costs. (See section III E on page 51-52 of this paper and Annex E for more details on the project's construction program.)

5. The Project Management Support Unit

The Project will be assisted to a great extent with its procurement and construction requirements by the Project Management Support Unit (PMSU). This unit was created by the USAID mission in 1978 to provide administrative support to all of the Mission's projects. A direct hire supply management officer currently directs this unit, and working under him, are four direct hire U.S. employees (an engineer, a training officer, an assistant supply manager and one secretary). There is also TCN financial assistant and several local hire employees are serving as translators and typists. The PMSU prepares all PIO's and provides various other administrative services to USAID projects as required.

The Project Management Unit of the Niamey Department Development Project under Phase I has demonstrated a considerable capacity for handling its own administrative problems, particularly in the area of procurement. However, in Phase II, the PMU and the PMSU expect to collaborate closely in order to meet the requirements for obtaining engineering and construction services as well as other contracting actions.

B. The Implementation Plan and Schedule

Actions taken after the approval of the Project Paper will have a principal objective of getting the second phase of the project started with a minimal delay. It is hoped that this project can be approved and an agreement signed early in the second quarter of FY 1981. In order to meet this tight schedule, the following actions will be required:

1. Project Autorization

The Project Paper should be approved and the Project authorized by January 1981 at the latest.

2. Project Agreement Signed

As soon as the project is authorized and an allotment of funds provided, the project agreement can be finalized with the Government of Niger. Since (1) the project is strongly supported at all levels of the GON; (2) the Ministry of Rural Development is thoroughly familiar with both the Project Agreement procedure and Phase I of this project, and (3) the GON is already aware of the stringent requirements of the U.S. environmental laws which are reflected in the covenants of the grant agreement, a relatively prompt signing can be anticipated. Signing should take place at as early a date as possible so as to allow the issuance

of PIO documents for commodity purchases and personnel contracts critical to the continuation of this ongoing project prior to the next growing season. The USAID intends to treat these negotiations as a priority matter. The Project Agreement should be signed by March 1981.

3. Submission of PIO/T's and PIO/C's to AID/W

Since a member of USAID and project personnel are already in place and at work under Phase I of this project, a number of implementation actions can be prepared for prompt submission following the Pro Ag signing. In particular, scopes of work and commodity lists and specifications are being readied now for rapid processing at an early date. It is anticipated that year 1 PIO/T and PIO/C's will be submitted as soon as the grant agreement is signed.

4. Recruitment of U.S. Contract Personnel

Contract technicians need not arrive simultaneusly and it is expected that they will come from various sources including some who may be recruited locally. The coordinator for Women's Activities, the Vehicle Maintenance Specialist, and possibly the training specialist, may be recruited from the available pool of talent already resident in Niger. Thus, many if not most, of the project personnel can be expected to be on board prior to the 1981 growing season. Satisfactorily housing is expected to be available to the U.S. technicians in Niamey without waiting.

5. Peace Corps Volunteers Arrive

Five Peace Corps Volunteers are in Niger undergoing in-country technical and language training prior to assignment to the existing CPT's in April 1981. Based on past experience, at least one of these individuals can be expected to drop out before April.

6. Construction Program Begins

The construction of 4 new CPT's will begin shortly after the signing of the project agreement with preparation of bid documents. Construction of the PMU office, garage and warehouse will proceed separately.

7. Orientation Programs Begin

An orientation program for middle and higher level project personnel is being planned before the cropping season begins. There will also be an orientation program for the extension personnel involved in the project, including aide-encadreurs.

8. Cropping Season Begins

The beginning of the agricultural season depends upon the onset of the first rains and generally can be assumed to start in June.

Harvest generally begins in October, again depending upon the frequency and timing of the rains.

9. CPT's Opened

The first three CPT's in the Niamey Department are already open and in operation. The next four are expected to open by April 1982. The final three CPT's will be open by April 1983. Each CPT will require a certain minimal staff to begin operations as well as one Peace Corps couple each.

10. Timing of Other Activities

The timing for the other activities in the project should remain flexible during the entire period of the project. Depending upon the results of the program in the first year, a number of activities providing resources to primary beneficiaries are planned to assure that the outputs are achieved by the end of the project. The preliminary scheduling of these activities are shown in the following outline. Dates shown represent "optimal" timing rather than "critical" dates for the achievement of the project purpose.

11. Completion Date

The project assistance completion date (PACD) is December 31, 1986.

DATE	ACTION	RESPONSIBLE ORGANIZATION
January 1981	Project authorized	AFR/DR
March 1981	Project agreement signed	GON, USAID
March 1981	Annual Report due	PMU
January-March 1981	Preparation and submission of PIO/T's and PIO/C's	USAID
April 1981	IFB preparation for CPT and PMU construction	PMSU/GON
April 1981	First group of 5 PCU's at CPT's	Peace Corps
April 1981	Orientation seminar for new personnel	PMU
April 1981	Orientation for agricultural extension personnel	PMU
January-July 1981	Recruitment of U.S. technicians	AFR/DR, DS/RAD, PMU

DATE	ACTION	RESPONSIBLE ORGANIZATION
April-June 1981	Design of applied research and pesticide use program (with participation of consultant)	PMU
June 1981	GON deposits subsidy and financial contribution to project account no later than this date	GON
June 1981	Agriculture season begins	-
July 1981	All additional staff for existing CPT s in place	PMU
July 1981	Arrondissement coordinators and office personnel in place	PMU
July 1981	Arrival of new Project Liaison officer (project manager)	AID
September 1981	Selection of CPT & PMU construction firms	GON/PMSU
October 1981	Harvest begins	-
October 1981	Construction of 4 CPT's and PMU begins	PMSU/GON
November 1981	GON deposits additional funds as required	GON
December 1981	Begin selection of long term participants	PMU
March 1982	Annual Report due	PMU
March 1982	Training/orientation of extension personnel	PMU
April 1982	Construction complete on 4 new CPT's	GON/PMSU
June 1982	Agriculture season begins	-
July 1982	Long term participants depart for U.S.	PMU/PMSU
July-August 1982	Pesticide evaluation	PMSU

DATE	ACTION	RESPONSIBLE ORGANIZATION
October 1982	Construction of 3 CPT's begins	PMSU/GON
October 1982	Harvest begins	-
November 1982	GON deposits additional funds as required	GON
Nov./Dec. 1982	First interim evaluation	USAID/GON
March 1982	Annual Report due	PMU
April 1983	Construction complete on 3 CPT's	GON/PMU
June 1983	Agriculture season begins	-
July-August 1983	Pesticide evaluation	PMU
October 1983	Harvest begins	-
November 1983	GON deposits additional funds as required	GON
March 1984	Annual Report due	PMU
June 1984	Agriculture season begins	-
July-August 1984	Pesticide evaluation	PMU
August 1984	Return of participant trainees	AID/W
October 1984	Harvest begins	-
November 1984	GON deposits additional funds as required	GON
Nov.-Dec. 1984	Second interim evaluation	USAID/GON
March 1985	Annual Report due	PMU
June 1985	Agriculture season begins	-
July-August 1985	Pesticide evaluation	PMU
October 1985	Harvest begins	-

DATE	ACTION	RESPONSIBLE ORGANIZATION
December 1985	Final progress reports submitted by US/GON	Individuals and PMU
March 1986	End of Phase II project	-
August 1986	Final Evaluation of project	USAID/GON

C. Evaluation Arrangements

Continuing evaluation of the managerial and technical aspects of the project is critically important to the achievement of the project purpose and attainment of project outputs. The Project Management Unit, therefore, must have a reliable and continuous source of data concerning both the nature and consequence of project operations. To provide such data, experience with the implementation of Phase I has clearly demonstrated that a self-contained data collection and analysis unit under direct control of the project must be established on a permanent basis. While the project unit itself may not be responsible for the complete range of data-collection activities, centralizing collection and analysis responsibility within one unit of the project reduces project dependency upon sources which are often unreliable, inaccurate, or irrelevant to project decision making.

For Phase II of this project, the monitoring and evaluation unit established under Phase I will be strengthened and expanded. This unit will determine data requirements for project decision making, identify pre-existing sources, establish systems for obtaining additional data, design studies, conduct analyses of this data and develop an orderly means of retrieving data relevant to project decision making. Research will be practical and project oriented, keeping "research for research's sake" activities to a minimum.

As accomplishment of this activity is considered an important project output, further amplification can be found in the project description. Other Evaluation requirements are as follows:

1. Annual Work Plans

Each specialist will submit a tentative work plan to the Project Management Unit within 30 days following his/her arrival in Niger. This plan will outline the specialist's work objectives as they are viewed at the outset of each work year. The work plans will be finalized within five months of start of work. Each annual work plan should provide specific measurable indicators of progress and detail the

criteria to be used to determine achievement of the objectives. The results should form the basis on which the following year's work plan is developed. Such work plans should be in conformity with the scope of work in the specialist's contract.

2. Quarterly Progress Reports

In addition to the annual work plans, each specialist will submit a quarterly report which will detail the progress made to date in achieving the annual work plan plus recommended modifications of that work plan. This report will be submitted through the Project Director to the USAID and the Ministry of Rural Development, with copies to the Ministry of Plan and the Niamey Department so that personnel at this level can provide thoughtful input into what actions need to be taken to resolve policy issues.

3. Annual Report

The project monitoring and evaluation unit will take primary responsibility for the preparation of the project's annual draft report which must be submitted by March 31 of each year in French. The Ministries of Rural Development and Plan and USAID will jointly review the report and will discuss their findings in a formal session of the Niamey COTEDEP. A summary of the COTEDEP session will become part of the Annual Report and form the basis for corrective project actions and policy formation. Both English and French versions of the report are due by May 31 each year. On the basis of this finalized annual report, and his personal observations and experience, the USAID Project Manager will prepare a Project Evaluation Summary (PES) for submission by June 30 each year.

4. Special Evaluations

In addition to the reporting process described above, special evaluations will be conducted at the end of the project's second and fourth years and six months following the end of Phase II. These evaluations will be conducted by a mixed team of five to six people composed of representatives appointed by the Government of Niger, USAID/Niamey and REDSO/Abidjan or AID/W. An effort will also be made to include the participation of appropriate short-term consultants or key personnel from one or more of the other productivity projects in Niger. These evaluations will last for three to four weeks with the time divided among in-the-field observations, interviews with farm couples, district-level project personnel, and GON officials with Niamey-based project personnel, and review of project documentation. The initial findings of these evaluations will be discussed in meetings chaired by the Secretary Generals or Ministers of Rural Development or Plan and attended by members of the evaluation team, the USAID Mission Director, key GON and U.S. project

personnel, the Prefect of Niamey, the GON Ministerial Service Chiefs and other key members of the COTEAR's and COTEDEP. At the conclusion of this meeting, a systhesis report will be prepared by the Project Management Unit for approval by the responsible GON officials and the USAID Mission Director. Preferably, these special evaluations will be held near or right after the annual harvest period which occurs in September-October.

Finally, the project will be visited on an annual basis by an environmental specialist to determine the extent to which the GON is in compliance with AID regulation No.16 concerning pesticide use. The project agreement will stipulate that no personnel or materials financed by the project, either directly by USAID or as part of the GON contribution, may be used to apply pesticides in contravention of this regulation (except in the case of national emergencies as determined by the AID administrator upon advice or recommendation of an appropriate international organization). The visit of this specialist will probably coincide with the special evaluation team in years two and four of the project as well as during the post project evaluation.

5. Post-Project Evaluation

Using the same basic methodology as during the project's life, a final impact assessment will be conducted to determine to what extent the logical framework indicators have been met and to what extent the project outputs will likely be utilized by the GON and its production services in forward planning for the ongoing development program. This evaluation will be undertaken during the 1986 cropping season. Some of the indicators which will be evaluated are the following:

1. Number of farmers using improved agricultural practices;
2. yield level increases for key crops;
3. farmer income increases, and
4. level of investment by participating farmers in agricultural inputs.

The accurate assessment of these indicators will require that measurements also be taken in a control area where improved agricultural practices are not being encouraged. This will necessitate the use of baseline data collected under phase I and the collection of new baseline data on the target and control areas early in this phase II of the project.

NB: Because the success of this project is highly dependent upon the building of institutions, any evaluation of the project should concentrate on the degree of institutional development achieved.

VI. Conditions and Covenants

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

1. Prior to any disbursement under the grant 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:

a. Specimen signatures (standard language).

b. Evidence that the Grantee has deposited or caused to be deposited the amount of 116,000,000 CFA into the Project's account (No. 125-11-SCI) at the National Treasury and the amount of 22,000,000 CFA into the Project's credit fund account (No. 10.590) at the CNCA.

c. Evidence that a Project Director and three key Nigerien project management personnel as described in Annex A of the Project Agreement have been assigned, as well as evidence that the Project Director has been delegated all necessary authorities required to implement the project. All assignments of key personnel hereunder shall be for a minimum period of three years.

2. Prior to any disbursement under the Grant, or to issuance by AID of documentation pursuant to which disbursement will be made, 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. Plans, bid documents, cost estimates and contracts (standard language).

The Mission in consultation with the REDSO Legal Advisor, recommends the following covenants to the Project Agreement:

1. The Grantee shall deposit or cause to be deposited into the projects' CNCA credit fund account by November 30 of each year of the life of the project, funds sufficient to cover the difference between the cost of farm inputs imported for the project and the price at which such inputs are made available to farmers in the project area, as well

as additional amounts as may be required to prevent decapitalization of the credit funds. The amount of such annual deposits will be established by mutual agreement by May 31 of each year.

2. The Grantee shall replenish the project's operations account at the National Treasury by November 30 of each year on the basis of a cash needs request submitted by project management to the Ministry of Rural Development by May 31 of each year.

3. The Grantee shall covenant that, with the exception of the use of pesticides accepted by AID for project use, plant protection activities conducted in the project zone shall be conducted by adequately trained Ministry of Rural Development personnel who are unconnected with the project. No project resource including personnel, buildings, vehicles, equipment or funds shall be utilized for the purchase, transport, handling, storage or use in any other manner of pesticides not accepted by AID for the project, except as AID may otherwise agree in writing in the event of imminent emergency requiring the prompt use of non-approved pesticides.

683-0240

VOLUME II

UNCLASSIFIED

PROJECT PAPER ANNEXES

NIGER

NIAMEY DEPARTMENT

DEVELOPMENT PROJECT

PHASE II

683-0240

USAID/NIGER

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

BEST AVAILABLE DOCUMENT

Annex A

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 81 to FY 85
Total U.S. Funding 13,582,000
Date Prepared: Dec. 12, 1980

Project Title & Number: Niamey Department Development II - 683-0240

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To assist Niger in achieving self-sufficiency in food production and improve rural standards of living.	**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.	Lack of chronic food shortages as evidenced by: a. stable food 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.	**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.
Project Purpose: To institutionalize a process of rural development through the establishment of self-managed village organizations capable of assisting farm families with the achievement of increased food production on a self-sustaining basis.	**Conditions that will indicate purpose has been achieved: End of project status.** 1. Number of rural organizations founded which are fully and efficiently functioning. 2. Quantity of goods and services being provided as a result of the establishment of that rural organization networks. 3. Enthusiasm and acceptance demonstrated by the rural population. 4. Number of farms using new practices and achieving increased food production. 5. Number of farm families benefitting indirectly from spread effects of project activities.	1. Project records and evaluation reports. 2. GON service reports and statistics. 3. Village cooperative reports & records. 4. Studies and surveys undertaken by project's monitoring and evaluation unit. 5. On site inspections and audits. 6. Annual harvest time yield measurements and farmer interviews. 7. Volume of agricultural credit requested and provided. 8. Amount of physical agricultural inputs procured and distributed.	**Assumptions for achieving purpose:** Improved agricultural practices remain popular and prove to be advantageous to the farmer. GON continues to place priority on rainfed crop production, the creation of a development society, local participation and on a decentralized development model. The rural population remains receptive to the changes introduced and is able to take on the new responsibilities implicated by this change. Satisfactory solutions can be found to agricultural input logistics problems. Management and planning systems function effectively at all levels. Planned evaluation efficiently carried out and used as effective management tool.
Outputs: 1. System of technical service delivery established and functioning in project zone. 2. System of self-managed village organizations established and functioning. 3. System of credit delivery established and functioning. 4. System of agricultural input delivery established and functioning. 5. System to increase women's access to development activities established. 6. System to monitor and evaluate project activities established and functioning. 7. Project coordination and management systems functioning effectively	**MAGNITUDE OF OUTPUTS:** 750 farmer couples receive long term training. 1,160 farmers receive short term training. 4,000 additional farmers adopt improved agricultural practices. 10 farmer couple training centers completed and fully operational. 3,350 tons of fertilizer distributed. Estimated 9,000 additional tons of millet and 2,000 addit. tons of niebe being produced.	Project records and evaluation reports. Coop and training center records: Interviews with participating villagers and GON technicians. On site census taking inspection and surveys.	**ASSUMPTIONS FOR ACHIEVING OUTPUTS:** Villagers and their traditional leaders remain receptive and eager to participate. Training facilities fully staffed-equipped and available on time. Construction firms engaged as planned and complete work on time. Women are able and willing to fully participate. Trained villagers return to their villages and remain there.

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 81 to FY 85
Total U.S. Funding 13,582,000.
Date Prepared: Dec. 12, 1980

Project Title & Number: Niamey Department Development II - 683-0240

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	Revolving credit/input fund establishing and working; 300 village cooperatives fully established and operating; 12 new coop warehouses built; 2,800 coop leaders trained. 58 selected coop managers receive special training. 600 coop member women receiving credit and technical advice. 65 literacy training centers established and 2,700 adults trained (2,100 men and 600 women). 30 grinding mills installed. 30 new blacksmiths trained and equipped. 6 mobile vaccination corrals put into service. 2,000 farmers participate in one of the animal husbandry programs. 300 villages participate in soil conservation and/or tree planting program. 100 school gardens initiated. 1 warehouse/office/house complex built for GON services. 24 GON departmental and arrondissement level personnel receive short term training. 4 GON personnel receive long term U.S. training. 60 CPT personnel trained 1 project management unit established. Preliminary Phase III plan produced at end of year 4. NB: While the above magnitude of outputs have been specifically identified, any evaluation of this project should also focus on qualitative elements that indicate the degree of institutional development achieved.		Villagers able to develop coop management capacity. Demand for blacksmiths' works will make it profitable. Existing GON service structure and personnel capable of providing required technical assistance. Appropriate animals can be procured locally. Reliable suppliers of the quantity of inputs required can be located. Efficient and timely transport from inputs origin to coastal port to Niamey to village coop centers can be arranged. GON services responsible for delivering and distribution of agricultural inputs are able to transport them on reliable timely fashion from coastal port to Niamey and coop centers. GON makes subsidy deposits on time and in quantities requested. GON planning cycles providing for adequate funds and lead times are adopted. Equitable rainfall patterns over project zone for at least 4 out of 5 years. Massive insect/locust attacks do not occur. GON service responsible for importing and distributing agricultural inputs collaborating closely. Loan repayment rate sufficiently high to allow continuity of ag inputs credit fund. GON services will work as integrated team under director of single departmental office. Auxiliary personnel able to satisfactorily undertake tasks assigned them. Competent GON personnel available and able to serve 3 year tours.

2

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 81 to FY 85
Total U.S. Funding 13,582,000
Date Prepared: Dec. 12, 1980

Project Title & Number: Niamey Department Development II - 683-0240

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Personnel:			Assumptions for achieving goal targets:
AID	19 person-years long term 56 person months short term		
GON	55 person years long term, middle level personnel 1075 person years long term, low level personnel		
Peace Corps	58 person years long term volunteer service.		
Training:			Assumptions for achieving purpose:
Participant training Short term, 3rd country and US. In-service	12 person years in US 42 person months 6400 person months CPT training 516 person months of literacy, coop, extension, blacksmiths, and women's training programs		
Commodities:	50 light pick up vehicles 8 heavy pick ups 6 8 ton trucks 2 utility vehicles		Assumptions for achieving outputs:
Fertilizer	3350 tons for project zone 120 tons for CPTS		
Mobile vaccination corrals Grinding mills Animal traction equipment Office supplies and equipment Training and classroom supplies Livestock, food and medicine Pesticides	6 30		
Construction:			Assumptions for providing inputs:
Farmer couple training center Cooperative centers Project headquarters (office, warehouse, garage) Agricultural service buildings in Say	7 12 1 1		
Evaluations:	35 person-months		

3

ANNEX B

Economic Analysis

By Warren Enger

I. Technological and Production Specifications:

A. Rainfed Farming.

1. Millet.

Increasing the production of millet is the main thrust of the NDD II project. Millet, grown under rainfed cropping on sandy soils throughout the zone, is generally a low yielder with only about 300 kilograms per hectare produced under traditional methods. Under various projects, including NDD Phase I, improved production practices for millet have been introduced, with mixed results.

According to the Niger Agricultural Sector Assessment[1] the results of on-farm demonstrations in the Niamey Department during Phase I showed yield increases from 160 to 170 kgs/ha. These appear, however, to have been demonstrations that were poorly conducted. In other areas, where supervision of agricultural extension staff was assured, yield increases of 265 to 460 kgs/ha were attained. The National Cereals Project attained yield increases over traditional methods of 450 kgs/ha with on-farm demonstrations of the improved practices.

The ability of the improved practices, which includes the use of chemical fertilizer, to increase yields seems to be fairly certain. The important aspect is the correct application of the technical package and techniques. As improving agricultural extension and farmer training is central to the NDD II, increased yield assumptions of 300 kgs per hectare are used for analysis. Although this will certainly vary throughout the zone, especially from north to south with over 300 millimeters difference in rainfall, it is considered a reasonable average.

Fertilizer, coupled with higher plant density, is the major yield raising component of the technical package.[2] It is also the most costly. In order for farmers to adopt fertilizer use, it will have to give yield raising effects that are profitable to the farmer. At present this is assured through heavy government subsidies. True economic cost of fertilizer (approximately 100-110 CFA per kg for either super triple phosphate * or urea) will require a gross return of 10,000 to 11,000 CFA per hectare to cover fetilizer costs. At present market prices, that means a yield increase of at least 200 kgs. of millet per hectare, versus about 75 kgs required to cover present subsidised cost of fertilizer. A change in the level of fertilizer subsidies could have a major impact on the rate of adoption of improved practices. For the purposes of analysis

*Super Triple Phosphate, 46% P_2O_5

it is assumed that the rate of adoption postulated below will be attained. That rate assumes that farmers will consider it profitable to use fertilizer, either because subsidies remain, the yield increases are adequate to cover fertilizer costs, or the price of grain rises faster than fertilizer prices.

2. Cowpeas.

Traditionally cowpeas are grown as an intercrop with millet or sorghum. Plant densities are relatively low, probably never more than 2000 hills per hectare. Yields in intercropping are estimated to average about 100 kgs/hectare. Under improved cultivation cowpeas are grown in pure stand at about 55,000 hills per hectare. Yields, using 50 kgs of STP[3], are estimated at 600 kgs/ha with manual cultivation and 690 with animal traction.

Input requirements under traditional cultivation are limited to 10 kgs of seed per hectare at 65 FCFA/kg. Under improved manual and improved animal traction techniques, seed requirements are 25 kgs per hectare. Fertilizer use is 50 kgs of STP @ 35 FCFA/kg.** Insecticide treatment is estimated at 1200 FCFA per hectare.**

Research has shown that cowpeas used in rotation with millet increase millet yields by 200 kgs/ha after 1 year of cowpeas. This nitrogen value is added to the crop production for farm budget studies as 200 kgs. of millet at a 10% discounted price (1 year lag) or 45 CFA/kg. Under traditional practice this volume is given 50 kgs increase at 45 CFA/kg.

Because cowpeas are planted later than millet, it is assumed the "farm" labor can grow 1 hectare of pure stand cowpeas with manual labor (100 hrs/ha) and 2 hectares with animal traction (60 hrs/ha). Cowpeas, when they are grown for grain, can introduce some labor competition for millet production particularly if the entire season is delayed due to late rains.

An alternative to growing cowpeas for grain would be to attempt to introduce cowpeas strictly as a forage crop. In this case, the economic value will be a function of the food conversion of cowpea hay to live meat (cattle or sheep), which will be related to market values for animals. For example, a yield of 3000 kgs of hay/ha and a feed conversion ratio of 25:1 would yield 120 kgs of beef. At a liveweight price of 250 CFA/kg the gross per hectare yield is 30,000 CFA (equivalent to 600 kgs of millet at 50 CFA/kg). For hay, cowpeas are planted thicker, require less weeding and no insecticide. Thus the labor requirement would be about 30 days/ha (hand harvesting of seed is eliminated as is insecticide application and 1 or 2 weedings). The production costs would be seed (50 kgs x 65 CFA = 3250) and fertilizer (50 kgs P_2O_5 x 35 CFA =1750 CFA) for a total production

** Subsidized prices

cost of 5000 CFA/ha. The net return (25,000) would yield 833 CFA/manday labor. The nitrogen residual will still be gained.

B. Land Use and Farm Incomes.

The agricultural study of the three arrondissements in the project zone done in 1979[4] indicated the average farm size was 3.22 hectares, with a low of 2.56 hectares in Ouallam and a high of 3.69 hectares in Niamey. Although these are preliminary data, they indicate a farm size much smaller than the 6 hectares per farm found in a 1960-61 study[5] and postulated in earlier project analysis. Further, over 50% of all farms may have less than 3 hectares of cultivated area. Table 1 summarizes farm and crop data for the NDD project zone.[6]

It is possible that this data may understate both farm size and total cultivated area in the project zone. Agricultural studies in 1977 and 1978 indicated larger farm sizes. Also the studies conducted in the early 1960's indicated farm size in the Zarma zone to be over 6 hectares on the average. If farm sizes have declined to the levels indicated by the 1977 study, it may imply that expanding population has not expanded total acreage, but rather reduced farm size, as more farm units were established.

The understatement hypothesis is also supported by extrapolating from the project zone to the whole of the Niamey Department. Using the 300 kgs/ha yields on millet and assuming the same farm sizes breakdown Department-wide, gross production would result that is 30-40 percent below GON estimates. The yields, as presented by project staff, could be low, or acreage could be greater. Additionally, GON total production estimates may be slightly overstated. Reality may be a combination of all three.

For project analysis, understating present yields presents no problems as our project benefits are based upon known incremental gains. If farm sizes are larger than those used for the analysis it could mean that more larger farms, i.e., those over 6 hectares, exist in the project zone than have been calculated. This would allow more use of animal traction as a viable option than are calculated for the life of the project. Labor studies, however, caution against assuming too much greater a cultivated area by farmers.

Typically over 50% of the farms have less than 1.5 hectares of cultivated land per male worker. As men perform all of the field work on cereal fields in the zone, except for seeding, male labor availability per hectare may cause labor constraint problems during critical periods such as weeding. On the other hand, the economic viability of animal traction will depend on the acreage expansion that animal traction will allow or the improvement in yields due to better or more timely cultural practices.

Table 2 gives estimates of labor time required for millet production in Niger by month and by operation. As can readily be seen, the critical periods June, July and October limit the land that a farmer can cultivate.

The data, taken from a 1965 study[7] are for traditional cultivation, and show the constraints around planting, weeding and harvest time.

Although wide differences in labor input between farmers exist,[8] it appears that labor constraints limit farm size to about 2 hectares per male worker, if land is not constrained. If more land is available, animal traction can allow expanding farm size. There is some evidence of increasing per hectare yields with animal traction however as results of tests are not definitive, a conservation approach has been taken. The economic viability of this input tends to be based mainly on increased acreage.

Production value of major crops grown in the zone, as noted in Table 1, indicates a per capita value of about U.S. $50 per year. Farm income/budget studies are unavailable for the project zone, therefore income from livestock enterprises, crafts or hired labor is unknown. In some years income from off-farm employment especially by migration to other countries can be substantial. For example in Arouna Hamidou Sidikou's study[9], he reports that in 1975, 23,736,467 FCFA (approx. $118,682) in postal money orders was cashed in Ouallam. In January of 1976, 3,101,306 FCFA ($15,506) of postal money orders was cashed in Ouallam from the Ivory Coast and Benin and 550,350 FCFA ($2,752) from Togo. Although direct comparisons are not strictly valid, studies in Upper Volta on labor migration[10] indicate that only about 15% of total repatriated earnings came in the form of postal money orders. However, if the situation is similar in Niger, then outside earnings coming into the Ouallam area could have reached $791,213 in 1975 and $1,460,640 in 1976. This would represent $5.50 and $10 per capita in these years or an addition to average farm income of $38.50 and $70.00 respectively. These figures must be viewed with caution. The exact makeup of migrant labor savings and transfers is unknown and the data represents only one year in one town.

Livestock income could perhaps be imputed by using estimated take off rates for the various types of livestock. However, it is difficult to relate this directly to average farm incomes, as livestock holdings are very uneven. 1977 data[11] indicated that in Niamey arrondissement the percentage of farms with cattle, sheep or goats was 15, 17 and 17% respectively while Filingue farms were 16,14 and 30% and Ouallam 33,20 and 25%.

Actual numbers in holdings range from a high for cattle of 6.5 animals per farm in Niamey to a low of 2.6 head in Ouallam, while goats are highest in Filingue with 13.7 per farm and lowest in Ouallam with 3.5. Whether the same farms hold all three types of stock or not is unknown, but farms holding some type of livestock range from 26% in Niamey to 39% in Filingue.

World Bank reports[12] indicate that crop income was $66.41 per capita in Maradi and that livestock increase this by 22% or about $16.61. In Dosso farm incomes were reported as $665 for rainfed crop income, with livestock about 17% of that figure, and total farm incomes about $840 for

7 people or $120 per capita. From studies of other areas in Niger[13] we can assume that total per capita production should be about $ U.S. 100 per year.

C. Animal Traction.

Animal traction using either oxen or donkeys is being promoted under the first phase of NDD. This effort will continue under Phase II, but it is assumed that it will only be adopted on the larger farms with at least 6 hectares of cultivatible land.

Although detailed cost/benefit analyses are difficult to find concerning the use of animal traction, it appears that its high cost makes animal traction marginal at best on smaller farms and only slightly improves the cash flow on larger farms. Farm size and labor availability become key factors in the consideration of animal traction.

Table 3 compares labor requirements under traditional methods with thoseunder improved methods and use of oxen. For the purposes of analysis we attribute a 15% yield increase with the use of oxen over the improved yields under only hand labor. This increase, although not completely verified, is attributed to the "scarifiage" (deep prerain harrowing) which permits better incorporation of phosphate fertilizer and moisture conservation of early rains, according to research. It is possible that further yield increases could result from more timely weeding, particularly in heavy rainfall years, but this has not been adequately tested.[14]

Table 4 incorporates data from Tables 2 and 3 to construct an annual field work calendar for millet cultivation. Considering land preparation as a capital investment (i.e. cutting trees or pulling stumps which need not be done every year) or an activity that can be spread over the Dec-May period, the land constraint for oxen employment would be about 15 hectares; i.e. constrained by work requirements during the months of June, July, and August. However, it would be an exceptional year and a well planned farm calendar that would permit weeding to be spread over a 30 day period. In most cases research indicates that the second weeding should follow the first in 12-15 days. Thus, considering millet alone, the constraint would be imposed with about 7.5 hectares. Considering again the weeding season, our maximum manpower need with oxen is 2.75 men. If the same men cultivated without oxen they could cover approximately 5.5 hectares; with oxen they can cover 7.5 hectares. Oxen thus increase total farm area by 2 hectares, or an overall production total of 1200 kgs of millet (plus a 15% increase as noted above).

Oxen can also be used for other work besides crop cultivation. Figures vary widely from region to region, but for transport purposes it is possible for a farmer with 2 oxen and a cart to earn about 1500 FCFA/day. If we assume a farmer can find 30 days of transport business then a total transport income of 45,000 FCFA per year is possible. Renting oxen

for custom plowing or weeding will also undoubtedly occur as well. However, the extent of this demand in the project zone is unknown and is therefore not added at this time.

Table 5 gives farmer costs for oxen and equipment. Assuming a 4 year loan with a 10% downpayment, one year of grace and 3 annual installment payments at 10% compounded interest,the farmer repays over 70,000 CFA per year in years 2 through 4. This debt burden would require over 1400 kgs of millet at the current 50 CFA/kg prices. Under traditional cultivation with 300 kgs/ha yields, the repayment would require 4.67 hectares of production. Assuming improved yields of 600 kgs (or 690 with animal traction), 2.33 hectares of production are required to retire the debt (2 hectares with animal traction) plus an additional .5 hectare to cover fertilizer costs.

Over time, oxen traction becomes profitable for the larger farmers with additional land available to cultivate and possibilities for oxen transport. Table 6 shows a cash flow position for a large farmer with 7.5 hectares of millet, and 2 hectares of niebe (cowpeas) using animal traction. The farmer would be an ideal situation, maximizing use of both men and animals. It would also be receiving yields of 690 kgs on both millet and cowpeas. Animal health is assumed excellent and equipment breakdowns minimal. Reducing our overall cash flow by 105,000 CFA to cover additional fertilizer costs (subsidized price for fertilizer on expanded hectarage over manual methods), the farmer would average 131,303 CFA per year ($656).

In reality, we could expect both lower acreage and yields in the early years, and more equipment breakdowns as both farmer and oxen receive training. In some studies, for example, production or acreage increases of only 5-10% per year in the initial years of converting to animal traction are shown. Thus a farmer starting with six hectares would increase acreage by only about 1/2 hectare per year until the maximum acreage was reached. Gross returns would thus increase by only about 15,800 CFA per year, reaching 75,000 in year 5, where the debt servicing would be possible.

Again even under these more conservative estimates, transport income can help cover debt payments. However, it is important to consider that a saturation point might be reached in an area with too many carts, thus seriously reducing potential income from transport.

II. Target Group:

The target group of beneficiaries includes the approximately 60,000 farm families in the project zone. However, the project will begin with a limited number of farmers who are chosen by cooperative members to attend the CPTs. Through the expanded and strengthened extension services and cooperatives, a multiplier effect is planned that will reach ever increasing numbers of farmers. As the core of the technical package is not specific to farm size, with the exception of animal traction, all farm families have similar access to project benefits.

Table 7 presents the expected multiplier which is used for economic analysis. It should be noted that the multiplier will have its greatest impact from 1986 to 1990. It is expected that the numbers of new adopters will begin to level off after 1993 at which point about 33,000 farms will have been reached, about 65% of the existing farms. Further expansion of either modern farms or increased production will depend on new technology.

Farm Acreage and Production Projections:

Using the farm size groupings as presented in Table 1, and the expected adoption rate of Table 7, we project output in Table 8. This projection expects adoption rates by larger farms (6 plus hectares) to be greater than medium farms (4 hectares) or small farms (2 hectares) in the early years. However, as larger farms are limited in number and their numbers are not expected to increase, a shift should occur in the late 80's whereby increasingly small and medium farms constitute the majority of new adopters. Approximately 4% of all farms covering 7% of the cultivated acreage should be adoptors by 1985. This should increase to 47% of farms and 70% of acreage on a 1979 basis by 1990.

We should expect a 10% increase in production over the 1979 base by 1985 and an 85% increase by 1990.

Comparisons of farm income under traditional methods and improved methods are shown on Table 9. In all three cases both net income and returns to labor are greater with the improved method. Animal traction shows the greatest return per day of labor. However, it must be cautioned that this is valid only on larger farms and must be viewed relative to the data presented in Table 6.

III. Prices:

1. Production.

The prices of millet and sorghum used for analysis are the C.I.F. price of sorghum in Niamey estimated as follows: U.S. sorghum price equals $2.75/56 lbs bushel. Freight charges $348.88 per metric ton less Cotonou port surcharge by American carriers of $44.20 per metric ton.

Sorghum FOB U.S.	21.65 CFA/kg
Ocean Freight, inland	
Freight, insurance	69.77
Less port surcharge	- 8.84
C.I.F. Niamey	82.58 CFA/kg

The price was therefore approximated at 80 CFA per kilogram for millet and sorghum,which is presently about 160% of the official price.[15]

The price of cowpeas was established from World Bank analysis as the export value to Nigeria of 67 CFA/kilogram.

The price for beef was estimated at 200 CFA/kilogram live-weight for young or thin animals and 250 CFA/kilogram live-weight for older and fatter animals. This would correspond to $.45 per lb and $.57 per lb respectively. These are considerably below U.S. prices which range from $.65 to $.80 per lb for similar beef. However, they are probably within range of import prices of beef in the coastal countries. As neighboring countries' demand generally determines the price level, these prices were accepted for economic analysis.

2. Inputs.

In general, inputs have been valued at C.I.F.Niamey prices or local market prices for the 5-year life of the project. For the recurrent cost components after the project investment period, adjustments were made where it was felt that future inputs would be cheaper. This is most notable in the case of fertilizer which is budgeted at $600 U.S. per metric ton, the latest actual cost quotations of NDD I in Aug 1980. Fuel costs have been calculated at pump prices as opposed to border prices, thus taxes are included. This compensates for subsidies that the government occasionally pays when import prices rise and fuel prices are held constant.

3. Inflation.

For analysis of the internal economic rate of return, prices of the cost and benefit streams are presented in current value. This represents the problem of presenting differential rates of inflation for project inputs and outputs. It is certain that prices will rise. Niger's inflation rate is presently about 10-15% and international inflation rates affecting project inputs, both investment and recurring range from 6 to 20% depending on origin. The major expenditures that will be influenced by inflation are vehicles, fertilizer and energy costs of the FX components and GON wages for the local cost components.

The prices of outputs, cereals and red meat are likely to rise, particularly considering population growth rates and limited production potential in West Africa. It is assumed that Nigeria's large demand for foodstuffs coupled with an expanding economy due to oil revenues will offset any softening of prices that would occur in the case that Niger's goal for food self sufficiency is attained. In fact, considering studies such as that done by the World Food Council, the FAO or the President's "Global 2000", it is likely that real food prices will rise over the next two decades.

Of course rising real prices for food stuffs would have a pull effect upon prices of inputs to food production. However, considering that land is generally not traded in the market place in Niger, Niger should be put in a favorable position vis-a-vis surplus food producers. Other producers will bid up land prices in the face of rising prices of production, thus restricting the value of the marginal ouput of other production inputs,[16] most notably fertilizer. This should have a positive effect on Niger's real farm wages which is a long term GON goal.

Thus, if we included inflation for purposes of project analysis at equal rates for both inputs and outputs, it would result in a decidely positive effect on the internal economic return.

IV. Economic Analysis Computations.

1. Benefit Streams.

The benefit streams from the project derive from five main sources: (1) production on the CPT's, (2) residual effect of nitrogen fixation by expanded surface under cowpea production, (3) oxen traction, (4) on-farm cattle feeding, and (5) increased crop production from use of recommended practices.

CPT production is the gross value of production of 15 hectares of millet, 5 hectares of sorghum, 2 hectares of cowpea grain and 3 hectares of cowpeas hay on each of ten CPTs. Production costs are included in overall project investment and recurrent cost categories because CPTs are primarily training centers.

The residual effect of nitrogen assumes a 200 kg increase in millet one year after cowpeas have been grown in pure stand. This level is supported by research done under the National Cereals Project. In this case it is counted as a benefit equivalent to the economic value of the millet as seen in Table 10, as opposed to the fertilizer savings that could be gained.

Oxen traction derives an economic benefit from two sources: (1) the assumed 15% increase in yield on fields where it is used and (2) the value added due to increased meat production (weight gain of oxen) in the zone. The former is subsumed in the production levels shown in Table 8. The latter is shown in Table 11. Deductions have been made for animal purchase, equipment purchase and animal maintenance as seen in Table 11. Thus a negative benefit stream results for the first 10 years as noted in overall benefit streams.

On farm cattle feeding was started under Phase I and will continue under Phase II. This activity continues at the present level of 300 head per year and expands to 1000 by 1985 and 2000 by 1990. By the end of the project between 500 and 1000 farmers should be able to participate in this

activity. The benefit stream is net of animal purchases and external feed and veterinary costs. Thus the benefit stream represents both a use of farm by-products and other unused feed in the zone. The benefit stream is summarized in Table 12.

Finally the benefit stream of improved crop production techniques is shown in Table 13. This benefit stream is the gross effect, subtracting the "without project" production from the "with project" production levels, valued at the economic price. Production costs are included in other investment and recurrent cost projections.

The 5 benefit streams and an adjusted gross benefit stream are given in Table 14. No secondary benefits have been calculated. In addition benefits from literacy training, cooperative development or women's programs are not included in the overall benefits for economic analysis.

2. Cost Streams.

Gross costs are given in Table 15. For the first 5 years of the project gross cost streams represent the cost factors budgeted for the project. GON costs are included where they are clearly project related. More general and administrative costs, i.e. prorata cost for the Ministry of Rural Development, are not included.

For the period after 1985, the cost categories are calculated recurrent costs that would be needed to sustain project activities. Again these do not include general and administrative cost items.

It should be clearly noted that a farmer labor value has not been included in the cost streams. This is not because we assume the marginal productivity of farm labor is zero. Rather, it reflects the fact that our farm units were built around farm labor availability. Thus overall project labor constraints are avoided although between farm labor costs could occur.

Opportunity cost of labor presents a more difficult problem. Availability of off-farm employment opportuities are unknown, although certainly some urban or coastal opportunities should exist. In areas where land is not constrained, simply expanding acreage would give a farmer production that would yield an opportunity cost for labor requirements of the more intensive cultivation of the technical package. This value would lie somewhere between 200 and 400 CFA per day,* and should probably be applied against some of the days in June, July and October. However, the cost in soil depletion or vegetation degradation due to expanding acreage would have to also be estimated.

Using the acreage found in Table 8, and multiplying by 17 days additional labor as noted in Table 3, and costing this at 300 CFA/day, lowers annual benefits by 20%. Sensitivity analysis indicates this would lower the internal economic return by approximately 5% (see Table 17).

*calculated as $\frac{\text{yield of prod. x price}}{\text{labor in mandays/ha}}$ = day wage

3. Internal Economic Rate of Return

Table 16 summarises the cost and benefit streams for the project and presents a cash flow. The analysis is done over a 20-year period which is assumed to be the life of the capital investment. Residual values added in the last year are only for oxen and cattle feeding as noted in Tables 11 and 12. The internal economic return thus presented is 24.8%.

Sensitivity analysis was done to test the possibility of both reduced benefit streams and increased costs. Reducing benefits by 20% while holding costs constant yields an economic return of over 20%. Increasing costs by 20% while reducing benefits by 20% yields an economic return of over 15% (Table 17). Graph I shows the effect of holding either costs or benefits constant as estimated while lowering benefits or raising costs. Costs can rise to 140% of estimates in Table 15 with projected benefits of Table 14, or benefits can fall to 60% of projections in Table 14 with estimated costs of Table 15 and still yield 12% economic rate of return.

Thus such things as a periodic drought every 5 years, lower than average expected yields or acreage, or higher operating costs, will not overly effect our positive results. The most crucial factor affecting the economic yield is achieving the multiplier effects which requires timely delivery of inputs and effective farmer follow-up by the extension service.

V. Marketing.

The Office des Produits Vivriers du Niger (OPVN), under the Ministry of Economic Affairs, Commerce and Industry, was established in 1970 by the GON as the official marketing agency for grain. By law, cereals marketing is the monopoly of OPVN. An interministerial National Cereals Committee fixes buying and selling prices for cereals, the official marketing channels, and the terms of operation of OPVN each year based on OPVN's recommendations. The marketing margins established by OPVN are supposed to reflect marketing costs.[17]

OPVN uses cooperatives, private traders and, more recently, traditional chiefs to purchase cereals from farmers. OPVN stores cereals and redistributes them to deficit areas and urban centers. OPVN's total storage capacity was 82,200 tons in 1979 with 15,500 tons in Niamey Department.

Although OPVN theoretically operates the grain trade from a monopoly position it is evident that private merchants account for the bulk of the grain trade. The proximity of markets in neighboring countries, the ease with which borders can be crossed. and past pricing policies which have often set official arm gate prices below market demand determined prices ensures that private traders will continue to play a major role in cereals marketing.[18] The Societe Nigerienne d'Arachide (SONARA) handles cowpea as well as peanut marketing. SONARA is a mixed venture with 90% government capital. It buys from cooperatives and private merchants and treats and

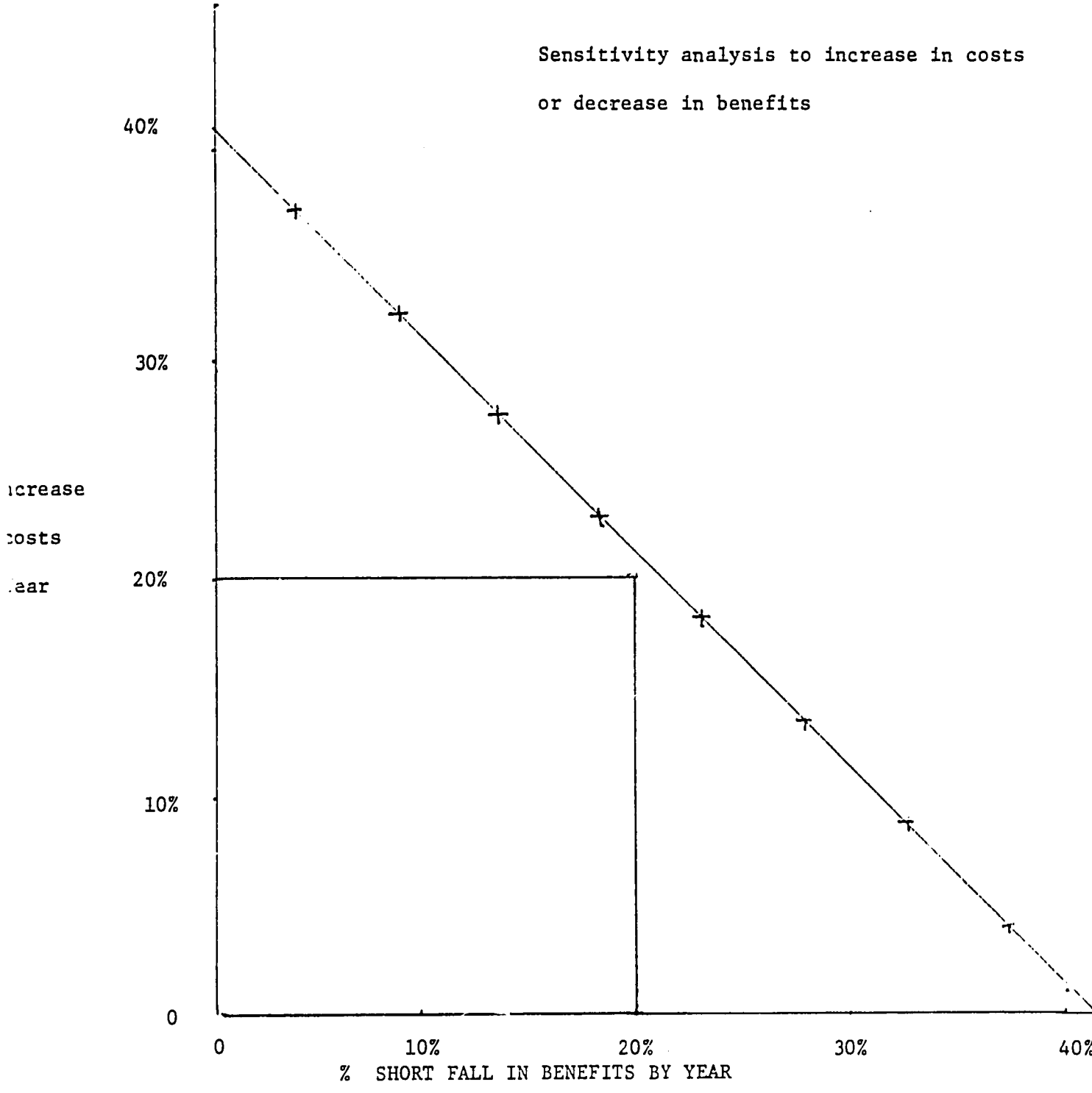
GRAPH I

Niger - Niamey Department Productivity

Project Phase II

Sensitivity analysis to increase in costs

or decrease in benefits



Maximum expected rise in costs _____20%

Maximum expected shortfall in benefits ____20%

Cost switching point ≅ 41%

Benefit switching point ≅ 42%

Target Yield is ——x——x——x——x——x——x—— 12%

stores cowpeas for delivery for export or local processing. Due to difficulties in storing cowpeas it appears that private merchants have been less involved in the cowpea marketing system.

Livestock marketings is managed through a traditional private system either for local (within village area) or export (outside of village zone or for foreign export) markets. Herdowners will sell livestock directly or through professional middlemen. These may be purchased by local butchers, large urban butchers or large traders. Traders in the project zone may sell to urban butchers or the government slaughterhouse or export livestock to coastal markets. Grain and livestock marketing is also actively pursued by farmers in inter- and intra-village trading.[19] It is common for an active grain trading period to exist at harvest time or shortly thereafter. Some farmers, pressed for cash, may sell grain, while other farmers with adequate cash reserves buy grain to increase stocks for consumption or speculation. Livestock are actively traded as farmers often invest surplus cash in animal, buying when cash reserves are high and selling when cash expenses increase. Thus livestock becomes a savings mechanism for rural families.

It has been found that grain production and marketing is not very responsive to prices in Niger.[20] It appears that quantities marketed by farmers are more closely related to on-farm stocks. Thus we could expect market volumes to increase very little as production rises in the early years of the project. Until on-farm stocks reach levels which farmers require for security, grain marketing will probably be limited strictly to needs for cash. Given the growth of urban areas, particularly Niamey, in the project zone, disposing of excess production should pose no problems and the marketing mechanisms should easily cope with the volumes through the next decade.

Footnotes to Text

[1]Enger, et al, Niger Agricultural Sector Assessment, USAID/Niger, 1980 draft.

[2]The technical package includes use of fertilizers, plant density, seed treatment, weeding practices, selected seed and timing of cultural operations as recommend from research (INRAN & IRAT) over several years of testing. The package has had minimal on-farm testing. See Niger Ag Sector Assessment, op. cite.

[3]Latest actual price quotations for fertilizer C.I.F. Niamey are $600 per metric ton, NDD I July, Aug 1980.

[4]Enquête Agricole 1979 preliminary data. Analysis of their data was done by F. Stier for the P.P. design team, August 1980.

[5]Raulin, H., Enquête Socio-Economique Rurale 1961-1963, Republique du Niger, Etudes Nigeriennes 14, IFAN-CNRS. See also Enquête Agricole au Niger, INSEE, Paris 1970 edited by M. Louis Marciniak. This study appears to draw on the base line data used collected in Raulin's study.

[6]Stier, F. from review of Enquête Agricole 1979, op.cite.

[7]Republique Française, Ministere de la Cooperation Techniques Rurale en Afrique, No. 21, "Les Temps de Travaux," Annex 1 & 2, BDPA, 1965.

[8]See Agriculture Sector Assessment, op. cite, Part II Sec. B. Differences from 29 to 176 mandays of labor per hectare for millet production were reported in ome study. It might be interesting to determine the marginal productivity in traditional cultivation and this as related to production under the improved method.

[9]Arouna Hamidou Sidikou, Maitre-Assistant, University of Niamey, "The Zarma people of Zarmengandi: Their adaptive strategy, and its limits, in the face of Current Drought (1965-1976)." Report for the conference on the aftermath of drought in Nigeria, April 1977.

[10]ORSTOM, Enquête sur les movements de population a partir du pays Mossi (Haute-Volta), Paris 1976. The ORSTOM study reports that earnings were repatriated in a variety of ways, the most important of which were through trade goods brought back for petty commerce, consumer durables and cash carried back by the migrant.

[11]Republique du Niger, Ministere du Developpement Rural, Service de l'Agriculture, Section Statistique "Enguête Agricole 1977".

[12]Staff reports on Maradi and Dosso Departments.

[13]Ag Sector Assessment 1980 op.cite., Section D.

[14]Sleeper, Jonathan Arthur, An Economic Analysis of the Role of Ox-Plowing and Cattle-Feeding in the Stratification of West African Livestock Production-1979, Univ. of Mich, CRED. See also Meritt Sargent, et. al., "An Assessment of Animal Traction Schemes in Sahelian West Africa", REDSO/WA 78-144, Aug 1980, MSU, mimeo.

[15]The official selling price of the GON grain agency (OPVN) was raised to 60 CFA on Oct 1, 1980, making the economic (border) price about 133% of the official selling price.

[16]Niger's farmers are not required to service increasing land debts, thus they can afford greater costs for other production factors such as fertilizer, i.e., under usufruct, rent is seldom a cost factor.

[17]See Niger Ag Sector Assessment, Section F, op.cite., for more detailed market analysis.

[18]World Bank Staff reports op.cite. (note 12).

[19]Niger Ag Sector Assessment, Section D, op.cite.

[20]Ibid, Section F.

Table 1 Niger - Niamey Department Development Project Phase II
Farm and Crop Data in Zone

	Niamey	Filingue	Ouallam	Say	Totals
Total Population 1/	147083	208234	143834	95062	594213
Total Population in Zone 2/	38300	150500	90800	27300	306900
Farm Population 3/	36385	142975	86260	25935	291555
Persons per Farm Family 4/	7.1	6.1	5.1	7.0	5.9
Farms/Families	5124	23438	16913	3705	49180
Total area cultivated 5/	26647	114849	87951	29640	259086
Planted area 5/	18961	82034	43976	14820	159791
Fallow area 6/	7686	32814	43975	14820	99295
Farm Size 4/	5.2	4.9	5.2	8.0	5.27
Cultivated 4/	3.7	3.5	2.6	4.0	3.25
Fallow	1.5	1.4	2.6	4.0	2.02

1/ From preliminary 1977 census data.

2/ From N.D.D. I final report.

3/ 95% of total Pop. in Zone

4/ From preliminary data 1979 Enquete Agricole - MDR, except SAY, estimated.

5/ Calculated from farm size data - note 4.

6/ As % of cultivated, 40.5% Niamey, 40% Filingue, 100% Ouallam & Say.

Table 1(cont'd)

	Niamey			Filingue			Ouallam			SAY	Totals
Farm Size 4/		5.2			4.9			5.2		8.0	5.27
Cultivated 4/		3.7			3.5			2.6		4.0	3.25
Fallow		1.5			1.4			2.6		4.0	2.02
Farm Size Divisions - Cult. in Ha.	0-2.9	3-5.9	6	0-2.9	3-5.9	6	0-2.9	3-5.9	6		
Farm Size Ave. in Div. - Cult. Ha.	2.3	4.5	7.1	2.2	4.3	7.0	1.7	3.9	6.8	8	
Farms in Division No.	2884	1358	886	13828	5602	3961	12008	3230	1810	3705	49272
Total acreage Cult. in Div. Ha.	6598	6116	6290	30421	24088	27727	20413	12597	12300	14320	161370
Crop Production/metric tons											
Millet 7/	1979	1834	1887	9126	7226	8318	6124	3779	3690	4446	48409
Cowpeas 8/	165	153	157	1399	1108	1275	265	163	159	111	4955
Sorghum 9/	99	92	94	456	361	416	306	189	185	222	2420
Total Cereals	2243	2079	2138	10981	8695	10009	6695	4131	4034	4779	55784
											Kgs/hab.191
Crop Value/1000 CFA											
Millet	98950	91700	94450	456300	361300	415900	306200	188950	184500	222300	2420450
Cowpeas	10725	9945	10205	90935	72020	82875	17225	10595	10335	7215	322075
Sorghum	4950	4600	4700	22600	18050	20800	15300	9450	9250	11100	121000
Totals	114625	106245	109255	570035	451370	519575	338725	208995	204085	240615	2863525

7/ Estimated yields, millet 300 Kgs/ha.
8/ Cowpeas intercropped on 2/3 of millet and yields 100 Kgs/ha. Enquete 1977, 78, 79.
9/ Sorghum intercropped on 1/3 of millet and yields 100 Kgs/ha. Enquete 1977, 78, 79.

Source: compiled from data 1979 Enquete Agricole.

TABLE 2 - ESTIMATES OF MANDAYS REQUIRED IN

AGRICULTURAL OPERATIONS/HECTARE - NIGER

OPERATION	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Land Preparation	2	3								5
Sowing			5	2						7
Thinning & Weeding			10	5						15
Weeding				8	6					14
Harvest						6	16			22
Finish (Transport, store, etc)								6	3	9
TOTAL	2	3	15	15	6	6	16	6	3	72

Source: Les temps de travaux, 1965 cited in 1980 Ag. Sector Assessment, USAID/Niger, draft.

TABLE 3 Comparison of labor requirements under traditional and improved cultivation practices and with animal traction (6 hour) days/hectare - millet.

Activity	(1) Man days traditional no A.T.	(2) Man days Improved no A.T.	3 Diff 2-1	4 Man days with oxen	5 Oxen requirement, days	6 Diff on improved with oxen 4-2
Land Preparation 1/*	(5)	(6)	(+ 1)	(15)	(5)	(* 9)
Scarifiage	0	0	0	8	4	+ 8
Apply $P_2 O_5$	-	1	+ 1	1	0	0
Row Marking	-	2	+ 2	2	0	0
Seeding 2/	3	4	+ 1	4	0	0
Replanting	2	2	0	2	0	0
Thinning 3/	3	6	+ 3	6	0	0
Weeding (1) 4/	12	12	0	4	2	- 8
Apply Urea (1/2) 5/	-	2	+ 2	2	0	0
Weeding (2)	12	12	0	4	2	- 8
Apply Urea (1/2)	-	2	2	2	0	0
Weeding (3)	10	10	0	4	2	- 6
Misc, Transport) Fert, Treatseed)	-	2	+ 2	1	1	- 1
Harvest	22	24	+ 2	24		0
Transport & Storage	9	11	+ 2	* 2	2	- 9
Total	73	90	+ 17	66	13	- 24

Source: Table 2 ; 1979 Ag Sector assessment Vol II Sec B: Dir. CFJA N'Dounga; Days are estimated from review of these and other sources.

1/ Land preparation should be considered a capital cost when fields are used over several years. Higher labor requirements under A.T. are assumed necessary for better stump and root clearing. This item is not added in totals.

2/ Seeding requires more accuracy and higher density.

3/ Thinning to three plants per hill, higher density on improved.

4/ Weeding is often done only twice (occassionally once) but 3 times are often needed.

5/ Urea should be placed around hills. Often it is broadcast which takes less time but gives lower yields.

TABLE 4 Estimated labor and oxen requirements

For millet cultivation using animal traction

	Apr.	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Land Prep. 1/	(7)	(8)								(15)
Scarifiage	4	4								8
Apply P_2O_5		1								1
Row marking		1								1
Seeding			4							4
Replanting				2						2
Weeding			4							4
Thinning			3	3						6
Apply urea				2						2
Weeding				4						4
Apply urea					2					2
Weeding					4					4
Misc. Transport Fert,Treatseed	1	1								2
Harvest						9	13	2		24
Transport & Storage								2		2
	(1)	(14)								(81)
Man days/ha	4	6	11	11	6	9	13	4		66
Oxen days/ha	(5)4	(5)4	2	2	2			2		16
x 15 ha MD	165	210	150	165	90	135	195	60	45	
man(30 day)	5.5	7	5	5.5	3	4.5	6.5	2	1.5	
Oxen x15 ha	75	75	30	30	30	0	0	30		
Oxen(2)30 days	2.5	2.5	1	1	1			1		

1/2 [MD. man]	3.75	3.5	2.5	2.75	1.5	2.25	3.25	1
Oxen	1.25	1.25	1/2	1/2	1/2	0	0	1.5

1/ Non-add item, considered primarily as a capital investment item.

Source: Tables 2 & 3

TABLE 5

Animal traction with oxen, cost factors.

	Prices CFA subsidized	unsubsidized
Oxen cost 1/	100 000	100 000
Equip. cost 2/	61 000	152 725
Total	161 000	252 725

1/ Two 3yr old oxen approximately 250 kgs each at CFA 200/kg - 50 000 each.

2/ Includes multicultivator main frame, spring tooth harrow with five shovels, peanut lifter/cultivator plow, ox cart, yoke and chains.

Farmer costs by year, oxen traction, CFA

	Cost	Interest 3/	Payment 4/	Debt Balance
Year 0	161 000		1610	159390
Year 1		15939	-0- 5/	175329
Year 2		17533	70502	122360
Year 3		12236	70502	64094
Year 4		6409	70503	-0- -0-
Total	161 000	52117 6/	213117	

3/ Interest at 10% / annum

4/ 10% down payment at receipt of loan

5/ 1 year grace on loan payment with compounded interest

6/ Interest amounts to 32.3% of initial loan, over four years averages approx. 8.09% straight interest per year over 4 year period.

Table 7

Niger - Niamey Department Development Project Phase II
Expected Rate of Technology Adapters

	Phase I		Phase II																			
Adapters/Year	1979	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	200
CPT Graduates 1/	20	60	60	60	140	200	200	200	200	200	200	200	200	200	200							
2nd year adapters			20	80	140	200	340	540	740	940	1140	1340										
3rd year adapters					20	100	240	440	780	1320	2060	3000										
4th year adapters							20	120	360	800	1580	2900										
5th year adapters									20	140	500	1300										
6th year adapters											20	160										
Total yearly	20	60	80	140	300	500	800	1300	2100	3400	5500	8900	2/									
Total Accumulated		80	160	300	600	1100	1900 3/	3200	5300	8700	14200	23100 4/	27000	31000	33000							

1/ Based on 3 existing CPTs and 7 new CPTs each producing 20 graduates per year when fully operational.

2/ The expansion rate will become somewhat constrained due to conservatism, small field size, marginal lands, minor crops.

3/ Represents 3.9% of farmers in zone in 1979, 7.5% of surface cultivated in 1979.

4/ Represents 47% of farmers in zone in 1979, 71% of surface cultivated in 1979.

Table 8 Niger - Niamey Department Development Project Phase II
Farms, Acreage and Production Projections, 1981-1985

	Phase I	Phase II									
	1979	80	81	82	83	84	85	86	87	88	89
No. of farms to 1985 1/	20	80	160	300	600	1100	1900	3200	5300	8700	14200
Small 20%		16	32	60	120	220	380	580	1090	1990	2490
Medium 30%		24	48	90	180	330	570	1170	1760	3260	7260
Large 50%		40	80	150	300	550	950	1450	2450	3450	4450
Acreage - Ha's(modern)			1016	1905	3810	6985	12065	18795	32495	49895	76295
Small 2			64	120	240	440	760	1160	2180	3980	4980
Med. 4			192	360	720	1320	2280	4860	7040	13140	29040
Large 9.5			760	1425	2850	5225	9025	13775	23275	32775	42275
Ave. Farm size			6.4	6.4	6.4	6.4	6.4	5.9	6.1	5.7	5.4
Fertilizer. metric tons 2/			91.2	171	342	627	1083	1777.5	2934.5	4489.5	7041.5
Small			6.4	12	24	44	76	136	236	416	718
Medium			16.8	31.5	63	115.5	199.5	409.5	616	1141	2541
Large			68.0	127.5	255	467.5	807.5	1232	2082.5	2932.5	3782.5
Animal traction units addition			80	70	150	250	400	500	1000	1000	1000
(large farms only) Accum.			80	150	300	550	950	1450	2450	3450	4450

1/ Number of farms from table 1, farm size division from table 2, farm sizes and production data from table 5.

2/ Based on using 50 kgs STP and 50 kgs urea per hectare on millet and 50 kgs STP on cowpeas.

Table 8 Niger - Niamey Department Development Project Phase II Cont'd

Farms, Acreage and Production Projections, 1981-1985

	Phase II 1990	91	92	93	94	95
No. of farms to 1985 1/	23100	27000	31000	33000	33000	33000
Small 20%	4390	6000	8000	10000	10000	10000
Medium 30%	13260	15000	17000	17000	17000	17000
Large 50%	5450	6000	6000	6000	6000	6000
Acreage - ha's (modern)	113595	129000	141000	145000	145000	145000
Small 2	8780	12000	16000	20000	20000	20000
Med. 4	53040	60000	68000	68000	68000	68000
Large 9.5	51775	57000	57000	57000	57000	57000
Ave. Farm size	4.9	4.8	4.5	4.4	4.4	4.4
Fertilizer. metric tons 2/	10369.5	11550	12650	13050	13050	13050
Small	1096	1200	1600	2000	2000	2000
Medium	4641	5250	5950	5950	5950	5950
Large	4632.5	5100	5100	5100	5100	5100
Animal traction units addition	1000	550	-	-	-	-
(Large farms only) Accum.	5450	6000	-	-	-	-

1/ Number of farms from table 1, farm size division from table 2, far sizes and production data from table 5.

2/ Based on using 50 kgs STP and 50 kgs urea per hectare on millet and 50 kgs STP on [illegible]

Table 8 Cont'd Niger - Niamey Department Development Project Phase II
Farms, Acreage and Production Projections, 1981-1985

	Phase I		Phase II										
	1979	80	1981	82	83	84	85	86	87	88	89	90	91
Production M.T. 3/			538.8	1010.3	2020.5	3704.3	6398.3	10386.7	17154.7	26154.7	39084.7	57339.7	65250
Millet S			38.4	72	144.0	264	456	696	1308	2388	2988	5268	7200
M			86.4	162	324	594	1026	2187	3168	5013	13068	23868	27000
L			414	776.3	1552.5	2846.3	4916.3	7503.7	12678.7	17853.7	32028.7	28203.7	31050
Cowpeas S			-	-	-	-	-	-	-	-	-	-	-
M			28.8	54	108	198	342	729	1056	1971	4356	7956	9000
L			110.4	207	414	759	1311	2001	3381	4761	6141	7521	8280
M.T.			139.2	261	522	957	1653	2730	4437	6732	10497	15477	17280
Value 4/													
Millet millions CFA			27	51	101	185	320	519	858	1308	1954	2867	3263
Cowpeas			9	17	34	62	107	177	288	438	682	1006	1123
Total			36	68	135	247	427	696	1146	1796	2636	3873	4386
000 $ 5/			180	340	675	1235	2135	3480	5730	8730	13180	19365	21930

3/ Production from Table 5.

4/ Market value of crop estimated at 50 CFA/kg millet and 65 CFA/kg cowpeas.

5/ 200 CFA - 1U.S. $

Table 8 Cont'd Niger-Niamey Department Development Project Phase II
Farms, Acreage and Production Projections, 1981-1985

	Phase II			
	1992	93	94	95
Production M.T. 3/	71250	73650	73650	73650
Millet S	9600	12000	12000	12000
M	30600	30600	30600	30600
L	31050	31050	31050	31050
Cowpeas S	-	-	-	-
M	10200	10200	10200	10200
L	8280	8280	8280	8280
M.T.	18480	18480	18480	18480
Value 4/				
Millet millions CFA	3563	3683	3683	3683
Cowpeas	1201	1201	1201	1201
Total	4764	4884	4884	4884
000 $ 5/	23820	24420	24420	24420

3/ Production from Table 5.

4/ Market value of crop estimated at 50 CFA/kg millet and 65 CFA/kg cowpeas.

5/ 200 CFA - 1 U.S. $

TABLE 9 A Farm crop production

Estimate of farm crop income/expense flow on farms of over 6 has with minum of 3 adult workers, manual and animal traction

	Unimproved		Improved manual		Improved animal tract.		
	Millet	Millet Cowpeas 1/	Millet	Cowpeas	Millet	Cowpeas	Cowpea Hay 8/
Hectares	6.75	2	5.5	1	7.5	2	4
Yield kg/ha	300	100	600	600	690	690	3000
Tot. Prod. kgs	2025	200	3300	600	5175	1380	12000
Value CFA/kg 2/	50	65	50	65	50	65	10 9/
Tot. Prod. value CFA	101250	13000	165000	39000	258250	89750	120000
Prod. costs							
Seed 3/	3375	1300	4950	1625	6750	3250	13000
Fertilizer 4/	-0-	-0-	19250	1750	26250	3500	7000
Insecticide 5/	-0-	-0-	-0-	1200	-0-	2400	-0-
Other	-0-	-0-	-0-	-0-	-0-	-0-	10/
Net Prod. Value	97875	11700	140800	34425	225250	80600	100000
Total labor days 6/	493	80	495	100	495	120	120
CFA/day	198	146	284	344	455	671	833
Combined net value	109575		144225		305850		325250
CFA/day labor	194		242		497		529
Residual of N in kgs of millet 7/		100		200		400	800
Price/kg 2/		50		50		50	50
Prod. Value of N from cowpeas		5000		10000		20000	40000

1/ Intercropped with millet or sorghum, cowpea data.
2/ Value at estimated market prices Sept. 1980. Official price for millet increased to 60 CFA/kg Oct.1, 1980
3/ Seed, Unimproved millet 10 kgs/ha 50 CFA/kg
Improved millet 15 kgs/ha 60 CFA/kg
Seed, Unimproved cowpeas 10 kgs/ha 65 CFA
Improved cowpeas 25 kgs/ha 65 CFA
Cowpea Hay 50 kgs/ha 65 CFA
4/ Fertilizer at subsidized price of 35 CFA/kg.
5/ Insecticide, Subsidized, est. of 1200 CFA/ha
6/ From table 3
7/ Value of nitrogen fixation from cowpeas rotated with millet in following year; 50 kgs of millet intercropped, 200 kgs of millet pure stand.
8/ Cowpea hay to be considered as alternative to cowpeas for grain.
9/ Value based on estimated 25:1 Feed conversion ratio and beef at 250 CFA/kg live weight.
10/ Cost of animal traction not included See tables 5 & 6.

TABLE 9 B Farm crop production

	Estimate of Farm crop Income/ expense flow. Farms under 3 has - (ave. 2 has.)				Estimate of Farm crop Income/ expense. For Farms from 3 to 6 has. (ave. 4 has.)			
	Unimproved		Improved		Unimproved		Improved	
	Millet	Millet Cowpeas 1/	Millet	Cowpeas	Millet	Millet Cowpeas 1/	Millet	Cowpeas
Hectares	2	2	2	-0-	4	2	3	1
Yield kgs/ha	300	100	600		300	100	600	600
Tot. Prod. kgs	600	200	1200	-0-	1200	200	1800	600
Value CFA/kg 2/	50	65	50		50	65	50	65
Tot. Prod. Value, CFA	30000	13000	60000		60000	13000	90000	39000
Prod. Costs								
Seed 3/	1000	1300	1800		2000	1300	2700	1625
Fertilizer 4/	-0-		7000		-0-	-0-	10500	1750
Insecticide 5/			-0-		-0-	-0-	-0-	1200
Other			-0-		-0-	-0-	-0-	-0-
Net Prod. Value	29000	11700	51200	-0-	58000	11700	76800	34425
Total labor days 6/	146	80	180		292	80	270	100
CFA/day	198	146	284	-0-	198	146	284	344
Combined net value	40700		51200		69700		111225	
CFA/day labor	180		284		187		300	
Residual value of N in kgs of millet 7/		100				100		200
Price/kg		50				50		50
Prod. Value of N from cowpeas		5000		-0-		5000		10000

1/ Intercropped with millet or sorghum, cowpea data.
2/ Value at estimated market prices Sept. 1980. Official price for millet increased to 60 CFA/kg Oct.1, 1980
3/ Seed, Unimproved millet 10 kgs/ha 50 CFA/kg
Improved millet 15 kgs/ha 60 CFA/kg
Seed, Unimproved cowpeas 10 kgs/ha 65 CFA
Improved cowpeas 25 kgs/ha 65 CFA
Cowpea Hay 50 kgs/ha 65 CFA
4/ Fertilizer at subsidized price of 35 CFA/kg.
5/ Insecticide, Subsidized, est. of 1200 CFA/ha
6/ From table 3
7/ Value of nitrogen fixation from cowpeas rotated with millet in following year; 50 kgs of millet intercropped, 200 kgs of millet pure stand.
8/ Cowpea hay to be considered as alternative to cowpeas for grain.
9/ Value based on estimated 25:1 Feed conversion ratio and beef at 250 CFA/kg live weight.
10/ Cost of animal traction not included See tables 5 & 6.

Table 10 Niger - Niamey Department Productivity Project Phase II
Calculation of Benefits due to Nitrogen fixation on cowpeas

	1979	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94 5/
Acreage in																
Cowpeas 1/	40	104	208	248	780	1430	2470	4070	6660	10160	16160	24160	27000	29000		
Tons millet Prod. 2/			20.8	41.6	49.6	156	286	494	814	1332	2032	3232	4832	5400	5800	5800
Value million CFA 3/			1.66	3.3	4.0	12.5	22.9	39.5	65.1	106.6	162.6	258.6	386.6	432	464	464
FX savings Urea 4/			.7	1.4	1.6	5.2	9.5	16.5	27.1	44.4	67.7	107.7	161.1	180	193	193

1/ From Table 8

2/ 200 kgs/ha lagged 1 year

3/ Economic Value of millet 80 CFA/kg

4/ Urea ratio to millet production increases - 1:3, millions CFA

5/ Constant benefit stream after 1993.

Table 11 Niger - Niamey Department Development Project Phase II
Calculation of Cost and Benefit streams of Oxen Traction

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Oxen-Animal Traction											
Purchase, head 1/	40	120	160	180	420	660	980	1420	2660	2980	3420
Sell, head	-	-		40	120	180	180	420	660	980	1420
Year Bal. head	40	120	160	140	300	500	800	1000	2000	2000	2000
Accum Hd.	40	160	320	460	760	1260	2060	3060	5060	7060	9060
Purchase, tons meat 2/	10	30	40	45	105	165	245	355	665	745	855
Sales, tons meat 3/				16	48	64	72	168	264	392	568
Bal (-) + tons meat	(10)	(30)	(40)	(29)	(57)	(101)	(173)	(187)	(401)	(353)	(287)
Value, millions CFA (-)+	(2.0)	(6.0)	(8.0)	(5.0)	(9.0)	(17.0)	(31)	(29)	(67)	(51)	(129)
Expense (millions CFA)											
Feed & Vet 4/	.2	.8	1.6	2.3	3.8	6.3	10.3	15.3	25.3	35.3	45.3
Equip purchase 5/			9.8	4.3	9.2	15.0	24.0	30.5	61	61	61
Income (millions CFA)											
Transport 6/	.2	1.0	1.9	2.8	4.6	7.6	12.4	18.4	30.4	42.4	54.4
Value Pre-project/end			.8								
Cash Flow 9/			(25.5)	(8.8)	(17.4)	(30.7)	(52.9)	(56.4)	(122.9)	(104.9)	(80.9)

1/ From requirements on table 3 and turnover rate table 6 .
2/ Oxen purchased at 250 kgs live weight at 200 CFA/kg.
3/ Oxen sold at 400 kgs liveweight at 250 CFA/kg
4/ Estimated at 5000 CFA/hd/year
5/ Equipment by requirements of Table 3, 10 year amortization
6/ 20 CFA per ton kilometer with one R.T. equals 20 kms in zone, 30 trips per year
FX savings from transport estimated at 50%

Table 11 Niger - Niamey Department Development Project Phase II Cont'd
Calculation of Cost and Benfit Streams of Oxen Traction

	1990	91	92	93	94	95	96	97	98	99	2000
Purchase	4660	4080	3420	4660	4080	3420	4660	4080	3420	4660	4080
	2660	2980	3420	4600	4080	3420	4660	4080	3420	4660	4080
	2000	1100	-	-	-	-	-	-	-	-	-
	11060	12160	12160	12160	12160	12160	12160	12160	12160	12160	12160
	1165	970	855	1165	970	855	1165	970	855	1165	970
	1064	1192	1368	1864	1632	1368	1864	1632	1368	1864	1616
	(101)	222	513	699	662	513	699	662	513	699	646
	33	104	171	233	214	171	233	214	171	233	210
Expense	55.3	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8
	61	38.4	4.3	9.2	15.3	24.4	30.5	61	61	61	61
Income	66.4	73	73	73	73	73	73	73	73	73	73
Value end project											1216 7/
											214.9 8/
Cash Flow	(16.9)	77.8	178.9	236	210.9	158.8	214.7	165.2	122.2	184.2	1592.1

7/ Residual value of unsold oxen

8/ Residual value of undepreciated equipment

9/ No expense calculated for equipment repairs, assumed to have no economic value

Table 12 Niger - Niamey Department Development Project Phase II
Calculation of Benefit Stream from on Farm Cattle Feeding

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Annual Until 2000
No. animals	300	600	1000	1000	1000	1500	1500	2000	2000	2000	2000
net gain - tons meat 1/	30	60	100	100	100	150	150	200	200	200	200
gross value - millions CFA 2/	7.5	15.0	25	25	25	37.5	37.5	50	50	50	50
less feed cost - millions CFA 3/	2.7	5.4	9.0	9.0	9.0	13.5	13.5	18	18	18	18
less vet cost - millions CFA 3/	.3	.6	1.0	1.0	1.0	1.5	1.5	2.0	2.0	2.0	2.0
Net meat value CFA	4.5	9.0	15.0	15.0	15.0	22.5	22.5	30.0	30.0	30.0	30.0
Revolving funds CFA	(60.0)										60.0
Net Benefit Stream	(55.5)	9.0	15.0	15.0	15.0	22.5	22.5	30.0	30.0	30.0	4/90.0

1/ 100 kgs gain per head

2/ Meat value 250 CFA/kg

3/ Feed and vet cost average 100 CFA/kg gain

4/ Benefit stream averages 30 million CFA/year
with 60 million revolving fund recooperated in year 2000

Table 13 Niamey Department Development Project Phase II
Benefit Stream of Use of Crop Production Technical Package

	1981	82	83	84	85	86	87	88	89	90	91	92	93
Improved - with Project													
No. Farms 1/	160	300	600	1100	1900	3200	5300	8700	14200	23100	27000	31000	33000
Surface - Tot. (HAs) 2/	1016	1905	3810	6985	12065	18795	32495	49895	76295	113595	129000	141000	145000
Millet	808	1515	3030	5535	9595	14725	25834	39735	60135	89435	102000	112000	116000
Cowpeas	208	390	780	1430	2470	4070	6660	10160	16160	24160	27000	29000	29000
Production M.T. 2/													
Millet - with	539	1010	2021	3704	6398	10387	17155	266155	39085	57340	62250	71250	73650
Cowpeas	139	261	522	957	1653	2730	4437	6732	10497	15477	17280	18480	18480
Value (millions CFA) 3/													
Millet	43.1	80.8	161.6	296.3	511.8	830.9	1372.4	2092.3	3126.8	4587.2	4980	5700	5892
Cowpeas	9.3	17.5	35.0	64.1	110.8	182.9	297.3	451.0	703.3	1036.9	1158	1238	1238
Total	52.4	98.3	196.6	360.4	622.6	1013.8	1669.7	2543.3	3830.1	5624.1	6138	6938	7130

1/ From table 1

2/ From table 3

3/ Economic value of 80 CFA/kg millet 67 CFA/kg cowpeas

Table 13 Niamey Department Development Project Phase II Cont'd
Benefit Stream of Use of Crop Production Technical Package

	94	95	96	97	98	99	2000
Improved - with Project							
No. Farms 1/	33000	33000	33000	33000	33000	33000	33000
Surface - Tot. (HAs) 2/	145000	145000	145000	145000	145000	145000	145000
Millet	116000	116000	116000	116000	116000	116000	116000
Cowpeas	29000	29000	29000	29000	29000	29000	29000
Production M.T. 2/							
Millet - with	73650	73650	73650	73650	73650	73650	73650
Cowpeas	18480	18480	18480	18480	18480	18480	18480
Value (millions CFA) 3/							
Millet	5892	5892	5892	5892	5892	5892	5892
Cowpeas	1238	1238	1238	1238	1238	1238	1238
Total	7130	7130	7130	7130	7130	7130	7130

1/ From table 1

2/ From table 3

3/ Economic value of 80 CFA/kg millet 67 CFA/kg cowpeas

Table 13 Niamey Department Development Project Phase II CONTD
Benefit Stream of Use of Crop Production Technical Package

	93	94	95	96	97	98	99	2000
Unimproved - without Project 4/								
Surface								
Millet (HA) 5/	128500	128500	128500	128500	128500	128500	128500	128500
Cowpeas (HA) 6/	17288	17288	17288	17288	17288	17288	17288	17288
Production M.T. 7/								
Millet	38550	38550	38550	38550	38550	38550	38550	38550
Cowpeas	1729	1729	1729	1729	1729	1729	1729	1729
Value (millions CFA)								
Millet	3084	3084	3084	3084	3084	3084	3084	3084
Cowpeas	116	116	116	116	116	116	116	116
Total	3200	3200	3200	3200	3200	3200	3200	3200
Benefits (millions CFA)								
Value with Project	7130	7130	7130	7130	7130	7130	7130	7130
Value without Project	3200	3200	3200	3200	3200	3200	3200	3200
Net benefit stream	3930	3930	3930	3930	3930	3930	3930	3930
Prod. with (M.T. cerals)	92130	92130	92130	92130	92130	32130	92130	92130
Prod. without (M.T. cereals)	40279	40279	40279	40279	40279	40279	40279	40279
Prod. net benefit (M.T.)	51851	51851	51851	51851	51851	51851	51851	51851

4/ Calculated from improved farms subtracting animal traction expansion on acreage, busing production on 300 kgs/ha millet 100 cowpeas and sorghum from table 2

5/ Based on area that could be cropped without animal traction and with traditional labor requirements.

6/ Cowpeas only intercropped in unimproved cultivation. Surface calculations based on farm size division from Tables 1 and 8.

7/ 300 kgs/ha for millet under unimproved and 100 kgs/ha for cowpeas.

Table 13 Niamey Department Development Project Phase II CONTD
Benefit Stream of Use of Crop Production Technical Package

	1981	82	83	84	85	86	87	88	89	90	91	92
Unimproved - without Project 4/												
Surface												
Millet (HA) 5/	796	1493	2985	5473	9453	15628	25728	40308	64058	98608	112500	124500
Cowpeas (HA) 6/	187	350	449	823	1422	2325	3830	5892	8937	13313	14438	16688
Production M.T. 7/												
Millet	239	448	896	1642	2836	4688	7718	12092	19217	29582	33750	37350
Cowpeas	19	35	45	82	142	233	383	589	894	1331	1444	1669
Value (millions CFA)												
Millet	19.1	35.8	71.7	131.4	226.9	375.0	617.4	967.4	1537.4	2366.6	2700.0	2988.0
Cowpeas	1.3	2.3	3.0	5.5	9.5	15.6	25.7	39.5	59.9	89.2	96.7	111.8
Total	20.4	38.1	74.7	136.9	236.4	390.6	643.1	1006.9	1597.3	2455.8	2796.7	3099.8
Benefits (millions CFA)												
Value with Project	52.4	98.3	196.6	360.4	622.6	1013.8	1669.7	2543.3	3830.1	5624.1	6138	6938
Value without Project	20.4	38.1	74.7	136.9	236.4	390.6	643.1	1006.9	1597.3	2455.8	2796.7	3100
Net benefit stream	32.0	60.2	121.9	223.1	385.7	622.4	1026.6	2543.3	2232.8	3168.3	3341.3	3838
Prod. with (M.T. cereals)	678	1271	2543	4661	8051	13117	21592	32887	49582	72817	79530	89730
Prod. without (M.T. cereals)	278	483	941	1724	2978	4921	8101	12681	20111	30913	35194	39019
Prod. net benefit (M.T.)	400	788	1601	2937	5073	8196	13491	20206	29471	41904	44336	50711

4/ Calculated from improved farms subtracting animal traction expansion on acreage, busing production on 300 kgs/ha millet 100 cowpeas and sorghum from table 2

5/ Based on area that could be cropped without animal traction and with traditional labor requirements.

6/ Cowpeas only intercropped in unimproved cultivation. Surface calculations based on farm size division from Tables 1 and 8.

7/ 300 kgs/ha for millet under unimproved and 100 kgs/ha for cowpeas.

Table 14 Niger - Niamey Department Development Project Phase II
Adjusted Gross Benefits

Millions CFA

	P.Y	CPT Production	Cowpea Residual	Oxen Animal Traction	Cattle Feeding	Crop Production	Adjusted Gross Benefit Stream
1981	1	5.25	1.66	(25.5)	(55.5)	32.0	(42.09)
	2	5.25	3.3	(8.8)	9.0	60.2	68.95
	3	11.47	4.0	(17.4)	15.0	121.9	134.97
	4	14.72	12.5	(30.7)	15.0	223.1	234.62
	5	14.72	22.9	(52.9)	15.0	385.7	385.42
	6	14.72	51.5	(56.4)	22.5	622.4	654.72
	7	14.72	65.1	(122.9)	30.0	1026.6	1013.52
	8	14.72	106.6	(104.9)	30.0	2543.3	2589.72
	9	14.72	162.6	(80.9)	30.0	2232.8	2359.22
	10	14.72	258.6	(16.9)	30.0	3168.3	3454.72
	11	14.72	386.6	77.8	30.0	3341.3	3850.42
	12	14.72	432.0	178.9	30.0	3838	4493.62
	13	14.72	464.0	236.0	30.0	3930	4461.72
	14	14.72	464.0	210.9	30.0	3930	4649.62
	15	14.72	464.0	158.8	30.0	3930	4597.52
	16	14.72	464.0	214.7	30.0	3930	4653.42
	17	14.72	464.0	165.2	30.0	3930	4603.92
	18	14.72	464.0	122.2	30.0	3930	4560.92
	19	14.72	464.0	184.2	30.0	3930	4622.92
	20	14.72	464.0	1592.1	30.0	3930	6030.82

Table 15 Niger - Niamey Department Development Project Phase II
Gross Costs

Million CFA

P.Y.	Personnel 1/	T.A. 2/	Training 3/	Commodities 4/	Fertilizer 5/	Insecticide 5/	Building Oper-maint	Vehicle Operations	Construction	Other 7/	Contingencies 8/	Total
1	93.2	88	14.5	233.3	16.0	12.4			99.0	94.6	20	782.6
2	125.1	152.4	42.4	82.0	80.0	12.4			297.0	166.6	110	967.9
3	140.2	152.4	46.9	233.1	120.0	12.4				116.8	80	801.8
4	146.8	122.0	49.3	3.1	204.0	12.4				150.4	60	748.0
5	152.8	42.0	25.9	19.1	-0-	12.4				63.8		316.0
6	152		32	202.6	168	15	16.2	48				633.8
7	152		32	26.6	292	25	16.2	48				591.8
8	152		32	200.6	448	40	16.2	48				936.8
9	152		32	28.6	682	60	16.2	48				1018.8
10	152		32	26.6	1015	90	16.2	48				1379.8
11	122			104	1116	90	16.2	56 6/				1454.2
12	122			104	1265	90	16.2	56				1653.2
13	122			104	1305	90	16.2	56				1677.2
14	122			104	1305	90	16.2	56				1677.0
15	122			104	1305	90	16.2	56				1677.0
16	100			104	1305	90	16.2	56				1677.0
17	100			104	1305	90	16.2	56				1671.2
18	100			104	1305	90	16.2	56				1671.2
19	100			104	1305	90	16.2	56				1671.2
20	100			104	1305	90	16.2	56				1671.2

1/ Niger Personnel
2/ Technical Assistance - U.S. hire
3/ Includes short term, long term U.S.,and incountry or other
4/ Some commodities listed under "OTHER" see budget breakdown
5/ Based on needs according to expected adoption rate
6/ Added 6 more trucks, reduced small vehicles by 3
7/ Includes vehicle operations and building maintenance
8/ Includes construction $300,000, inflation $750,000, misc. $200,000 which represents FX assumed inflation costs during investment period

Table 16 Niger - Niamey Department Development Project Phase II
Internal Economic Return

Millions CFA

	P.Y.	Adjusted 1/ Gross Costs	Adjusted 2/ Gross Benefits	Net Benefit 'Cash Flow'	D.F. 20%	Present Worth 20%	D.F. 25%	Present Worth 25%
1981	1	728.6	(42.1)	(770.7)	.833	(642.)	.800	(616.6)
	2	967.9	69	(898.9)	.694	(638.8)	.640	(575.3)
	3	801.8	135	(666.8)	.579	(386.1)	.512	(341.4)
	4	748.0	234.6	(513.4)	.482	(247.5)	.409	(210.0)
1985 (EOP)	5	316.0	385.4	69.4	.402	27.9	.327	22.7
	6	633.8	654.7	20.9	.335	7.0	.262	5.5
	7	591.8	1013.5	421.7	.279	117.6	.209	88.1
	8	936.8	2589.7	1642.9	.232	383.5	.168	277.7
	9	1018.8	2359.2	1340.4	.194	260.0	.134	179.6
1990	10	1379.8	3454.7	2074.9	.162	336.1	.107	222.0
	11	1454.2	3850.4	2396.2	.135	323.5	.086	206.1
	12	1653.2	4493.6	2840.4	.112	318.1	.069	196.0
	13	1677.0	4461.7	2784.7	.093	259.0	.055	153.2
	14	1677.0	4649.6	2972.6	.078	231.8	.044	130.8
1995	15	1677.0	4597.5	2920.5	.065	189.8	.035	102.2
	16	1671.2	4653.4	2982.2	.054	161.0	.028	83.5
	17	1671.2	4603.9	2932.7	.045	132.0	.023	67.5
	18	1671.2	4560.9	2889.7	.038	109.8	.018	52.0
	19	1671.2	4622.9	2951.7	.031	91.5	.014	41.3
2000	20	1671.2	6030.8 3/	4359.6	.026	113.3	.012	52.3
						+1162.5		(42.8)

Internal economic return = $20 + 5 \frac{(1162.5)}{1205.3} = 24.8\%$

1/ See Table 15, same costs have been subtracted from benefit stream

2/ See Table 14, Benefits net of some producer costs

3/ Includes some residual values see Tables 11 & 12, capital items assumed fully depreciated.

Table 17 Niger - Niamey Department Development Project Phase II
Internal Economic Return - Sensitivity Analysis

Millions FCFA	P.Y.	Decreased Benefits 20%				Decreased Benefits 20% Increased Cost 20%			
		Gross Benefits 20% Reduction	Adjusted Gross Costs	Net Benefit 'Cash Flow'	Present Worth 20%	Gross Costs 20% Increase	Net Benefits 'Cash Flow"	Present Worth 15%	Present Worth 17%
1981	1	(51)	729	(780)	(650)	875	(926)	(805)	(792)
	2	55	968	(913)	(634)	1162	(1107)	(837)	(809)
	3	108	802	(694)	(402)	962	(854)	(562)	(533)
	4	188	748	(560)	(270)	897	(709)	(406)	(379)
1985(EOP)	5	308	316	(8)	(3)	379	(71)	(35)	(32)
	6	524	634	(110)	(37)	761	(237)	(102)	(92)
	7	811	592	219	61	710	101	38	34
	8	2072	937	1135	264	1124	948	310	270
	9	1887	1019	868	168	1223	664	189	161
	10	2764	1380	1384	224	1656	1108	274	230
	11	3080	1454	1626	220	1749	1331	286	237
	12	3595	1673	1942	218	1984	1611	301	245
	13	3569	1677	1892	176	2012	1557	254	202
	14	3720	1677	2043	159	2012	1708	241	190
	15	3678	1677	2001	130	2012	1666	205	158
	16	3723	1677	2048	111	2012	1711	183	139
	17	3683	1677	2006	90	2012	1671	155	115
	18	3649	1677	1972	75	2012	1637	133	97
	19	3698	1677	2021	63	2012	1643	115	84
	20	4825	1677	3148	82	2012	2813	172	121
					45			109	(354)

Benefit Reduction 20%, Internal Economic return = 20+ %

Benefit Reduction 20% cost increase 20%, Internal Economic return $15 + 2 \frac{(109)}{463} = 15.47\%$

ANNEX C

Part I

Social Soundness Analysis of the Niamey Department Development Project (Niger Republic)

(Evaluation of Phase I; Recommendations for Phase II)

Part I:

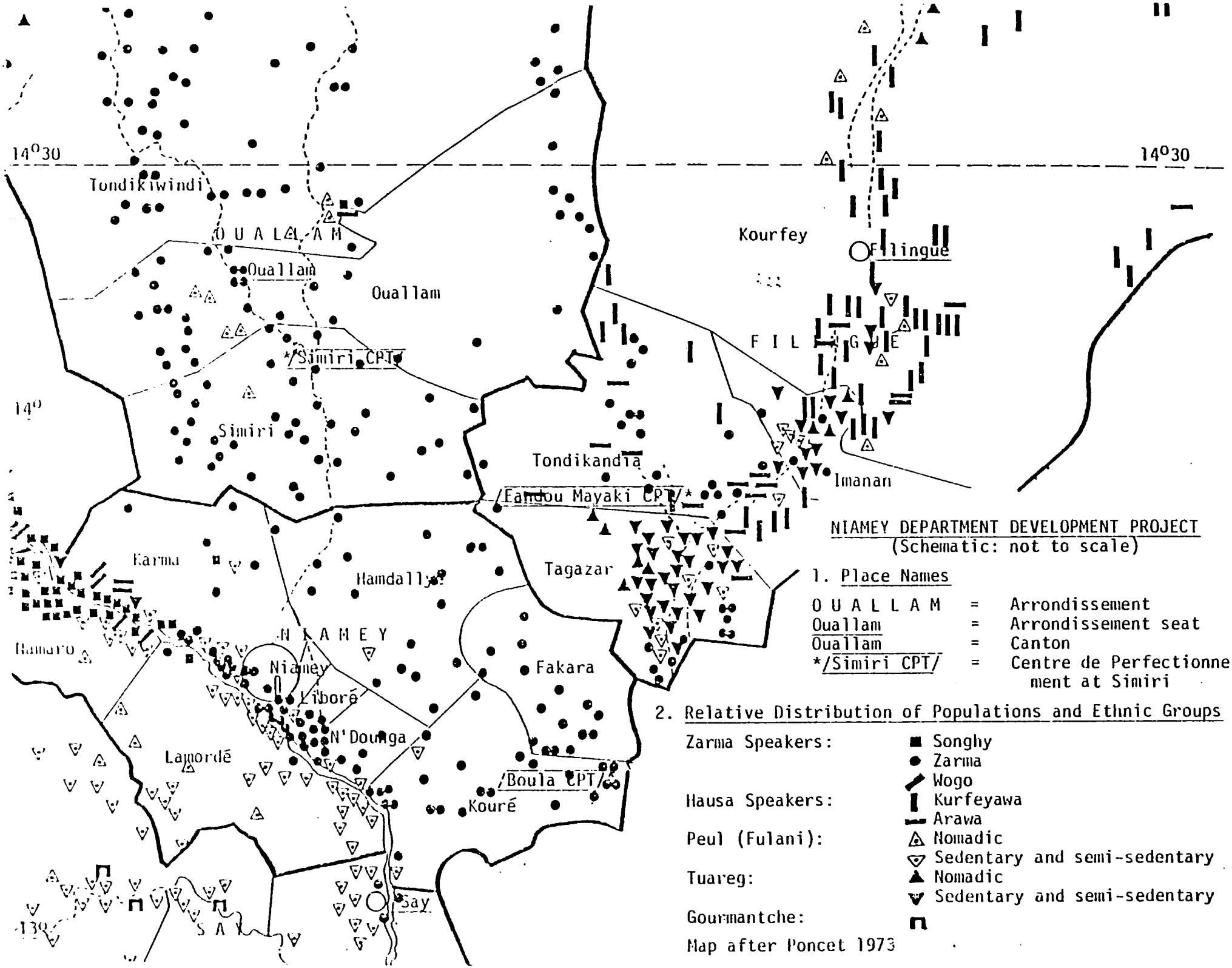
Overview of the Area and Populations within Project Zones; Analysis[1]

by

Thomas M. Painter

October 27, 1980

Contract No. AID/afr-C-1686
Project No. 625-0929 for Planning Management and Research


14°30
14°30
14°
13°
Tondikiwindi
OUALLAM
Ouallam
Ouallam
*/Simiri CPT/
Simiri
Kourfey
Filingue
FILINGUE
Tondikandia
/Eandou Mayaki CPT/*
Imanan
Karma
Hamdallaye
Tagazar
Hamaro
NIAMEY
Niamey
Liboré
N'Dounga
Fakara
Lamordé
/Boula CPT/
Kouré
Say
SAY
NIAMEY DEPARTMENT DEVELOPMENT PROJECT
(Schematic: not to scale)
1. Place Names
OUALLAM = Arrondissement
Ouallam = Arrondissement seat
Ouallam = Canton
*/Simiri CPT/ = Centre de Perfectionnement at Simiri
2. Relative Distribution of Populations and Ethnic Groups
Zarma Speakers:
Songhy
Zarma
Wogo
Hausa Speakers:
Kurfeyawa
Arawa
Peul (Fulani):
Nomadic
Sedentary and semi-sedentary
Tuareg:
Nomadic
Sedentary and semi-sedentary
Gourmantche:
Map after Poncet 1973

A - Overview of the Area and Populations within Project Zones

During the first three years (Phase I) of operation, the Niamey Department Development Project (NDD, or Project) promoted a variety of development interventions in three of the Niamey Department's six arrondissements -- Niamey, Ouallam and Filingue (see map). In all cases, NDD activities were conceived with a view toward increasing productivity levels of staple food (principally millets, sorghums and cowpeas) and some cash-crop (cowpeas) production in order to promote GON's national priority of greater food self-sufficiency. During the second phase of the Project, operations will be introduced on a limited scale in a fourth arrondissement -- Say. Phase II will see NDD operating in four arrondissements whose combined surface areas (66,719 km^2) account for about 74% of the Department's total land area of 90,000 km^2 (Bilan Departemental, 1978, Vol. I, p. 17).

In practice, NDD operations are more limited in scope. In the Ouallam and Filingue arrondissements, they have been confined to areas below the $14^{o}30$ parallel (see map). Areas to the north of this limit, roughly coterminous with the 350/400 mm isohyet, are considered too marginal for rainfed agriculture (Op. cit., Vol. IV, p. 1). Within the Niamey arrondissement, only the Koure, Fakara and Hamdallye cantons, and those areas in the Karma canton five kilometers to the east of the Niger River have been included in NDD operations.

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[1] Part II of the Social Soundness Analysis Appendix, prepared by Dr. Frances Stier, REDSO/W Anthropologist, and entitled "Agricultural Techniques," follows Part I, and provides information on regional variations in agricultural production which are not detailed in Part I. These variations are of substantial importance to agricultural development projects such as NDD which promote intensification of production for, as Dr. Stier notes, "the local situation determines whether or not land is locally scarce and whether or not people will be willing to intensify" (personal communication).

My thanks to Dr. Stier, who spent several weeks with the Project Preparation team and contributed to the development of the Social Soundness Analysis in numerous ways. She participated in all field trips, provided a valuable reading and summary of much available ethnographic material concerning Project zones, and in addition, provided the PP team with analyses of Nigerien census and Agricultural Statistics Service data at a time when I was engaged in an evaluation of NDD adult literacy and cooperative training programs. Finally, Dr. Stier critically read, helpfully pointed out several errors, and suggested possible changes in the first draft of the Social Soundness analysis. Dr. Stier's work will be frequently cited in Part I and in several instances the reader will be referred directly to her materials. In all cases, responsibility for errors of fact and interpretation in the text of the Social Soundness Analysis (Part I) are mine and not Dr. Stier's, despite the occasional use of the editorial "we."

Given these considerations, it may be estimated that the areas within NDD's purview account for substantially less than the 74% cited above. NDD has, nonetheless, been active in all or part of eleven of the eighteen cantons that make up the Niamey, Ouallam, and Filingue arrondissements (Table I) and NDD zones contain a considerable portion of the Department's total population -- amounting in this case to roughly a third (an est. 400,000 of the c.1,221,790 listed in the 1978 Bilan Departemental, Vol. IV, p. 1).

1. Rainfall patterns in the Niamey Department and Project Zones

Rainfall distribution varies considerably in the different Project zones, from about 350 mm per year in the northern regions (toward Ouallam) to about 500 mm in the south (toward Say). It should be noted that in addition to the expected gradient of diminishing precipitation which occurs as we move northward from the 13° parallel, there has been a significant southward shift of the 400 mm isohyet since the mid-1960s so that overall, the region containing Project zones was receiving less rainfall through 1976 than had been true earlier. Until about 1966 the 400 mm isohyet was located north of the $14^{o}30$ parallel; during the period 1966-1976, it moved southward to almost 14°. Estimates of the distance involved in the shift vary. Maps contained in the 1978 Bilan Departemental suggest a southward movement of 50 to 70 kms; drawing from Sidikou's (1974) materials, Stier notes that between 1960 and 1977 the 300 mm and 400 mm isohyets moved from 100 to 120 km south (p. 16). Farther south in the Department, the 600 mm isohyets formed an arc which cut through the Niamey canton at about the level of the capital in 1966 but has since dropped well below Say. Rainfall measurements from several observation stations in the Department provide a more complete indication of the changes involved (see Table 2).

Within these longer-term rainfall averages it is necessary to distinguish more recent developments -- since 1974. During 1975 and 1976 average rainfall improved considerably, but the largest increases were recorded in regions south of the 14° parallel. For regions to the north of this line (e.g., stations at Ouallam and Filingue), rainfall deficits continued until very recently (i.e., have remained below pre-1968 levels; see the Bilan Departemental, Vol. II, p. 2 and Table 2). It is noteworthy that very roughly one half of NDD operational zones lie north of the 14° parallel, i.e., in those areas where rainfall has remained somewhat marginal.

2. Distribution and Socio-Economic Characteristics of Populations within Project Zones

a.) Niamey and Ouallam Arrondissements

(i) Distribution of Populations

Much like rainfall distribution, the distribution of human populations within NDD zones roughly follows a north-south gradient, with population densities decreasing as we move from the southern regions of the Department (e.g.,

TABLE 1

Population Size, Surface Areas and Population Densities in the Niamey Department, Arrondissements and Cantons Affected by NDD Operations

Arrondissement	Canton	Total Populations	Number Of Villages	Surface Area (km^2)	Population Density
Niamey	Karma	42,050	41	1,430	29.4
	Hamdallye	13,355	43	1,549	8.6
	Koure	21,566	49	1,500	14.4
	Fakara	10,390	34	860	12.1
Total - Project Zone		87,361	167	5,339	-
Total - Arrondissement		156,625	262	8,219	18.6
Ouallam	Simiri	36,323	66	2,724	13.3
	Ouallam	51,162	81	4,658	11.0
	Tondikiwindi	45,468	73	8,350*	5.5
Total - Project Zone		132,953	220	15,732	-
Total - Arrondissement		154,362	243	22,132	7.0
Filingue	Tagazar	58,596	103	1,420	41.3
	Tondikandia	45,818	65	2,710	16.9
	Imanan	18,911	30	510	37.1
	Kourfey (Filingue)	71,665	81	9,900	7.2
Total - Project Zone		194,990	279	14,450	-
Total - Arrondissement		232,015	320	24,420	9.5
Say (Project zone not yet determined)					
Total Arrondissement		74,855	218	11,943	6.3
Total for the Niamey Department		1,221,790	1,334	90,074	13.6

* Portion of the Tondikiwindi canton within the NDD zone is approximately 2,783 km^2.

Source: Bilan Departemental, Niamey, 1978, Vol. IV, pp. 4.2.2, 4.2.3, 4.2.4, and 4.2.6.

Table 2

Rainfall recorded at selected stations in the Niamey Department: Averages through 1966, and for 1967 - 1976

Station	Annual Average/Rainfall (mm)		Percentage of years during 1967-1976 period with less than 400 mm
	Through 1966	1967-1976	
Mangaize[a,1]	385.9	308.6	100%
Ouallam[b]	539.0	367.1	90%
Toukounous[1,2]	437.5	325.8	80%
Filingue[b]	519.4	335.1	90%
Niamey (city)[a]	594.1	561.7	20%
Niamey (airport)[a]	609.0	547.8	10%
Kolo[a,3]	611.1	553.1	10%
Say[c]	694.4	545.8	20%

Source: Bilan Departemental, Niamey, 1978, Vol. V, Map 5.

[a] Stations outside NDD zones

[b] Stations within NDD zones

[c] Portions of the Say arrondissement will be included in NDD zones during Phase II

[1] Located about 60 km north of Ouallam.

[2] Located about 40 km north of Filingue.

[3] Located about 10 km south of Niamey.

the Tagazar canton of the Filingue arrondissement, where the average density is 41.3 persons per km^2; see Table 1) to the northern areas of the Department (e.g., the Tondikiwindi canton in the Ouallam arrondissement, having an average population density of 5.5 persons per km^2). Of course, the gradient is not an even one as we will see, and a variety of factors affect population settlements; among them, soil quality, availability of ground water, etc.

In the Niamey arrondissement, population densities in the Karma canton exceed those of the arrondissement as a whole (18.6 persons per km^2) by one third and are almost three times greater than the average for the Department (11.2 persons per km^2). In large part, this reflects high densities along the Niger River in areas outside NDD zones. Within the Project zones of the Niamey arrondissement, population densities are greater in the northern part of the Karma canton, and attain 50 persons per km^2 in the northwestern Hamdallye, southern Fakara and eastern Koure cantons. In most cases, these greater densities are associated with proximity to marshlands and ponds (mares) or low-lying areas (bas-fonds) with relatively shallow water tables (République du Niger 1978: Population Map). The Project's Centre de Perfectionnement Technique (CPT) at Boula is located in one of these relatively more populated areas in the extreme southeast corner of the arrondissement (see map).

In the Ouallam arrondissement, both the Simiri and Ouallam cantons have higher than average population densities. In part this is a function of their relatively small size when compared with the Tondikiwindi canton to the north. More importantly, these higher densities are associated with more concentrated settlements in valley areas having relatively shallow water tables which run in a north-west, south-east direction and to a certain extent, in a north-east, south-west direction (Ibid.). These valley areas in the Simiri and Ouallam cantons, in some cases interconnected and totalling more than thirty kms in length, contain low-lying areas, temporary and several permanent marsh/pond areas (République du Niger 1978; Vol. V, Map 5.2, and Stier, p. 27). Here, population densities may exceed 50 persons per km^2 and in some cases may reach 80 persons per km^2. The higher density zones have two principle focal points: the town of Ouallam (the arrondissement seat), and a cluster of villages about 20 km to the south of Ouallam. The second Project CPT - Simiri - is located just south of these higher density areas (see map). The remainder of the Ouallam arrondissement is relatively sparsely populated (5 - 7 persons per km^2).

(ii) Ethnic Composition and Some Salient Features of Social Organization and Agricultural Production

The ethnic composition of NDD zones within the Niamey and Ouallam arrondissements is overwhelmingly Zarma (see map) and for this reason they will be discussed together. We were unable to obtain details on religious affiliation in Project zones, but we may assume that Islam predominates throughout the three arrondissements in which NDD operations occur. There is some question, however, concerning the depth of the Islamic religion's effects on local societies whose traditions are animist[2] and in the southern part of the Filingue arrondissement,

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[2] Goldmark, on the basis of conversations with Yveline Poncet (1977:8); see also Diarra 1971:109-154.

even this Islamic overlay is absent among Arawa populations (Stier: 6).

Data are not presently available on educational levels among populations in Project zones, but estimated percentages of primary school age children actually enrolled in primary schools are low: 10%, 14% and 14% for the Ouallam, Filingue, and Niamey arrondissements respectively (Bilan Departemental, Niamey, 1978, Vol. IV, p. 4.7.1). Given the limited access of most rural populations to public schools and the even more restricted scope of national language literacy programs for adults, an estimate of 5% literacy in rural areas of the department is very generous. It is noteworthy that estimates of national language literacy, however low, apply solely to men, for women in Project zones currently have no access to literacy programs outside the Project-sponsored CPTs (see evaluation of NDD adult literacy programs).

In addition to the above-mentioned Zarmaphone predominance, other ethnic groups are found in both arrondissements. Some sedentary and semi-sedentary Fulani are located in the southern portions of the Niamey arrondissement, and slightly southwest and to the north of Ouallam, while Hausaphone Arawa groups are found toward the center of the Ouallam arrondissement (see map). The Fulani presence in both cases is related to the presence of marshes and ponds which serve as water sources for their animals.

The Zarmaphone peoples of the two arrondissements are agriculturalists -- peasant cultivators. In the vast majority of cases, the staples of agricultural production are millets, sorghums and cowpeas. Varieties of each are planted, reflecting the influence of selected seed variety promotion programs conducted by GON (The Agriculture Service and INRAN), NDD, and a long history among peasant producers of careful seed selection on the basis of numerous criteria: responsiveness to soil conditions, length of maturation cycle, etc. Agricultural production in Project zones may be considered schematically in terms of five "focal points": household gardens, in-fields, outfields, low-land and marshy areas, and finally, livestock. Local practice with reference to each varies considerably, as Stier's discussion in Part II shows.

In addition to the distinctions suggested above among various "focal points" of production in the Niamey and Ouallam arrondissements, Zarma peasants in Project zones make distinctions concerning the social organization of production, the nature of the relationship between the producer and the means of production, and, finally, the product. Thus collective fields (windi fari) are distinguished from individual plots (Kourga).

While variations certainly exist, the theme is roughly as follows. Collective fields are managed by the windi koy, head of household -- but more to the point, this individual (a male) is the head of an agricultural production unit -- as collective patrimony, often linked to the founder of a given village or hamlet, i.e., the first person to effectively use the lands in question. On the basis of these initial use claims, continuing rights of prior claims are established by virtue of blood or other alliance links. In addition, permission to use land may be obtained by outsiders on a variety of terms. These collec-

tively-owned fields, managed by the eldest male in the line, are worked by all productive members as directed by him. The resultant produce is appropriated by the head of the production unit, is stored, and redistributed as necessary to the various members.[3] Production relations of this kind have been characterized as "dependent" (goo bande); junior members are "behind" the authority of the senior member.[4] In addition to collective fields, individual plots may be allocated to household members by the household head. Recipients may cultivate these plots as they wish and do as they like with the product; i.e., store it for personal consumption, and/or sell it as a source of revenue. The stability of this individual tenure is not clear (see Stier: 28) and deserves additional study, particularly in connection with the interventions proposed for Phase II of the NDD as a means of increasing women's access to agricultural credit and inputs (cf. Painter 1979: 12-15). Women may be ill-inclined to increase present levels of investment in borrowed plots unless there is some assurance that they will retain access to the plot for more than one season (Ibid.). Similar constraints may affect young men -- married (as is the case of CPT trainees) or not (as is more frequently the case with CFJA* trainees) -- who are being trained by GON and NDD in improved techniques of agricultural production and equipped -- on credit -- with a combination of relatively expensive animal-drawn cultivating equipment (see Section B.2.a below). In the case of CFJA trainees, difficulties continue to be encountered once they return home and attempt to apply the new techniques on fields owned and managed by their fathers (see Section B.2.b below). Given their lack of authority within the production unit (i.e., their relation of dependence -- goo bande), they occasionally discover that they are not permitted to use the equipment (Pradier 1979a:41-42; 1979b; 1980a:10). As a consequence, some hire it out to others having money and land enough to make it worth their while. Another strategy, even less productive in the desired sense, involves outright sale of the equipment in order to obtain cash the trainees need.[5]

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3 It is important to re-emphasize that this characterization masks considerable diversity, as Olivier de Sardin (personal communication) and Part II of the Social Soundness Analysis by Stier suggest. Second, however tempting, we must be very cautious about drawing parallels between the windi fari / kourga distinction made by Zarmaphone peoples of Western Niger and the gandu / gamana distinction made by Hausaphone peoples to the east. Third and finally, in addition to being complex in their specific features, these forms are in a state of flux, i.e., are breaking down (Olivier de Sardin; ethnographic materials on the Hausa of Niger are replete with arguments of this kind). This gradual erosion of collective ("traditional") forms of productive and redistributive organization affects all of Niger's peasantries.

4 Thanks to M. Ouattara Mahamadou of the Institut de Recherche en Sciences Humaines, Niamey for stressing this point.

5 Instances of equipment sales were not recorded during our stay in Niger, but they are known to have occurred among CFJA trainees in the Maradi region in southern central Niger. The motives are predictable: the need for cash.

* "Young Farmers Training Center"

It is important to note that women play an important role in livestock production as well as crop production. Frequently, but not invariably, this involves small livestock and fowl. Livestock provides women with practically the only interest-bearing investment outlet for incomes resulting from the sale of their agricultural and artisinal (e.g., straw mats) production (cf. Diarra 1971: 104). Thus it is possible for women to gradually build up their small livestock holdings, to sell them and to purchase a calf or two (Ibid.:104-108). Purchase of livestock may afford them a more secure investment than is presently possible with land alloted for their use by their husbands (above) or other male members of the village community (see Stier: 17). Men are also involved in livestock production, and their animals, usually larger, may be confided to pastoral Fulani for care.

b.) Filingue Arrondissement

(i) Distribution of Populations

Population densities in the Filingue arrondissement vary considerably: from five persons per km^2, particularly in the northern regions -- beyond the boundary of the Project zone, to very heavy settlements in the south of the arrondissement. These distributions very closely follow the outlines of a large valley (the Dallol Bosso or Dallol Boboye) and its two smaller branches which traverse the arrondissement diagonally in northwesterly and northeasterly directions from the bifurcation located just north of the town of Balayara (see map; cf. Beauvilain 1977: map B and Republique du Niger 1978: Population Map). These Dallols (Dallol being the Fulani word for valley) are the remains of long-extinct surface affluents of the Niger River, having their northernmost origins in the Azaouak valley system of south-eastern Mali and north-western Niger. Relative to the plateau on either side, the Dallols are favored areas for settlement in the Filingue arrondissement and in the Dosso Department to the south (see map). Dallol-type soils contain more loam, and in many places the water table is no more than three to five meters below the surface; in some areas it is less than one meter deep, the result of a continual, now subterranean flow from the basins far to the north toward eventual confluence with the Niger River. Not surprisingly, settlement in these dry river valleys is substantially denser than on the plateaus where the soil is not as rich and where the water table depth varies from twenty to sixty meters. Population densities are particularly high south of the town of Filingue on through the Imanan canton (where the average density is 37.1 persons per km^2), and toward Balayara near the southern-most limit of the arrondissement (the Tagazar canton where average densities of 41 persons per km^2 are recorded). Population densities along the course of the Dallols easily exceed 50 persons per km^2 and available cultivable land is in very short supply. Under these conditions, fallows are extremely short if not non-existent; the continuous working of even manured fields over long periods has contributed to a serious depletion of soil quality in much of the area. This will be discussed in greater detail shortly. The NDD's third CPT, Fandou Mayaki, is located to the northwest of the point in the Dallol Bosso where it branches into the two smaller valleys mentioned above (see map).

(ii) Ethnic Composition and Some Salient Features of Social Organization and Agricultural Production

The ethnic composition of the more populated areas of the Filingue arrondissement is much more diverse than that we observe in most of the Ouallam and Niamey arrondissements to the west[6]. Hausaphone Kurfeyawa are found in the Kourfey canton north and south of the town of Filingue, particularly along the course of the Dallol (see map and Stier: 6). In addition, some nomadic Fulani are found in this area, and south of Filingue we find larger numbers of Hausaphone Arawa. These become particularly numerous in the Tondikandia canton. As a whole, however, the predominant group in settled areas north of the Tagazar canton are Hausaphone Kurfeyawa (see map). These Hausaphone groups -- both the Arawa and the Kurfeyawa -- are referred to locally as "Mawri," although it must be noted that Zarmaphone Arawa and Mawri are also found in the area (Stier:6).

Continuing southward along the northeastern branch of the Dallol Bosso, we find greater numbers of nomadic, and particularly sedentary and semi-sedentary Fulani and Taureg (many of whom are Zarmaphone; Stier: 7) and Zarmaphone Mawri. Populations of Kurfeyawa and Arawa are once again more numerous south of the village of Bankoukou in the Tondikandia canton. Finally, in the southernmost region of the arrondissement (the Tagazar canton), substantial numbers of sedentary and semi-sedentary Fulani and Taureg and Zarmaphone Mawri are found.

Along the smaller northwestern branch of the Dallol Bosso, the location of the Fandou Mayaki CPT, Zarma and Hausaphone Arawa predominate, giving way to greater numbers of Kurfeyawa in the north (see map).

In some respects agricultural practice in the Filingue Project zones resembles those in the two arrondissements to the west. There are important differences, however, and these are discussed by Stier in Part II.

B - Analysis

1. Overview of Project Beneficiaries

The evolving structure of the NDD conforms to current attempts by GON within the several departments of the Niger Republic to increase levels of rain-fed agricultural productivity, hence to promote greater regional and national food self-sufficiency. Through the operations of ten CPTs during Phase II, the Project will train an estimated 600 peasant couples in improved cultivation techniques. In addition, these couples will be trained in numeracy and national language literacy, will be exposed to a number of other agricultural innovations, and will receive an orientation to the principles and utility of cooperative organization in rural areas. The CPT peasant couples are the primary beneficiaries of the NDD.

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[6] What is true of the Niamey arrondissement does not apply to the riverine areas outside NDD zones. There, mixtures of Songhy, Zarma, Wogo, Kourtey, and sedentary and semi-sedentary Fulani are found (see map).

Second, it is anticipated that as many as 6,000 peasant producers in the Project zone will be exposed to the advantages of the new agricultural techniques during Phase II through a combination of demonstration effects (on the basis of differences between observed yields obtained by CPT graduates using the recommended techniques and yields on "traditional" fields) and the reinforced extension program which will be included in the Phase II project structure. Through the extension system, much larger numbers of peasant producers in Project zones will be exposed to and given the opportunity to gain access to the techniques being promoted by the Project. These individuals may be considered as "secondary" beneficiaries.

Third, thanks to project financial support, an estimated 2,800 cooperative officers will be elected and trained by the UNCC (with support from Project training programs; see below) during Phase II. In a sense, these too are secondary beneficiaries.

Fourth, additional categories of beneficiaries will consist of men and women who will attend a small number of experimental education centers (Continuing Education Centers, or CECs) in rural areas where a variety of learning activities will be supported by the Project. As many as 45 CECs will be established for men during Phase II, and will involve as many as 2,700 adults. Basic CEC training themes will include numeracy, national language literacy, and cooperative education, but the curriculum of the CECs will remain sufficiently flexible as to include a wide variety of possibilities on the basis of interests at the various Center locations (see Evaluation of NDD adult literacy programs). In addition, a maximum of twenty CECs will be set up for women (the first such rural centers in the Niamey Department), and as many as 590 women will benefit from courses in literacy, and as importantly, a variety of other subjects to be designed through collaboration among Project training staff, the Project's coordinator of women's activities, the National Literacy Service and other GON services (in particular, Animation Rurale). Among possible topics to be included are health and health related themes, possible improvement in women's rainy-season and dry-season crop cultivation, hand-sewing, etc. Once again the curriculum will be structured but will respond insofar as possible to local interests and local conditions rather than follow a centrally-designed lesson program. The estimated number of men's and women's CECs should be considered as maxima. The actual number and progression of CECs during Phase II will depend entirely upon evidence of strong local interest, relative success, and the results of careful follow-up and evaluation.

A special fund will be allocated solely for the use of women in order to facilitate their direct access to agricultural credit which is presently unavailable due to the structure of membership in rural cooperatives (limited to male heads-of-households). Thus, in addition to receiving support for learning activities in rural areas (CECs), women in Project zones will have the option of enhanced direct access to credit for purposes of, e.g., investment in small livestock, improved cultivation techniques on rainy-season and dry-season plots, etc. These interventions are detailed in a separate section devoted to women's activities in NDD.

Finally, the altered Project management structure, combined with the infrastructural support which began during Phase I (construction of cooperative warehouses, CPTs, bureaus for some GON services, etc.) will provide greater institutional support for the range of training, extension, and follow-up activities envisioned for Phase II. In large part this will occur through greater coordination of GON line services within Project zones.

Overall, the activities proposed for Phase II of the NDD are judged to be acceptable from a socio-cultural view point. We are of the opinion, however, that a number of issues deserve particular attention during Phase II of the Project if NDD is to (a) maintain an acceptable socio-cultural and economic profile vis-a-vis the rural milieux in which it operates, (b) strengthen the institutions found therein, and (c) optimize the potential for "spread effect" among Project zone populations. We feel that attention to these points will do more than merely enhance the Project's social-cultural feasibility; it will increase its capacity to achieve its stated purposes, amd move toward its specified goals. This will be possible through more effective training programs and greater responsiveness to the socio-economic and cultural features of the Project zones as summarized in Section A above and Part II. Grosso modo, these issues include the following: (1) appropriateness of NDD's technical package; (2) selection of CPT trainees; (3) structure of CPT training; (4) choice of CPT locations; (5) cooperative organization in Project zones; (6) effects of NDD interventions on local tenure, and (7) migrations.

2. Points for consideration during Phase II of NDD, with a view toward enhanced social soundness of design

a.) Appropriateness of the NDD Technical Package*

The ensemble of improved productive techniques currently being promoted by NDD does not reflect the regional diversity of the various Project zones. Instead, a standard "technical package" is promoted at each of the three CPTs, and throughout Project zones (see Part II). Phase II of Project activities should place greater emphasis on the "micro-economics" of the technical package with trials under conditions as close to those of "normal" farm conditions as possible. It will be necessary to demonstrate the "pay-off thresholds" of variations of the present package under different conditions of land holding size, household labor availability, soil conditions, and rainfall.

Animal-drawn cultivation equipment may be more cost-effective in zones where holdings are larger, rainfall more satisfactory, and soils heavier. Elsewhere, where sandier dune-type soils predominate, and where rainfall is less, returns from the use of traction equipment may be considerably less.[7]

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[7] These restrictions do not apply to animal-drawn carts which may be used year-round for household purposes, and which serve as revenue-earners from hauling fees and sales from hauled commodities (firewood, hay, etc.), although animal maintenance costs differ (donkeys versus oxen). Not surprisingly, carts are the most popular animal-drawn equipment currently available in NDD zones. On the basis of Sargent's data, Stier suggests that the profitability of carts declines as their number in a region increases (thus reducing income from rental fees).

* Sections 2.a and 2.b are in part a summary of Stier's more detailed discussion; for details, see Part II.

The possibility that land holdings in Project areas may be considerably smaller than national averages indicate (6 hectares, USAID/Niger 1980:2), is suggested by Stier's analysis of 1979 Agricultural Statistics Service data (see Table 12 in Part II). These points must be carefully studied during Phase II, for information obtained during Phase I does not permit an evaluation of this kind (see Mullenax 1979 and Wagner 1980:9-10).

Even at currently high levels of GON subsidies, the present technical package (with animal traction) represents a considerable investment (about $800) for peasant producers whose annual average income is estimated to be less than $100. In point of fact, acquisition of these materials entails considerable indebtedness on the peasant's part, for the equipment is obtained on credit from CNCA* through the channels of local cooperatives. Finally, it is likely to induce a greater dependence of peasant producers on GON - provided inputs under conditions where adequate and timely delivery remain highly problematic.[8] The risks involved here are greater, not less, and in the final analysis will be absorbed by the peasantry.

In addition to rethinking the cost-effectiveness under normal farm conditions of the ensemble of productive techniques being promoted by the project, the undesirable potential for considerably increased peasant indebtedness should be critically examined during Phase II as more and more packages are distributed among the peasantry of Project zones. Failure to do so may result in the unanticipated consequence of greater agricultural wage labor in Project zones (on the part of peasants who may not be able to use their equipment profitably, but who are obliged to reimburse their loans nonetheless) and increased participation of these individuals in labor migrations.[9]

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8 Dependence upon an inefficient government delivery system, however serious for projects such as NDD which rely heavily on the timely delivery of inputs, is only one aspect of a larger pattern of dependence of which we must be aware; one which includes, among others, greater dependence of peasant producers on particular combinations of commodity inputs which are not only costly, but whose technologies are completely beyond the control of the peasant producers involved in agricultural development projects. See Mooney 1979. (My thanks to Victoria Barres for bringing this useful book to my attention.) As a means of combatting this dependence, NDD efforts to train village blacksmiths in the manufacture and repair of tools and animal-drawn equipment in Project zones are commendable.

9 Experience elsewhere in the Third World has shown that increases in agricultural productivity levels through greater capitalization of agricultural production (hence greater producer investments) have resulted in increased movement away from rural areas. Popular accounts emphasize the greater efficiency of the newer techniques of production which make it possible for fewer and fewer farmers to produce higher and higher yields. Not surprisingly, accounts of this kind which emphasize efficiency may not place much stress on the role of rural indebteness, its linkages to increased capitalization of agricultural production, to land-accumulation among a rural petty bourgeoisie, out-migrations of poorer peasants, and to the gradual formation of a part-life time proletariat. Debt is only one of several factors which may contribute to the peculiar situation in several regions of Niger, (e.g. NDD zones) where participation in seasonal labor

* Caisse Nationale de Credit Agricole.

CPT-based applied research activities planned for Phase II should help considerably to illuminate what is now a very fuzzy area and one which has significant implications for the Project's "spread" or multiplier effect in the Department. NDD applied research should address not only the current technical package, but that considerable attention be given to the possibilities for improving upon the already considerable expertise of NDD zone peasantries. Of all parties in the Project zones, their understanding of "production constraints" is best, and NDD stands to learn a great deal from the strategies these peasant producers have adopted over time in order to insure a meagre subsistence (see Part II).[10]

b.) Selection of CPT Trainees

Stier and Enger (PP team agricultural economist) have suggested that a minimum of five to six hectares of land may be necessary in order for the current NDD technical package to pay off; i.e., to cover costs and produce greater yields

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9 (continued)

migrations has become a necessary component of a peasant "subsistence" strategy. Another is a generalized monetization process in which all of Niger's peasant producers are caught up, albeit in varying degrees. Increasingly, life within the "subsistence economies" of Niger's peasantries is filled with commodities which can be had only through the use of money as a means of exchange. See Section 2.g below.

10 It is noteworthy that INRAN shows an increasing appreciation for the suitability of local millet varieties, particularly vis-a-vis P_3 Kolo (introduced to Niger in 1960) and CIVT (the variety currently being promoted by NDD); also that field tests are being conducted on a range of grain varieties. These INRAN trial programs might be usefully linked with applied research activities planned for CPT operations during the second phase of NDD. Concerning the qualities of different millet varieties, an INRAN agronomist remarks that:

> CIVT is better than P_3 Kolo; and several other local varieties produced just as good a yield as P_3 Kolo and CIVT at specific locations within the country (Brown 1980:1).

Concerning sorghum, the same author notes that:

> The four selected varieties of sorghum L30, 1/2MSB, A_2B_2 and A_4B_4 produced better than the local varieties only at Maradi and Niamey. At all other sites, the local variety of the district gave higher yields of grain. The local varieties tested were Bagoba, El Dele, El Aboua, Jan Dawa (Ga-Dawa), Jan Jare, Mo-Aja, Itchordi, Thebou, Abdou-Kadri, Gotheye, Fara-Dawa, Biyil, Guero, Babodia-Fara, and N'Gabiri Kene (Ibid.:2).

Pradier (1980a) makes much the same point about introduced varieties of cowpeas vis-a-vis local varieties. Finally, see Mooney 1979.

for household consumption and/or sale. Stier's examinations of SAA data on the distribution of sample holding sizes suggests that there is a heavy skew toward smaller holdings in the three arrondissements (Table 2 in Part II). It remains to be seen whether the distribution of accessible land holdings among CPT trainees reflects the distribution of the SAA sample (assuming that the SAA sample is representative). If they fall largely into the smaller than five or six hectare categories, the wisdom of blanket promotion of a relatively expensive technical package becomes a highly questionable strategy. If, on the other hand, CPT trainees are drawn disproportionately from those production units having access to at least six hectares of land, then CPT training and outfitting programs may be disproportionately benefitting medium and large-holders rather than small holders. For details, and discussion of differences in land holdings requirements for profitable use of ox- and donkey-drawn equipment, see Part II.

Reportedly one of the criteria for the selection of CPT trainees is effective access to at least five hectares of cultivable land. It appears, however, that systematic information on actual sizes of trainees' holdings has not been gathered on a routine basis.[11] Data of this kind must be routinely obtained and evaluated during Phase II of the Project.

Access to minimal land holdings is only one of several criteria used to select CPT trainees. A second desideratum is that all CPT trainees exercise authority over the land (whatever the size) accessible to them. In the absence of this relative autonomy vis-a-vis senior members (principally fathers) of the agricultural production unit of which they are a part, CPT-trained and equipped trainees may encounter difficulties in the use of the new techniques as recommended. As we have seen on page 8, difficulties of this kind have already been encountered by graduates of the GON CFJA training center at N'Dounga, south of Niamey. In several cases, trained and equipped trainees returned home only to find that their fathers did not allow them to use the equipment (v. Pradier 1979 a & b, 1980 a & b).

Once again, no systematic data has been collected on these factors, and must be during Phase II in order to better insure that learned innovations will be applied. It is noteworthy that eight of the twenty trainees currently enrolled at the Fandou Mayaki CPT will return home to cultivate fields controlled by their fathers. Cases such as these deserve careful follow-up.

Finally, it is not clear how candidates are selected to become CPT trainees. In principle, "CPT trainees are selected by their cooperatives," but we do not know how the selection occurs within the cooperative. What are the criteria used in the selection process? Who does the actual selection - the cooperative general assembly, cooperative officers, or persons within the cooperative who may wield local political influence? These issues must be more satisfactorily

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[11] "AID will attempt to ensure that projects do not inadvertently contribute to inequity and that they, in fact, promote equal opportunity..." (FY 1982 CDSS: 7-8). However laudable, good intentions are not enough. They must be translated into procedures.

clarified if in fact the CPT selection process is not to drift into a pattern of promoting inequitable access to resources among Project zone populations. Cooperatives in Niger (and elsewhere in Africa) have been common loci for the inadvertent promotion of inequitable access through the interplay between cooperative structure and local-level, patronage politics. NDD zone cooperatives are not immune to these effects. This is duscussed in Section 2.e below and notes 12 and 13.

c.) Structure of CPT Training

Project CPTs presently combine two important functions: training and production. While intimately related, there is some evidence (a) that the emphasis currently given to production outweighs that given to training, (b) that training linked to agricultural production receives a much greater emphasis than that which is not (e.g. literacy), and (c) that the role of women in the training programs is marginal and does not reflect their importance in agricultural production, or in the reproduction and maintenance of peasant households as production units.

We recommend that greater emphasis be given to the essential training role of the CPTs during Phase II, and that if necessary, this re-orientation occur at the expense of the presently heavy emphasis on production per se. Time-use at the CPTs should be critically examined with a view toward optimizing the opportunities of all trainees for active learning in response to real interests and needs. We recommend that literacy be more functionally integrated with other CPT activities, and that it not be relegated to the "off hours" when trainee energies and attention-spans may be low as is often the case at present. In addition to the integration of what are now somewhat isolated elements of the CPT curricula, upgrading of training approaches will be necessary (see evaluation of NDD literacy programs). Greater emphasis should be given to learning activities for women which go beyond the present and marginally interesting limits of national language literacy. Concomitant with this change in emphasis, a change in the structure of women's activities is recommended so that women will have more time and more energy to pursue learning activities responsive to their interests. Possible approaches may entail changes of class schedules, the investigation and promotion of collective provisioning and meal-preparation activities, the installation of grinding mills as labor saving devices and as educational tools, and possibly the provision of some child care for women who are involved in training activities.

Additional support for a variety of educational activities in rural areas of the Project zones will be provided on an experimental basis by CECs for men and women.

d.) CPT Locations

De facto choice of CPT locations appears to depend a great deal on the availability of sufficient land (40 hectares each), and we do not expect this to change much during Phase II. Insofar as possible, however, efforts should be made to install Phase II CPTs in locations representative of the diverse geographical,

ecological, and socio-cultural mileux of Project zones. Furthermore, the content of CPT training programs should be responsive to the opportunities and constraints within each region of Project operations. Given the scattered presence of low-land and marshland areas in NDD zones, and the substantial promise these hold for improved dry-season agriculture, we recommend that one or more of the Phase II CPTs be located in close proximity to a low-land or marsh-land area (Stier provides a partial listing of these areas). This will permit CPT training programs to emphasize the possibilities for improved production within a significant focal point of agricultural production in Project zones which is presently not possible because of (a) CPT locations being some distance from well-watered areas, and (b) the impracticality of experimentation with dry-season agriculture at some CPT locations (e.g., Simiri, where all water is hand-drawn by women from a 74 meter deep well).

e.) Cooperative Organization in Project Zones

During Phase I, NDD supported the promotion of rural cooperatives in Project zones in several ways. Among others, NDD began a program of cooperative warehouse construction at the site of each cooperative seat village in Project zones. Secondly, NDD provided UNCC* with considerable financial assistance in the training and up-grading of elected cooperative officers in Project zones. Third, the Project reinforced cooperative officer-training programs through cooperative education curricula in village level and CPT literacy classes. (See evaluation of NDD cooperative training programs).

With some modification (principally, a substantial reduction in village-level education centers [CECs] whose installation will be stretched out over the five years of Phase II on the basis of observed success and careful evaluation), NDD will and should continue to support these forms of cooperative promotion. Indeed, this approach is in keeping with GON policy of cooperative promotion in cereal-producing areas with a view toward eventually moving beyond cooperative functions presently limited to credit provision and marketing, and promoting a wide range of cooperatively-based development activities.

Some doubt has been voiced about the capacity of local (i.e., "traditional") social structures within Project zones to mesh with and benefit from the proposed cooperative promotion programs (cf. Charlick 1976:4 and Goldmark 1977: 2; 17-18). While the issue of "socio-cultural" fit can only be satisfactorily answered by longer-term research on indigenous forms and processes of cooperation in Project zones and their relation to introduced cooperative structures, there is no a priori reason on ethnographic or "political" grounds alone to suspect that the "fit" will be poor. These issues require study, and to date none has been done in western Niger.[12] Despite the uniqueness of peasant social formations with-

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[12] On the other hand, the potential effects of local-level (particularly patronage) political linkages on the viability introduced cooperative forms of the kind described by Charlick in eastern Niger (1974) and Robinson (1975) in the Dosso (and Tibiri) region may be significant and do deserve careful attention. For this to occur during NDD's Phase II, more than reliance on UNCC will be necessary, for there seems to be a singular disinterest among UNCC field staff in the dynamics of local power brokerage (cf. Holmquist 1980), something which has proved to be important in cooperative success and failure elsewhere.

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in NDD zones, the factors of greatest significance for success during Phase II are liable to be super-ethnic in nature, affect all Nigerien peasantries (although with a specificity which remains to be described), and reflect. more than anything, state (GON) cooperative, marketing, and price policies versus the peasant producers in Project zones, rather than ethnic differences between the producers themselves.

It must be recognized that the cooperatives within the Project zones are new -- the oldest existing cooperatives date from 1977, and more than half of the present number date from 1978. As such, their actual functions -- whatever the evolving expectations entertained by GON about their future as the basis for Societes de Developpement -- are limited to those of cooperatives throughout Niger: marketing and credit diffusion. In the past, modest profit margins afforded cooperatives by GON (UNCC) on the basis of their cash-crop and/or staple crop marketing activities furnished the basis for cooperative capital accumulation which, in theory, could be invested in a variety of locally-defined "development" activities. In practice, cooperatives have not been accorded much autonomy in this area.[13]

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[13] Despite a great deal of rhetoric since the mid-1960s about the "cooperative movement" in Niger, it is important to realize that in the vast majority of cases, cooperative organization has occurred not because of peasant initiative, but because of state planning priorities. This pattern of state intervention in marketing, and to a lesser extent, agricultural production itself (via input-tied credit), takes a particular form in Niger (see, e.g., Keita 1975), but has occurred throughout West Africa as post-colonial states have increasingly moved into areas of capital accumulation based on agricultural marketing in which metropolitan trading companies (e.g., CFAO), Levantine and to a lesser extent, African merchants, long enjoyed privileged access. (See Holmquist 1980 for a brief discussion of the East African case.) These interventions have taken the form of state agricultural marketing boards (in the case of Nigerien groundnuts, the Societe nationale de commercialisation de l'arachide, SONARA) and the creation of rural marketing "cooperatives" which are allowed to sell solely to the marketing boards. The result has been greater state "coverage" of agricultural marketing processes (at low cost, for cooperative officers are not remunerated for their work or are remunerated at levels well below those of civil servants), but not necessarily greater degrees of peasant control. See among others, Goussault 1976 and Holmquist 1980. The case of Nigerien cooperatives is discussed by Bachard 1976, Belloncle 1978, Charlick 1974, and Painter, forthcoming. All of this is not to say that cooperatives cannot serve as vehicles for local initiatives in NDD zones, but to emphasize that in the vast majority of cases elsewhere in Niger, cooperatives have not - that is, have not been able - to function in this manner. As the text suggests, the new orientations being given to rural cooperatives by GON may afford these

Given the new orientations which the GON statutes of 1978 and 1979 promise to give cooperative organization in Niger, we may anticipate (but cannot assume) that greater local control will be exercised over cooperative returns from marketing operations. Cooperative "autonomy" is one of several issues which remain to be resolved before the cooperatives in Project zones will become viable, locally-controlled investment and development structures. The issues are complex and cannot be discussed at length in the present paper, but two merit brief mention. The first is GON price policy; the second concerns the real (as opposed to theoretical) possibilities for the generation profit margins by Projecct zone cooperatives, and the consequent potential for accumulation of capital and investment according to local cooperative priorities.

The rapid expansion of cooperatives in western Niger has not been accompanied by a similar increase in tonnages of cereal and cowpeas marketed by cooperatives as percentages of total production in cooperative zones. This is particularly true of millet, and slightly less true of cowpeas, a staple crop which has replaced groundnuts in much of the west as a major cash crop for export. Substantial differences in purchase prices paid by GON marketing boards and traders on the "free" (i.e., non-cooperative) market result in continuing large portions of total marketed production by-passing GON-installed cooperative markets.

Because cooperative profit margins are in part a function of returns on total marketed tonnages less a wide variety of fixed and variable expenses, a combination of small marketed tonnages and substantial expenses result in cooperative operating losses. Losses of these kinds are absorbed by a nation-wide intercooperative fund, so individual cooperatives which run in the red remain viable in principle, but in fact, any profit margins they might obtain for future local investment purposes are cancelled out by each year of deficit operations.

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13 (continued)

local organizational forms the autonomy and clout they must have if they are to be anything more than an inexpensive means of facilitating state penetration into Niger's rural economy. As Holmquist (1980) argues in the case of Tanzania, cooperative viability remains problematic even where the state affords them substantial political and economic support. Elsewhere (e.g., Niger), support of this kind has manifested itself largely in the government rhetoric of cooperative promotional programs and stopped there. There are grounds for some optimism over the nascent Societes de developpement (which even well-placed Nigeriens do not clearly understand) whose foundations are the cooperative structures presently in place, but it will be an uphill battle. A great deal will depend on GON's ability and willingness to deliver the kind of structural support for autonomous operations which viable cooperatives require.

We were unable to obtain information on the operations of all cooperatives in NDD zones since their installation, but details on cooperatives in the Ouallam and Filingue arrondissements for the 1979-80 marketing season provide some indication of the problems alluded to above. All project zone cooperatives in the two arrondissements -- where purchases consisted of millet, cowpeas and some sorghum -- operated at a loss during the 1979-80 season. Individual cooperative losses varied from a low of about 10,500 CFA francs ($50) to a high of 71,000 CFA francs ($340); most were in the twenty to forty thousand franc loss range.

If these patterns are representative of cooperative marketing activities throughout Project zones (an empirical question), then we suggest that the health of the nascent cooperatives is in jeopardy, and will probably remain problematic for at least four to five years (depending on the date of creation) during which fixed costs will remain at substantial levels. (An important, but not the only factor in these initial fixed costs is the yearly deduction over five years of about $84 [17,500 CFA francs] as payment for produce scales provided at unsubsidized cost to each cooperative by UNCC.)

These two issues -- GON price policy and the real capacity of NDD zone cooperatives to benefit from their cooperative activities -- will have an important effect on the viability of these local organizations and the enthusiasm of peasant producers about them.

The success of cooperatives in Project zones appears to hinge less on their "fit" with local cultural practice and values than their capacity to help peasant producers in the region obtain returns on their investments of time, energy, and money, as they attempt to optimize in a very harsh environment. Unfortunately, NDD in itself can do little to affect these factors which are in large part determined by GON policies.

Finally, there remains the thorny issue of GON's policy of cooperative "collective responsibility"* for agricultural loans which in fact are accorded to heads of households. It appears that Zarma society has even less low-level political centralization than Hausaphone groups in the east of Niger. A variety of non-cash remunerated mutual assistance/labor exchange forms (collectively referred to here as boogou among the Zarma, with parallel forms among the Tuareg and Hausaphone people in the Filingue region)[14] are found in NDD zones, but we know nothing about their incidence or their economic importance in agricultural production. In any event, they are spontaneous, ephemeral, and appear to be in a transitional stage in which they are being replaced by variations on the theme of agricultural wage labor. Since 1974, GON has made considerable efforts to revalorize local youth organizations -- the Samaria -- but largely for the completion of

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[14] See Guillaume 1974:71-73 and Olivier de Sardin 1974:14-17, among other sources.

* Actually, a collective security (caution) or guarantee.

state-sponsored community development and improvement activities, and as a means of fostering support among Niger's youth for the government. (This is not the first time that efforts have been made to rejuvenate the Samaria for political purposes; much the same thing happened during the 1960s under the Diori regime.)

We have no good reason to expect that a policy of collective responsibility for agricultural credit in the absence of a program of massive social mobilization and re-socialization will be any more successful in NDD zones than anywhere else in Niger.[15] True to form, the Groupement mutualiste (G.M.) remains the basic social "cell" of cooperative organization, but as a "functional entity," Zarma villages appear to offer even less promise than Hausa villages in the east (v. Charlick 1976 and Goldmark 1977). Insofar as the fit between indigenous and introduced cooperatives is concerned, there is one bright spot in the recent GON cooperative statutes. The GM may be a village or a quarter within a village or a tribe (in the case of nomadic groups). For the first time in the history of cooperative promotion in Niger, there is some promise of a linkage between GON-sponsored cooperative structures and forms of indigenous cooperation based on linkages of kinship. These issues deserve careful study during Phase II, for our current understanding of potentially relevant structures, and processes of cooperation among peasantries of project zones is very poor.

The relative youth and apparently precarious health of NDD-zone cooperatives also affects areas of NDD programs which are not, strictly speaking, economic in character. We hypothesize that the disappointing results of Phase I literacy programs may be traced in large part to an inadequate answer for a question peasants in project zones may reasonably ask: "National language literacy for what?" In a real sense, a satisfactory answer to this question depends on the viability of cooperative organization in the rural areas where literacy is being promoted. Elsewhere in Niger (Maradi and Zinder departments), substantial impetus was given to "functional literacy" programs in rural areas by the enhanced possibilities literacy offered peasant producers for <u>participation in</u> and <u>management of</u> local marketing and credit cooperatives.[16] The promise of increased capacities of this kind in NDD zones is a novel development, and in many respects, may not be considered very risk-worthy by many peasants. Quite reasonably, their response to these activities may be one of hesitation until they see more. The proposed improvements in project literacy programs (CPTs and CECs for men and women) will doubtless improve the situation, and because of this are considered necessary. In a more general sense, however, the health of NDD literacy programs will remain linked to the health of the cooperatives being installed in project zones. In the short run, the only way to break out of what may be a chicken-egg dilemma during the formative period of Project zone cooperatives is to replace the present heavy emphasis on literacy <u>per se</u> within Project training programs with a more diversified curriculum. This has been proposed in the section on literacy programs.

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[15] See Bachard 1976:60-75.

[16] Critical analyses of the links between "functional literacy" and cooperative growth in Niger are rare and overwhelmingly restricted to experiences in groundnut producing areas in the east. See essays in Belloncle 1973, but especially Easton 1971; for a more thorougngoing analysis and comparative data from Mali, see Easton 1978.

f.) Effects of NDD Interventions on Local Tenure

The transitional nature of "traditional" land tenure in the Project zones was briefly discussed earlier (see Stier and Goldmark 1977). Within the context of these changing tenure patters, NDD is introducing a range of productive innovations whose success depends in part on and is likely to have consequences for access to land in Project zones.

It is not impossible (although on the basis of current data no predictions are possible) that Project "spread effects" will disproportionately benefit medium and larger holders in Project zones (for reasons suggested above) unless some assurance is provided that beneficiaries represent a cross-section of Project zone producers or are déliberately selected from among smaller holders. On the other hand, given the character of the terrain in much of the Project zones, it is not at all likely that land accumulation will occur as a result of Project activities, for overall valorization of rain-fed cultivation areas will probably be minimal.[17] The long-term, cumulative effects of repeated application of recommended inputs remains to be seen.

In those areas of Project zones where the valorization of land has been relatively greater due to better soil quality (greater loam content, greater accessibility of water, etc.) there is a greater possibility that some accumulation of land holdings will occur as investments in the production of agricultural commodities (market crops) increase. It may be anticipated that the tempo of this process will be greater in those better-endowed areas (low-land and marsh-land areas) which are in closer proximity to regional market centers or road networks providing access to consumer populations in towns and cities. On the other hand, it is almost certain (but presently unknown), that most of these areas already have claimants even though they are under-utilized. Tenure in low-land and marshy areas deserves further study.

Finally, considerable attention should be given to the nature of women's land tenure in Project zones during Phase II. A strength of Phase II design lies in the provisions therein for credit funds earmarked solely for

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[17] Accumulation does occur in the Nigerien countryside, however poorly the phenomenon has been studied in NDD zones. Not surprisingly, those most likely to benefit are engaged in commerce or have privileged access to the state (civil servants, veterans, "traditional" chiefs, etc.). See DeLatour Dejean 1975:205-216 et passim on tenure changes in Mawri country (cf. Derriennic 1977:295). This topic, like several other issues raised by NDD interventions, deserves careful field study. Changes in land tenure are all the more interesting given Goldmark's (1979) preliminary study and the suggestion by Poncet that the quantity of land in one's possession -- cultivated or not -- is much more important among the Zarma (see Stier's discussion of descendents of captive castes in NDD zones and their terms of access to land) than among Hausaphone peoples of Niger (Poncet: 30-31; cf. Laya 1973:137 and Derriennic [1977:243-244], who cites sections of an article by Henri Raulin who argued in a similar vein ten years earlier! [1965]). See Painter 1979:62-64 and notes 24-28 concerning the Dallol Bosso and Dallol Mawri regions of the neighboring Dosso department.

women's agricultural activities. If women are to benefit from investments resulting from their access to this fund, a modicum (i.e., more than one season) of security of tenure will be necessary. Otherwise, it may prove unrealistic to expect women to make more than minimal investments in rainy-season and dry-season crop and garden cultivation as long as the plots allocated to them are liable to summary repossession by the owners.

g.) Migrations in NDD Zones

The NDD goal of increased productivity levels in staple and cash crop (cowpeas) production carries with it the expectation of increased real incomes for rural producers. One anticipated result of this -- however implicit -- is some reduction in the current pattern of seasonal migrations from Project zones, and an accompanying reduction in the drain on household labor resources these migrations entail.

Data on the scope and the economics[18] of labor migrations in the Project areas are sketchy, but observations are numerous enough to suggest that the seasonal outflows of living labor from some Project zones are considerable, particularly in the Zarmaganda region (Sidikou 1974:66-68, 143-158 and 1978) and the Dallol areas in the southern part of the Filingue arrondissement (Beauvilain 1977:157-160 and Guillaume 1974:110-111).

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[18] Figures on the participation of NDD zone populations in migrations vary considerably. On the basis of 1966 census data, Sidikou estimated that 1.0% of the Simiri canton's population was absent on migrations (1974:143), while Beauvilain estimates that as much as 36% of all household heads in the Dallol Bosso region (in the Dosso department, just southeast of NDD zones) are absent during periods of seasonal migration (1977:159). Once again from data collected in the neighboring Dosso region, Poncet estimated in 1974 that 60% of all active males were absent from some Dallol Bosso villages on seasonal labor migrations (1974:15). Poncet's high estimates were given considerable support by observations made early in 1978 by staff of the Dosso Department's Service du Plan who found that as many as half of all active males in a sample of ten villages they visited in the Boboye region (northwestern Dosso Department) were absent on migrations (Painter 1979:69, note 11).

Details on migrants' earnings and their importance to the local economy within NDD zones are even sketchier than those on incidence of participation in migrations. Sidikou very briefly mentions migrants' incomes, but in areas beyond the limits of NDD operations (1974:156-157). Data from nearby areas in the Dosso department are indicative of the seasonal influx of money repatriated by migrants, most of whom work in the Guinea Coast countries (cf. Painter 1980: 2-3; 32). A survey by the Dosso Service du Plan of all money order receipts recorded by Dosso Department post offices revealed that 39 million, 96 million, and 120 million CFA francs entered the department solely by mail during the migrant labor seasons of 1974, 1975 and 1976 respectively. During 1974, 4,119 money orders averaging 21,800 CFA francs entered department post offices. The figure for 1975 was 9,284, averaging 13,900 CFA francs each, while 9,600 money orders with an average value of 22,600 CFA francs were recorded for 1976. Overwhelmingly the money orders originated from Guinea Coast countries, and the most massive influx occurred during Niger's dry season months (Painter 1979:51-52).

"Wanderlust," "rites of passage," and "psychological" factors all figure importantly in popular accounts of these seasonal labor migrations from rural project areas to the towns and cities of Niger and the Guinea Coast states (e.g., Ivory Coast, Ghana). We are in no position to discount the social-psychological factors which figure in seasonal labor migrations, but the socio-economic matrix in which they occur is of particular interest and overriding significance. We would do well, for example, to examine the historical and economic changes which have so affected peasant social formations in Western Niger that seasonal labor migrations have become validated as part of the transition from youth to adulthood ("rites of passage"). In a related sense, rather than taking this "natural" fact of life in some Project zones as a given, we might inquire into the sequence of events which has made labor migrations such a predictable feature of the social landscape.

The topic is a complex one and cannot be treated at length here, but a search for explanations must necessarily lead us to a consideration of the changing nature of peasant "subsistence" economies throughout western Niger. Labor migrations, for many households in NDD zones, have become an integral part of an overall subsistence strategy whose aim is the maintenance and reproduction -- the social continuity -- of the household form of production and consumption. These migrations, rather than adventurous forays, have become a necessary household activity which involves both benefits and costs (neither of which are very well understood). Some (not all) earnings are returned by migrants, and some of these are converted into staple foods and livestock; others are spent less productively. On the other hand, the migrants' absence drains labor resources from the household as a unit of production.

Insofar as NDD operations prove themselves to make economic sense to peasant producers in Project zones, i.e., to enhance their capacity to increase production and incomes with a minimum of risk, it is possible that some very modest modifications of the present pattern of labor migrations may occur. Gains will have to be substantial and risks rather low. It is less than certain that the NDD -- or GON -- can provide such a combination. In the meantime, until the opportunity costs of migration are greater than those of remaining in a situation of marginalized subsistence or adopting the ensemble of productive techniques being promoted by the project, these migrations will continue. At present, these opportunity costs are not known. Nor for that matter, is the economic viability of the Project technical package under a variety of "normal" conditions. What is more, there is the possibility, as suggested in Section 2.a above, that current Project strategies, if continued unaltered during Phase II, may contribute to an <u>increase</u> in seasonal labor migrations for reasons which are by no stretch of the imagination, "psychological." Substantial attention to these factors will be necessary during Phase II of NDD.

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ANNEX C

PART II

NIAMEY DEPARTMENT DEVELOPMENT PROJECT (683-0240)

Social Soundness Part 2: Ethnographic background, technical package, and use of animal traction.

A project--to get off the ground
has got to be socially sound
with equity flowing
and spread effects growing
and other nice things, seldom found.

Handbook 3, chapter 4, Annex A
Tells us all the right things we should say
and how to assure
that the poorest of poor
are succoured in a feasible way.

Frances Stier
Anthropologist
REDSO/WA
Abidjan, Ivory Coast

November 20, 1980

The NDD is an effort to increase small holder farm productivity, in order to reach the GON's goal of alimentary autarchy. One of the principal means to this end is a basic technical package for rainfed millet and cowpeas that includes the use of chemical fertilizers, a huge increase in the density of planting, improved seed varieties, and use of seed treatment and insecticide. Phase I of NDD included several routes for spreading use of package: establishment of a system of cooperatives (UNCC) to furnish credit for agricultural inputs and to distribute them, an extension service (Service Agricole) to demonstrate the superiority of the package, and a set of Centres de Perfectionnement Technique (CPT) to train small numbers of farm couples in the use of the package and in the use of animal traction. The equipment package sold to CPT graduates includes an ox-drawn multicultivator, a donkey-drawn cart, and (at two of the three CPT's) a donkey-drawn cultivator.

During Phase I of NDD, the GON services encountered many difficulties in supplying the needs of farmers for agricultural unputs, in supervising extension agents, and in demonstrating that the improved methods were, indeed, improvements (Wagner 1980, Enger 1980). As a result of these problems, Phase II of NDD is seeking in part to reorganize rural services at the local level by centralizing them at the CPT. The project will establish a CPT in each of ten agricultural districts (which correspond roughly to administrative cantons, shown in figure 1) and use the CPT for training pilot farmer couples, for supplying inputs to CPT graduates, for follow-up of former students, for a demonstration center for local communities, and for small amounts of applied research to adjust agricultural recommendations to local environmental conditions.

Assessing the social soundness of a development project requires some familiarity with the basic ethnic and demographic characteristics of the region, a brief account of the social structure and political organization of the principal ethnic groups within the project zone, and, most important, a description of the economic organization of the project zone that describes current agricultural practice in some detail. Given this information, it is possible to infer the likely direct beneficiaries of the project, to assess the indirect impact of the project on non-participants, and to judge the chances that the techniques and organizational structures introduced by the project will be adopted by individuals and by communities outside the project area.

A major problem in the social analysis of NDD Phase II is the lack of ethnographic studies based on long-term observation. Several major studies within the project area have discussed agriculture (Raulin 1963, 1964) and regional economic patterns (Sidikou 1973, Beaulivain 1977, Guillaume 1974); these investigations are valuable and give considerable

information on social structures, but cannot give a detailed picture of how a specific community resolves problems, arrives at decisions, and carries them out. For one of the ethnic groups in the eastern project zone, there is a meticulous synthesis of oral tradition (Karimou 1977), but this again has not been combined with long term field observation.

Phase I of NDD tried to compensate for this lack of data on social structures by requesting community studies from Animation Rurale and from trained social scientists from IRSH. Animation Rurale was able to complete only one study (for Ouallam, GON Service de l'Animation 1979) which seemed the product of considerable labor, but would have profited by trained supervision. IRSH was unable to meet NDD's needs, and so the project contracted for a study by two sociologists, Luc and Reid (1978).

The survey was planned, executed, and analyzed in three months, at a time when NDD was starting up and was unable to give the investigators logistical support. The investigators themselves felt that the study was useful only as a preliminary sketch of the project area, and advocated more thorough research on the social and economic characteristics of the project zone. With respect to econimic data, the surveys of MDR's Section Statistiques Agricoles have helped fill the deficiencies of the early study. With respect to data on social structure, this has not been the case.

Where is the Project Zone and Who Lives There?

Figure 1 shows that the project zone for Phase II of NDD includes sections of four arrondissements within Niamey Department: Ouallam and Filingue south of 14°30 south latitude, Niamey arrondissement north of a boundary five km. from the Niger, and a small part of Say. Table 1 shows the population of the project zone broken down by canton, and figure 2 shows the approximate distribution of population in the project zone as of 1970 and the approximate location of the present CPT's. The environment has important influence on population distribution: most settlements lie along the valleys left by intermittent or fossile streams--for example, the Dallol Bosso--because the water table is closer to the surface than in plateau locations.* Topography, geology, and the depth of the water table determine the distribution of mares and bas-fonds, which are important for watering livestock and for gardening (to be discussed below), and the same factors determine the depth of wells and

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*A Popular song from the Dallol Bosso shows how much these factors affect the ease of women's work: "unfortunate woman, to have left your husband in the Dallol to remarry on the (plateau of) Fakara; the time you used to spend with your family you now use in drawing water from wells (Beauvilain 1977:76)."

puisards (watering holes).

Factors that affect ethnic affiliation are more complex than those that affect population density. When starting to read African ethnography, one often has the impression that tribes are like biological species: that individuals of the group have uniform characteristics that change very slowly, that individuals from different groups seldom hybredize, though, to think of ethnic groups as the way people distinguish themselves from their neighbours in a particular situation. The boundaries between ethnic groups are neither impermeable nor immutable. For example, when Marc-Henri Piault first went to the field to study the Mawri, he was surprised to find that whether or not people identified themselves as Mawri depended on the situation (M.H. Piault 1976: 674). By the same token, an ethnic label does not always permit a planner or investigator to predict an individual's behavior. Setting aside these reservations, this analysis uses Poncet's (1973) designations for ethnic groups, whose distribution is shown in figure 1.

The Zarma are the predominant group in the arrondissements of Ouallam and Niamey. Scholars debate whether they originated in northern Ouallam (the Zarmaganda) or migrated from what is now Mali during the 12th and 13th centuries C.E. (Goldmark 1977:3, Sidikou 1973:48-50, Raulin 1963:7ff). Recent settlement patterns reflect external political pressure: from the mid-18th century through the 19th century, resistance to the Touaregs (Muslim Berbers from the north) forced the Zarma into nucleated settlements in defensible locations, created chiefs, wangari, whose sole function was to lead communities in war, and created a series of alliances among villages (Sidikou 1973:53).

French penetration of the Zarma region began in 1898 and local resistance followed: Zarma of Simiri participated in the revolt of 1906 led by Zarma of the Dallol Bosso. Since the French found no indigenous centralized civil authority, they created the cantons of Simiri, Ouallam, Tondikiwindi, and two others (later absorbed), and designated some former war chiefs (wangari) as chefs de canton (Sidikou 1973:55). In response to colonial rule, to head taxes, conscript labor and, after 1930, to requirements that peasants store 120 kg/cap in village graneries (Sidikou 1977:9), the Zarma dispersed to the least accessible parts of the region. Since independence, the GON has tried to regroup populations into larger administrative villages (Sidikou 1973:59).

Filingue is divided into four cantons: Kourfeye, Imanan, Tondikandia, and Tagazar. Compared to Ouallam and Niamey, the area of Filingue covered by NDD is ethnicly diverse: figure 1 shows settlements of Kurfeyawa, Arawa, Peul, Zarma, and Touareg, as well as groups of nomadic Peul and Touareg. The first two of these groups are called "Mawri" by Zarma and Peul; the term applies most generally to Hausa

Table 1: NDD Population 1980, by Canton

Arrondissement	Canton	No. of villages	Population
Ouallam			
	Tondikiwindi	41	21,182
	Ouallam	60	35,828
	Simiri	61	33,800
		(subtotal)	90,800
Niamey			
	Karma	12	5,087
	Hamdallaye	38	11,014
	Fakara	27	5,913
	Koure	38	15,580
	N'Dounga	2	651
		(subtotal)	38,245
Filingue	Tondikandia	60	37,372
	Kourfey	76	52,823
	Imanan	27	25,596
	Tagazar	81	36,622
		(subtotal)	150,473
Total Population within the Project Zone			279,518

(Niamey Department Development Project Annual Report 1979)

Note: These figures were furnished by the sous-prefets of each canton within the project zone.

speakers in the Dallol Mawri and the Dallol Bosso (Poncet 1973:22). Within the project zone, the most important of these groups is the Kurfeyawa, who originated in the pre-colonist empire of Bornu, near Lake Chad. The Kurfeyawa had emigrated to Tahoua and were forced to the northern Dallol Bosso during the late 18th century by the advance of the Touaregs. Many assimilated with earlier Zarma inhabitants of Kourfeye, and many now are Zarmaphone, and are called by some the Sudie (Poncet 1973:24).

The Arawa, who are concentrated in the canton of Tondikandia, also originated in the Bornu empire. Their name means "children of Ari" (their first chief), and Karimou's study of Arawa oral tradition suggests that they became a distinct group in the last half of the 15th century or the first quarter of the 16th century (1977:35), that a later chief was driven from Bornu in an uprising (1977:47) and that his partisans and their descendents settled in Tondikandia at about the mid-18th century. An account of the founding of a late 19th century Arawa village shows that original inhabitants of the region and many former slaves attached themselves to the settlement, assimilated themselves to the Arawa, and adopted Arawa facial scars (Karimou 1977:86). During their time in the Dallol Bosso, the Arawa took Zarma as their primary language and adopted Zarma social and political structures. Thus, Tondikandia in the 19th century was a network of independent villages, in which chiefs ruled through concensus, allocated uncultivated lands, and received a proportion of each household's production. For defense, communities designated a war-leader, mayaki. The Arawa also took on a caste system similar to that of the Zarma, which will be discussed below. The only aspect of Zarma culture that the Arawa did not adopt was Islam; they remained animists (Karimou 1977:172).

Guillaume (1974:12-30) summarizes the available information on the entry of groups of Touaregs (now mostly Zarmaphone) into Imanan canton in the Dallol Bosso. The earliest immigration took place around 1810, did not involve armed conflict with the previous inhabitants of the region, and seems to have included intermarriage with local women. Through the 19th century, other Touareg groups joined them, attracted by the (then) relatively low density of population in the Dallol Bosso, by the abundance of temporary marshlands, and by the shallow depth of the water table. The area was not yet heavily cultivated, the vegetation was luxuriant, and game was abundant (Guillaume 1974:38).

By the mid-19th century, however, Peul incursions into the Dallol Bosso had increased, the Touaregs were using Imanan as a base for raids against neighboring areas, and the Arawa and Zarma allied themselves in resistance. The Arawa experienced the same sorts of change in political structure as the Zarma: increasing importance given to war chiefs, settlements located in defensible places rather than with regard to natural

resources, and decreasing efforts made in agriculture. With the entrance of the French, there started a series of sporadic, bitter efforts at resistance, in 1901, 1916, and 1926-7 (Beauvilain 1977:56).

The Touareg that settled in Imanan had formed permanent villages during the 19th century (Guillaume 1974:98), and the present-day Touaregs of Imanan entrust their herds to Peul and northern Touareg herders for the long yearly migration to the north. Most of the Peul that fall within the project zone also sedentarized; in many cases, this has been a gradual process. For example, a Zarma village in the Dallol Bosso just south of the project zone (Beauvillain 1977:146) was largely abandoned by Zarma during the famine of 1913-1914 and was resettled by Peul who had rented nearby land.

This very sketchy account of major ethnic groups in the project zone has not yet discussed the caste system: in particular, the position of clients or captives (elkam - Touareg, tam - Arawa, and bella - Zarma). The Touareg, the Arawa, and the Zarma groups all contained such castes: inprinciple, these were freed by French decree in 1905.

The official response to the problem of assuring livelihood to the freed slaves was the establishment of liberty villages in Niamey, Zinder, and Tahoua. These villages did not have sufficient land to support the residents, however, and became a source of cheap labor for colonial authorities (Raulin 1963:101). Since that time, descendents of captive groups have made several sorts of adaptations: some, attached to Zarma and Arawa communities, have retained links with their former masters: others formed independent agricultural villages in Tillabery and in Tera arrondissements of Niamey department (Raulin 1963:103: GON Animation 1979:20).

Those who remained within Zarma communities are linked to the free folk of the communities by bonds of marriage and by economic bonds. The rules for marriage vary. In Ouallam, they are asymmetric: captive women can undergo a rite of redemption and marry non-captives (their children are considered Zarma), but captive men cannot marry outside their caste (GON 1979:20). Raulin reported, however, that in the Dallol Bosso and on the plateau of Fakara during 1960-61, captives could redeem themselves and marry free persons (Raulin 1963:103). In many communities, captives could not by law posess land. Some share-cropped, receiving land and seed, and giving half the harvest to their landlord (Raulin 1963:104): others paid a monetary rent (Raulin 1964:85). In Ouallam, captives dominate the crafts: blacksmithing, weaving, pottery, shoemaking, and griotage (GON Animation:20). Karimou (1977:166-169) reports similar structures among the Arawa: he notes that craftsmen are obligated to give a tithe to the village chief.

In principle, before 1905, the Touareg distinguished among three major categories of clients: inadn (artisans who work leather and metal, who were never captives, and who maintain strict endogamy -that is, marry within the group), innezziyn ("those who are bought"), and isaha ("those who are born"). Within the last category are two subgroups: 1) ighawelen, populations without the memory of having been captive, who migrated to Imanan in the first half of the 19th century, and 2) iderfan. individuals recently emancipated (Guillaume 1974: 45-53).

Ethnographic data are scarce, and, without fieldwork, it is impossible to know to what extent these terms and the restriction they imply actually influence people's behavior. The GON is trying to eliminate caste distinction, and forbids projects to collect or to use information of the ethnic or caste origins of participants.

SMALLHOLDER AGRICULTURE IN THE PROJECT AREA

One tends to think that traditional farmers in a given region all do the same things in the same way, and that all can be approached by a single set of recommendations. While, in practice, it may be necessary because of lack of research to give a set of uniform recommendations to wide area, it seems adviseable to start with as detailed a picture as possible about how farmers farm in the project area. I will therefore discuss the three arrondissements separately.*

The data for this section are drawn from several sources: the socio-economic studies discussed in the last section, day trips in the project area (during August and September 1980), and surveys carried out by the Section Statistiques Agricoles (SSA) of Ministere du Developpement Rural, Direction du Service de l'Agriculture, which were commissioned by the NDD. The final reports for studies carried out in 1977 and 1978 were available at the time of writing (GON Section Statistiques Agricoles 1977-1978); the results of the study of 1979 have not yet been released, but SSA very kindly allowed me to copy their data from the project area, in order to arrive at rough estimates of household workforce and cultivated area. I should emphasize that these figures are preliminary, unofficial, and calculated in some haste: SSA intends to verify and to remeasure parts of its sample before publishing definitive results.

Each of SSA's studies encountered the difficulties found in any large scale survey in a region where few people are literate, where travel is

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* Say was not included in the Phase I project zone, and so was not included in the survey areas.

difficult, and where trained supervisors are rare. In particular, the survey of 1977 completed a fairly large (65%) proportion of the sample it had chosen, but used a very ambitious interview schedule, and was not able consistently to review interview forms with the field workers. The survey of 1978 encountered great difficulties with personnel, and completed the survey of about half the sample that had been drawn. In the 1979 study, it was necessary to eliminate the data furnished by some of the interviewers; however, survey forms had been simplified, they had been carefully reviewed after being filled out, and the supervision of field workers had markedly improved.

Table 2 gives an overview of a preliminary tabulation of the results of the 1979 study, and compares them with data from the 1977 survey. The average total cultivated area per exploitation in Niamey was roughly the same for the two surveys; however, the average total cultivated areas per exploitation reported in 1979 from Ouallam and Filingue were roughly half the area reported in 1977. Average area per capita shows the same discrepancy. Average areas per worker are not comparable for the two surveys because the tabulation of the 1979 data calculated area per male worker (since areas cultivated by women in Zarma area are quite small, see below), while the tabulation of the 1977 data included both sexes in calculating cultivated area per worker.

Averages can be somewhat deceptive, however. When one looks at the proportion of exploitation in each size category, one sees that these are huge numbers of very small farms, and a relatively small number of large farms.

During Phase I of NDD, the CPTs promoted use of a millet/niebe technical package using ox-drawn equipment.

Animal traction can have two sorts of effects on small-holder farms: it permits increases in cultivated areas and it can increase yields by permitting more timely planting and weeding. A recent review of animal traction projects in Sahelian West Africa suggests that where land is available, animal traction's effect on cultivated area is at best 20-30% and that the documented yield increases range from 20-25% (Sargent et al. 1980:66).

Because animal traction equipment is expensive, meeting loan repayments for the equipment requires a threshold farm size. Although these thresholds will obviously vary from one situation to another, Sargent et al. suggest that 4 ha is roughly the minimum size for profitable adoption of donkey traction and that 6 ha is roughly the minimum size for profitably investing in ox-drawn equipment. If we assume that animal traction in the NDD zone will produce a 30% increase in cultivated area, the minimal cultivated area for donkey traction would be about 3.0 ha and the minimal

Table 2: a) Cultivated Area Per Exploitation, by Arrondissement 1979

	Less than 1 ha	1 ha -1.99	2 ha -2.99	3 ha -3.99	4 ha -4.99	5 ha -5.99	6 ha -6.99
Niamey	11.6%	20.7%	24.0%	9.9%	8.3%	8.3%	4.9%
Ouallam	35.9%	22.1%	13.0%	6.9%	7.6%	4.6%	2.3%
Filingue	15.7%	26.1%	17.2%	12.7%	7.5%	3.7%	3.0%

	7 ha -7.99	8 ha -8.99	9 ha -9.99	10 ha -10.99	11 ha -11.99	12 ha -12.99	13 ha -13.99	Total	n
Niamey	4.1%	2.5%	1.7%	0.8%	1.7%	0	1.6%	100%	121
Ouallam	0	2.3%	1.5%	1.5%	0.8%	0.8%	0.8%	100%	131
Filingue	4.4%	3.0%	0.7%	0.7%	1.4%	0.7%	3.0%	100%	134

	Average cultivated area	Standard deviation	Average per capita (ha)	Average per Male Worker (ha)
Niamey	3.69	2.97	.48	2.29
Ouallam	2.56	2.72	.34	1.40
Filingue	3.45	3.24	.46	2.16

b) Cultivated areas reported in 1977

	Average cultivated per exploitation (ha)	Average per capita (ha)	Average per worker (male & female) (ha)
Niamey	3.7	.49	.95
Ouallam	6.5	.81	1.51
Filingue	6.2	.79	1.64

cultivated area for ox-drawn traction would be roughly 4.6 ha. Table 3 shows the estimated proportion of farms that fall below these minima for each arrondissement.

If animal traction is to expand cultivated area, there must be arable land available for expansion and small farmers must be able to get use rights to that land. The national data on the proportion of arable land now cultivated are poor. AID's recent agricultural sector assessment (Enger 1980:8) notes that some experts contend that agricultural yields are declining for Niger as a whole, and attribute the decline in part to increasing use of marginal land and to shortened fallow period, which imply that uncultivated arable land is scarce. For several parts of the project zone, particularly in the Dallol Bosso in Fillingue, we will see that uncultivated land is very scarce indeed. Whether farmers have access to uncultivated lands depends on the land tenure system, which varies from place (see below).

Even if we assume that uncultivated arable land is available, that farmers have access to it, and that animal traction permits a large increase in cultivated area, a majority of farms in all parts of the project area fall below the threshold size for donkey traction, and very few farms indeed are large enough to profitably adopt ox-drawn equipment.

This is not to say that animal traction should be excised from NDD Phase II, in fact, this paper argues that it may benefit some farmers in some parts of the project zone, and that these farmers are neither kulaks nor latifundistas, and deserve aid. It does seem necessary, though, that the CPTs devise and teach alternative sets of cultivation techniques. Donkey traction without ox-drawn equipment is one possibility, use of the seed/fertilizer/planting density/insecticide package with hand cultivation alone would be possible for all farmers. Gardening with small scale irrigation, improved marshlands (mares) and low-lying areas (bas-fonds) are other possibilities.

Agriculture in Ouallam

Ouallam is an area where millet cultivation that depends on rainfall is risky. Millet needs at least approximately 400 mm rainfall: between 1960 and 1977, the 400 mm isohyte in Ouallam moved 100-200 km south. The distribution of rainfall is also important: rainless periods at the start of the agricultural season (in July) can kill the young plants and require that the farmer replant; rainless periods in September can also ruin the crop. Grasshoppers can destroy the millet near maturity, jerboas (kangaroo rats) eat the seed at sowing, especially in dry years where farmers plant seeds more shallowly, (Sidikou 1977:4) and locusts have periodically devastated the countryside.

Table 3: Percent of farms with cultivated areas below minimum for profitable adoption of donkey and ox traction - estimated from 1979 survey data of NDD project zone.

Arrondissement	%farms with cultivated area less than 3.00 ha.	%farms with cultivated area less than 4.6 ha.
Niamey	56.3%	71.2%
Ouallam	71.0%	82.5%
Filingue	59.0%	76.2%

a) interpolated from grouped data.

A partial list of droughts and famines and shortages that have struck Ouallam during the last 100 years gives an idea of how marginal the region is for agriculture (Sidikou 1973:22-25; 1977:9-11).

1888-9 or 1891-2	drought: called Kaou-Kaou, the sound of grinding calabashes for flour.
1900-1903	drought and locust attack: called izenere, ("the sale of children"), men sold children for slaves. The dead were too numerous to bury.
1911-1914	drought: called yollomoru (to stroke the hair) because women, on occasions, when they had grain to pound, stole handfulls while pretending to arrange their hair. Deaths from this famine were not common; many migrated to the Dallol Bosso and Nigeria.
1929-1931	drought: zamo kano ("the cutting knife"), followed by locust attack (doa guire). Mortality was high, especially among children, and migration to the east was also high.
1944	a dry year, called yeda kono djire because people travelled to Yedo, in the Dallol Bosso, to obtain grain.
1954-55	drought: called garo djire ("manioc year") because people purchased manioc flour (from Dahomey) in Niamey and in the Dallol Bosso.
1960-61	Poor years (reason unspecified) called kaligongou ("empty stable") because people sold their livestock to get grain.
1965-66	famine: bandabari, ("to turn the back"), because those who had food turned their back on those who did not, in order to avoid sharing with them.
1968	early drought year: mata ai ga te ("what shall I do?"), because that is what household heads asked themselves.
1969-72	drought: Sidikou gives no name to it. Massive imports of relief sorghum and massive out-migration.
1975	bad rainfall distribution, and numerous insect attacks.

Thus, the region has seen famines or serious shortages at least 11 times during the last century. Sidikou (1977:17) discusses some of the ways people coped with the most recent famines, they included: small plantings of sorghum and cassava in valley lands with clay-sand soil, migration to the coast and to urban centers, and remittances from migrants and savings brought back by migrants, estimated at 30-35,000,000 CFA for 1975. Reliance on crops other than millet and reliance on food produced outside Ouallam is very heavy, during some periods, and it is unlikely that farm households supply all their food needs from millet they grow themselves.

In Ouallam, as in Niamey, the Zarma are the predominant ethnic group. The basic unit of agricultural production is the household, which tends to be relatively small. About 80% of marriages are monogamous (Sidikou 1974: 90, Luc and Reid 1978:11), and most households consist of a male head of household (windi koy), who has relatively little authority, his wife or wives, their unmarried children, and, in addition, the widowed or divorced mother or sisters of the head of household and assorted cousins, nieces and nephews. Table 4 gives the distribution of male and female adult workers (aged 15-59) for Ouallam and shows households have more workers than Niamey of Filingue. It is generally a single household that occupies a compound; where several families live in a single compound, each has its own autonomous head of household. Household members cultivate some fields collectively (fari-beri Raulin 1963-58, or windi fari) and cultivate other fields individually (kourba).

Table 4: HOUSEHOLD WORKFORCE -- OUALLAM

Females	0	1	2	3	4	5	6 & over	Total
Males								
0	0	1.5%	1.5%	0	0	0	0	3.0%
1	0.7%	15.9%	6.1%	1.5%	0	0	0	24.2%
2	0.7%	8.3%	10.6%	6.1%	3.8%	2.7%	0	32.2%
3	0	2.3%	6.8%	4.5%	3.0%	3.0%	0	19.6%
4	0	3.0%	0.7%	6.1%	0.7%	0.7%	0	11.2%
5	0	0	0.7%	1.5%	0.7%	2.7%	0.7%	6.3%
6 & over	0	0	0	0.7%	1.5%	0	1.5%	3.7%
	1.4%	31%	26.4%	20.4%	9.7%	9.1%	2.2%	100.2%

Raulin (1963:24-48) describes two major types of hand cultivation techniques in Niger: one based on the hoe for weeding, the other using the iler, a flat, curved metal blade with a long, straight handle that permits the cultivator to work without bending over. Ouallam falls within the region in which the iler is used: it is the best adapted tool to the sandy soils of the area. Because the iler disturbs only a shallow layer (2-5cm, Raulin 1963:30) in cultivation, it may reduce the amount of wind erosion.

The staple crop of the whole project zone is millet, and peasants cultivate many varieties: rapid-growing types, which take as little as 60-70 days to reach maturity, and slower growth types, which take up to 120-140 days. Small farmers in Ouallam make several sorts of cultivations. Kali are small gardens, often just outside the house, which are planted with a variety of vegetables and useful plants. They are heavily fertilized with manure and household wastes. Koiratie ("near the village") are relatively intensively worked lands immediately outside the village. In some cases they are manured; they are the first land to be weeded and are under almost continual cultivation. Zigi are brush fields at a considerable distance from the village; in some regions households construct temporary dwellings in their brush field and remain there for part or all of the cultivation season.

The relative importance of these sorts of fields, the specific cultivation practices used in each, and mixes of local cultivars vary with the situation of the community. Sidikou (1973) describes three villages that are characteristic of different situations: Dakalo Beri, a very old village from which many residents have migrated to other parts of northern Ouallam; Kassi Tondi, a village that has spawed four satellite villages, and Siwili, a recently settled village slightly to the north of the project zone. The location of these villages is shown on figure 3.

Dakala-Beri included, in 1972, a population of 335 Zarma residents, and some 56 sedentarized Peul, who were lent small amounts of land on the outskirts of the village. The agricultural lands around Dakala-Beri include small gardens (kali) around each compound, the in-field area (koiratie) which extends 1.5-2 km from the village. The in-field contains a number of protected trees: Acacia albida (gao), A. nilotica, Sclerocaria birrea (used for tools) and Balanites aegyptiaca, valued for the organic matter they add to the soil as well as for their fruits and foliage that attract animals that leave manure in the fields. The in-field area is devoted mostly to millet; there are also small gardens of calabasses, which are the principle cash crop in the village.

After the weeding of in-field areas is completed, much of the workforce of Dakala-Beri abandons the main village to take up residence in huts in the out-field (zigi) areas, of which there are five. Some of the

lands have relatively high clay content and are difficult to work; it is here that people cultivate sorghum. In the more friable sand-clay mixtures, they grow millet. Households build enclosures every one to four years; thus, the area gets some manuring.

The principle millet cultivars (cultivated varieties) in Dakala are:

mbunga — Cultivated on manured plots in the in-field, it reaches maturity in 70 days.

hainikirey — The most common, reaching maturity in 90-120 days.

darankoba — A variety introduced from the Dallol Bosso, planted mostly on dune sands, reaching maturity in 100 days. Villagers I spoke to in Sadiezekoira (near Simiri) added that darankoba had highest yields of the short varieties they used, and that they preferred the taste.

somno — A late-maturing variety, requiring 120-140 days to reach maturity. It is drought-resistent, is not damaged by being weeded late, and gives high yields. However, Dakala farmers planted it less and less frequently because of short rainy seasons, and peasants at Sadiezekoira had not planted it for several years.

Unfortunately, Sidikou gives no quantitative data on cultivated areas per household.

The second village, Kassi-Tondi, was founded around 1880 by the son of a slave, and many of the people who later came to settle there were weavers by trade. It is likely that many were the descendents of captives who were able to take possession of land, and to acquire herds. In 1972, the principal village contained some 235 persons, and the satellite villages contained 72 persons.

The satellite villages are formed of households which did not inherit fields near the village--most inhabitants of satellite villages have kin links through women (but no links through men) to the central village. The major sorts of cultivation are the same as at Dakala-Beri: house garden (kali), in-field (koiratie) and out-field (zigi). The crops of the house gardens are the same as described above. In-field plots were cultivated six or seven years, and then left fallow for two or three years; most fields held only millet and sorghum, but there were also a few garden plots of watermelons located near wells. Out-field plots were planted with millet, cowpeas, sorrel, and a small amount of sorghum.

There are considerable differences in agricultural methods between persons living in the central village and those living in the satellite

villages. Those living in the main village use little or no animal manure: although they have cattle, the cattle are left with Peul herders. However, the stalks of millet (pied de mil) are left on the ground after the harvest to protect the soil and to protect the next year's millet from foot damage during cultivation (Sidikou 1973:130).

Most of the inhabitants of the central village weed their fields only once, although some manage two weedings. The principle difficulty seems to be households' lack of food during this period: many heads of household must leave their own cultivations and work in the fields of others for money to feed their families.

Those who live in the satellite villages use much more animal manure, because they keep their livestock on the farm itself. During the dry season the animals are kept on the empty fields, in enclosures which are moved every two or three months; during the rainy season, they are kept in a single enclosure on the edge of the cultivated area. This enclosure is then planted the next year. In addition, farmers of the satellite villages keep close ties with Peul herders who come in the dry season to graze their animals in the harvested fields.

The types of millet cultivated by the central and satellite villages of Kassi-Tondi include the types described above, with two additions:

tchumo — whose cycle varies from 100-140 days.

ayoru izo — a variety that, when milled, yields a higher proportion of flour than darankoba.*

Siwili, the third village that Sidikou (1973:135-142) discusses, was claimed as a hunting ground in 1914. It was at first a hamlet occupied only during the agricultural season, and did not have a reliable year-round source of water until 1969. In 1971, the total population of the village was 429 - half of whom lived there throughout the year. The population included Zarma, Peul, and bella (ex-captive) families.

Land within the village cannot be bought or sold. Those who are descendents or collateral descendents of the original claimant establish rights to land by clearing it for cultivation. Strangers can be given land which was not previously claimed: the village can also decide to accord them permanent rights to land.

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* Tchumo and somno are among the local cultivars that were collected by INRAN researchers: in heavily fertilized soils, yields of tchumo (poids epis) were considerably higher (3.61 and 4.93 t/ha) than yields for somno (1.5 t/ha and 2-47 t/ha) (Republique du Niger, MDR, INRAN 1978: Annex 5, table 8).

Cultivation methods here are much more simple than to the south. People do not manure their fields: since the area was only recently brought under cultivation, the soils are (presumably) undepleted. Fields are weeded only once. The only kind of millet grown there is haini kirey. In normal years, when the sowing could be completed early and when the stalks had a chance to grow to normal height before forming grain, the millet is called haini beri ("large millet"); in bad years, when the planting was late and the millet was still short when forming grain, it is called haini kaina ("little millet"). In some cases, sorrel and legumes are interplanted with the millet.

Until about 1968, harvests were very good, and the area had a reputation as a granery. However, the start of the drought and attacks of grasshoppers have made the region far less attractive.

Siwili is a village near the northern limit of rainfall agriculture. Since land is plentiful, and since rainfall is very unpredictable, millet cultivation is less labor intensive than in villages to the south.

To sum up the critical characteristics of the three villages described, and their implications for development:

1) Villages in long-settled areas, like Dakala-Beri, have more the problem of soil exhaustion than of lack of land per se. There is probably opportunity for greater cultivation of secondary crops for market. It is these villages that lose the greatest number of young workers to cities and to the coast (Sidikou 1973:121).

2) Villages that have broken up into quarters, like Kassi-Tondi, have the greatest potential for mixed farming: use of manure in the satellite hamlets is already extensive. Out migration during the dry season is less common in villages like these than elsewhere; many young men find employment hauling water for herds owned by Peul.

3) Pioneer villages like Siwili have little potential for intensified agricultured methods; there is no perceived lack of land, and, in terms of rainfall, the land is marginal

One aspect which receives very little attention in Sidikou's study is the cultivation of low-lying areas in the Zarmaganda.

The Niger Marshaland Survey Project produced an inventory of marshlands and bas-fonds for Ouallam arrondissement summarized below:

(a) Marshes		
Ouallam	Adamouss	GTZ has done preliminary studies
	Badouga	now cultivated with manioc for local consumption

(a) Marshes (contd.)

Ouallam	Farka	not presently cultivated; Peace Corps Volunteers thought would be good for rice
Simiri	Panneberi	now used for flood recession agriculture (potatoes, cowpeas, etc.)
	Sinibangou	chef de village tried growing rice: PCVs thought rice cultivation might be possible may be over-pessimistic.

(b) Bas-fonds

Ouallam	Bardouga-Ouallam-Sargane-Tolkoboy (see below)	
Simiri	Tolkoboy-Guesse	now used for tomatoes, lettuce, onions, cabbage, peppers, potatoes, mostly for sale in Ouallam and Niamey.
	Kaoura	some calabashes and watermelons grown.
	Sinibangou	now used for subsistence crops, report thought that could be used for market crops with the excavation of wells.
	Tondikiwindi Banibangou	used already for market crops.
	Mondolo	there is some small-scale cultivation of calbashes, manioc, and squash. Report thought that manioc cultivation could be increased.

GTZ (German Agency for Technical Cooperation) just set up a pilot project for dry season gardens irrigated from wells that use ox-traction to raise the water (GTZ 1980). The preliminary studies for that project give a fairly complete picture of land use in the Ouallam-Sargane lowlands. During the rainy season, the farmers plant fields of millet, sorghum, and niebe. After the harvest (i.e. in October or November) people plant gardens of cotton, tomatoes, onions, peppers, squashes, sweet potatoes, potatoes, manioc, some fruit trees (guavas and mangoes) and niebe. The report examined existing gardens, which averaged .15 ha. Around Ouallam, there were relatively few gardens and the principal crops were manioc and niebe. Around Sargane, gardens were more numerous and the dominant crop (identified as pastèque, or watermelon) is

preferred because it does not require watering. Its fruits are dried and sold.

In the Etude de Milieu (GON, Animation 1979:35-38) of Ouallam, the authors included a section entitled "Aspiration - Souhaits" for a list of 25 communities, and of these communities, 21 hoped for improvement of low-lying ground (bas-fonds) or excavation of wells in order to increase their ability to cultivate market crops and crops like manioc for local consumption. Although NDD Phase I was to have included six small-scale irrigation schemes (Reyna 1979), these were never set up, and it seems likely that NDD Phase II will not budget money for feasibility surveys or for pilot studies. I think this is unfortunate, because horticultural techniques could profitably be taught at the CPTs, as an adjunct to staple crop techniques.

This brings us to the question of the division of labor within the household. One day trips through Ouallam, when team members asked what agricultural work women carried out, the answer was almost always the same: they cultivated small plots of peanuts, Bambara groundnuts (Vouamdzou subterrania), and hanti (Cyperus ēsculentus), gombo, and sesame, and they participated in the sowing, the replanting, and harvesting of millet, but not in the weeding. Women do not, we were told, inherit land; their husbands give them small plots. Because women manure their plots heavily, husbands in one village told us they often expropriate their wives' plots every few years, in order to benefit from the increased fertility. Women also seemed to buy a good deal of chemical fertilizer: one village (Garbe fande, in Tondikiwindi) told us their total sale of fertilizer -- 34 sacks -- had been to women, who pooled their money to buy the sacks, a and them divided them up among themselves for their garden plots.

It is likely that women also work in dry-season gardens in some parts of the project zone. Raulin (1964:77) reports that in Sakoira, a Zarma village in the arrondissement of Tillaberi, just outside the project zone, one household in five has dry-season gardens (about 1/4 ha.) on the banks of the river where older women, with the help of their children, cultivate onions, cotton, tomatoes, rice, manioc, and mangoes.

Table 5 gives a two-way breakdown of exploitations surveyed in the 1979 SAA study by area per capita and area per male worker. I think it is difficult to argue that the main constraint on cultivated area is workforce: almost half of all farms have less that .5 ha. per male worker. A more likely cause for small area per capita is the unreliability of rainfall and consequent search for livelihood outside agriculture.

Household workforce (defined as persons aged 15-59) in Ouallam was shown in Table 4. Compared to other arrondissements (see Tables 9 and 13), the number of households with two or more male workers is large. The

Table 5. Cardina Cultivated Area Per Male Worker by Cultivated Area Per Capita (Percent of Total Farms)

Hectares Cultivated Per Capita / Ha. per male worker	less than .10	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89	.90-.99	more than 1.0	Total
.5	30 27.7%	17 15.1%	1 0.8%	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	54 41.5%
.50-.99	2 1.5%	10 7.7%	6 4.6%	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	18 13.8%
1.0-1.49	0 -	1 .8%	4 3.1%	4 3.1%	1 .8%	3 2.3%	1 .8%	1 .8%	0 -	0 -	0 -	15 11.5%
1.5-1.99	0 -	0 -	0 -	1 .8%	2 1.5%	3 2.3%	1 .8%	1 .8%	0 -	0 -	1 .8%	9 6.9%
2.0-2.49	0 -	0 -	0 0	2 1.5%	0 -	3 2.3%	2 1.5%	2 1.5%	1 .8%	0 -	2 2.3%	12 9.2%
more than 2.5	0 -	0 -	0 -	2 1.5%	3 2.3%	2 1.5%	4 3.1%	0 -	3 2.3%	1 .8%	4 3.1%	19 14.6%
no male workers	3 2.3%											3 2.3%
	41 31.5%	28 21.5%	11 8.5%	9 6.9%	6 4.6%	11 8.5%	8 6.2%	4 3.1%	4 3.1%	1 .8%	7 5.4%	130 100%

interviewers included as household members any persons who migrated but returned for the agricultural season; Enger (pers. comm.) suggested the data might overstate the size of the workforce, and, in consequence, underestimate the cultivated area per male worker.

Table 6 parts a through d, gives the reported numbers of cattle, sheep, goats, and camels per exploitation. The project zone excludes northern Ouallam, where herding is more important, I think these figures show under-reporting, especially for landholders.* What these tables do show, I think, is the moderate importance of livestock as a supplement to rainfed agriculture.

The remittances and the savings of migrants are another important supplement to household income. The demographic data from Ouallam (indeed, from Niger as a whole) are scanty. Sidikou carried out a census in the canton of Simiri in 1966, and noted that absent persons made up 1.6% of the total population. Migrants were almost all males aged 20-39, and a majority of migrants were married. The destination of most migrants in 1972 was Ghana (73.7%), Niamey (18.3%), or Ivory Coast (6.8%). These figures resemble the results of the 1960 demographic survey of Niger (Republic du Niger 1960).

The most recent census of Niger was taken in 1977, and most of the data have not yet been published or, indeed, tabulated. Preliminary tabulations were made by hand by the GON, and from these, a random sample of five villages within the project zone of NDD in Ouallam showed that absent persons comprised 5.09% of the total population. The destinations of migrants have changed since Ghana expected foreign workers in 1969, Ivory Coast now receives a large proportion (Sidikou 1973:68).

Agriculture in Filingue

As in Ouallam, one of the major factors affecting agriculture in Filingue is rainfall. Peasants judge the start of the planting for millet by the depth of soil moisture: they sow when the rains have penetrated to 20 cm. (Beauvilain 1977:15). Given the sandy soils that dominate the project zone and the water requirements of local millet varieties, table 7 shows the length of the agricultural season for Niamey (1905-1971) and for Filingue (1930-1971), and for Toukounous (1955-1971). Most of the millet cultivars used in the region take at least 90-100 days to mature.

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*It is unfortunate that the 1979 survey did not record numbers of donkeys, since donkey-carts are by far the most popular piece of equipment distributed by the UNCC network.

Table [illegible] - Cattle ownership by Size of Exploitation, Per Cent of Total Exploitation - Gualiama

No. of cattle/ exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	[illegible]	[illegible]	4-4.99	5-5.99	6-6.99	7-8.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	[illegible]	11.[illegible]	[illegible].1	[illegible].3	[illegible].6	.8	1.6		1.6	.8		.8			[illegible].6
1			.6			.8	.8								[illegible].4
2	5.6	[illegible].4	1.6	.8							.8	.8			12
3	1.6	.8	.8		.8		.8		.8						5.6
4	.8					1.6									2.4
5	1.6	[illegible].2		.8									.8		6.4
6	.8	1.6		.8	.8										4.0
7										.8					.8
8			1.6								.8				2.4
9		.8													.8
10					.8										.8
10		1.6			.8										2.4
TOTAL	4.6	21.7	1[illegible].9	7.[illegible]	7.[illegible]	4.8	3.[illegible]	0	2.4	1.6	1.6	1.6	.8	0	100%

*Totals may not be exactly 100% due to rounding error

Table 6 B - Carlisle - Sheep Ownership by Size of Exploitation, Per Cent of Total Exploitations

No. of sheep/ exploitation	SIZE OF EXPLOITATION														
	Less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4-.99	5-5.99	6-6.99	7-7.99	8-8-.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	21.0	12.9	6.5	4.8	4.0	1.6	2.4		1.6		1.6	.8	.8		58
1	.8	1.6	[illegible]	.8	.8	.8									8.0
2	4.8	2.4	1.6	.8			.8								10.4
3	2.4	2.4	.8	.8		.8			.8						8.0
4	2.4	.8	.8							.8					4.8
5	2.4	.8			2.4					.8					6.4
6		.8				.8									1.6
7															0
8															0
9												.8			.8
10	.8					.8									1.6
10+															0
Total	4.0	21.0	1[illegible]	7.[illegible]	7.[illegible]	4.8	[illegible]	0	2.4	1.6	1.6	1.6	.8	0	100%

Table [illegible] Quellna - Goat Ownership by Size of Exploitation, Per Cent of Total Exploitation

No. of caprine/ exploitation	SIZE OF EXPLOITATION															
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	[illegible]	6.4	[illegible]	[illegible]	4.8	.8	2.4				1.6		.8		42.7
1	[illegible]	.8	1.6												5.6
2	1.6	.8		.8	.8										4.0
3		4.0	1.6	.8			.8								7.2
4	2.4					.8									3.2
5	2.4	1.6	.8						.8						5.6
6	3.2														3.2
7	.8	.8	.8		.8				.8						4.0
8		1.6								.8					2.4
9		.8										.8			1.6
10	4.8	1.6	.8	.8						.8					8.8
10	3.2	1.6	.8	1.6	.8	1.6			.8			.8			11.2
TOTAL	34.5	21.7	17.9	7.2	7.2	4.8	3.2	0	2.4	1.6	1.6	1.6	.8	0	100%

Table 6 D - Ouallam - Camels Owned Per Exploitation

Camels owned per exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	27.4	10.5	10.5	4.8	4.8	4.8	2.4		2.4	.8	1.6	1.6	.8		72.4
1	4.8	6.5	2.4	1.6						.8					16.1
2	2.4	1.6			.8		.8								5.6
3		.8			1.6										2.4
4		.8		.8											1.6
5		.8													.8
6		.8													.8
Total	34.6	21.8	12.9	7.2	7.2	4.8	3.2	0	2.4	1.6	1.6	1.6	.8	0	100%

Table 7 Length of agricultural season for millet (Beauvilain 1977-16)

	less than 10 weeks	10-12 weeks	13-15 weeks	16-18 weeks	19-21 weeks	more than 21 weeks	Total observations to 1971
Niamey	0	9	22	23	12	0	66
		(14%)	(33%)	(35%)	(18%)	0	(100%)
Filingue	2	9	15	9	6	0	41
	(5%)	(22%)	(36%)	(22%)	(15%)	0	(100%)
Toukounous	1	6	4	5	0	0	16
	(6%)	(38%)	(25%)	(31%)	0	0	(100%)

For Filingue, 27% of the seasons recorded were shorter than this minimal length; for Toukounous (where the observation period is short) 46% of the seasons recorded fell below the minimum. An excess of rain can be almost as harmful as a deficiency: for example, in July 1974 there was rain, on the average of once every two days. Low insolation limited the growth of the millet, and intense leaching carried soil nutrient below the root depth.

Beauvilain (1977:18-19) and Guillaume (1974:88) list the following periods of food shortage some of which affected only single cantons, others of which affected the whole area.

1901	whole region	
1913-14	whole region	drought <u>rafowa anga</u> ("the great famine")
1926-27	whole region	poor rains, epidemics, epizootics
1930	Imanan	
1931-33	whole region	grasshoppers and drought
1941	Kourfeye	drought
1942	Imanan & Tondikandia	
1948-9	Imanan	
1953	Imanan	
1954	whole region	excessive rainfall <u>intade lato</u> ("the year of sacks")
1969-74	whole region	drought

In sum, Filingue resembles Ouallam in being a region that is, at best, marginal for rain-fed agriculture. Beauvilain (1977:64-67) traces the demographic history of the region and notes that the famines of 1911-1914 and 1930-1933 caused heavy mortality and heavy migration toward the south. In spite of this, the region remained very densely settled, and by the 1940's Imanan was being described as a region of exhausted soils and chronic food shortage (Beauvilain 1977:66, Guillaume 1974:88). In general, Peul herders were less affected by drought and famine than farmers because of being able to move in search of water, and because, for example, the locust attack of 1930 during June spared many of the pasturelands (Beauvilain 1973:67).

In order to get a concrete idea of how people farm in the Dallol Bosso in Filingue, it is possible to work from two ethnographic sources. One is Beauvilain's (1977) description of Peul and Zarma cultivators in the villages of Alkaoual and Dineyzougou, which are located in the Karma-Kouringuel area of the Dallol, in Dosso Department, about 10 km. south of the project zone (the location is shown of Figure 4). The other is Guillaume's (1974) account of Touareg and Zarma farming in Imanan.

The Peul of Karma Kouringuel distinguish two sorts of fields: ouinde, manured fields next to the house, and guessa (also called balanga) permanetly cultivated fields that are not manured. The house-sites are moved every few years in order to distribute household refuse more evenly (Beauvilain 1977:138).

The principal crops are millet, sorghum, and niebe. Cultivars recorded are similar to those for Ouallam:

gairo:	millet (90-100 day), grown in the manured fields near the house sites
somno:	long-season (120-130 day) millet
bayeri malle:	early-maturing, red, sorghum
sokombari:	sorghum, (90-100 day), cultivated around the house sites, the most common variety.
kellori:	long-season millet, with maturation period of 120-130 days.

Peul farmers are much less likely than Zarma to grow local varieties of niebe, because it matures in early December, long after herds have returned from rainy-season pastures. People who cultivate niebe worry about damage from animals, and, during the drought years, when animals returned earlier than usual, damage to the standing crop became an even greater problem than usual. Therefore, most Peul use niebe almost exclusively as forage. House gardens are somewhat more rare among Peul than among Zarma, and Peul women do not participate in agricultural work (Beauvilain 1977:134).

Average cultivated area for the 16 Alkaoual Peul households was 3.85 ha; average cultivated area for Dineyzougou Peul (n= 15) was 5.0 ha. Average cultivated area for the 13 Zarma farms in the area was considerably larger: 10,63 ha. Cultivated area per male worker is also lower for the Peul exploitations (2.5 for Alkoual; 2.6 for Dineyzougou) than for the Zarma exploitations (4.4 ha/male worker). Beauvilain estimates millet yields (1977:139) during 1974 as 355 kg/ha. for Peul farms,

and 239 kg/ha for Zarma.

The sedenterized Peul of Alkaoual and Dineyzougou have fitted themselves into a Zarma village context. Traditional routes (gourtol) for the passage of animals traverse this terrain; some are regional routes that permit nomad herds to cross the Dallol Bosso; others are village routes that regulate the daily movement of local herds. The land tenure situation is a complex one, and differs from place to place. In Alkaoual relations between Peul and Zarma are not good. The village chief, a large landholder, used his right to redistribute abandoned lands to add to his own landholdings. Some Peul pay the zaka (which was at first a religious and charitable tithe (Raulin 1963:115) as rent to the chief of the canton; others pay the zaka to the chief of the village (Beauvilain 1977:144). Increasingly, renters have had to make a deposit (tolme) which is reimbursable if they are evicted, and this deposit fluctuated between 1500 and 3000 CFA from 1972 to 1974.

Recently, this deposit has often been used to pay the travel expenses to Ivory Coast for the landlord or his children, and there has been a trend toward evicting old tenants (who pain relatively small deposits) in order to receive larger deposits from new tenants. In theory, tenancy rights are granted to families rather than to individuals, and long-standing ties between Zarma and Peul families make Peul rights to rent land relatively secure. In fact, examination of changes in field tenancy at Alkoual since 1964 shows that Peul tenancy is decreasing, and members of the Peul community are increasingly obliged to cultivate lands on the plateau above the Dallol Bosso, or to seek cultivable lands from their in-laws.

In Dineyzougou, relations between Peul and Zarma are far better, and evictions of Peul tenants are quite rare. Indeed, there has been a net increase in the lands cultivated by Peul farmers, due mostly to the departure of Zarma farmers for the Ivory Coast.

For the Karma-Kouringuel area as a whole, the proportion of cultivated area rose from 60.7% of total area in 1950 to 87.5% in 1973, There was simply no land capable of agricultural production that was not in use (Beauvilain 1977:155). As a result of increasing population pressure on land; migration during the dry season among Zarma is very high: in 1974 of Zarma heads of household under age 50, 81% of those in Alkaoual and 50% of those in Dineyzougou were absent. The overwhelming majority of these went to Ivory Coast, and the duration of absence was, for the largest group (69%) less that a year (Beauvilain 1977:158).

The canton of Imanan, farther north in the Dallol Bosso (see figure 4) resembles the Karma-Kouringuel area in being very heavily cultivated and in having very little fallow land. Guillaume (1974:85)

felt that Touareg farmers used the soil to the point of exhaustion. His description of agricultural practice does not give much detail. Some elements of agricultural practice, for example, collective work parties (tadigishit) were borrowed from the Zarma (Guillaume 1974:65). Among the Imanan Touareg, both men and women form these groups.*

The pattern of land use differs in some respect from the Zarma: there is no distinction between manured fields near the compound and bush fields, and women are not allotted fields for their personal use.

Farmers make great efforts to obtain animal manure for their fields. During the rainy season, some animals, mostly goats, donkeys and lactatimg camels, are kept staked or enclosed in the least fertile parts of the land. People lacking animals make fairly complex arrangements to obtain them. There is also an effort during the rainy season to use household wastes on the fields: at the start of the agricultural season, most of the population disperses into temporary huts in the midst of the fields, and, again there are several sorts of arrangements that give housesites to persons possessing relatively little land, in return for the deposit of household residues.

After harvest, herds owned by the Imanan Touareg return from the north, graze on the field residues, and get water mostly from shallow wells. As in Karma-Kouringuel, there are fixed corridors to allow animals access to water. In spite of these, animals sometimes get into the standing crops, and there is a complex series of fines, depending on the type of animal and the extent of the damage (Guillaume 1974:95).

Imanan canton also serves as a dry-season grazing ground for nomads from the north, and there are fixed rates of payment in millet to the herders for keeping herds on the harvested field. However, manure deposited during the dry season benefits the soil far less than manure deposited during the wet season. (Guillaume 1974:102). Some households lack both livestock and sufficient resources in millet to arrange that animals belonging to others be pastured on their land.

In sum, Imanan is a heavily cultivated area which relies heavily on manuring with human refuse and animal wastes in order to assure even minimal yields. However, table 8, which shows livestock holding broken down by cultivated area for Filingue arrondissement as a while, does not give the impression that the herds owned by small farmers are large enough to keep farms well manured.

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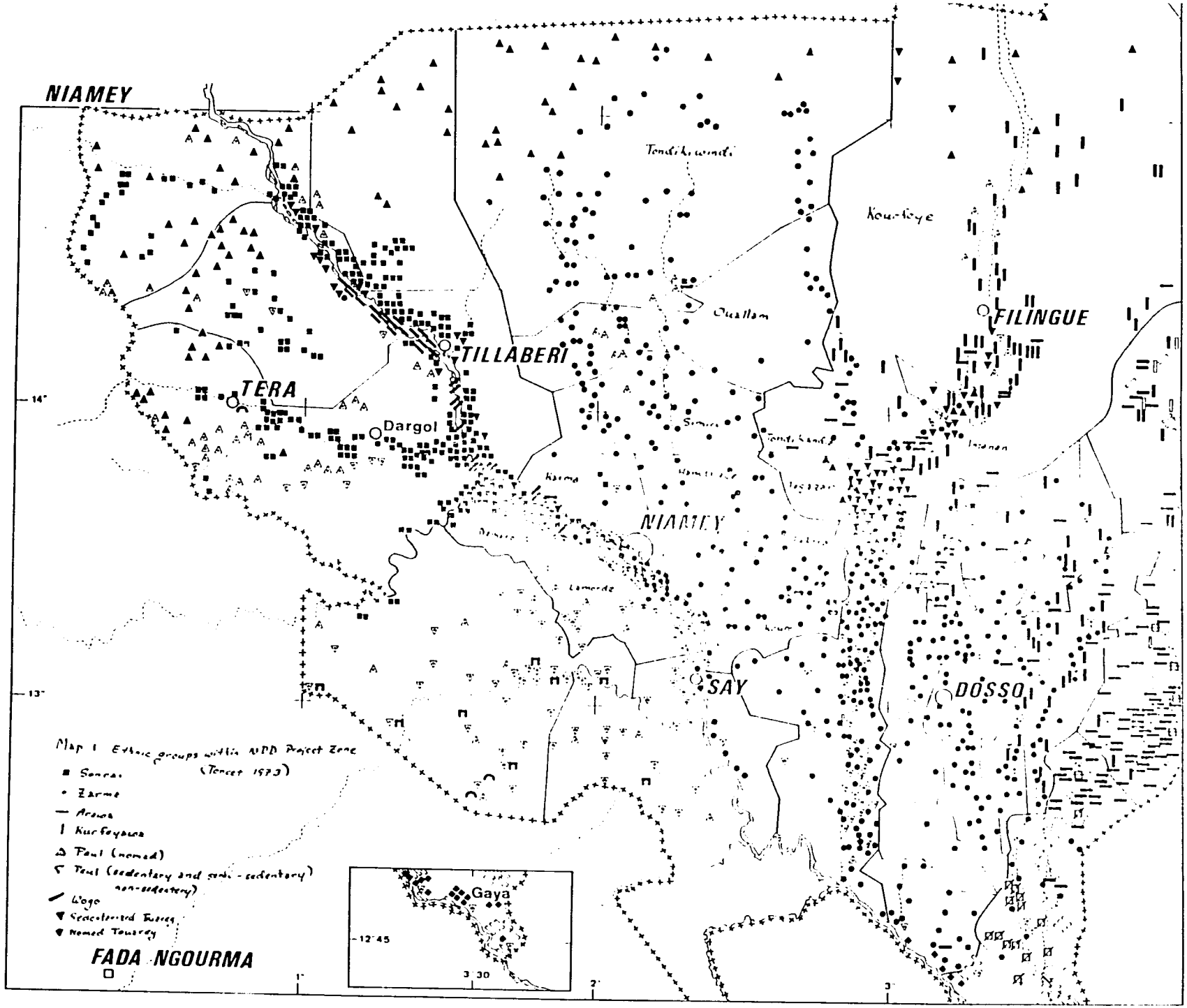
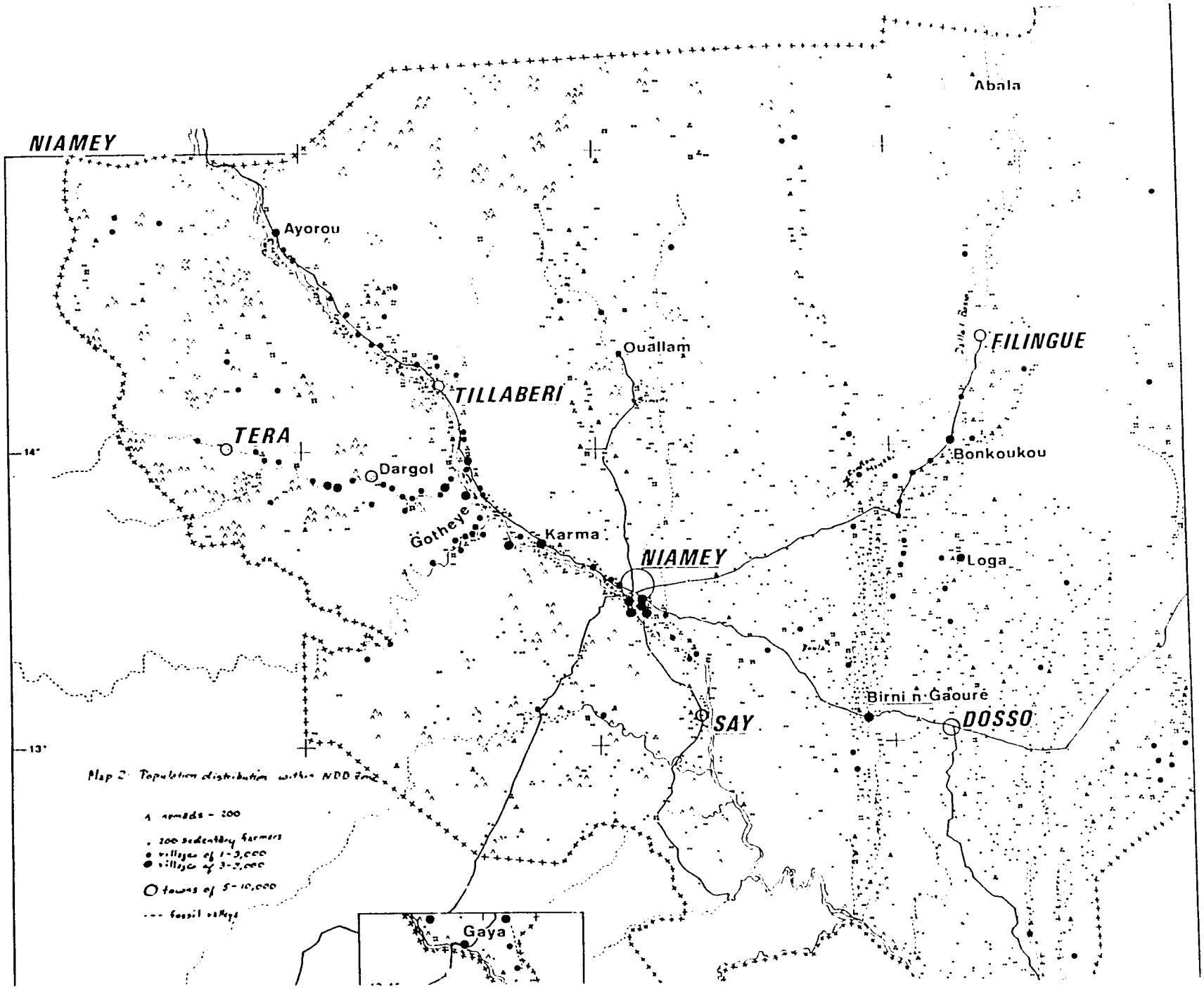
* The harvest of late-maturing varieties of niebe is often carried out by work parties of women. (Guillaume 1974:72).

Table 8 - Filingue - Number of Cattle Owned by Total Cultivated Area, Percentage of Exploitation

No. of cattle per exploitation	SIZE OF EXPLOITATION														
	Less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	10.7	10.7	9.8	10.7	5.7	.8	1.6	4.1	1.6	.8				1.6	67.1
1	.8	.8	.8			.8									3.2
2	.8		1.6	1.6	.8	.8			.8				.8		7.2
3	.8	2.5		.8											4.1
4		.8	.8									.8		.8	3.2
5	1.6														1.6
6		.8	.8									.8			2.4
7				.8											.8
8		.8				.8		.8							2.4
9															0
10	.8														.8
11		.8	.8		1.6									.8	5.7
Total	15.5	[illegible]	[illegible]	1.6	8.1	[illegible]	2.4	4.9	2.4	.8	0	1.6	.8	3.2	100%

[illegible] may not be exactly 100% due to rounding error.


NIAMEY
TILLABERI
TERA
Dargol
FILINGUE
NIAMEY
SAY
DOSSO
FADA NGOURMA
Gaya
14°
13°
12°45
3°30
1°
2°
3°
Map 1 Ethnic groups within NPD Project Zone
(Tencet 1973)
Songrai
Zarma
Arawa
Kurfeyawa
Peul (nomad)
Peul (sedentary and semi-sedentary)
non-sedentary)
Wogo
Sedentarized Tuareg
Nomad Touareg



Map 2: Population distribution within NDD Zone

A nomads - 200

. 200 sedentary farmers

● villages of 1-3,000

● villages of 3-5,000

○ towns of 5-10,000

--- fossil valleys

Table 3.8 - Filingue - Number of Sheep Owned by Total Cultivated Area, Percentage of Exploitation

No. of sheep per exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	11.5	19.7	13.9	10.7	4.1	3.3	1.6	4.1	2.5	.8		.8	.8	1.6	75.4
1		1.6			.8										2.4
2	1.6	1.6	.8	.8	.8									.8	6.4
3	.8	1.6		.8	.8									.8	4.8
4	.8	.8	.8	1.6											4.0
5	.8		.8												1.6
6		.8													.8
7															0
8								.8							.8
9															0
10					.8					.8					1.6
10					.8		.8								1.6
TOTAL	15.5	26.1	16.5	13.9	8.1	3.3	2.4	1.9	2.5	.8	0	1.6	.8	3.2	100%*

*Totals may not be exactly 100% due to rounding error.

Table 8 C - Filingue - Number of Goats Owned by Total Cultivated Area, Percentage of Exploitation

No. of goats per exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7-.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13.99	Total
0	10.7	17.[illegible]	12.3	10.7	4.1	.8	1.6	2.5	1.6				.8	1.6	63.9
1	.8	1.6			.8		.8								4.0
2		2.5	1.6	.8	.8	.8		.8	.8						8.1
3	2.5	4.1		.8	.8	.8				.8					9.8
4	.8														.8
5				.8										.8	1.6
6	.8														.8
7			.8					.8							1.6
8			.8					.8		—					1.6
9															0
10	.8			.8	.8	.8						.8			4.0
11			.8		.8							.8		.8	3.0
Total	15.6	[illegible]	16.[illegible]	[illegible]	8.1	[illegible]	2.4	4.9	2.4	.8	0	1.6	.8	[illegible]	100%

Totals may not be exact, 100% due to rounding error

Table 8 b - Filingue - Number of Camels Owned by Total Cultivated Area, Percentage of Exploitation

No. of camels per exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	9.9	22.1	10.7	11.6	6.6		2.5	4.1	1.7	.8		.8	.8	1.7	73.5
1	2.5	3.3	4.1	2.5	.8	3.3			.8						16.5
[illegible]	1.7	.8		.8										.8	4.1
[illegible]			1.7											.8	2.5
4								.8							.8
5	.8		.8									.8			2.4
5															0
TOTAL	14.9	26.4	16.5	14.1	8.2	3.3	2.5	4.9	2.5	.8	0	1.6	.8	3.3	100%*

*Totals may not be exactly 100% due to rounding error.

The land tenure system in Imanan is somewhat simpler than that described above for the Karma-Kouringuel area. Guillaume (1974:80-82) describes three sorts of exchange of rights to land use: 1) mortgage, in which the landowner receives 15-20,000 CFA for a small one, and receives , in addition, 50-100 kg. of millet. 2) a rental arrangement, in which the landlord receives 1/10 of the harvest, and 3) land allocations in which the person who receives the land to cultivate pays only a small rental that serves as a reminder that his rights to the land are not permanent. Ouright sale of land is very rare.

A major problem in describing agriculture in Filingue is lack of information on the Arawa and Kurfye populations: the ones lumped in the original project description as Housa. Arawa women of Bogondoutchi, a town in the southern Dallol Maouri, have received some ethnographic attention, but their situation seemed very different from that of women in the northern rural parts of the Dallol Bosso (Piault 1965).

M. Piault (1965:43-46) gives little detail on agriculture as practiced by women, and even less detail on general practice. She notes that the women spend considerable time on garden plots, that the principal crop cultivated by women was Bambara groundnut, that women traditionally planted fonio and peanuts, and helped in during harvest transporting millet to the graneries. This is very much like the division of agricultural work practiced by the Zarma. Marc Henri's more general studies of Arawa populations did not include a description of their economic organization (1967:674).

It may be the case, however, that the division of agricultural work among northern Arawa populations is closer to the Housa type than the Zarma type, and it may also be the case that in some situations the division of labor can change. At the CPT in Fandou Mayaki (in Filingue, on the plateau to the west of the Dallol Bosso), women were being trained in animal traction techniques because, noted the Director, many households had only one adult male and the traction techniques necessitated a larger work team. The data on household workforce in Filingue, shown in table 9, bears out the CPT instructor's observations. Since he had arrived only 2½ months earlier, it will not by possible to see until next year whether wives in pilot couples continue to participate in all aspects of field work. The household workforce in Filingue is considerably smaller than that of Ouallam: while the majority of households in Ouallam had two or more workers, the majority of households in Filingue have one or less.

Table 10 shows the distribution of farms with respect to cultivated area per capita and cultivated area per worker. Comparing these data with the distributions from Ouallam, it is obvious that there are fewer farms with extremely small areas per worker and per capita in Filingue than in Ouallam, and more farms in the middle ranges.

Table 9 - HOUSEHOLD WORKFORCE -- FILINGUE

MALES	FEMALES 0	1	2	3	4	5	6 & over	TOTAL
0	0.7%	3.7%	0.7%	0	0	0	0	5.1%
1	0.7%	20.0%	17.8%	5.9%	2.2%	1.5%	0	48.1%
2	0	10.4%	8.9%	3.7%	0	0.7%	0.7%	24.4%
3	0	1.5%	5.9%	1.5%	1.5%	0	1.5%	11.9%
4	0	0	3.7%	1.5%	0.7%	0	0	5.9%
5	0	0	0	0.7%	1.5%	0.7%	0	2.9%
6 & over	0	0	0.7%	0	0.7%	0	0	1.4%
	1.4%	35.6%	37.7%	13.3%	6.6%	2.9%	2.2%	100%

n = 135

Table 10 - Filipino - Cultivated Area Per Male Worker by Cultivated Area Per Capita (Percent of Total Farms)

Ha. per male worker	Ha. per cap. less than .10	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89	.90-.99	more than 1.0	Total
No male workers	0 -	1 0.7%	0 -	1 0.7%	2 1.5%	0 -	0 -	1 0.7%	0 -	0 -	2 1.5%	7 5.2%
Less than .50	9 6.7%	5 3.7%	1 0.7%	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	15 11.2%
.50-.99	1 0.7%	15 11.1%	5 3.7%	7 5.2%	1 0.7%	1 0.7%	0 -	0 -	0 -	0 -	0 -	30 22.4%
1.00-1.49	0 -	4 3.0%	6 4.5%	3 2.2%	1 0.7%	0 -	0 -	0 -	0 -	0 -	0 -	14 10.4%
1.50-1.99	0 -	2 1.5%	6 4.5%	5 3.7%	3 2.2%	3 2.2%	1 0.7%	0 -	0 -	0 -	0 -	20 14%
2.0-2.49	0 -	1 0.7%	2 1.5%	1 0.7%	2 1.5%	3 2.2%	1 0.7%	0 -	1 0.7%	0 -	0 -	11 8.2%
more than 2.5	0 -	0 -	0 -	8 6.0%	4 3.0%	2 1.5%	1 0.7%	8 6.0%	2 1.5%	2 1.5%	10 7.4%	37 27.6%
	10 7.4%	28 20.8%	20 14.9%	25 18.7%	13 9.7%	9 6.7%	3 2.2%	9 6.7%	3 2.2%	2 1.5%	12 8.9%	134 100%

Livestock holdings, shown on table 10 are considerably smaller for Filingue than for Ouallam. It is difficult to know whether to attribute the difference to characteristics of the population surveyed, or to under reporting. Beauvilain (1977:178) notes that in the northern Dallol Bosso, sedentary farmers held little livestock and herders a good deal. Thus, in 1965, Touareg and Bouzou averaged 0.8 cattle-equivalents per capita* while the Peul averaged 5.5 cattle equivalents per capita. For comparison, table 11 gives the results of administrative census in cantons of Filingue.

Niamey Arrondissement

Of the arrondissements within the project area, Niamey gets the most rainfall, and the distribution of that rainfall has been most favorable for agriculture. Table 7 shows that of the agricultural seasons 1911-1971, 86% had been long enough for local millet varieties, Beauvilain noted that Niamey was far less affected by the 1969-1973 drought than, for example, Filingue: for Niamey average total rainfall for the decade 1965-74 was 9.4% less than for the decade 1950-59, while for Filingue, the difference was 37.2%.

Discrepencies in the reported results of demonstration plots (Wagner 1980) make it difficult to evaluate the basic project's technical package in any of the arrondissements, but, if one accepts the figures of Service de l'Agriculture, yields in millet and niebe demonstration plots in Niamey (and, for that matter, in the control plots) were considerably higher than in demonstration plots in Filingue or in Ouallam. Niamey arrondissement's favorable rainfall makes it likely that if the technical package advocated by NDD works well anywhere, it works well in Niamey.

Unfortunately, there is no ethnographic information available on farming in Niamey arrondissement. The available statistical data from the 1979 survey are summarized in tables 12, 13, and 14. Table 13 shows that Niamey households have perceptibly fewer male and female workers than households in Ouallam. Table 2 showed that Niamey farms averaged 2.29 ha/male worker, compared with 1.40 ha/male worker in Ouallam and 2.16 ha/male worker in Filingue. Table 3 showed that 43.7% of farms in Niamey reached Sargent et al.'s threshold for donkey traction (assuming that an increase in 30% in cultivated area) equipment and 30.8% of farms reached the threshold for ox-traction equipment.

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*A cattle equivalent is (cattle + (small ruminants/10)).

Table 11 - Per capita livestock holdings - from administrative census in Filingue

Canton	year	non-Peul cattle/ cap	small stock/ cap	Peul cattle/ cap	small stock/ cap
Tagazar	1934	.470			
	1940	.409	.055		
	1944	.366	.527		
	1953	.326	.207		
	1963	.384	2.517		
Tondikandiz	1935	.122	.473		
	1942	.168	.936		
	1946	.166	.684		
	1950	.214	.605		
	1954	.253	.612		
	1967	.308	.244		
Imanan	1932	.413	.733		
	1933	.531	1.143		
	1938	.656	1.049		
	1943	.798	1.943		
	1946	.943	1.550		
	1950	.646	.951		
	1953	.663	.686		
	1972	.575	.430	1.927	1.464
Kourfeye	1953	.737	.693		
	1965	.661	.536		

Table 1: - Hinsey Arrangement. Cultivated Area Per Capita and per Male Worker

Hectares per male worker	less than .10	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0 and over	Total
less than .5	8.3% (10)	3.3% (4)	0.8% (1)	0	0	0	0	0	0	0	0	12.5% (15)
.5-.99	1.7% ( )	9.1% (11)	4.[illegible] (5)	0.8% (1)	2.5% (3)	0	0	0	0	0	0	18.[illegible]% ([illegible])
1.0-1.49	0.8% (1)	2.5% (3)	5.0% (6)	4.[illegible]% (5)	1.7% (2)	0	0.8% (1)	0	0	0	0	15% (18)
1.50-1.99	1.7% (2)	0.8% (1)	2.5% (3)	1.7% (2)	2.5% (3)	1.7% (2)	2.5% (3)	0	0.8% (1)	0	0	14.[illegible]% (17)
2.0-2.49	0	0	0.8% (1)	2.5% (3)	0.8% (1)	0	0.8% (1)	0.8% (1)	0	0	0.8% (1)	6.7% (8)
2.50 and over	0	0	1.7% (2)	5% (6)	1.7% (2)	3.3% (4)	3.3% (4)	0.8% (1)	3.3% (4)	3.3% (4)	10.8% (13)	33.[illegible]% (40)
TOTAL	12.5%	15.7%	15.0%	14.[illegible]%	9.5%	5.0%	7.4%	1.6%	4.1%	3.3%	11.6%	100%

Table 13: HOUSEHOLD WORKFORCE (15-59) -- NIAMEY

	FEMALES 0	1	2	3	4	5	6 and over	TOTAL
MALES								
0	0	0	0	0	0	0	0	0
1	0	25%	14.2%	1.7%	0.8%	0	0	41.7%
2	0	10.8%	15%	5%	2.5%	0.8%	0	34.1%
3	0	1.7%	1.7%	1.7%	0.8%	0	0.8%	6.7%
4	0	0.8%	5.8%	3.3%	0	0	0	9.9%
5	0	0.8%	0.8%	1.7%	0	0.8%	0	4.1%
6 & over	0	0	0	0.8%	0.8%	0.8%	0.8%	3.2%
	0	32.1%	37.5%	14.2%	4.9%	2.4%	1.6%	100%

n=121

Table 14 A - Bilaney - Cattle Ownership by Size of Exploitation, Percent of Total Exploitations

No. of cattle/ exploitation	SIZE OF EXPLOITATION														
	Less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13.99	Total
0	4.6	15.9	17.6	6.5	5.6	5.6	5.6	2.8	.9		.9	1.8			65.8
1		.9		.9					1.8					.9	4.5
2		3.7	2.8	.9	.9					.9		.		.9	10.1
3		.9	1.8	.9		.9									4.5
4		.9			.9										1.8
5		.9	.9												1.8
6				.9		.9		.							1.8
7		.9		.9											1.8
8				.9											.9
9															0
10			.9												.9
11	1.8				1.8	.9		.9							5.4
TOTAL	6.4	22.1	24	11.9	9.2	8.3	5.6	3.7	2.7	.9	.9	1.8	0	1.8	100%

Table 14 B - Hiamey - Sheep Ownership by Size of Exploitation, Percent of Total Exploitation

No. of sheep/ exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	4.6	17.6	18.5	5.6	5.6	5.7	3.7	3.7	2.8		.9	1.8		1.8	70.3
1			1.8	2.8	1.8	1.8	.9								9.1
2	.9	.9	1.8		.9	.9				.9					6.3
3				.9		.9	.9								2.7
4	.9	2.8	.9	1.8											6.4
5			.9		.9	.9									2.7
6				.9											.9
7															0
8															0
9															0
10		.9													.9
10															0
Total	6.4	[illegible]	[illegible]	[illegible]	9.[illegible]	8.[illegible]	5.5	3.7	2.8	.9	.9	1.8	0	1.8	100%

Table 14 C - Hinsey - Goat ownership by Size of Exploitation, Percent of Total Exploitations

No. of goat/ exploi-tation	SIZE OF EXPLOITATION														
	Less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13 - 13.99	Total
0	2.8	9.3	11.1	5.6	4.6	4.6	2.8	2.8	.9						44.5
1		.9	2.8	1.8				.9	.9		.9			.9	9.1
2	.9	5.6	2.8	.9						.9		1.8			12.9
3	.9	1.8	.8				.9								6.4
4				.9	1.8	.9			.9						4.5
5	.9	.9	.9	.9	.9	.9	.9							.9	7.2
6		.9	1.8			.9	.9								4.5
7					.9										.9
8				.9		.9									1.8
9															0
10			1.8												1.8
11	.9	.8		.9	.9										3.5
TOTAL	6.4	20.9	24.0	11.9	9.1	8.2	5.5	3.7	2.7	.9	.9	1.8	0	1.8	100%

Table 14 D - Hitamey - Camel Ownership by Size of Exploitation, Percent of Total Exploitation

No. of camel/ exploitation	SIZE OF EXPLOITATION														
	less than 1 ha.	1-1.99	2-2.99	3-3.99	4-4.99	5-5.99	6-6.99	7-7.99	8-8.99	9-9.99	10 - 10.99	11 - 11.99	12 - 12.99	13.99	Total
0	5.7	20.8	21.7	8.5	8.5	8.5	3.8	2.8	1.9			.9		1.9	85.0
1	.9	.9	1.9	2.8	.9		.9	.9	.9	.9	.9	.9			12.8
2			.9	.9											1.8
3															0
4															0
5															0
5															0
TOTAL	6.6	21.7	4.5	12.2	9.4	8.5	4.7	3.7	2.8	.9	.9	1.8	0	1.9	100%

A final point in favor for animal traction in agriculture in Niamey arrondissement is that in at least one instance, small farmers who had not passed through animal traction training programs had none the less bought Arara plows through cooperatives to work the heavy soils of the nearby low-lying areas, where they were presently cultivating manioc for local consumption, and tomatoes and peppers for sale (pers. comm. director Boula CPT). Niamey is relatively well endowed with mares and bas-fonds. The marshlands survey (Republic du Niger, MDR 1976) listed among the major mares:

Karma	Mare Kaba	Approx. 10 ha. cultivated at time of study. During the rainy season, people cultivated rice; during the dry season, people cultivated potatoes, onions, manioc, peppers, and beans.
	Mare Bangoula	Small area cultivated in manioc, fruit trees.
	Mare gourou Balawathe-koira and Goudel-gorou	Orchards, manioc, potatoes, tomatoes, and peppers.
Koure	Mare de Boula	Approx. 21 ha. cultivated at time of study, in manioc (10 ha.), rice, sorghum, corn, gombo, sugar cane, and orchard crops.

These low-lands are relatively near the city of Niamey, and the road system in Niamey is considerably better than in Ouallam. This probably means that cultivation is more profitable say, than is Ouallam, and can bear heavier investment.

CONCLUSIONS AND SPECULATIONS

One major problem with NDD's efforts to date at improving farm productivity has been that it has been advocating a uniform technical package and a uniform set of techniques taught at CPTs for animal traction for a large region in which local conditions vary widely. Another major problem has been its lack of information about the characteristics of households in its target population.

Sargent et al.'s (1980) review of animal traction projects made several points that are relevant to NDD Phase II. The first -- threshold farn size -- was discussed at the start of the paper. The second is the distribution of benefits over time. A year-by-year analysis of model farm budgets from Gambia's Rural Development Project (Sargent et al. 1980:67-69) showed that even in a case where ox traction led to

increases in farm production, payments for the traction equipment meant a decrease in net farm income during the first two years, and there was no substantial increase in net farm income until the fourth year. This implies that households adopting ox-drawn equipment need some additional source of income to help them through the first years of paying for the equipment. Donkey carts are now used to a supplement to household income, but the carts may become less profitable as they become more common (see below).

The study stresses the importance of support services for the traction equipment:

> Lack of adequate support services appears to be a major cause of low benefits to farmers and low adaptation rates in projects. If any one of the critical services breaks down, the entire chain of production is broken and farm profitability is seriously compromised. The inadequacy of these support services is well documented in the 27 projects analyzed. Under such conditions animal traction produces little benefit and a high risk of being unable to recover the costs of investment. (Sargent et al. 1980:73-4).

NDD Phase I has not yet shown itself capable of getting inputs to the graduates of two CPT centers in time for the agricultural season (approx. May): graduates of the first class at Fandou Mayaki received their oxen in mid-June and their multiculteurs and donkey hoes in mid-July, and had not yet received all parts for their carts (Pradier 1980:9): graduates of the first class at Simiri received their equipment in late June.

Through much of Phase I, the only provision for maintenance of the equipment sold to CPT graduates was to help a Voluntaire du Progres make rounds of the graduates of CPTs and the C.F.J.A. (Centre pour le Formation des Jeunes Agricoles) and sell some spare parts (Pradier 1979,1980). Although Phase I of NDD was to have included training blacksmiths in the repair of the equipment distributed to CPT graduates, this training began only recently. At present, NDD feels it has no direct responsibility for repairing the broken equipment of the graduates of CPTs.

To sum up: the curriculum of the CPTs during Phase I stressed the ox-drawn multicultivator in a zone where NDD has not yet shown it can furnish support services to project participants, and in a zone where roughly 70-80% of holdings are probably too small for ox-drawn traction to be profitable. In parts of the project zone, northern Ouallam and Filingue, there are the added risks of crop failure due to low rainfall, and the possibility that increased tillage would exacerbate wind erosion. However, NDD has recently begun to measure the fields of CPT students, and to adopt recommendations for equipment to each student's resources.

For larger-than-average farms within Niamey arrondissement, where rainfall is relatively reliable, and where there is access to repair services in the city of Niamey, ox-traction may well benefit adopters. In other parts of the project zone, there is a large risk involved in adopting it. Given these circumstances, it is fortunate that most CPT students to date have been drawn from relatively large farms and relatively prominent families. These are the people who can best afford the risk.

One problem with saying anything about the profitability of animal traction is that NDD has not yet evaluated the experience of adopters of either the basic technical package or of animal traction. That is, apparently, a common failing of projects promoting animal traction (Sargent 1980:63).

However, the basic focus of NDD -- millet and niebe production -- is probably a sound one, and it is likely that the techniques and inputs advocated by the project would provide adequate yield increases, if properly applied. The ethnographic accounts of the kind of arrangements farmers make to get manure for their fields makes it likely that they would use chemical fertilizer if they had access to it. It is likely that the cowpea part of the package is profitable. The high yielding variety might even have some beneficial effects on social relations in the project zone. At present, most of the local varieties of niebe grown in the region are probably daylight-sensitive: that is, their flowering is triggered by a specific day length, which assures that they mature toward the end of the rainy season (Matteson pers. comm, Rachie and Roberts 1974). Unfortunately, this means they mature after the millet harvest, and, often, after herds have returned from rainy season pastures, The return of the herds (and the consequent risk of damage to the standing crop) often leads to conflict between neighbors and between ethnic groups. Most of the improved cowpea strains have a shorter maturation period, which would permit them to be harvested while the risk of damage by cattle is low.

Use of the <u>houe asine</u> (donkey-drawn weeder) would be possible on more farms than use of the multicultivator. The problem seems to be, however, that the <u>houe asine</u> now used in the project zone is fragile. Efforts at strengthening it would probably be well spent.

The parts of the traction package that has been most widely adopted by non-CPT participants are the ox-carts and donkey carts, and these are seen as a source of non-agricultural income for people adopting the whole traction package. However, the earning possibilities are greatest for the early adopters of the carts: after there are several carts in each village, their earning potential often declines (Sargent et al. 1980:54).

To sum up, what is needed in NDD is an effort to adopt recommendations to the constraints of local environments and to the needs of a hetrogenous population of farms. Applied research on the CPT's can help in this adjustment, as can an expansion of the CPT's repertoire of agricultural methods. Extension staff should try to pay attention to farm sizes when selling traction equipment, and to permit CPT graduates to choose to buy some pieces and not others. The staff should try very hard to complete the training of the first group of blacksmiths and to establish the smiths in locations that will be accessible to farmers using traction equipment. With added flexibility and with provision of better support services, NDD Phase II can hope to introduce innovations that small farms will be able to adopt.

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ANNEX D

The Role of Women in the Niamey Department Development Project

by Jo Albert

I. Introduction

Women are involved in various aspects of agricultural production. In addition to providing labor to the family fields at planting and harvesting times, women also frequently cultivate their own fields. They process the family staple crops and help prepare the crop for storage. In addition, women are generally responsible for raising the small ruminants; both theirs and their husbands'.

Income earned from the sale of their crop and their livestock provides women with a limited degree of economic independence. Women can spend this money as they please, with certain social responsibilities such as gift giving for baptisms and marriages which account for the largest share of spendings, followed by new clothes and medicine for their children. Labor-saving devices such as millet mills have not been in operation long enough in the project area to determine whether the husband or the wife should pay for its use. The results from a survey on millet mill usage conducted in May 1980 showed that either can pay any time.

II. Phase I Results

Women participated only marginally in Phase I activities. As discussed in the Social Soundness Annex, women CPT students were unable to attend the informational talks and literacy classes due to work conflicts. Talks were held during meal preparation times; literacy classes at high noon. Women were not introduced to the basic ideas of co-operative organization and agricultural credit schemes. Since women were not involved in the co-operatives, they generally did not express any need for numeracy/literacy training.

Village women did not seem to benefit at all from project interventions. First, since women are not, except in rare cases, members of local GM's or co-operatives, they cannot obtain agricultural credit for inputs. Secondly, women farmers were not contacted or given technical information by the extension agents. Even women CPT graduates received no follow-up advice by the agriculture service.

Consequently, the only tangible impact of Phase I of the project was the introduction of millet mills in 2 villages; 6 others were never installed. However, due largely to lack of communication, co-operative and extension agents working with villagers did not know those mills even exested. The mills have proven to be extremely popular among the village women interviewed.

III. Previous Experiences Working with Women in Niger

Other foreign donor experience working with Nigerien women has proven frustrating and disappointing. Projects addressing the role of women as producers have mostly had dismal results, due to specific socio-economic factors (discussed below) which were not thoroughly considered, and strong resistance from men.

The successful project interventions have dealt with the traditional roles of women as mother and nurse. The popular "Operation Midwives" receives support from both men and women and by answering an acutely felt need for safer birth practices, has had the most positive impact. In much the same way, "Operation Flavoquine" reduced the incidence of malaria among children, and, thus, is also a popular program. Women were quite willing to pay for such a service.

There are several constraints in working with women in their role as agricultural producers.

Land acquisition. Women do not generally own the land they farm. The small parcels are given them by their husbands and are returnable upon divorce. Although Islamic law stipulates that women can inherit land through the female line, this appears to be the exception rather than the rule. In many cases, women are compensated for inheritance rights with the gift of an animal.

Because women do not own the land, they are reluctant to invest very much time or money into it since it can be taken away at any moment.

Land fertility. The land given to women to cultivate is often of the poorest quality. Men will reserve the best fields for themselves, while giving their wives land which has not rested in fallow for a sufficient amount of time.

Access to manure. Although women are generally responsible for the care and feeding of livestock, especially small ruminants--both men's and women's animals--they do not usually have the right to the manure. Men argue that since the animals are kept within the compound of which they are the head, the manure belongs to them.

Access to fertilizers, other inputs and credit. Djerman women's direct access to credit, and thus to inputs, is severely constrained by Islamic teachings. According to the Koran, women may only accept loans from their husbands. Hence, married women's participation in co-operatives and credit schemes must be via the husbands. No such laws prevent divorced and widowed women from participating.

Women do manage to purchase fertilizer, however, by buying it on the open market. Some receive fertilizer from their husbands. Women interviewed by the team used fertilizer on their groundnuts, sesame, and okra.

Sale of produce. Women will usually market their own garden crops, groundnuts, okra, sesame. Profits are theirs to dispose of as they wish. Women are usually not allowed to sell their own animals, although the profits eventually return to them. The husband or other male acts as intermediary for the sale, for which he receives a percentage.

In addition to the above general constraints, other problems arise when project interventions address the needs of women independently from men's needs. Men may feel threatened by women oriented production projects

and take self-protective measures (retaliatory) which might limit women's options and worsen their socio-economic position. A man might restrict women's access to credit and inputs or even go so far as to divorce his wife, in the most extreme case.

Previous experiences have taught us that the integration of women in development activities is a slow, deliberate process of sensitization of both men and women. Both men and women need greater awareness of options open and resources available to them, and how to best utilize and manage these resources. Village men in the project area do not seem to be opposed to women's participation in village affairs and, in fact, they may even welcome a limited women's role in the co-operatives. Their agreement is a prerequisite to women's participation and their cooperation a necessity for implementation.

IV. Project Response to Women's Needs and Constraints

The project will address the role of women in the agricultural system, as food producers, processors, and consumers. Well aware of the socio-cultural constraints and keeping in mind the lessons learned from Phase I, the project strategy will necessarily emphasize close collaboration between village men, women, and extension agents, will involve the village in decision-making, and will be constantly monitored by project staff to ensure the social acceptability of the proposed interventions.

The project will take a two-pronged approach to addressing the needs of women: (1) intensive training in agriculture, literacy, livestock, and nutrition/health education at the Farmer Couple Training Center (CPT); and (2) organization and training of village women to give them access to agricultural credit with the aim of their eventual integration into the local co-operative structure.

1. The Farmer Couple Training Centers (CPT's). The CPT's provide an ideal setting for training young women as well as men farmers in agriculture and other areas. Women will receive training in livestock, literacy, nutrition/health, in addition to receiving much of the same training as men in agricultural techniques: use of fertilizers and improved seed. Djerma women do not normally use animal traction, partly for cultural reasons and in part because the size of their own fields is not appropriate; so women at most CPT's will not learn animal traction. The exception is in the Hausa regions, where women do handle animals.

Livestock: Since livestock are generally women's responsibility, women will be encouraged to bring their livestock to the Center where they can be used in improved care demonstrations given by the agents from the livestock service.

Literacy: Literacy classes for women will stress functional numeracy. This is discussed at length in the literacy section.

Nutrition/health: All of the women at the centers are very young mothers who have asked for nutrition and health care information during their 9-month stay at the CPT's. Their request will be met by a team consisting of a Peace Corps Volunteer trained in rural development with a health component, and a recent graduate of ENICAS (Ecole Nationale d'Infirmiers Certifies de Sante), working for the service. The woman PCV assigned to

the CPT and her animation counterpart will give nutrition health education classes on a bi-weekly basis. Simple weaning foods presently recommended by the Minstry of Health will be demonstrated and concocted each day by the women students. The team will also benefit from the research findings of the recently completed nutrition survey (financed under Phase I) for the curriculum design. It is expected that these CPT graduates will continue to apply the knowledge they have acquired and will serve as models for other women upon their return to the village. Follow-up visits will be made monthly by the Animation Service Agent the following year.

Informational talks: Women will attend the talks given by the various technical services such as UNCC, Agriculture and Eaux et Forets. Classes can be co-educational. During Phase I, these classes were held during meal preparation times which effectively precluded women from attending. In Phase II, millet mills will greatly alleviate women's domestic work load (see appropriate technology, below) and allow them to partcipate in these informational talks.

In addition, the directors' complaints that the babies which accompany the women distract the men can be resolved through a rotating day-care system. Women will take turns baby-sitting, allowing the others to attend the classes.

Finally, group sharing of food purchasing and preparation will free up women's time to participate in the discussions and might prove a valuable learning experience in group work.

Appropriate Technology: The first priority of women trainees is to participate in and learn from as many of the center's activities as possible. Given the severely limiting time constraints imposed on women by their household chores, the project proposes to relieve women of one of their most burdensome, arduous tasks by introducing millet grinding mills. Relieved of the drudgery of pounding, women will then be able to devote at least 2 hours per day to more productive activities.

Own Plots: Each center will allocate at least 1 hectare to each couple. for the women to grow their own favorite crops. From observation at one CPT woman's garden, groundnut, Bambara groundnuts (voandzu), sesame, and okra will be most often cultivated. Women might want to experiment with new vegetable seeds when available. The nutritionist might also have specific recommendations. In any case, the nutrition education classes will be greatly enhanced by the ready availability of protein-rich foods from the women's own gardens. Agriculture personnel will be available to offer technical advice to women. As in the village, the women will be free to dispose of the harvest as they wish.

2. Village-level Organization and Extension. Only members of cooperatives can presently obtain agricultural credit. Since members are required to be heads of a production unit, women have often been excluded from cooperative participation. In order to give women access to production credit, to encourage village organization, and in response to women's articulated need for labor saving devices and technical information, NDDP will

help initiate a system for delivery of extension services to women.

The project will work in three selected villages in each arrondissement of the project zone where there is a CPT. By year four of the project, this can encompass as many as 30 villages in all.

The village level extension component will try to realize a set of interlocking goals:

--to encourage women's active participation in village decision-making through organization and awareness of the evolving co-operative development structure;

--to teach women the basic principles of credit: how it works and what needs to be done to obtain it;

--to introduce labor-saving devices to off-set extra workload resulting from increases in farm production and to free up time allowing women to devote their energies to other activities;

--to provide village women with technical assistance in livestock production;

--to conduct socio-economic surveys to determine priority areas of intervention, appropriateness of strategy, and to monitor and evaluate activities.

To achieve these goals, NDDP will work with the Association des Femmes Nigeriennes and will train two categories of village-level workers: Animation Service Agents (or possibly agriculture extension service agents), and village animation women. The animation agents will have PCV counterparts.

Animation service: The Animation service, under the Ministry of Plan has over three years, developed a methodology for village level work. They first execute "contact tours" to villages, followed by more in-depth socio-economic studies (etudes de milieux), and in tandem with the technical services, they attempt "sensitization", and finally, they serve as the liaison between villagers and the technical services in the actual delivery of services.

However, animation personnel lack training in group dynamics, and in sociological methodology to effectively conduct socio-economic surveys. Moreover, frequent personnel changes, especially among the female agents, do not allow for continuity in program planning and implementation.

The project will assist the animation service better execute its responsibilities as a support unit to the technical services. Ten animation staff (animatrices), (five in year one, five in year two), assigned to the project for a period of not less than two years, will receive an intensive training in survey methodology prior to their assignments in the arrondissements. The six-week training session will be organized by the Women's Coordinator working closely with the Project's Training and Evaluation Specialist, and will draw to the greatest extent possible on expertise from the University of Niamey's Sociology department. The summer course will be held in Niamey with frequent field trips to nearby villages for practical experience.

Each animation staffer will be assigned to an agricultural district which has a functioning CPT. They will spend at least three months in their assigned district collecting socio-economic data from about five villages. Exhaustive discussions with the village chiefs and other officials will proceed actual data collection. This will ensure village cooperation and participation in the study.

Based on survey findings, three villages will be selected to participate in the project. Although specific criteria for village selection must be flexible to respond to differences in zones within the Niamey Department, certain factors can be defined now:

--villages must be geographically near enough to the CPT to permit easy access throughout the rainy season and follow-up by the Animation and PC staff;

--there should be no millet mills presently in the village;

--village women must designate (and be willing to compensate after the initial year) two village women to receive training as a village animatrice (VA);

--the village must enthusiastically support the project and must be willing to contribute time and labor to construction of a shed for housing the mill.

Prior to returning to the village, the village animatrices will receive a thorough preparation in the operations of the credit system: what the criteria is, how to apply, who can apply, how to draft amortization plans, etc.

Selection of village animatrices. Each village will select two women to be village animatrices (VA). Specific criteria will be defined by the village women in collaboration with the Association des Femmes Nigeriennes which has representation at all levels of government, including village presidentes. These should include: age and status in the village; dynamism and teaching ability; mobility. Naming of two women from each village should facilitate displacement and divide the work burden.

These VA will participate in a two-week intensive training course held at the CPT in each arrondissement during February or March. Organized by the staff, the training course will involve the active participation of several technical services.

The first week's program will emphasize co-operative development and management, an introduction to the various technical services, livestock, agriculture. It will include practical demonstrations covering such topics as livestock vaccinations, improved planting techniques, improved seed.

The second week of classes will overlap with the re-training course for the extension agents.

3. Village activities

The project will concentrate initially on organizational activities. Although each village has an elected representative of the AFN, no functioning women's groups exist in most villages.

As a focal point for women's organization and definition of priorities, a $50,000 credit fund will be established, serving both to help

women finance development projects and to introduce the credit system.

Loans will be made only to groups of women. Loan applications should be discussed with the Animatrice and PCV, who will assist women in completing the simple application forms. The loan is then presented to the GN for approval and passed on to the Co-operative. This way, village men can be kept abreast of and involved in the women's activities.

The loan application is then reviewed by the arrondissement committee of the AFN before being sent to the NDD project office (Women's Co-ordinator) for final approval. The AFN has a fairly well-organized structure in the Niamey department and has expressed great enthusiasm for involvement in such a pilot scheme.

Since the loans are approved by the GM, they are also guaranteed by th GM. Women will quite likely use their livestock as collateral.

The Women's Credit Fund is an innovation in agricultural credit for Niger. Because of its highly experimental nature, it is imperative to monitor it closely and to evaluate it after two years to insure that women, in fact, are participating.

Subsequent to the analysis of the Etudes de Milieu, activities responding to articulated needs will be begun. From preliminary discussions, the following are likely to be attempted:

Millet Mills: This project input will adress the strongly articulated need of village women to reduce their work burden, freeing up time for more directly productive activity. Studies show that a minimum of two hours is spent daily in the pounding of millet into flour for one meal for one family of eight people. Millet mills have met with enormous success in those areas of Niger where they have been operating.

Certain pre-conditions must be met by the villages prior to installation of the mills. Requests will be forwarded from the village women's committee through the Animation staffer to the GM, the AFN, and finally to the project for approval and distribution of machines. Conditions include:

--the village must build adequate shelter for the machine; the shelter should be centrally located, and easily accessible to village women.

--a village committee necessarily composed largely of women must be responsible for the management and operation of the mill. An amortization plan (not to repay, but to purchase a new mill after the expected five-year life) must be accepted by the village cooperative and a villager must be selected for training in operation and repair. Women can apply to the credit funds to finance the training of the operator.

--priority should be given to large villages or villages at crossroads to maximize the mills' potential users. In addition there will be a grinding mill installed at each CPT.

Livestock. Small ruminants are owned by most women in the project area as "walking capital". Livestock are women's to do with what they please and connot be taken away by their husbands upon divorce. Many women invest the profits from the sale of their fields in sheep and goats as an

insurance policy against divorce.

Large-scale livestock projects target their interventions at men who have easier access to capital. In the project, small scale measures will be introduced, aimed as women, but which will certainly benefit men owners of livestock as well. The livestock service sill provide veterinary health care such as vaccinations, and advice on sanitary conditions. In addition, basic sound management practices in the upkeep of enclosures, rational use of manure and the problems resulting from uncontrolled grazing will be discussed by livestock agents.

Women in groups will be able to obtain credit for livestock improvement from the special Women's Credit Fund, using their livestock as collateral.

Other Activities

After the first two years when (it is hoped) the first 15 villages will have strong, well organized women's committees, project activities can be expanded to include health/nutrition education and credit for agricultural inputs. But the choice of projects should be definitely be made by group consensus.

Follow-up: Each animatrice/PCV will pay weekly visits to each village; the other two days will be spent at the CPT.

ANNEX E

Engineering Annex

The major statistics concerning construction work to be undertaken by this project are presented in the following table.

		FY 1981					FY 1982					($000)		
ilding Type nd Use	M^2 per unit	No.	Cost per M^2	Cost per unit	Total M^2	Total Cost	No.	Cost per M^2	Cost per unit	Total M^2	Total Cost	No.	TOTALS M^2	Cost (Rounded
T Classroom	90	4	.600	54.0	360	216.0	3	.600	54.0	270	162.0	7	630	378.0
T House odel I	75	4	.600	45.0	300	180.0	3	.635	47.6	225	142.8	7	525	322.0
rvice House odel B	75	-	-	-	-	-	1	.635	47.6	75	47.6	1	75	48.0
rvice ware-ouse	160	-	-	-	-	-	1	.600	96.0	160	96.0	1	160	96.0
rvice office	72	-	-	-	-	-	1	.635	46.0	72	46.0	1	72	46.0
op. ware-ouse/office	140	-	-	-	-	-	12	.635	89.0	1,680	1,068.0	12	1,680	1,068.0
oject mgmt. nit complex	550	-	-	-	-	-	1	.635	350.0	550	350.0	1	550	350.0
TOTALS	-	8	-	-	660	400.0	22	-	-	3,032	1,908.0	30	3,692	2,308.0

All of the above building types, except for the project management unit office complex, were among the 56 buildings satisfactorily constructed under phase I and, therefore, the same plans used under phase I will again be employed under phase II. A detailed plan for the management unit complex has already been prepared by the Ministry of Rural Development's rural engineering office (Genie Rural) and this plan, along with all other building plans and cost estimates, has been reviewed by the Mission's general engineer-officer.

All the buildings are very unsophisticated, single story, rectangular structures which utilize the techniques common to this part of the world. These include concrete block walls with cement plaster, reinforced concrete columns and lintels, metal doors and

windows, cement floors and aluminum roofing supported by metal trusses. There are basically six (6) major different building types called for under this project. The CPT classroom building houses one large classroom and an adjoining office and storeroom; the coop warehouse is basically a larger version of the CPT classroom design; the service warehouse is a large, enclosed storage space, approximately 10m x 16m; the service office building houses a series of four (4) rooms positioned in a straight line with doors opening up upon a narrow, outside terrace which serves as a passageway between offices and an entrance-exit way; the CPT and GON service houses are of the same, 5-room design; the project management unit which will furnish office space to some 16 people, includes a conference/library room, a reception area, an attached 6m x 8m warehouse and garage facilities for vehicle repair.

As in phase I Genie Rural will continue to have technical responsibility for all project construction activities. This responsibility includes the preparation of all plans, contracts, estimates, IFB's, contractor payment invoices, contractor selection and on-site surveillance. With project assistance Genie Rural was able to successfully carry out all these responsibilities during phase I and it is expected that with the smaller phase II construction program that Genie Rural will be able to improve its performance under phase II. An additional factor which will contribute to this improved performance is the recent creation of an office of Genie Rural for the department of Niamey. This means that project management will now have a qualified Genie Rural engineering aide as a permanent member of its departmental backstop team. Also, for this phase additional professional assistance will be available from the Mission's new general engineering officer and other staff of the Mission's project management support unit. This engineering officer will participate in the selection of the construction sites, the approval of plans, cost estimates and bid documents and in the acceptance of completed construction work.

As in phase I all of phase II construction work will be executed under AID financed host country contracts with reputable small Nigerien firms. Phase I experience with such local construction firms was very satisfactory and it is believed that with the judicious selection of such firms through the regular local IFB process that this experience will be repeated under Phase II. The employment of this kind of contracting mode will require waivers be approved for non-advertising in the U.S. and that a source/origin waiver be approved to permit AID Geographic Code 935 procurement of some construction materials and supplies (primarily sheet metal, aluminum roofing, steel beams and stringers, window glass, re-bar, etc.) in an amount not to exceed $650 thousand (approximately 30% of total projected construction costs). All remaining construction materials (principally, cement and lumber) and services will be from Niger or neighboring 941 countries. (See Annex F for draft waiver requests).

All sites for the 30 buildings to be constructed have tentatively been identified by the GON. These sites are scattered throughout the project zone and are usually located in isolated rural areas. The project management unit complex will be located on a 1 hectare lot of land on the outskirts of Niamey in an area which has been designated as the new administrative zone for the construction of offices for the GON's department level services. This zone has been surveyed and all weather laterite roads have been constructed. It is currently being hooked up with the city of Niamey's power, water and sewage system; therefore, there will be adequate facilities for the building. For all the other buildings, which will be located in rural areas, there will be no such facilities. However, the CPT and GON service houses will be equipped with a septic tank system for the use of toilets which will be

flushed with buckets of water carried from the local village water sources (usually a hand dug well).

The following condition precedents with respect to construction will be included in the grant agreement:

Prior to any disbursement under the grant, or to the issuance by AID of documentation pursuant to which disbursement will be made, 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 the qualified technical personnel are available to oversee all construction work and to provide periodic reports in a form acceptable to AID.

b. Evidence that sites for construction, satisfactory to AID, have been selected and have been made available to the project.

c. The plans and accounting books, bid request documents the cost estimates and the construction contracts with a firm acceptable to AID.

The most recent AID financed construction contract signed with a local firm was in October 1980. This contract was for the construction of buildings similar to those to be constructed under phase II of the project. The cost per square meter for the construction work was about $\$500/m^2$. For planning purposes a $\$600-\$635/m^2$ cost factor has been employed for construction work under this project. The variances within the cost per square meter range is due to such factors as distance from Niamey to the worksite, accessibility by road, whether or not plumbing and/or electrical installations are required, the availability of sand, gravel and/or water near the work site, number of interior walls, etc. In addition to this 25-27% increase in projected costs over late 1980 construction costs, project management has considered it prudent to also include about $300 thousand in contingencies for construction work in the project budget. Given that all project construction is scheduled to start before the end of 1981, this financial estimate is considered adequate.

Project Management is currently finalizing the IFB documents and it is intended that IFB's will be published immediately following the signing of the grant agreement. Assuming that the grant agreement will be signed by March 31, 1981, and that the funding increment amendment to this agreement will be signed by October 31, 1981, the basic implementation schedule for construction is as follows:

	FY 81	FY 82
IFB published*	4/81	11/81
Bids reviewed and contracts awarded	5/81	12/81
Construction starts	6/81	1/82
Construction completed	12/81	10/82

(*See table on page 1 for which facilities will be constructed in each year.)

After an initial advance of 20% of the total contract value has been made to the contractor, incremental payments are made at different stages of the construction work following an inspection visit by the Niamey Department chief of Genie Rural, a representative of project management (normally the AID project officer and the GON project director) and a representative of the Mission (normally the engineering officer). These inspections are made when the foundation is completed, the building is at lintel height, when the roof is completed and when the building is completed. The prefet of the Niamey Department and/or the sou s-prefet for the district concerned often paticipate in the final building inspection tour. The officials and project personnel who are constantly traveling in the zone usually visit the construction sites every week or 10 days and any problems noted are quickly communicated to the appropriate authorities. All payments must have the signed approval of the prefet of Niamey, the Director of Genie Rural, the GON project director, the Ministry of Plan's controller of donor funds, the AID project officer and the Mission's controller.

The same IFB and contract format used under phase I will again be employed. This format wa approved by REDSO/WA's chief engineer and contracts officer. This contract must be reviewed and approved by the Prefet of Niamey, the GON Project Director, the AID project officer, the Director of Genie Rural, the AID Mission Director (who first requires clearances by the Mission's engineer and controller), the Minister of Plan, the Minister of Rural Development, the Minister of Finance and by the Ministry of Plan's controller of donor funds.

USAID/Niamey Mission will be undertaking in 1981 an assessment of Genie Rural's capacity to adequately provide contracting and engineering services and the results of this assessment will be evaluated prior to initiating any of the construction activities financed under those projects approved in 1981. If this assessment indicates that Genie Rural will require additional assistance, it is expected that such assistance can be provided through other AID projects. However, it is possible that for this project that Genie Rural may need limited technical assistance, training, survey equipment and/or surveying equipment and materials. An amount of $30,000 has been included in the contingency provisions of the project budget to cover such needs.

The recurrent costs for building operations and maintenance were included in the overall project recurrent cost analysis presented in the project paper. In this analysis the recurrent cost of maintaining the 30 buildings constructed under this phase was calculated at $16,200 per year beginning in 1986.

Cleared by: Roy Haftorson, AFR/DR/ENGR:2/3/81

Drafted by:MWentling, Project Officer/NDD,USAID/Niger:1/29/81

ANNEX F - Waiver Request

Commodity Source/Origin Waiver

Problem: The implementation of the project will require the procurement of 30 millet grinding mills and miscellaneous construction materials of Code 935 origin. You are requested to authorize such procurement by granting an origin waiver from Geographic Code 941 (Selected Free World) to Geographic Code 935 (Special Free World).

Facts:

(a) Cooperating Country: Republic of Niger

(b) Authorization Document: Project Authorization

(c) Project: Niamey Department Development Project - Phase II (683-0240)

(d) Nature of Funding: Grant (RLDC).

(e) Description of Commodities: 1. 30 diesel powered millet grinding mills.

2. miscellaneous construction materials.

(f) Approximate Value: 1. $150,000
2. $650,000

Total $800,000

(g) Probable Source: Niger or Nigeria.

(h) Probable Origin: France, United Kingdom or West Germany.

Discussion: In accordance with AID Handbook 13, procurement of commodities of Code 935 origin under a grant-financed project requires a waiver. Under Handbook 13, Chapter 5B4b(2), a waiver may be granted if "the commodity is not available from countries included in the authorized geograhic code."

A. Grinding Mills.

The millet grinding mills will be used, in the Women in Development (WID) component of the project, to relieve Nigerien women of the time consuming task which manual preparation of flour entails. The time saved will enable women to better participate in project activities.

Mills of the type required for the project are manufactured in European countries but are found throughout West Africa. Ten such mills were satisfactorily installed under Phase I of this project. Spare parts for these mills are locally available and the people are capable of repairing and maintaining the mills. Similar mills are unavailable from manufacturers in the U.S. and other Code 941 countries.

B. Construction Materials.

The construction materials which consist of sheet metal, aluminum roofing, electrical and plumbing fixtures, steel beams, rebar, paint, window glass, etc. will be used for the immediate construction, at widely scattered rural sites, of 30 single-story buildings for the project's village cooperative, farmer extension, and project management components.

The need for rapid procurement of materials compatible with Niger's existing construction industry renders procurement from countries in Code 941 impracticable/infeasible. While some of the materials may be manufactured in Code 941 countries other than the U.S., there are currently no existing commercial channels through which they can quickly be brought into Niger. Furthermore, insofar as US manufacturers are concerned, the dimensions and specifications of roofing materials, electrical fixtures and plumbing are incompatible with materials generally needed in Niger. Such compatibility is critical for repair and maintenance purposes. In addition, materials such as turkish toilets and fused light switches, standard items in Niger, are not manufactured at all in the U.S. Finally, even if the required materials would be custom-built to be compatible with the Code 935 materials found in Niger and new commercial channels established to permit such procurement, the cost of the commodities would be unreasonable and the resulting delays would seriously jeopardize implementation of the project.

Because Code 941 building materials are incompatible with many of the materials ordinarily used in Niger and the lack of readily available spare parts and repair capability for Code 941 building materials, it is concluded that the required building materials are, in effect, unavailable from Code 941 manufacturers. In addition, even in those cases where compatible Code 941 materials could be located, procurement outside of normal commercial channels of the small amount of commodities required for this project would be harmful to project objectives because project implementation would be seriously delayed.

Conclusion: A waiver authorizing the procurement of 30 millet grinding mills and miscellaneous construction materials of Code 935 origins is justified because, in view of the circumstances surrounding this project, as described above, such commodities are not available from countries in the authorized geographic code.

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

(1) approve a commodity origin waiver from AID Geograhic Code 941 to Code 935 authorizing the procurement of 30 millet grinding mills and miscellaneous construction materials in an amount not to exceed $800,000; and

(2) 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 US foreign policy objectives and the objectives of the foreign assistance program.

ANNEX G

SC(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 the 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 direclty 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 govenment, 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(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	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(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	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:	Negative.
a. has any deduction required by the Fishermen's Protective Act been made?	
b. has complete denial of assistance been considered by AID Administrator?	
11. FAA Sec. 620; FY 79 App. Act, Sec. 606. (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 Sup Act, Sec. 6[illegible]. 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 agreements 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 extension, 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 ooportunities 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 PRODUCT? Yes.

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 611 (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 1981 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 all 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.

This project's specifically designed to encourage development and use of cooperatives in the Niamey Department and to improve the technical efficiency of agriculture.

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).

As this project is designed to foster rural development at the village level, it will neither encourage nor discourage private U.S. trade and investment except to the extent that the project requires (cont'd below)

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.

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)

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?

The U.S. owns no excess foreign currency in Niger.

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes.

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?

No.

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

a) This project is completely focussed upon involving the rural poor in development by increasing their access to appropriate agricultural inputs and resources and by increasing the yields from labor intensive food production.

8. the use of U.S. manufactured chemical fertilizers and EPA approved pesticides on a significant scale and a long term basis.

9. 30% of total costs. GON budgeting constraints will require that a portion of the grant funds be used to meet some local currency costs.

5.1.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 over the maximum 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 resource development; if so, extent to which activity strengthens non-formal 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 project is to establish rural cooperative organizations in every village of the project zone.

c) The project is oriented around a self-help model of extension service.
d) A major component of the project is designed to increase women's access to development resources
e) As this project functions at the village and district level, this consideration is not applicable.

The project is directly aimed at providing training and services to small farmers to aid them in increasing productivity and income.

N/A.

N/A.

N/A.

B.1.b.(4).

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institution, to help urban poor participate in economic and social development.

c. [107] Is appropriate effort placed on use of appropriate technology?

Yes. Simple animal traction equipment is being provided to farmers.

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)?

Due to the very high interest of the GON in this project, some 30% of project costs are being provided by the host 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 efforts for other financing, or is the recipient country "relatively least developed"?

Niger is considered to be a relatively least developed country.

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

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. A major focus will be on village cooperative development.

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.

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 US 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 1936, 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 paritcularly 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 73 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 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. 307(c). 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? — Yes

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? — Yes

C.

5. 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(c). 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 pensions, 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**

ANNEX H

Certification of Section

611 (e)

of the FAA of 1961

as amended

I, Jay P. Johnson, 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 Niamey Department Development II.

This judgement is based upon a thorough review of the first phase of the project, the extensive consultations with the GON during the preparation of Phase II of this project, and the past good record of implementation support of other AID projects carried out in Niger.

Jay P. Johnson
Mission Director
USAID/Niger

December 1, 1980

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INFO RUTAIJ/AMEMBASSY ABIDJAN PRIORITY 0347
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ANNEX I

683-0240

ACTION: PDE
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E.O. 12065:N/A
TAGS:
SUBJECT:NIAMEY DEPARTMENT DEVELOPMENT PID REVIEW 683-0240

REF: NIAMEY 1811

1. SUBJECT PROJECT REVIEW HAS RESULTED IN COMMITTEE RECOMMENDATION TO AA/AFR TO APPROVE THE PHASE II PROJECT. THE COMMITTEE USED THE MAY 1979 EVALUATION SYNTHESIS REPORT AS A BACKGROUND DOCUMENT AND LOOKS FORWARD TO RECEIVING THE SECOND EVALUATION REPORT IN JULY 1980. THE AA/AFR HAS SUBSEQUENTLY AUTHORIZED USAID NIAMEY TO PROCEED WITH DEVELOPMENT OF THE PP. THE AA/AFR HAS ALSO APPROVED THE IEE AND THE RECOMMENDATIONS THEREIN.(PREPARATION OF AN ENVIRONMENTAL ASSESSMENT OF PESTICIDE USAGE ON PROJECT ACTIVITIES AND A NEGATIVE DETERMINATION OF ALL OTHER PROJECT ACTIVITIES). SEE PARA B.

2. FOLLOWING ISSUES SHOULD BE ADDRESSED IN PP PREPARATION.

(A) ECONOMIC ANALYSIS: THE PID AND THE MAY 1979 EVALUATION REPORT PROVIDED ONLY MINIMUM INFORMATION ON THE PROJECTED ECONOMIC FEASIBILITY OF PHASE II. THE PP SHOULD CONTAIN AN ELABORATED DISCUSSION ON (I) THE BENEFITS ACCRUING FROM THE PROJECT I.E., WHAT IS THE INTERNAL RATE OF RETURN; AND (II) THE FINANCIAL VIABILITY OF THE TECHNICAL PACKAGE I.E., CAN THE FARMER ABSORB THE INPUTS, REPAY THE CREDIT AND SHOW A PROFIT. NOW THAT SIGNIFICANT INVESTMENTS HAVE BEEN MADE IN THE PROJECT AREAS, KNOWLEDGE OF PRODUCTION YIELDS AND SYSTEMS SHOULD BE SUFFICIENT TO QUANTIFY REASONABLE PROJECTIONS OF LIKELY FINANCIAL RETURNS. COINCIDENTALLY, THE SAME ANALYSIS SHOULD PROVIDE YOU WITH THE DATA TO MAKE DECISIONS REGARDING THE ELIMINATION OF MARGINALLY EFFECTIVE ACTIVITIES UNDERTAKEN DURING PHASE I. THE PP SHOULD INCLUDE INFORMATION ON WHEN FARMERS ARE LIKELY TO BENEFIT IN TERMS OF INCREASED PRODUCTION AND INCOMES BASED ON THEIR RESPONSE TO THE SERVICES AND OPPORTUNITIES PROVIDED BY THE PROJECT. THIS WILL REQUIRE AN EXAMINATION OF THE POTENTIAL COMMODITY MARKETS FOR THE PRODUCTS FROM THE PROJECT AREA; THE LINKS BETWEEN PRODUCTION, PROCESSING, AND MARKETING; AND THE DISTRIBUTION OF BENEFITS AMONG THE VARIOUS PARTICIPANTS IN THE PROJECT.

THE DRYLAND FARMING PACKAGE (SEE NDE I FIRST ANNUAL EVALUATION, PAGE 8, SEC. III A.1., MAY 1979) ANALYSIS

BEST AVAILABLE DOCUMENT

SHOULD INCLUDE STUDIES OF COST AND RETURNS AT THE FARM LEVEL TO DEMONSTRATE THE ABILITY OF THE FARMERS TO REPAY THE LOANS PROVIDED UNDER THE CREDIT PROGRAM.

THE INSTITUTIONAL BUILDING COMPONENT OF THE PROJECT SHOULD ALSO BE FURTHER EXAMINED. SINCE THE TRADITIONAL COST/BENEFIT ANALYSIS IS USUALLY NOT FEASIBLE FOR INSTITUTION BUILDING COMPONENTS, THE MISSION MAY WISH TO UNDERTAKE A COST EFFECTIVENESS STUDY: I.E., THE GOAL IS A FUNCTIONAL INSTITUTION - WHAT IS THE MOST COST EFFECTIVE WAY TO ACHIEVE THIS GOAL.

B. ENVIRONMENTAL: THE IEE HAS BEEN RECEIVED AND REVIEWED. THE COMMITTEE HAS RECOMMENDED TO THE AA/AFR THAT THE REQUEST FOR A POSITIVE DETERMINATION FOR THE SECTION ON PESTICIDE USE AND NEGATIVE DETERMINATION FOR ALL OTHER PORTIONS OF THE PROJECT BE APPROVED. A FORMAL ENVIRONMENTAL ASSESSMENT TO COVER THE ADMINISTRATION OF PESTICIDES WILL BE UNDERTAKEN, AND WILL BE CONDUCTED CONCURRENTLY WITH THE PP DESIGN. THE EA TEAM WILL CONSIST OF A PESTICIDE EXPERT (FUNDED BY DSB) AND A SOCIOLOGIST.

C. GEOGRAPHIC EXPANSION: WE NOTE THAT RECOMMENDATION NO. 3 ON PAGE 7 OF THE EVALUATION, STATES QUOTE TO ASSIST IN COORDINATION AND TO REDUCE GEOGRAPHIC OVER EXTENSION, THE PROJECT SHOULD CONCENTRATE ITS ACTIVITIES IN SPECIFIC RESTRICTED ZONES. UNQUOTE IN LIGHT OF THIS RECOMMENDATION, THE COMMITTEE VOICED CONCERN ABOUT PROJECT EXPANSION AT THIS TIME.COMMITTEE ASSUMES THAT IF PP ALSO RECOMMENDS PROJECT AREA BE EXTENDED, THE MAY 1980 EVALUATION AND THE PP WILL PROVIDE STRONG JUSTIFICATION FOR PROJECT EXPANSION.

D. ADDITIONAL T.A.: THE PP TEAM SHOULD EXPLORE THE DESIRABILITY OF ADDITIONAL T.A. ESPECIALLY IN THE AREA OF TRAINING (PAGE 9 OF EVALUATION). THE PP TEAM SHOULD ALSO CONSIDER THE NEED FOR ADDITIONAL T.A. IN OTHER AREAS WHERE PROJECT ACTIVITIES ARE LAGGING I.E., CREDIT SYSTEM.

E. COOPERATIVES: IN THE ORIGINAL PROJECT DESIGN THE VILLAGE COOPERATIVES WERE IDENTIFIED AS HAVING A KEY ROLE IN THIS PROJECT. IN THEIR MAY 1979 REPORT, HOWEVER, THE EVALUATION TEAM NOTED THAT THE COOPS QUOTE DO NOT ADEQUATELY SATISFY THE PERCEIVED NEEDS OF NIGERIEN FARMERS UNQUOTE (PAGE 11). IN CONJUNCTION WITH THE NEW PP DESIGN, AN ASSESSMENT SHOULD BE MADE OF THE CURRENT COOPERATIVE SYSTEM. IF THE COOP COMPONENT IS FOUND INADEQUATE, THE PROJECT STRATEGY SHOULD BE MODIFIED TO EITHER STRENGTHEN THE COOP SYSTEM, BYPASS IT ALTOGETHER IF POSSIBLE, OR SOME COMBINATION OF BOTH.

F. WAIVER: GIVEN THE LARGE CONSTRUCTION COMPONENT (DOLS 3,700,000) AND COMMODITY PROCUREMENT COMPONENT (DOLS 5,750,000) OF THIS PROJECT, A SPECIAL EFFORT SHOULD BE MADE TO IDENTIFY ALL NECESSARY WAIVERS AND INCLUDE THEM IN THE PP.

G. GON PERSONNEL HUMAN RESOURCES CONSTRAINT: BOTH THE PID FOR PHASE II AND THE MAY 1979 EVALUATION OF PHASE I INDICATED A SERIOUS GON HUMAN RESOURCE CONSTRAINT IN THIS PROJECT AREA. THE GON/USAID SOLUTION TO THIS PROBLEM SHOULD BE FULLY PRESENTED IN THE PP.

THE COMMITTEE RECOMMENDS THE FOLLOWING MEMBERS BE ADDED TO THE PP TEAM: TWO ENGINEERS (AGRICULTURE AND ENVIRONMENTAL) AND TWO ECONOMISTS (AGRICULTURAL TO ASSIST WITH COST EFFECTIVENESS ANALYSIS AND A MARKETING SPECIALIST TO ASCERTAIN MARKET POTENTIAL). CHRISTOPHER

BT

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INCOMING
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PAGE 01 NIAMEY 01811 01 OF 02 230402Z 4186 AID4227
ACTION AID-35

ACTION OFFICE AFDR-06
INFO AAAF-01 AFFV-04 AFDP-02 PPCE-01 PPPB-02 PPEA-01 FM-02
PDC-02 AADS-01 DSAG-02 DSRD-02 PVC-02 AGRI-01 TRSY-05
RELO-01 STA-10 MAST-01 AFDA-01 PDPR-01 /048 A4

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TO SECSTATE WASHDC 7437
INFO AMEMBASSY ABIDJAN
AMEMBASSY BAMAKO

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AIDAC

AID/W FOR (1) AFR/DR/SFWAP; (2) AFR/SFWA; (3) AFR/DP
ABIDJAN FOR REDSO/WA

E.O. 12065: N/A
SUBJECT: ABBREVIATED PID FOR NIAMEY DEPARTMENT DEVELOPMENT
- PROJECT PHASE II (683-0240)

REF: (A) 79 STATE 333887, (B) NIAMEY 00410

1. PROJECT DESCRIPTION:

- THE THREE YEAR (1978-80) NDD PHASE I PROJECT (683-0205) WAS A PRELIMINARY AND EXPERIMENTAL EFFORT TO TEST POSSIBLE DEVELOPMENT ACTIONS, THE GON'S ORGANIZATIONAL AND MANAGERIAL EFFECTIVENESS AND TO PUT IN PLACE CERTAIN BASIC INFRASTRUCTURE NEEDED BY THE GON TECHNICAL SERVICES TO FACILITATE THEIR OPERATIONS IN THE PROJECT ZONE. NDD I HAS BEEN INSTRUMENTAL IN ORGANIZING VILLAGE LEVEL COOPERATIVES, TRAINING VILLAGE LEADERS AND PROVIDING LOGISTICAL AND OPERATIONAL SUPPORT FOR THE RURAL DEVELOPMENT PROGRAMS OF THE GON TECHNICAL SERVICES.

- NDD I EXPERIENCE DEMONSTRATED THAT PROJECT IMPLEMENTATION ABILITY WAS REDUCED BY THE LIMITED CAPACITY FOR DIRECTION AND COORDINATION WITHIN THE EXISTING GON DEVELOPMENT MANAGEMENT STRUCTURE AT THE DEPARTMENT LEVEL. THIS WEAKNESS WAS EXACERBATED BY THE GENERAL LACK OF TRAINED AND EXPERIENCED FIELD STAFF OF THE TECHNICAL SERVICES AND THE LACK OF FUNCTIONING VILLAGE LEVEL ORGANIZATIONS. NDD I HAS ALSO SHOWN THAT LIMITATION IN THE AGRICULTURAL INPUT DELIVERY SYSTEM, INCLUDING THE WEAKNESS OF THE NASCENT VILLAGE COOPERATIVES, REPRESENT A MAJOR CONSTRAINT TO INCREASING AGRICULTURAL PRODUCTION.
- PHASE II OF THE NIAMEY DEPARTMENT DEVELOPMENT PROJECT (NDD II: 683-0240) WILL CONTINUE TO DEVELOP VILLAGE LEVEL ORGANIZATIONS PROMOTING SELF MANAGEMENT AND STRENGTHENING THE GOVERNMENT OF NIGER'S TECHNICAL SERVICES SERVING RURAL AREAS. THE GOAL OF SUCH ASSISTANCE WILL BE TO INCREASE FOOD GRAIN PRODUCTION WITHIN THE NIAMEY DEPARTMENT. NDD II WILL EXTEND THE GEOGRAPHICAL PROJECT ZONE TO INCLUDE A PORTION OF A FOURTH DISTRICT OF THE NIAMEY DEPARTMENT. THE PHASE II PROJECT IS PLANNED OVER A FIVE YEAR PERIOD FOR AN ESTIMATED TOTAL AID/GON COST OF 15 MILLION DOLLARS. ABOUT 6,200 FARM FAMILIES LIVING WITHIN THE FOUR DISTRICTS COVERED BY THE PROJECT ARE THE PROJECT'S DIRECT BENEFICIERIES. THE PROJECT PURPOSE, BACKGROUND, AND ANALYSIS CONTAINED IN THE PHASE I PROJECT PAPER REMAIN LARGELY APPLICABLE TO THIS PHASE II PROJECT.

- FOR THE FORESEEABLE FUTURE, INCREASING FOOD PRODUCTION TO MEET TARGETED GOALS WILL REQUIRE THE INCREASED USE OF

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IMPORTED INPUTS (ESPECIALLY FERTILIZERS). THE EXISTING SYSTEM FOR MOVING IMPORTED AND LOCALLY AVAILABLE INPUTS TO FARMERS IN A TIMELY AND RELIABLE MANNER AND IN THE QUANTITIES NECESSARY WILL REQUIRE STRENGTHENING FROM THE VILLAGE LEVEL TO THE NATIONAL LEVEL. THIS PROJECT WILL FOCUS ON THAT PART OF THE DELIVERY SYSTEM FROM THE DEPARTMENT LEVEL DOWN TO THE VILLAGE WHILE THE AGRICULTURAL PRODUCTION SUPPORT PROJECT (683-0231) WILL ADDRESS NATIONAL LEVEL OPERATIONS. NDD II WILL ENLARGE AND STRENGTHEN THE OPERATIONS OF THE 41 COOPERATIVE ASSOCIATIONS BEGUN DURING PHASE I AND TARGETS THE CREATION OF 16 NEW COOPERATIVES WITHIN A FOURTH DISTRICT (SAY ARRONDISSMENT) BEING ADDED TO THE PROJECT ZONE. THE NDD II WILL ALSO STRENGTHEN THE DEPARTMENT NETWORK OF THE NATIONAL COOPERATIVE SERVICE, (UNCC), ITS ANIMAL TRACTION EQUIPMENT MANUFACTURING CENTER (DARMA) AND THE NATIONAL AGRICULTURAL CREDIT BANK (CNCA), ALL OF WHICH FORM AN INTEGRAL PART OF THE AGRICULTURAL INPUT DELIVERY SYSTEM OPERATING WITHIN NIAMEY DEPARTMENT.

- LINKED TO THE INPUT DELIVERY SYSTEM IS THE AGRICULTURAL EXTENSION PROGRAM WHICH MUST ASSIST FARMERS MAKE OPTIMAL USE OF AVAILABLE RESOURCES AND THE RATHER COSTLY INPUTS. THE PROJECT WILL CONTINUE SUPPORT TO THE EXTENSION SERVICE NETWORK COVERING THE PROJECT ZONE, CONTINUE SUPPORT TO THREE FARM-COUPLE TRAINING CENTERS CREATED UNDER PHASE I, AND ESTABLISH SEVEN ADDITIONAL CENTERS TO REACH THE GON GOAL OF ONE CENTER PER AGRICULTURAL DISTRICT (ROUGHLY EQUIVALENT TO A CANTON). THESE CENTERS FORM A PILLAR OF THE GON'S RURAL STRATEGY AND HAVE PROVEN TO BE ONE OF THE MOST SUCCESSFUL INNOVATIONS OF THE VARIOUS DEPARTMENTAL PRODUCTIVITY PROJECTS. THE FARM-COUPLE TRAINING CENTERS SERVE AS PERMANENT MULTI-PURPOSE RURAL DEVELOPMENT SUPPORT AND TRAINING INSTITUTIONS FOR BOTH MEN AND WOMEN. WHILE LIVING AT THE

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ACTION AID-35

ACTION OFFICE AFDR-06
INFO AAAF-01 AFFW-04 AFDP-02 PPCE-01 PPPB-02 PPEA-01 FM-02
PDC-02 AADS-01 DSAG-02 DSRD-02 PVC-02 AGRI-01 TRSY-05
RELO-01 STA-10 MAST-01 AFDA-01 PDPR-01 /048 A4

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INFO AMEMBASSY ABIDJAN
AMEMBASSY BAMAKO

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AIDAC
CENTER DURING THE CROPPING SEASON, FARM COUPLES RECEIVE TRAINING IN LOCAL LANGUAGES CONCERNING FARM CROP AND LIVESTOCK PRODUCTION TECHNIQUES, COOPERATIVE TRAINING, LITERACY, HEALTH AND NUTRITION. THE CENTERS ARE ALSO USED FOR SHORT COURSES TO TRAIN OR RETRAIN SMALL GROUPS SUCH AS FARMER DEMONSTRATORS, COOP MANAGERS AND LEADERS, AND BLACKSMITHS.

- OTHER PROJECT ACTIVITIES INITIATED BY NDO I WILL BE CONTINUED AND EFFORTS TAKEN TO EXTEND THEM MORE EFFICIENTLY AND EFFECTIVELY TO A GREATER NUMBER OF PEOPLE. SUCH ACTIVITIES INCLUDE SOIL CONSERVATION/TREE PLANTING, ANIMAL HEALTH AND FATTENING PROGRAMS, ADULT LITERACY CLASSES, SCHOOL GARDENS, AND FISH CULTURE. THESE ACTIVITIES WILL CONTINUE TO STRENGTHEN THE CAPACITY OF THE GON'S OTHER RURAL DEVELOPMENT SERVICES TO PROVIDE NEEDED ASSISTANCE TO THE INHABITANTS OF THE PROJECT ZONE. A NUMBER OF VILLAGE SELF-HELP ACTIVITIES WILL ALSO BE UNDERTAKEN SUCH AS THE IMPROVEMENT OF MARKET PLACES AND THE INSTALLATION OF VILLAGE GRAIN MILLS. AT THE REQUEST OF THE GON, THE GEOGRAPHICAL ZONE OF THE PROJECT WILL BE EXPANDED TO INCLUDE THE 96 EXISTING VILLAGES (ESTIMATED POPULATION OF 27,500) IN THE EASTERN PORTION OF THE NIAMEY DEPARTMENT'S SAY ARRONDISSEMENT. THE PROJECT SUPPORTED ACTIVITIES WILL BE SIMILAR TO THOSE BEGUN IN THE FIRST THREE ARRONDISSEMENT BY NDO I, NAMELY, FORMING VILLAGE COOPERATIVES, VILLAGE TRAINING PROGRAMS AND ASSISTANCE TO THE GON TECHNICAL SERVICES IN IMPLEMENTING THEIR RESPECTIVE DEVELOPMENT PROGRAMS. USAID/NIGER HAS DETERMINED THAT THE LEVEL OF PLANNED ACTIVITY IN THIS NEW ARRONDISSMENT SUPPORTED BY THE PROJECT CAN BE UNDERTAKEN BY THE GON TECHNICAL SERVICES STAFF ALREADY ASSIGNED TO THE AREA AND IN PLACE. AS SUCH, THIS ADDITION WILL NOT IMPOSE GREATLY INCREASED WORK LOADS ON THE PROJECT MANAGEMENT STAFF OR THE DEPARTMENT LEVEL SERVICES PERSONNEL. THIS ADDITION WILL NOT REQUIRE REALLOCATING THE EXISTING HUMAN RESOURCES OF THE GON TECHNICAL SERVICES AT THE ARRONDISSEMENT LEVEL WITHIN THE PROJECT ZONE.

- IT IS ESTIMATED THAT THE FIRM ESTABLISHMENT OF PROJECT SUPPORT SERVICES AT THE DISTRICT LEVEL, WITH IMPROVED INSTITUTIONAL SUPPORT FROM THE NATIONAL LEVEL, WILL IMPACT ON A MINIMUM OF 6,000 FARMS (ROUGHLY 10 OF THE FARMS IN THE PROJECT ZONE) BY THE END OF PHASE II. THE ADOPTION BY THE PROJECTED NUMBER OF FARMS OF THE IMPROVED PRACTICES BEING PROMOTED BY THE PROJECT WILL MEAN AN INCREASE IN ANNUAL MILLET PRODUCTION OF AT LEAST 9,000 TONS AND COWPEA PRODUCTION BY MORE THAN 2,400 TONS DURING A NORMAL GROWING SEASON. THIS INCREASE IN PRODUCTION WOULD HAVE A VALUE OF APPROXIMATELY 2,300,000 DOLLARS ANNUALLY AND WOULD REDUCE THE CHRONIC CEREALS DEFICIT IN THE PROJECT ZONE BY APPROXIMATELY 30 PERCENT.

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2. MAJOR OUTPUTS

VILLAGES RECEIVING INPUTS AND FULLY PARTICIPATING	300
VILLAGE COOPS MADE FULLY FUNCTIONAL	57
FARM FAMILIES RECEIVING AND EMPLOYING INPUTS	6,000
MILLET PRODUCTION INCREASEL	9,000 T
COWPEA PRODUCTION INCREASED	2,400 T
VILLAGERS TRAINED	1,500
VILLAGE COOPERATIVE CENTERS CONSTRUCTION	30
OFFICES, WAREHOUSE AND HOUSING FOR GON TECHNICAL -SUPPORT SERVICES	7
FARM-COUPLE TRAINING CENTERS CONSTRUCTED	7
MARKET HANGERS CONSTRUCTED	20
GRINDING MILLS INSTALLED	20

- THE EXACT NUMBER OF THESE OUTPUTS WILL BE A FUNCTION OF THE RATE AT WHICH THE PROJECT WILL BE ABLE TO DEVELOP THE CAPACITY OF THE VILLAGES AND THE GON TECHNICAL SERVICES TO IMPLEMENT THE ACTIVITIES.

3. BENEFICIARIES

- THE IMMEDIATE PROJECT BENEHFICIARIES WILL BE THE 6,000 FARM FAMILIES (40,000 PEOPLE) LIVING IN 300 VILLAGES WHO WILL BE ASSURED THE DELIVERY OF AGRICULTURAL INPUTS AND

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TECHNICAL ASSISTANCE. THE INDIRECT BENEFICIARIES WILL BE THE REMAINING 60,000 FARM FAMILIES (396,000 PEOPLE) LIVING IN THESE SAME VILLAGES AND 600 ADDITIONAL NEIGHBORING VILLAGES WHO WILL BENEFIT FROM THE SPREAD EFFECT OF THE PROJECT INTERVENTIONS AND THE FUTURE SUPPORT AND ASSISTANCE OF THE STRENGTHENED GOVERNMENT SERVICES.

4. RELATIONSHIP OF THE PROJECT TO THE CDSS AND HOST COUNTRY PRIORITIES.

- AID OBJECTIVES IN NIGER AS STATED IN THE CDSS - 1980 CONCENTRATE ON THE RURAL AREA IN AGRICULTURE AND LIVESTOCK PRODUCTION, HEALTH AND HUMAN RESOURCES DEVELOPMENT. THE LONG-RANGE GOALS ARE SELF-SUFFICIENCY IN BASIC CEREALS GRAINS, IMPROVED RANGE MANAGEMENT AND LIVESTOCK PRODUCTION, IMPROVED MANAGEMENT OF NATURAL RESOURCES, AND IMPROVED HEALTH AND WELL-BEING FOR THE RURAL POPULATION.

- AS DETAILED IN THE CDSS, USAID/NIGER'S STRATEGY OVER THE NEXT FIVE YEAR PERIOD WILL BE TO ADDRESS THE DEVELOPMENT CONSTRAINTS FACING NIGER BY RE-ENFORCING AND UPGRADING THE HUMAN RESOURCE AND PHYSICAL INFRASTRUCTURE OF THE GON'S RURAL DEVELOPMENT SERVICES, UNDERTAKING SELECTED ACTIONS WHICH ARE WITHIN THE ASSESSED CAPABILITY OF THE GON'S ADMINISTRATIVE CAPACITY AND THE RURAL FARMERS' RATE OF RESPONSE TO DEVELOPMENT INTERVENTIONS. THIS STRATEGY WILL CONTINUE THOSE ACTIONS DESIGNED (1) TO ENCOURAGE AND INCREASE IN THIS RESPONSE RATE THROUGH THE INTRODUCTION OF NEW TECHNOLOGY, INFORMAL EDUCATION AND COOPERATIVE STRUCTURES, AND (2) TO ESTABLISH A PLANNING, RESEARCH AND IMPLEMENTATION CAPABILITY FOR THE PROTECTION OF NATURAL RESOURCES. (SEE NIGER FY 82 CDSS, PAGE 36-40).

- ALTHOUGH THE MAJORITY OF AID'S EFFORTS WILL BE DIRECTED AT THE NATIONAL LEVEL, INTENSIVE ACTIONS AT THE VILLAGE LEVEL WILL CONTINUE TO BE CONCENTRATED IN NIAMEY DEPARTMENT FOLLOWING THE GON STRATEGY OF DEPARTMENTALLY FOCUSED "PRODUCTIVITY" PROJECTS. THIS PROJECT WAS SPECIFICALLY INCLUDED WITHIN THE NIGER CDSS AND FOLLOWS THE STRATEGY OUTLINED WITHIN THAT APPROVED DOCUMENT.

- THE PROJECT IS DESIGNED TO BE COMPLEMENTARY TO USAID/NIGER'S OVERALL COUNTRY PROGRAM AND WILL TRANSFER ELEMENTS DEVELOPED BY OTHER USAID/NIGER NATIONAL LEVEL PROJECTS TO THE DISTRICT AND VILLAGE LEVEL FOR WIDESPREAD APPLICATION. NDD II WILL BENEFIT FROM IMPROVED SEED AND PRODUCTION TECHNIQUES DEVELOPED BY THE NATIONAL LEVEL AGRICULTURAL PRODUCTION SUPPORT PROJECT (683-0240) AND THE NIGER CEREALS RESEARCH PROJECT (683-0225) (SEE P. 41-42 OF CDSS). THE NIGER FORESTRY AND LAND USE PLANNING PROJECT (683-0230) WILL DEVELOP FORESTRY AND SOIL CONSERVATION TECHNIQUES IN MODEL SITES, AT LEAST THREE OF WHICH WILL BE LOCATED IN NIAMEY DEPARTMENT. THESE TECHNIQUES WILL EVENTUALLY BE DIFFUSED THROUGH THE GON TECHNICAL SERVICES REPRESENTED AND OPERATING IN THE DISTRICTS COVERED BY NDD II. THE RURAL HEALTH IMPROVEMENT PROJECT (683-0208) PROVIDES SUPPORT TO THE VILLAGE AND RURAL HEALTH PROGRAMS BEING IMPLEMENTED IN THE PROJECT ZONE. CARE, ISAID AND THE LUTHERN WORLD RELIEF HAVE ONGOING ACTIVITIES IN THE PROJECT ZONE WHICH TO VARYING DEGREES ARE SUPPORTED BY AID.

- THE PROJECT WILL ADDRESS THE IDENTIFIED HUMAN RESOURCE CONSTRAINT BY CONCENTRATING ON TECHNICAL TRAINING OF RURAL FARM COUPLES, MANAGEMENT TRAINING OF COOPERATIVE LEADERS AND INFORMAL LITERACY TRAINING OF THE GENERAL POPULATION. WOMEN'S NEEDS WILL BE ADDRESSED THROUGH THE INCLUSION OF WIVES IN THE EXPANDED TECHNICAL TRAINING PROGRAMS AND THE SUB-ACTIVITIES AIMED AT FIREWOOD PRODUCTION AND VILLAGE GRINDING MILLS (CDSS, PAGE 50-51).

5. POLICY ISSUES

A. THE PHASE I PROJECT MANAGEMENT TEAM HAS CONCLUDED AFTER MORE THAN TWO YEARS OF IMPLEMENTATION EXPERIENCE THAT THE FOLLOWING AREAS OF CONCERN REPRESENT THE MOST SERIOUS OBSTACLES TO THE SMOOTH IMPLEMENTATION OF PHASE II.

- GON AGRICULTURAL INPUTS SUBSIDY FUNDING LEVEL

- GON PLANNING AND COMMODITY PROCUREMENT CYCLE

- PROJECT'S MANAGEMENT STRUCTURE IN RELATION TO
- ORGANIZATIONAL AND ADMINISTRATIVE STRUCTURES OF THE
- DEPARTMENT-LEVEL TECHNICAL SERVICES

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- RAPID TURNOVER OF GON PERSONNEL

- PROCUREMENT OF IH VEHICLES TO PROVIDE LOGISTICAL
- SUPPORT FOR THE PROJECT.

- B. THESE PROBLEM AREAS WERE COVERED IN THE PROJECT EVALUATION REFERENCED BELOW. SOME PROGRESS HAS BEEN MADE SINCE THE COMPLETION OF THIS EVALUATION, BUT MUCH DISCUSSION BETWEEN GON AND THE MISSION AND CONTINUED PROJECT EXPERIENCE MUST STILL OCCUR IF SOLUTIONS ARE TO BE FOUND. MISSION IS CONFIDENT THAT THE PP PREPARATION EXERCISE WILL PROVIDE THE OPPORTUNITY NEEDED TO MAKE SUBSTANTIAL PROGRESS IN SOLVING MANY OF THE NEGATIVE CONSEQUENCES THESE PROBLEMS POSE FOR THE DEVELOPMENT PROGRAM IN THE NIAMEY DEPARTMENT.

6. ESTIMATED PROJECT COSTS: ALL YEARS ($000)

A. AID FINANCED INPUTS	FX	LC	TOTAL
1. PERSONNEL: EXPATRIATE	1,000	100	1,100
- LOCAL	-	150	150
2. LOCAL TRAINING	-	425	425
3. CONSTRUCTION	-	3,700	3,700
4. COMMODITIES			
- A. AG INPUTS	4,000	400	4,400
- B. VEHICLES	600	-	600
- C. OTHER	600	150	750
5. MONITORING/EVALUATION	75	100	175
- TOTAL AID CONTRIBUTION	6,275	5,025	
-			11,300

THE PROJECTED FUNDING OBLIGATIONS FOR THIS PROJECT WILL BE DIVIDED AMONG FIVE FISCAL YEARS AS FOLLOWS:

FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
1,650	3,550	2,600	1,700	1,700	11,300

- USAID/NIGER ANTICIPATES THAT NDD II WILL CONTINUE WITH THE SAME LEVEL OF U.S. TECHNICAL ASSISTANCE PROVIDED DURING PHASE I. PLANNED T.A. INPUTS ARE (A) ONE TECHNICAL ADVISOR TO THE GON PROJECT DIRECTOR AND (B) ONE COORDINATOR OF THE PROJECTS EVALUATION AND INFORMATION UNIT.

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PEACE CORPS IS BEING REQUESTED TO PROVIDE VOLUNTEERS TO WORK WITH THE FARM COUPLE TRAINING PROGRAM.

- B. HOST COUNTRY CONTRIBUTION

- DURING THE FIVE YEAR LIFE OF THE PROJECT THE GON WILL CONTRIBUTE 25 OF THE TOTAL AID/GON ESTIMATED PROJECT COST OF 15 MILLION DOLLARS. THIS CONTRIBUTION WILL BE PRIMARILY EMPLOYED TO DEFRAY RECURRENT GON SERVICE COSTS SUCH AS VEHICLE MAINTENANCE, SALARIES/ALLOWANCES, AND ROUTINE OPERATIONAL EXPENSES.

7. PROJECT PREPARATION STRATEGY

PID APPROVED BY AID/W	30 MAY 1980
DRAFT PROJECT PAPER COMPLETED	31 JULY 1980
PP SUBMITTED TO AID/W	30 AUGUST 1980
PP APPROVED	NOVEMBER 1980
PROJECT GRANT AGREEMENT SIGNED	DECEMBER 1980
CONDITIONS PRECEDENT MET AND - IMPLEMENTATION BEGINS	JANUARY 1981

8. INITIAL ENVIRONMENTAL EXAMINATION

- GIVEN THE ON-GOING NATURE OF THIS PROJECT AND ITS CONTINUATION OF ACTIVITIES COMMENCED UNDER THE FIRST PHASE, THE IEE THAT WILL BE SUBMITTED AS PART OF THE PP WILL RECOMMEND A NEGATIVE DETERMINATION AS MADE IN THE PHASE I PP.

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9. REFERENCES:

(A) PHASE I PROJECT PAPER, APPROVED MAY 31,1977

(B) PROJECT EVALUATION SUMMARY, JUNE 21, 1979

(C) FY 1982 - CDSS/NIGER

(D) ABS, FY 1981, NIGER

(E) NIGER AGRICULTRAL SECTOR ASSESSMENT (DRAFT)
- 3/19/80

(F) VARIOUS PROJECT REPORTS AND STUDIES SUBMITTED TO
- AID/W PER TRANSMITTAL MEMO OF MARCH 29, 1979.
- (WENTLING/NIGER DESK OFFICER).
- (1) EVALUATION REPORT ON THE AGRICULTURAL
- DEMONSTRATION UNDERTAKEN UNDER THE NIAMEY
- DEPARTMENT DEVELOPMENT PROJECT IN 1978

- (2) REPORT ON THE SOCIO-ECONOMIC SURVEY OF SIX
- VILLAGES IN THE PROJECT ZONE

- (3) REPORT ON THE TRAINING OF FIELD AGENTS IN
- THE PROJECT ZONE.
- (4) ANALYSIS OF FARM-LEVEL MILLET SORGHUM AND COWPEAS
- STORAGE CONDITIONS AND RECOMMENDED IMPROVEMENTS
- IN THE DEPARTMENT OF NIAMEY, NIGER

- (5) REPORT ON THE SOIL CONSERVATION AND LAND USE
- COMPONENT OF THE NIAMEY DEPARTMENT DEVELOPMENT
- PROJECT.

- (6) A BASIC ANALYSIS OF THE AVERAGE FARM IN THE
- PROJECT ZONE.

- (7) STUDY OF RURAL MARKETS IN THE ARRONDISSEMENTS OF
- FILINGUE, NIAMEY AND OUALLAM: 5 MONTH REPORT.

10. FO.. THE MISSION/HOST COUNTRY REVIEW OF THE MISSION PREPARED DRAFT PROJECT PAPER, USAID REQUESTS A TEAM OF THREE INDIVIDUALS:

A. RURAL COMMUNITY DEVELOPMENT SPECIALIST HAVING EXPERIENCE IN MANAGEMENT AND IMPLEMENT OF INTEGRATED RURAL DEVELOPMENT PROJECTS IN WEST AFRICA, FRENCH READING/ SPEAKING CAPABILITY AT 3/3 LEVEL.

B. AGRICULTURAL COOPERATIVES SPECIALIST HAVING EXPERIENCE IN DESIGN AND IMPLEMENTATION OF SMALL FARM CREDIT PROGRAMS IN WEST AFRICA. FRENCH AT 3/3 LEVEL REQUIRED.

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C. HUMAN RESOURCES DEVELOPMENT SPECIALIST HAVING PROJECT IMPLEMENTATION EXPERIENCE IN FORMAL AND NON-FORMAL ADULT TRAINING PROGRAMS IN LOCAL LANGUAGES. AGAIN FRENCH AT 3/3 LEVEL ESSENTIAL.

- TEAM REQUIRED FOR PERIOD OF 5 WEEKS BEGINNING O/A JULY 1, 1980. REQUEST INDIVIDUALS SELECTED BE PROVIDED COPIES OF ORIGINAL PHASE I PP, EVALUATION AND DRAFT AG SECTOR ASSESSMENT. AFTER FAMILIARIZATION TRIPS TO PROJECT ZONE, THE TEAM WILL ASSIST IN REVIEWING PROPOSED PROJECT PAPER WITH HOST GOVERNMENT OFFICIALS AND ASSIST MISSION IN ANY MODIFICATIONS AND REDRAFTING OF PROJECT PAPER AFTER SUCH REVIEW. BISHOP

REPUBLIQUE DU NIGER

CONSEIL MILITAIRE SUPREME

MINISTERE DES AFFAIRES ETRANGERES
ET DE LA COOPERATION

DIRECTION DE LA COOPERATION INTERNATIONALE

N° ..... MAE/C/DCI

N° 12035

Niamey, le .....

17 DEC. 1980

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 des actions de développement retenues pour la 2ème phase du projet de productivité Niamey, pour transmission à l'USAID aux fins de financement. Ce projet est retenu dans le plan quinquennal et compte parmi nos priorités.

Le Ministère des Affaires Etrangères et de la Coopération saisit cette occasion pour renouveler à l'Ambassade des Etats-Unis d'Amérique, les assurances de sa haute considération./.

AMBASSADE DES ETATS-UNIS
D'AMERIQUE

N I A M E Y

ANNEX K.

NIAMEY DEPARTMENT DEVELOPMENT PROJECT - (683-0240)

SUPPLEMENTARY BUDGET REQUIREMENTS

INPUT CATEGORY	ESTIMATED COSTS ($000) FY 82	FY 83	FY 84	FY 85	TOTAL	COMMENTS
I. LOCAL PERSONNEL						
Proj. Mgt. Unit and CPT (Non-GON)						
Accountant (1)	6.0	6.0	6.0	6.0	24.0	Represents only a partial contribution. Remaining local personnel costs will be paid from GON contribution to the project.
Janitor/Messenger (1)	2.0	2.0	2.0	2.0	8.0	
Warehouse/Procurement Clerk (1)	5.0	5.0	5.0	5.0	20.0	
Typists (4)	16.0	16.0	16.0	16.0	64.0	
CPT laborers (4)	30.0	-	-	-	30.0	
SUB-TOTAL PERSONNEL	59.0	29.0	29.0	29.0	146.0	
II. TRAINING	-	-	-	-	-	None except commodities listed below which are for training purposes.
III. CONSTRUCTION						
Cooperative Centers (20)	2,000.0	-	-	-	2,000.0	Warehouse/Office complexes 140 m^2 [illegible] building sites.
Agricultural Service at Say:						
- 1 House (140 m^2)	84.0	-	-	-	84.0	(All construction will employ same plans used under Phase I).
- 1 Office (72 m^2)	43.2	-	-	-	43.2	
- 1 Warehouse (160 m^2)	96.0	-	-	-	96.0	
Livestock Service at Kolo:						
- 1 House (140 m^2)	84.0	-	-	-	84.0	
- 1 Office (72 m^2)	43.2				43.2	
SUB-TOTAL CONSTRUCTION	2,350.4	-	-	-	2,350.4	
IV. COMMODITIES						
Mobile Corrals (7)	100.0	75.0	-	-	175.0	For livestock service: animal vaccination [illegible]
School Gardens:						
- Hand Tools	15.0	20.0	-	-	35.0	For the support of 100 school gardens.
- Seeds	.3	.4	.4	.4	1.5	
- Fencing Materials	25.0	30.0	-	-	55.0	

Audio-Visual Equip. for Coops and CPT's-68 sets						
- Slide Projectors	4.5	5.7	-	-	10.2	
- Cassette Radio Player	4.5	5.7	-	-	10.2	
- Portable Generators	36.0	45.6	-	-	81.2	
Tarpulins(8m x 10m)(42)	8.4	8.4	-	-	16.8	For temporary storage at CPT's coops + Proj. Mgt. Unit.
SUB-TOTAL COMMODITIES	193.7	190.8	.4	.4	385.3	
V. OTHER						
Forestry:						
Production of 200,000 Trees ($.30/tree)	15.0	15.0	15.0	15.0	60.0	
Stypends to Villages	100.0	100.0	100.0	100.0	400.0	
CPT Windbreaks and Plantations(50has.x $1,000/ha)	30.0	20.0	-	-	50.0	
SUB-TOTAL FORESTRY	145.0	135.0	115.0	115.0	410.0	
Genie Rural:						
50 Hectares of pond/low-land development						
- Survey/Mapping (50 has x $200/ha)	10.0	-	-	-	10.0	
- Survey equipment and map making materials	10.0	10.0	-	-	20.0	
- Land-clearing/Preparation wrk(50ha x $1200/ha)	30.0	30.0	-	-	60.0	
SUB-TOTAL GENIE RURAL	50.0	40.0	-	-	90.0	
Creation of 1 additional CPT in Say:						
-Construction-1 House(72m²)	-	52.5	-	-	52.5	
- 1 Classroom (90m²)	-	63.0	-	-	63.0	
-Fence posts (1,000)	7.0	-	-	-	7.0	
-Rolls of barb wire (30)	1.5	-	-	-	1.5	
-Rolls of wire (20)	0.2	-	-	-	0.2	
-Office supplies/equip.	2.4	0.5	0.5	0.5	3.9	
-Other equip/animals	16.5	1.8	1.8	1.8	21.9	
SUB - TOTAL CPT - SAY	27.6	117.8	2.3	2.3	150.0	
SUB-TOTAL OTHER	422.6	292.8	117.3	117.3	750.0	
VI. CREATION OF SDARMA ANIMAL TRACTION EQUIP. MANUFACTURING CENTER						This does not include Dosso Dept. Center and the Animal Traction Center also request by the GON.
Construction:						
1 Manu.Cent.at Niamey	700.0	-	-	-	700.0	
5 Wrkshops at dis.level	650.0	-	-	-	650.0	
Equip./Materials	420.0	-	-	-	420.0	
Tech.Assistance (p.m's)	115.0	115.0	-	-	230.0	
SUB-TOTAL-ANTRAC CENTER	1,885.0	115.0	-	-	2,000.0	
T O T A L	4,710.7	627.6	146.7	146.7	5,631.7	
CONTINGENCIES(10%)	471.1	62.8	14.7	14.7	563.3	
INFLATION(15% Compounded)	-	94.1	47.3	76.4	217.8	
GRAND TOTAL	5,181.8	784.5	208.7	237.8	6,412.8	

ANNEX L

Personnel Requirements

In order that the objectives of the project be met, five long-term personnel will be required as follows:

A. Applied Research Specialist (Agronomist)

Qualifications: A M.S. degree in agronomy preferably with an emphasis on research methodology. A minimum of four years experience in applied agronomic research involving cereals and a demonstrated ability to work with a multi-disciplinary research team would be an advantage. It will also be required that the candidate have some experience in pesticides and current U.S. plant protection practices. Experience in French-speaking Africa would be beneficial and a 3 level in French is a minimal requirement.

Duties: The Applied Research Unit specialist will be responsible to the Nigerien Project Director for the design and implementation of an applied research program the overall purpose of which is to provide further economic and agronomy evaluation of the current recommended technical practices, explore possible modifications and alternatives of or to these practices in each sub-zone of the project and obtain data necessary for devising an integrated system of pest management for extension in the project zone using pesticides that satisfy the requirements of U.S. environmental legislation. This person will maintain liaison with local, U.S. and third country basic and applied research institutions such as INRAN, ICRISAF, SAFGRAD, etc., and should develop a formal but workable relationship with INRAN and the plant protection service. The applied research specialist will have at his disposal the services of short term consultants to assist in experiment design and analysis, integrated pest management and pesticide use.

Specific duties will incude:

1. With the assistance of short term consultants, the specialist will:

   a. devise pesticide trials to ascertain the effectiveness, environmental hazard and economic feasibility of use of E.P.A. approved chemicals or chemicals which may hold the potential for gaining approval for use in Niger under current guidelines;

   b. develop guidelines for correct, safe, economical and effective use of chemicals which may be likely to be used in the extension program (e.g., diazinon);

   c. explore alternative pest control methods.

2. Collect data on current recomended technical practices in each sub-zone to determine the economic returns to the farmer of different practices and the package as a whole.

3. On the basis of current research and experience gained in the first phase, design trials which will test modifications of or alternatives to current practices such as different varieties and fertilizer dosages, viable alternative crops and land use. This should include consideration of feed and cover crops, feed storage and studies of the viability of intensified use of composing and the economics of feed and animal production as opposed to food production.

4. Study the economic potential and possible improvements in cultural practices of minor crops particularly those raised by women.

5. Collaborate with the monitoring and evaluation unit and the extension and training unit in the design and execution of socio-economic surveys.

B. Monitoring and Evaluation Unit Coordinator

Qualifications: A M.S. degree in the social sciences (sociologist, economist, public administration) preferably with an emphasis on rural development. A minimum of four years experience in data collection and research methodology as well as a demonstrated ability to work with a multi-disciplinary research team would be advantageous. Experience in French-speaking Africa would be useful and a 3 level in French is an indispensable requirement.

Duties: The social science analyst will be responsible for the development of the Monitoring and Evaluation Unit on a solid basis within the project office. Under the guidance of the coordinator, the M + E unit will be expected to collect and evaluate all information required to properly monitor project inputs and outputs, evaluate the results and effects of project interventions and diagnose why varios activities have or have not been successful. The coordinator will maintain liaison with the Agricultural Statistics Office, Ministry of Plan, the National Institute for Agricultural Research (INRAN), the National Social Science Research Institute (IRSH), the various services of the Ministry of Rural Development, the University of Niamey, and the equivalent monitoring and evaluation units of the other departmental productivity projects. The coordinator will train and supervise all project data collectors and provide instruction to all personnel who have project information collection and analysis responsibilities.

C. Extension and Training Specialist

Qualifications: A M.S. degree in the applied Behavioral Sciences or Education with an emphasis on the development of training programs. A minimum of four years experience working with extension or training programs in underdeveloped countries, preferably in rural development projects. Past experience with a multidisciplinary organization such as a Private Voluntary Organization would also be an asset. Experience in French-speaking Africa would also be useful and a 3 level in French is a firm requirement.

Duties: The duties of the extension and trainig specialist will be to identify training needs within the project or related GON agencies involved in implementing NDD II activities, to design short term, task-based in-service training programs to address these needs, identify and coordinate resources required for conducting these programs, participate in those programs as appropriate, design evaluations for training programs, prepare a manual synthesizing the role of the training components in rural development projects and provide additional assistance in the area of training as requested by the Project Director.

The extension and training specialist will be expected to be cognizant of other training and extension efforts in Niger and West Africa and, where possible, should coordinate and exchange project activities with other organizations and entities such as MDR, IPDR, UNCC, and other development projects in Niger. The specialist will be responsible for dealing with institutions contracted to carry out in-country, third country and long-term training.

Specific duties will require that this specialist:

1. Elaborate policies and programs proposals for the recruitment of trainees and the operation of the farmer training centers adapted to each sub-zone of the project, including:

a. criteria for participant selection;

b. content of pre-selection information program;

c. policies concerning trainee costs, stipends, amount of harvest to be allocated to farmers, etc.;

d. determine activities which will be carried out at the centers and devise curricula and pedagogical methods which will assure that each activity results in an educational experience for the trainee.

2. Provide guidance for the follow-up of ex-trainees in the field to assure that trainees successfully apply the techniques learned at the center and that the model created by the ex-trainees serves in a structuted manner as a means of extending the recommended techniques to other farmers.

3. Develop and organize short-term training programs at the village level to teach farmers how to apply the improved technical package.

4. Carry out an analysis of cooperative training neess and devise training programs and on-the-job supervision oriented toward making the cooperatives capable for self-management.

5. In collaboration with the applied research, the women in development and the evaluation and monitoring units, devise surveys necessary to collecting socio-economic data relevant to the development of an extension system responsive to farmers needs.

6. Plan and coordinate short-term third country training, long-term training, on-the-job training, and seminars for Nigerian personnel. This will include analyzing the field staff specific needs for training and determining the best procedure and setting for this training. The specialist will participate in the selection of candidates for both long and short term training.

7. If an when sufficient Nigerian personnel are available, train a replacement candidate.

D. Credit/Commodity Specialist

Qualifications: A university or professional degree in accounting, economics, business administration or cooperative organization. A minimum of four years experience in the provision of agricultural credit or the procurement of agricultural inputs in underdeveloped countries, preferably in rural development projects in Africa. A 2 level in French is required.

Duties: Under the supervision of the Project Director, and in close collaboration with UNCC and CNCA personnel, this person will be responsible for:

a. Keeping detailed records of all credit and agricultural inputs transactions occurring under the projects farmer credit fund at the CNCA;

b. assuring the timely procurement, storage, delivery and distribution of all agricultural inputs;

c. reviewing for the project all loan requests;

d. developing materials for the training cooperative leaders and field agents;

e. organizing and participating in training programs for cooperative leaders and field agents;

f. Calculating annual credit fund needs and preparing the request for the funds required;

g. Providing any additional assistance as requested by the Project Director.

E. Coordinator for Women's Activities

Qualifications: A university or professional degree in the social sciences and at least three years experience in village level community development work in Africa, preferably with women. Willingness to spend extended periods of time working in rural areas is a must. Good speaking and writing ability in French (3 level is required) and some knowledge of the Djerma language would be extremely desirable.

Duties: The coordinator will be head of the women's development office of the project management unit and as such will be responsible for determining in what ways women in the project zone can best benefit from the training and extension structures developed by the project. This will entail devising methods for determining women's social and economic needs and subsequently prescribing ways of addressing these needs within the frame-work of the project.

Specific duties will require that the coorinator:

1. Participate in the design and implementation of surveys for each sub-zone destined to ascertain the role of women in the family and community, their agricultural and economic activities, their social and economic needs and the possible constraints to improving the status of women in the project zone.

2. Participate in the design and implementation of programs which will address themselves to identified needs through use of credit, organizational and training facilities offered by the project. This will entail the development of curricula and supervision of training at the farmer training centers, the establishment of organizational models to incorporate women into the cooperatives and GPV's and the conception of effective uses and management of credit for women's activities.

3. Supervise animatrices at village level to coordinate CPT follow-up and aid in diffusion of ideas and techniques.

4. With the Nigerien Women's Association, seek ways of commercializing women's artisan products.

5. Supervise women's literacy classes at the CPT and assure their extension to the village level.

6. Seek ways of financing projects of special interest to women, such as grinding mills and well pumps.

7. Improve the role of women in agriculture, both through improved practices on their own fields and an increased participation on family fields.

8. Promote the raising of small animals, i.e., chicken. rabbits, goats.

9. Evaluate the impact of project interventions on women.

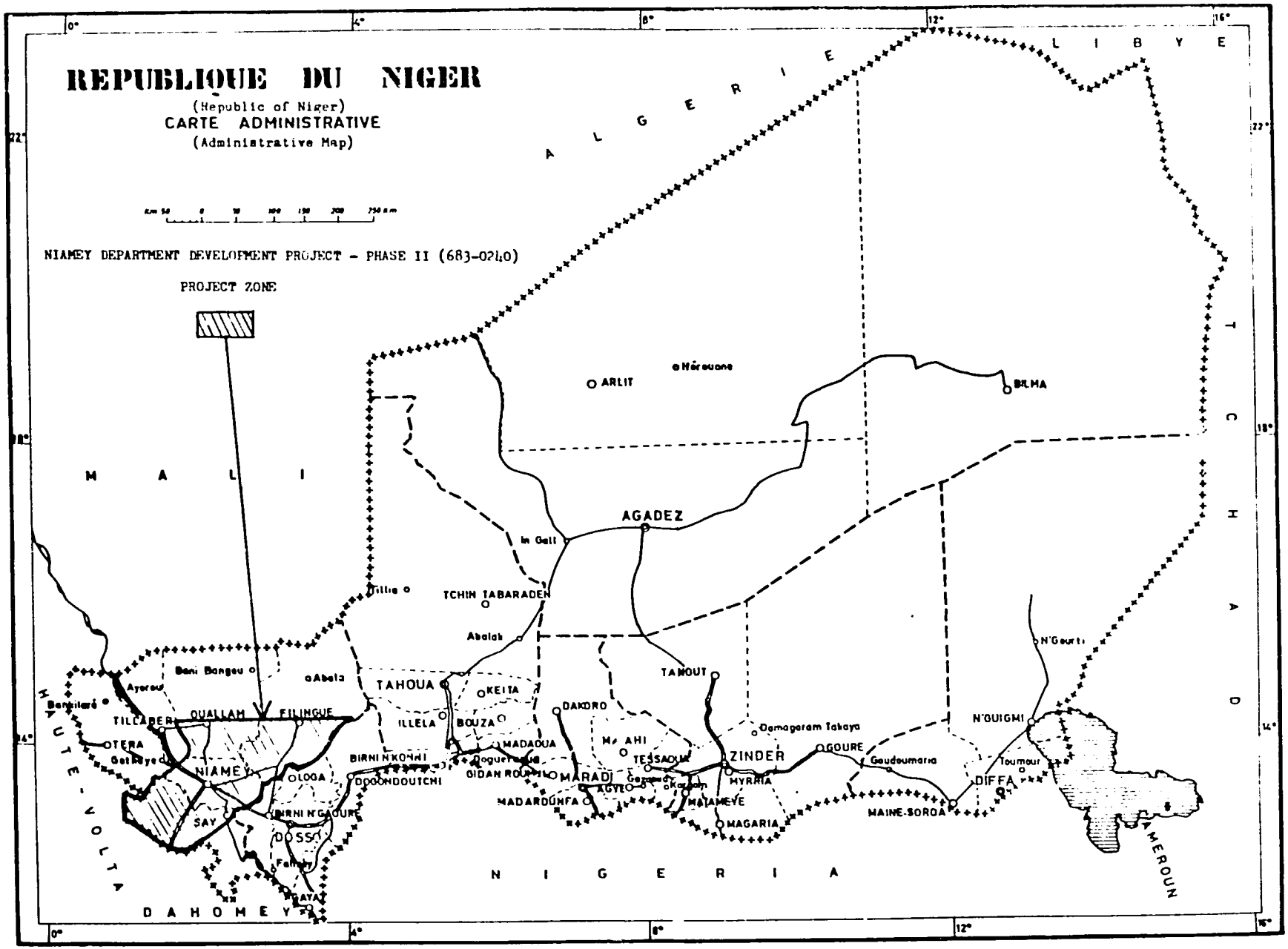
10. Act as catalyst, coordinator and advisor for existing services such as the UNCC, Health, Adult Literacy and the Nigerien Women's Association, to make them aware of ways in which their programs and the resources of their services or organization can best be oriented toward improving the status of women in the project zone.

Peace Corps

In addition, the Peace Corps will provide the services of a volunteer couple at each CPT. Four of these volunteers are currently assigned to two of the three training centers. In keeping with Nigerian customs of men and women undertaking separate work activities, the husband will work primarily with the men and the wife with the women. The volunteers will undertake follow-up visits to farm couples who have been through the training in order to: (1) determine whether the farmers are utilizing the improved practices taught, and the reason for adoption or lack of adoption; (2) determine whether the farmers are using their agricultural equipment and supplies, particularly animal traction equipment; (3) repair or arrange for the repair of broken equipment; (4) provide advise and assistance in the care of animals; (5) as a supplement to UNCC efforts, explain agricultural credit terms and payment schedules; and (6) collect data relating to the viability of the various innovations being introduced. The volunteers will also work in the areas of human and animal nutrition, health practices and literacy. They will work closely with available extension and cooperative personnel to establish an effective follow-up program that will continue after the

departure of the volunteer. The volunteers will live at the centers or in nearby villages. Work related transportation for such things ar the village follow-up program will be furnished by the project.

ANNEX M


REPUBLIQUE DU NIGER
(Republic of Niger)
CARTE ADMINISTRATIVE
(Administrative Map)
NIAMEY DEPARTMENT DEVELOPMENT PROJECT - PHASE II (683-0240)
PROJECT ZONE
ALGERIE
LIBYE
TCHAD
MALI
NIGERIA
CAMEROUN
HAUTE-VOLTA
DAHOMEY
ARLIT
Hérouane
BILMA
AGADEZ
In Gall
TCHIN TABARADEN
Abalak
Tillia
TAHOUA
KEITA
ILLELA
BOUZA
MADAOUA
DAKORO
TANOUT
MARADI
TESSAOUA
ZINDER
MYRRIA
MAGARIA
MAINE-SOROA
DIFFA
GOURE
Damagaram Takaya
Gaudoumaria
N'GUIGMI
N'Gourti
Toumour
Bani Bangou
Abala
Ayorou
Banfilaré
TILLABERI
OUALLAM
FILINGUE
OTERA
NIAMEY
OLOGA
BIRNI N'KONNI
DOGONDOUTCHI
BIRNI N'GAOURE
DOSSO
SAY
Fallmey
GAYA
GIDAN ROUMJI
MADAROUNFA
AGYEO
MAYAHI
MAMAMEYE

ANNEX N

Adult Literacy and Cooperative Training Programs in the Niamey Department Development Project (Niger Republic): Evaluation of Phase I Activities and Recommendations for Phase II

by

Thomas M. Painter
October 23, 1980

Contract No. AID/afr-C-1686
Project No. 625-0929 for
Planning Management and Research

Introduction

Throughout Phase I of the Niamey Department Development Project (NDD or Project) adult literacy and cooperative education have been interlinked through dry-season literacy classes, classes at Project-created Centres de Perfectionment Technique (CPTs), and some independent training programs conducted by The Union Nigerienne de Credit et de Cooperation (UNCC). Despite some overlap in content and approaches at times, adult literacy and cooperative training in the strict sense of the terms will be considered separately in this evaluation, for each reflects the particular emphasis of the two different services involved -- the National Literacy Service and UNCC.

In Section I, NDD adult literacy activities will be considered with a distinction being made between dry-season literacy classes and literacy classes offered by the Projects' CPTs. In the case of the former, the NDD supported the installation, staffing and operation of literacy centers of the same kind operated by the National Literacy Service throughout rural Niger. As a rule, these centers operate during the dry season months, beginning in January/February and continue their operations through May/June or until about the time of the beginning of the rainy season. Thus, the dry-season literacy centers sponsored by the Project during Phase I provided a common form of rural literacy training on a much larger scale than ever before in the Niamey Department. The CPTs, on the other hand, were few in number during Phase I (they totalled 3) and offered literacy courses in addition to training in a number of areas -- all of which are agricultural in nature. The CPTs begin their operations shortly before the onset of the rainy season (April) and continue through the end of each year. The CPTs, then, were smaller in number and, unlike the dry-season literacy centers, were novel training centers in the Department and provided some variation in a curriculum having a heavy emphasis on application of technical themes in agricultural production.

Finally, in Section II, particular attention will be given to the various cooperative training activities conducted by UNCC within NDD zones with Project support.

I. Adult Literacy in the NDD

A. Village literacy programs during the dry season months (January through May/June)

1. Results of Phase I

From the beginning, the NDD has shown an impressive commitment to the widespread promotion of adult literacy in the project zone's rural areas. The scope of project-sponsored literacy activities expanded rapidly during Phase I as

Table 1 indicates. While admirable in intent, this approach to literacy proved overly ambitious and the results were extremely modest.

Because of poor attendance in many centers during the 1979 campaign, several centers were closed, so the number of operational centers during 1980 declined from 72 to 65. During each of the six month-long dry-season literacy campaigns of Phase I, half or less (Table 1) of those villagers -- all men -- who enrolled at the beginning of the season were present at the campaign's end in May/June. The reasons reported for this chronically high attrition rate among adults in the literacy centers vary and include the following: physical mobility due to economic necessity, including seasonal migration to other regions of Niger or neighboring countries in search of remunerative work, "lack of motivation", often linked in literacy service reports to a preference among some adults for French language over national language literacy and, related, a lack of conviction among adults that their newly acquired literacy will be functional, "tiredness", etc.

In addition to the significant attendance declines suffered by the project's literacy centers during Phase I, the achievements of the students during the literacy campaigns may be described as modest at best. Information on literacy campaign test results are incomplete, but currently available details indicate that between c.1% and 6% (see Table 1) of those who enrolled at the beginning of literacy campaigns attained levels of tested competence sufficiently high (levels 5-6) to be considered literate by the National Literacy Service.[1] Slightly larger numbers, accounting for between 8% and 14% of initial enrollment each year, attained levels of competence described by the Literacy Service as "semi-literate" (test levels 3 and 4). The vast majority remained at the lowest test levels (levels 1 and 2) at the end of six months of classes or showed no measurable progress and remained in the "beginners" category.

Unfortunately, we have no way of knowing if tested literacy levels at the end of the 1980 campaign are the result of participation during only one year or the fruit of several years of participation in literacy centers. Details of this kind are not routinely recorded in annual reports submitted by arrondissement-level agents to their superiors at the Department level. In addition, estimates on the average length of time required for an adult to become literate are extremely difficult to obtain, for so many variables enter the picture (motivation, quality of instructors, attendance, etc.) that literacy personnel are extremely hesitant to risk generalizations of this kind. At best one is told that "in principle" an adult should be able to attain test levels 5 or 6 if he attends classes regularly for two years and applies himself. This is admittedly an ideal situation as Table 1 suggests and as most literacy agents readily concede. The actual time required for the "average" adult to become literate may be on the order of three or four years.

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[1] The Service de l'Alphabetisation et de la Formation Permanente.

Table 1.

Dry-Season Village Literacy Programs Within the NDD Project Zones - Phase I

	1978	1979	1980
Number of Centers	10	72	65
Enrollment at beginning of literacy campaign	279	1825	1327
Average enrollment per center at beginning of literacy campaign	28	26	20
Of Which Women	0	0	0
Enrollment at end of literacy campaign	?[a]	899	531[b]
Number of adults tested at end of campaign	59	942	691
Test Results:			
- Beginners	?[a]	466	168[c]
- Levels 1 and 2	36	264	258
- Levels 3 and 4	21	157	182
- Levels 5 and 6	2	55	85

Sources: NDD Annual Reports for 1978 and 1979; 1980 Annual Reports from the Niamey, Filingue and Ouallam Arrondissement Literacy Inspections.

[a] No information available in the Project's 1978 Annual Report.

[b] No distinction is made between project and nonproject centers in the 1980 Annual Report for the Filingue Arrondissement Literacy Inspection.

[c] Based solely on 1980 Annual Reports from the Niamey and Filingue Arrondissement Literacy Inspections; information on Ouallam not available.

As if the above-mentioned problems were not enough to compromise the results of dry-season literacy classes during Phase I, the ambitious goals of widespread access to literacy faced further obstacles. First, teaching materials available for use in the literacy centers were extremely limited. Other than their notes from classes, frequently the result of exercises and dictation given by the instructors, and Gangaa, a multilingual publication of the National Literacy Service which appears irregularly, adults had very littel to read during the early phases of literacy training. The capacity of the National Literacy Service's pedagogical section, which prepares national language materials for adult literacy programs throughout Niger (as opposed to INDRAP[2] which prepares materials solely for public schools), is very limited and presently has only one person in charge of Zarma language teaching materials. During Phase I, most literacy centers were Zarmaphone; fewer were Hausaphone. Secondly, many literacy instructors in Phase I centers were from other technical services (field agents, or aides-encadreurs from the Agriculture Service, UNCC field agents [encadreurs] Eaux et Forets agents, public school teachers, etc.) who had been given some pedagogical training by the Literacy Service (with NDD support). Several of these instructors were assigned elsewhere during the course of the literacy campaign, were obliged to be absent from time to time in order to carry out their service responsibilities or simply disappeared, feeling no real responsibility to the Literacy Service. The result was often temporary or permanent absence of instructors, delays in locating replacements, lost class days, and in some cases, neglected or closed centers because no replacements could be found. Third, arrondissement literacy agents, none of which has an assistant, found themselves unable to cope with the mushrooming needs for follow-up and evaluation activities in project zone centers. Overall, the project centers accounted for more than two-thirds of all literacy centers in the three arrondissements, an important part of, but not the entire workload for which literacy agents are responsible. Consequently, instead of visiting centers at least once a month as is recommended by the National Literacy Service, visits occurred once a month at best or in some cases every two months, or not at all. Chronic mechanical difficulties with the project-supplied International Harvester vehicles did not facilitate matters much, and the ability or willingness of arrondissement literacy agents to solicit and receive assistance from other technical services with their transportation needs varied considerably. The result was poor follow-up (particularly important in areas where literacy programs are new), few chances to encourage adults in centers where attendance was flagging, mediocre test results, and a general agreement among all parties concerned with the program that the Phase I strategy of wide coverage without sufficient resources was a strategic error.

2. Recommendations for Phase II

a.) Experimental Continuing Education Centers (CECs) for men.

Project staff and literacy agents unanimously agree that project literacy activities during Phase II should be scaled down, and there is strong feeling among literacy agents that Phase II activities should be limited to the CPTs.

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[2] The Institut National de Documentation de Recherche et d'Animation Pedagogique.

As an intermediate measure, however, the NDD Phase II PP draft calls for the progressive installation of Continuing Education Centers (CECs) at cooperative seat villages in project zones (each coop being the focal point for the credit and marketing operations of about five cooperative member-villages or GMs[3]) in addition to providing the literacy training currently available to peasant couples in the CPTs. According to the NDD Phase II PP draft, the CECs are conceived as multifaceted rural training centers which would:

- provide adult literacy classes
- organize and prepare written materials for use in training programs
- prepare and collect materials and organize a library for literate adults
- serve as an audio-visual aids center, including some exposure to scholastic TV broadcasts, etc.

The CEC idea has a certain appeal. First, it provides an intermediate alternative to widespread, but marginally successful village-based literacy programs (Phase I) and the more restricted scope of beneficiaries provided for by the CPT programs alone (Phases I and II). Secondly, emphasis on the cooperative as the focus for these educational activities coincides with present (but not clearly defined in operational terms) government policy of increasing the scope and importance of cooperative organizations in the countryside. It is also agreeable to current thinking by UNCC and the Literacy Service that effective cooperative and non-formal educational organization will require the progressive installation of rural centers where a variety of educational activities may be offered and supported on a near-year-round basis. Project support for a small number of CEC-type centers would provide, on an experimental basis, an organizational framework in which training programs conceived by the Project, UNCC and Literacy Service could be conducted with an audience larger than that available through CPTs alone.

Given experiences with educational activities beyond the scope of CPT organizational level during Phase I, extreme caution is in order for Phase II, for the capacity of arrondissement and cooperative-level representatives of relevant services -- UNCC and Literacy in particular -- to follow-up in a consistently collaborative fashion and assure adequate organization and functioning of large numbers of dispersed rural based training centers is limited. All things being equal, UNCC is better equipped with field staff, for in principle, each cooperative has a field agent assigned to it. In practice, one such field agent may be responsible for as many as three widely dispersed cooperatives and

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[3] Groupement Mutualiste, which under the current GON cooperative organization statutes may consist of a village or tribe containing less than 100 heads of household, or in the case of larger villages, village quarters.

and the present rate of cooperative expansion in the department (and throughout Niger) promises to tax these capacities even more during Phase II.

The consequences of the present economic conjuncture for cooperative expansion cannot be predicted, but one of two possibilities may occur. Depressed uranium earnings may lead to a slow-down in cooperative formation, or present UNCC personnel in the countryside may be spread even more thinly while cooperative promotion continues apace. Presently, there appears to be considerable pressure on department and arrondissement UNCC staff to set up as may cooperatives as possible, although it is much too early to predict their chances for success (see Part I, Section B.2.e of the Social Soundness Analysis).

An intermediate option for adult literacy and cooperative training should be supported by the Project's second phase in order to increase access of rural populations in the project zones to longer term, local training programs. It is recommended that budgetary provisions be made to support -- when there is a clear manifestation of local interest -- CEC-type activities to the extent judged locally feasible during the next five years.

The provision of effective numberacy and literacy training should be given the highest priority in the proposed CECs. A grounding in these areas is a prerequisite for many other continuing rural educational activities as currently conceived by the Project, UNCC, and the National Literacy Service.

It is proposed that on the basis of Phase I literacy center performance (as indicated by Arrondissement Literacy Service records of center attendance, test achievements, observed enthusiasm, relative ease of access of villages for follow-up, evaluations by literacy agents and instructors, etc.) potential locations for CEC-type programs be pre-selected by Literacy personnel in collaboration with Project staff and insofar as possible, representatives from other technical services.[4]

One approach would entail the pre-selection of promising village centers which are also cooperative seats which, as suggested above, would be in conformity with current Project and UNCC policy orientations. One possible argument against this preferred approach is the experience of literacy agents that larger villages (often the case with cooperative seats) tend to be less successful sites for literacy centers than smaller villages.[5] Thus, initial efforts need not be attached to cooperative-seat villages unless there is considerable local enthusiasm shown for the proposed program and past experience with

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[4] Throughout the text, "technical services" refers to all GON services normally involved in NDD zone activities -- UNCC, Agriculture, Waters and Forestry, Livestock Service, Literacy, and Animation Rurale.

[5] In addition to this "sociological" problem, many cooperative seat villages in Project zones are not centrally located. To insure maximum participation from nearby villages, the actual location of potential sites vis-a-vis commuting distances from neighboring villages should be carefully considered.

literacy endeavors in the village has been good. The final selection criteria must be worked out through a close collaboration between Project staff and literacy agents. The more carefully locations are pre-selected, the greater the chances that a significant percentage of adults who enroll will finish the campaign and make reasonable progress toward attaining literacy. It must be recognized, however, that some obstacles to the effectiveness of project-sponsored CEC literacy operations will remain, and are factors over which Project planning will have little if any control. Seasonal labor migrations (and resultant enrollment losses) may be expected to continue as long as the opportunity costs of peasants remaining in their home villages exceeds that of looking for remunerative work elsewhere.[6] Secondly, the present low levels of interest in national language literacy throughout much of the Niamey department are likely to continue during the early stages of marketing cooperative organization in Project zones, i.e., until cooperatives prove themselves to be a potentially important locus of local participation (v. Section B.2.e. of the Social Soundness Analysis).

Once this initial pre-selection is complete, a visitation plan should be formulated and those villages which are the most promising (whether or not they are cooperative seats) should be visited by an information team (Project, Literacy, Animation, UNCC) and the possibilities and responsibilities entailed by the installation of the CEC-type center in the village should be thoroughly discussed with GM members and with GM delegates in cases where a cooperative seat village is selected. The Project may be expected to provide the following for each center:

- Payment for a trained instructor who will live and teach in the village for eight to nine months (from October/November through May/June each year;[7]

- A blackboard and support unless it is determined that these are readily available from a nearby public school;

- Assistance with follow-up and evaluation (Project training support);

- Six "luciole" lamps;

- An initial stock of materials (notebooks, pens, etc.) to be sold to the center adults at cost. Proceeds from sales will go into a supply fund to be managed by a person to be selected from the adults, and to be used as necessary to purchase at cost additional materials from arrondissement literacy agents;

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[6] The significance of seasonal out-migration is another factor which must be considered in all center site-selection.

[7] This will allow a longer period of center operations each year while not conflicting with rainy-season cultivation and harvest operations. Where conditions are promising, some thought should be given to rainy season classes.

- Brochures sufficient for the instructor and all adults.

The GM or Cooperative Representatives will be asked to construct and maintain a suitable structure from local materials where none already exists, to provide mats for seating, and to insure the proper management of the supply fund.

Following the initial information visit, the assembly members will be left to decide for themselves whether or not they wish to have a center and requested to send a delegation to inform the Arrondissement Literacy Officer of their decision. Once contacted, the literacy agent will locate and very carefully select candidates for instructor posts, preferably but not necessarily from among persons living in or near the village. In the cases of persons known in the village (or immediate area), the candidate's acceptability should be clearly established on all counts, including age, maturity, comportment, etc.

Once selected, these candidates will be trained by the Literacy Service for about one month. Possible sources of instructor candidates are exceptional ex-CPT trainees, proven dry-season literacy instructors, or promising adults who attained literacy during Phase I dry-season village literacy classes. Literate adults (whether from the CPTs or literacy centers) should be given priority over elementary school drop-outs whenever possible. When no such candidates can be found, extreme care must be exercised to select former school students who are mature and, if at all possible, who are heads of households, and have substantial experience in agriculture. Instructor-training will occur in October/November of each year with CEC operations beginning immediately thereafter and continuing for eight to nine months (class times to be locally determined) instead of the usual six months allotted for annual literacy campaigns. Year 1 of Phase II will be used solely to plan details of CEC curricula, to prepare evaluation materials, to locate and contact possible center sites, and to locate, select and train/retrain instructor candidates. CEC operations will begin during Year 2 and will continue through year 5. At the end of each year all instructors will be upgraded and new candidates will be trained for the following year.

Project training support staff should collaborate closely with literacy agents and UNCC representatives in order to insure that the most active available pedagogy is used in the CEC instructor training and upgrading programs and that a sound introduction to cooperative principles and organization is given.[8]

This reliance upon careful pre-selection, thorough preparation and manifestations of substantial local interest before CECs are installed precludes lock-step predictions about CEC progression during the Project's lifetime, but being optimistic, it is recommended that sufficient funds be allocated to provide for the gradual installation of 45 CECs for men during Phase II, at an optimal rate of five CECs per arrondissement during year two, followed by a more modest rate of expansion during years three and four (see Table 2). It should be clearly

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[8] Current Literacy Service instructor-training sessions may include as many as 45 hours of instruction time of which zero to two hours are devoted to consideration of cooperatives.

Table 2

Suggested Progression for Continuing Education Centers - Phase II

(anticipated enrollment per center - 20)

Arrondissement	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Niamey	0	5	4	4	0	13
Filingue	0	5	4	4	0	13
Ouallam	0	5	4	4	0	13
Say	0	0	3	3	0	6
Totals						
Incremental	0	15	15	15	0	45
Cumulative	0	15	30	45	45	45
Total Enrollment for Project Zone						
Incremental	0	300	300	300	0	
Cumulative	0	300	600	900	900	2700

understood that the CECs are an experimental program and that the rate of expansion during Phase II will depend entirely upon the possibilities for careful pre-selection, follow-up and favorable evaluations of results. The progression suggested in Table 2 is ideal-typical, and it may be anticipated that actual expansion in some arrondissements will occur more slowly than elsewhere, depending on the basis for expansion in each as verified by Project staff and representatives from relevant services.

If interest, attendance, and performance are sufficient in the newly created CECs, new forms of educational materials may be introduced as they become available from the National Literacy Service, CRDTO,[9] and possibly the USAID/GON Maternal Language Program. Realistically it may be anticipated that these literature sources will remain limited during most of Phase II. As a countermeasure, students in the CECs should be encouraged and actively supported by their instructors, literacy agents, and Project training support staff to draw from the wealth of their own cultural resources, to make these available in simple written form from CEC use, for possible use in centers elsewhere, and in Project CPTs (see Section B). Final preparation of these materials, once collected by CEC instructors, will take place at CPTs or arrondissement literacy offices. Collected and prepared for duplication and distribution in this manner, cultural and historical resources may eventually be transformed into educational resources in the form of booklets and brochures. The content possibilities are manifold and include proverbs, fables, histories, riddles, stories, essays on local medicine, natural histories, biographies, and a variety of educational themes. The major difference between these materials and those presently supplied to literacy centers is that their content will reflect the thinking and experiences of the peasantry, rather than those of the various technical services involved in the project zone.

The tapping of local resources in this manner may in turn provide the beginnings of local national language libraries, do so at relatively low cost and with a maximum contribution to content and design coming from the students themselves with assistance from their instructors, literacy personnel and Project staff.

In sum, (a) the provision of more effective literacy training combined with a stronger introduction to cooperative principles and organization, and (b) active support for local interest and initiatives in the transformation of cultural into pedagogical resources provide two valuable and reasonable focal points within CEC-type centers during Phase II. In so doing, they will likewise provide the Project and the various participating technical services with the possibilities to experiment on a limited, workable basis with the potential for the establishment of viable continuing education centers in rural areas. The limited number of CEC-type centers to be installed will guarantee that unlike Phase I, activities will remain under control.

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[9] The Centre d'Etudes Linguistiques et historiques par tradition orale, located in Niamey.

b. Women's CECs

Finally, a concerted effort should be made to increase women's access to CEC-type programs in the Project zones. Women are presently excluded from participation in village literacy centers -- within and without the Project zones and there is no support for women who have been trained in CPTs once they leave. Mixed-sex classes appear to be unacceptable to adults in NDD zones and literacy agents understandably show no inclination to challenge local cultural practice on this issue. Furthermore, National Literacy agents show little enthusiasm for village-level arrangements in which the same male instructor provides separate classes for men and women as is presently done in the CPTs. During Phase II, therefore, serious consideration should be given to the practical problem of devising acceptable means of providing support to village women who have become literate or semi-literate on the basis of their participation in CPT training programs. One possible strategy will entail the progressive installation of a small number of experimental women's CECs in home villages of selected ex-CPT women trainees, in which they would serve as instructors.

This strategy will provide upgrading (teacher-training) and material and follow-up support for selected women who have attained moderate success in CPT literacy programs. Because it is not feasible to request that married women leave their husbands and homes for several weeks in order to benefit from Project-sponsored teacher-training/upgrading programs held at CPTs, we propose that both women and their husbands (also ex-CPT trainees) be given the opportunity to spend a month at a CPT with other selected ex-CPT couples. In addition to, and possibly in place of literacy training for women in the proposed upgrading programs (for our primary consideration is to respond to and provide support for women's interests, which may not include literacy), the curricula may include greater emphasis on practical applications of numeracy, improved health techniques, a review of accessible means of increasing productivity of their garden plots (a theme which will be included in the regular CPT training programs during Phase II), additional work with CPT grinding mills (see Section B,1) their local acquisition and management, possibly sewing (popular in urban centers) and other themes of immediate interest and importance to women. The final content of these brief upgrading programs should be flexible and based on careful consideration of women's desires and interests.

It is proposed therefore that efforts be made during Phase II to contact CPT-trained women who have achieved moderate levels of literacy and to determine their interest and willingness to share their CPT learning experiences with women in their home villages through work as instructors in small-scale CEC-type programs. These contacts should take two forms and should be pursued simultaneously during Phase II. First, the possibilities of participating in women's CEC programs should become a regular part of CPT training curricula for women. Secondly, ex-CPT women who are known to have done relatively well in CPT literacy classes should be contacted in their home villages and the possibilities discussed. These contacts should occur in the presence of their husbands and will require their support. At the same time, local receptiveness to women's literacy/education activities will be determined.

It may be anticipated that once women are selected and upgraded at CPTs, their subsequent progress as women's CEC leaders will gain momentum slowly once they are again in their home villages. It must be emphasized, however, that under the present circumstances, there is very little to lose. For this reason, it is proposed that Project staff, in conjunction with Literacy and Animation agents, provide follow-up and support for prototype women's CEC activities during Phase II and that budgetary provisions be made to provide material support for as many as twenty CECs (with an average expected enrollment of ten women) in NDD zones over the life of the Project. Their progression is summarized in Table 3. They will be equipped in the same manner as the men's CECs, but will initially operate with a short training cycle (three to six months), and scheduling of class hours will be the responsibility of the women in each CEC.

Women who are willing and able to lead the women's CECs should be remunerated. While the details of this must be worked out, a range of 5,000 to 7,500 F FCA per month may be considered a bench mark. 5,000 F CFA is currently the sum paid to dry-season literacy instructors outside NDD zones by the National Literacy Service and is the same as the stipends paid by NDD for Project zone literacy instructors (not to be confused with CPT literacy instructors) during Phase I. The final amount may be more or less, and should initially reflect (a) the length of the training cycle, and (b) expectations of women who serve as CEC leaders (e.g., frequency and regularity of classes, etc.). Insofar as possible, equal pay for equal work should be the rule when relative levels of remuneration are being considered for male and female instructors for Phase II CECs.

B. CPTs (April - December)

1. Results of Phase I

The second locus of NDD literacy activities during Phase I was more limited in scope than the village literacy centers. The three CPTs, two of which (Fandou and Simiri) are in their second year of operation, provide daily literacy classes for fifteen to twenty peasant couples during nine months of the year. Unlike the village-level literacy centers, both men and women receive instruction, although separately and at different times during the day. Typically, CPT wives are in literacy classes for two hours a day during the late mornings or early afternoons, five days a week. Men's classes are held in the evening, from 8 pm to 10 pm.

In principle, the quality of training given to CPT couples should exceed that given to adults in literacy centers. First, the instructors are assigned to live at the CPTs, so unlike instructors in dry-season literacy centers who may be technical service field agents, etc. hence liable to reassignment during the literacy campaign, CPT instructors are stable. They are relatively well paid, they receive 24,000 F CFA ($116.) a month while their dry-season counterparts are paid 5,000 F CFA ($24.). Their responsibilities include more than teaching; they are assistants to the CPT directors - but their primary purpose is to teach and

Table 3

Suggested Progression for Prototype Women's CECs

Phase II

(anticipated enrollment per center - 10)

Arrondissement	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Niamey	0	2	2	2	0	6
Filingue	0	2	2	2	0	6
Ouallam	0	2	2	2	0	6
Say	0	0	1	1	0	2
Totals						
Incremental	0	6	7	7	0	20
Cumulative	0	6	13	20	20	20
Total Enrollment for Project Zones						
Incremental	0	60	70	70	0	
Cumulative	0	60	130	200	200	590

assist CPT trainees with their literacy work. Second, CPT couples, unlike adults in literacy centers, live at the CPT, are well provided for while there, and have a commitment to the entire CPT curriculum for nine months. Thus seasonal migrations do not perturb attendance as they do in the village literacy centers. Moreover, trainees enter the CPT program with the understanding that minimum achievements in literacy are expected of them before completion of the training cycle. Third, each CPT has a full time director whose task it is to insure that all aspects of training progress as expected. Last, the small number of CPTs in the department should facilitate follow-up, morale-boosting sessions, presentations and evaluations by arrondissement literacy agents and representatives of the other technical services involved in Project operations.

To date, it has not been possible to evaluate the results of CPT literacy activities, due in part to organizational problems, and due in part to the unpredictable, long-term nature of the results. Each of these will be discussed in turn.

The Fandou and Simiri CPTs were constructed in 1978, and classes began in 1979; the Boula CPT is in the midst of its first training cycle. The results of the 1979 literacy cycle for Fandou (Filingue arrondissement) are not known. All trainees were reportedly tested at the end of the program and the results were sent to the regional literacy offices in Filingue, but arrived there after the departure of the literacy agent, who was reassigned elsewhere. The test results were never recorded, nor were levels assigned to the results. A new literacy agent was assigned to Filingue and has been there for almost nine months. For reasons which are not clear, the 1979 CPT test results have never been forwarded either to the Department Literacy Bureau or to NDD offices. Current CPT training at Fandou will continue through December, hence the results will not be known for several months, and a brief visit to the CPT did little to illuminate the situation. Two tests have been administered, but the results were sent to Filingue without copies being retained by the instructor.

A similar situation prevails at the Simiri CPT (Ouallam arrondissement) where a late start in 1979, and little activity, combined with the departure of the arrondissement literacy agent shortly thereafter, made tests unfeasible. Nothing is known about the little training dispensed at Simiri during its first year - or four first months - of operation. Evaluations of the current training cycle will be available later this year; tests have been administered, but no test levels have been recorded.

The third CPT, Boula (Niamey arrondissement) is in the midst of its first training cycle, thus final results will not be available until later in the year. In the meantime, unlike Fandou and Simiri, no tests have been given since the beginning of classes. The arrondissement literacy agent feels that tests during the literacy campaign are not useful and may exacerbate competition among trainees.

While these organizational obstacles to ongoing evaluation may require attention and resolution by Project staff during Phase II, it is necessary to emphasize that these results, etc. are but one means of gauging training progress. It may be expected that the results of CPT literacy training will manifest themselves in a variety of ways over the long run. Thus, in addition to more systematic evalutions of CPT training programs, Phase II operations should include means of following up the impact of literacy in the everyday economic lives of the ex-CPT trainees. These everyday manifestations of literacy were not specified in Phase I, and will require considerable thought, specification, and study by the Project training staff during Phase II. While the Fandou CPT director is of the opinion that literacy has been introduced in the CPT curriculum in order that trainees be able to write letters and do bookkeeping tasks, surely this is not the end of it! Indicators of success must be carefully worked out during Phase II.

All three CPTs were briefly visited, although in only one case was it possible to attend a literacy class (one for women, held at Fandou). In all cases, however, directors and assistant directors (literacy instructors) were contacted, and insofar as possible, trainees were contacted and the literacy programs were discussed. The following remarks on and recommendations for CPT literacy operations during Phase II are based on observations, conversations, and a review of available documents, but in no way constitute a comprehensive evaluation. On the one hand, it is premature for the 1980 training cycle; on the other, it is not possible, for results of 1979 training cycles are unknown.

2. Preliminary Observations

Attendance by CPT couples in the literacy classes is generally good. This is reflected in observed participation and attendance records. There remains, however, considerable room for improvement. Overall attendance varies, and accounts for from 60% to 80% of CPT enrollment on any given day. This is the case despite the fact that (a) trainees live in the CPTs, often a very short distance from the classrooms, and (b) attainment of test levels 5 or 6 (literacy) is required of all persons before successful completion of the CPT program (an unrealistic requirement given the present provisions for CPT literacy training). Chief among the reasons given for absences, particularly among women who are absent more often, is tiredness and fatigue. This seems to be particularly true where classes occur during the hot early afternoon hours (during what is ordinarily a rest time) following morning work and meal preparation. Lack of interest in literacy was also cited as a reason for some absences; a delegation of men accompany women to classes each day at one CPT in order to insure their presence. Elsewhere, organizational features of the CPT impinge on literacy classes in other ways. At Fandou, for example, provisioning in condiments and meal preparation is done on an individual household basis. Each wife is responsible for her family's supplies and meals. One result of this is that women are repeatedly absent from the literacy classes, particularly on market days in nearby Balayara. Elsewhere, at Boula, purchases of these kind are done by delegated women and meal preparation is done by a few on a collective and rotating basis. Thus, not all women are obliged to purchase and prepare food and absences from literacy courses because of this are infrequent.

The impossibility of obtaining progress reports in the CPTs except on the basis of instructor's impressions has been noted above and needs no repetition. Suffice it to say that however good the instructor's memory, visits from outsiders would be greatly facilitated if some register were maintained containing comments on the work of all students.

Motivation of trainees no doubt varies and this defies generalization except perhaps in Boula where both men and women are very enthusiastic about the literacy classes and reportedly help each other with their lessons outside the class. While estimations of motivation levels will not be hazarded here, a few comments on the structural support -- or lack thereof -- provided to CPT literacy programs are in order. Visits to CPTs by arrondissement literacy agents, not to mention representatives of the various technical services in the area, are infrequent and very often brief. This is significant because substantial support and encouragement are important factors in providing for CPT success in literacy activities, particularly during the early stages. For whatever the reasons -- and there are certainly many -- all of the technical services in the Project area are falling short of NDD expectations concerning their contributions to and follow-up of CPT activities. Where there is a clearly defined schedule for their participation on a weekly basis (Simiri), their appearances are irregular at best. Where there is no such provision in the CPT curriculum (Fandou and Boula) they do not appear.

A second motivational issue of particular importance concerns CPT literacy programs for women. Once again, without risking generalizations about their motivation and interest levels, a few remarks may be made concerning the structure within which women's literacy training occurs. The scope of "functional" literacy in Niger is rather limited, and has been linked de facto to participation of literate adults in local marketing cooperatives. Rural cooperatives are being rapidly promoted and installed in the Niamey Department as the basis for multi-functional local development structures. It must be emphasized, however, that (a) the vast majority of cooperatives installed in the Department are less than four years old, and that (b) their functions are limited to the beginning phases of cooperative functions found throughout Niger -- marketing and the diffusion of agricultural credit. As such, they are far from attaining the levels of self-management and peasant participation to be found in the eastern regions of the country. There cooperatives have been actively promoted for nearly fifteen years on the basis of continually expanding groundnut production and efforts by GON to increase coverage of groundnut marketing through UNCC cooperative promotion and crop sales to SONARA[a]. Under the cooperative organization statutes of 1978 and 1979, all individuals in principle who desire to come together in order to promote their mutual economic betterment can form cooperatives, be legally recognized as such, and eventually obtain CNCA[b] credit assistance through UNCC. In practice, it appears that cooperatives are more the result of UNCC promotional efforts than local, spontaneous initiatives. In addition, it appears that only heads of households -- men -- are accorded the right to form, or join cooperatives. Although Niamey Department UNCC personnel state that divorced or widowed women who head

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[a] Societe Nationale de Commercialisation de l'Arachide

[b] Caisse Nationale de Credit Agricole

households may also join , no such cases are known to exist. Thus, the vast majority of women are effectively precluded from direct participation in cooperative organizations. It is not unreasonable to expect, therefore, that their enthusiasm for CPT literacy programs may be tempered by a realization that (a) functional literacy as specified above is restricted to nascent organizational roles occupied solely by men, and (b) women are presently precluded from all rural adult literacy classes outside the CPTs. The question could not be bluntly asked during brief CPT visits, but the success of the literacy programs, particularly among women and also among men, will depend on the capacity of the Project, and more importantly, GON rural development policy to answer the basic question: "Literacy for what"? (see Sections B.2.c and e of the Social Soundness Analysis.)

3. Recommendations for Phase II

There is widespread agreement among Project staff and arrondissement and department literacy agents that the CPTs offer the greatest potential in the short run for effective literacy training. They provide all concerned with "workable groups" -- although their small number will reduce the immediate breadth of their impact.

Despite the lack of systematic evaluations on which to base recommendations for the organization of CPT literacy training for Phase II, we concur with the view that more limited, more effective programs are preferable in Phase II. Limited CEC-type activities should be undertaken, as suggested above, in order to better test local initiative and provide the option of increased access to literacy in areas where interest in literacy is known to exist. The Project's ten CPTs (3 created during Phase I, 7 to be created during Phase II; see Table 4) will form the core of Phase II educational efforts, for they offer the greatest promise for the development of a well-controlled, innovative pedagogy which is responsive to the realities of CPT training and trainee experiences, something which, in turn, may be used for the benefit of the experimental CECs. Expansion of CPT activities over the Project life will provide 700 peasant couples with training. In addition, CPT instructors and trainees are not mobile, something over which CEC programs, however well conceived, will have little control, for adult participants in the CECs will leave when economic necessity dictates. In order that the training potential of the present and projected CPTs may be more fully realized during Phase II, we recommend that particular attention be given to the following points

a. A more active, locally responsive pedagogy is needed for CPT literacy training. The current use of time-tested literacy teaching methods in the novel CPT structures is old wine in new bottles. It is slow and may not be terribly conducive to trainee interest in the absence of a "dynamic" instructor, hence should be re-evaluated and revised if necessary during Phase II. One approach to an improved pedagogy for CPTs would entail instructor training/upgrading by the Literacy Service through the use of the most up to date "rapid literacy" techniques available. Details of this upgrading will have to be worked out during Phase II, for rapid literacy methods are in an experimental phase, require further testing, and are not presently available as a package. Access of CPT (and CEC) programs to more effective instructor training and upgrading methods may be considerably enhanced

Table 4

CPT Progression during Phase II and Anticipated Literacy Training Enrollment in Phase I and Phase II CPTs

(anticipated enrollment per CPT - 40: 20 men and 20 women)

	Phase I	Phase II					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. CPTs							
Incremental	3	0	2	2	3	0	10
Cumulative	3	3	5	7	10	10	10
2. Enrollment							
Incremental	-	120	200	280	400	400	
Cumulative	-	120	320	600	1000	1400	

TOTAL----------1400

by closer links between NDD training endeavors and the ongoing training activities of the National Literacy Service's Literacy Agent Training Center (CFCA) located in Niamey.[10] Not only could literacy agents enrolled in CFCA programs experiment in CPTs and CECs (particularly the former) with improved teaching methods, but CPT (and possibly CEC) instructors could be trained and upgraded by CFCA staff and trainees. The CFCA should be considered as a particularly important resource for NDD efforts to improve and evaluate its training activities during Phase II. Contacts to date indicate a great deal of interest by Directors of the National Literacy Service and the CFCA in the formation of these linkages. In the meantime, initiatives should be taken at the CPT level to improve literacy training through the collaboration of instructors, CPT directors, literacy agents, and Project Training Support staff. The basic elements of CPT curricula are accpetable (the universal promotion of animal-drawn cultivation equipment is an exception, and will require further examination on a region by region basis [see Social Soundness Analysis, Section B.2.a]), but as offered are underdeveloped. A second characteristic of current pedagogy (in this respect it resembles literacy methods throughout Niger) is the relative passiveness of the trainees vis-a-vis the instructors and any other persons who may play the instructor role (technical service representatives, the CPT director, etc.) -- the mixed heritage of French colonial education and Koranic schools. CPT life is replete with situations which could serve as the basis for literacy and numeracy lessons, but it appears that these are rarely used to good advantage. We were unable to attend more than one CPT literacy class, but observations made therein, conversations with instructors, trainees, and CPT directors leads us to conclude that the vast majority of literacy work occurs in the classroom with the trainees seated, their notebooks on the tables before them. In short, the pedagogy is very similar to that of the public school -- the content is the major difference. While classroom lessons are essential, they tend to be divorced from the realities beyond the classroom door, and the immediate relevance of literacy is mediated through the few brochures currently available in the CPTs -- one for use by the instructor only; the others (prepared by the UNCC with a heavy emphasis on cooperatives) available to trainees only considerably later in the training cycle. In order to spark and maintain the interest of the trainees during Phase II, greater efforts will be necessary to link up literacy work with other aspects of training and community life at each CPT. This will require greater instructor initiative, something current instructor training methods do little to reinforce. This is an area where, as suggested above for the CECs, support from Project training support staff and collaboration with the CFCA could make an important contribution to CPT programming by building upon the training already being given to instructors by the Literacy service. In so doing, it may be possible to insure that experiences, issues and problems directly accessible through the trainees themselves be included in CPT curricula.

Concrete approaches to CPT curriculum development may take many forms and flexibility will be important. As an example, the following focal points of present and potential CPT activities may serve as a bsis for developing curricula responsive to local conditions:

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[10] Whose expansion and curriculum development will very likely -- and should -- be supported by USAID funding.

-- Small livestock production

-- The value and use of animal-drawn cultivation equipment under different conditions

-- Experimental use of other technical themes on CPT fields.

With particular reference to women, whose role as trainees tends to be marginalized in CPT training activities, the following should be considered in addition to and possibly in place of current literacy classes. Literacy should be offered to CPT women as an option, not an obligation.

-- Advantages of and possible arrangements for collective provisioning and meal preparation as an energy saving device.

-- Use and management of grinding mills, both as labor saving devices for CPT women, and as the basis for practical exercises in cooperative organization and management.

-- Sewing (particularly popular in Niamey's urban literacy centers, its acceptance by rural women remains to be seen, but the option should be provided).

-- Health and sanitation.

-- Experiments by CPT women with the use of various technical themes adapted for use on their individual garden plots.

These are but a few of the focal points for literacy work provided by the everyday experiences of CPT trainees. In addition, potentially interesting, but less practically oriented bases are found in the cultural backgrounds of the CPT trainees themselves. As suggested in the section on CECs, trainees may be actively engaged in the collection of proverbs, histories, tales, and other materials which form the basis for much of their everyday conversational lives and which, if properly handled, could be transformed through individual and group assignments into useful educational resources and a supplement to the limited selection of reading materials currently available in literacy courses.

b. <u>More adequate follow-up and evaluation of CPT literacy activities are needed.</u>[11] The basis for ongoing follow-up and evaluation of trainee literacy work is the routine collection of relevent information. In the final analysis, this information must be specified by the Project and the means for its collection assured by cooperation among Training Support Staff, literacy agents, and CPT staff. Data collection of this kind has not become a routine process among CPT instructors and considerable improvement will be necessary during Phase II. The Literacy Service provides each instructor with a center register. In all CPTs these

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[11] The following remarks should not be interpreted as a rush to judgment. In all fairness, the CPT training cycle is not over, and our visits were very brief. The importance of the issues mentioned, however, cannot be overstated.

registers are being used in a somewhat unorthodox manner. The result is that potentially useful information is not available. As a means of facilitating follow-up by Project and government staff, all CPT instructors should be trained -- and tested if necessary -- in the use of these registers. If needed, they should be required to provide other information as the Project deems necessary. These registers should furnish an on-the-spot overview of (a) selected trainee characteristics (their cooperative responsibilities, kin relations to village or canton chiefs, access to individual fields, approximate cultivated areas in their home villages, etc.); (b) weekly attendance; (c) results of any tests or quizes administered during the training cycle; and, in addition, (d) notes by the instructor and/or the CPT Director on the learning progress or difficulties of the trainees. Information of this kind is not consistently gathered by CPT instructors and only thorough training and follow-up will guarantee that it is collected.

Second, arrondissement literacy agents should be assisted in every way to insure a continuing and careful follow-up of CPT literacy activities. Specifically:

-- A concerted effort should be made to reduce changes of assignment by arrondiseement literacy agents during Phase II. This would optimize operational continuity and minimize the possibilities for aborted or non-existent follow-up and evaluation as occured at Fandou in 1979. Realistically, it may not be possible to demand that literacy agents remain in the same posts throughout Phase II,[12] but considerable effort should be made by the Project Director and Project training staff to impress the National Literacy Service Director with the need to keep these changes at a minimum.

-- Literacy agents should be assisted and accompanied as often as possible by Project training staff in follow-up activities.

-- Participation of other technical services involved in Project operations should be encouraged and required on a rotating basis if at all possible. It should become standard procedure that all technical service representatives in the area near CPTs offer their substantive as well as their evaluative expertise in order to improve the present situation in which:

--- their substantive contribution to CPT literacy classes (in terms of educational themes, presentations, demonstrations, etc.) is minimal and irregular. (In one case, a UNCC encadreur lives c. 100 meters from a CPT, but has not set foot in the training center. Whatever the formal reasons, this is an inexcusable waste of expertise.)

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[12] Participation in training and upgrading programs is a recurring reason for these personnel shifts.

--- their contribution to evaluation activities are nil.

c. CPT capacity for preparation and production of reading materials should be increased. During Phase II efforts should be made to increase the availability of reading and exercise materials for use by CPT trainees. The limited production capacity of the National Literacy Services' pedagogical section has already been emphasized (Section I.A.1) and no further elaboration is required here. In light of this limited capacity, and the need for materials for CPTs and CECs, greater support should be given by NDD to production capabilities at the CPT, arrondissement and national literacy office levels.
Mimeograph machines and typewriters with national language characters should be installed within arrondissement literacy offices. A supplementary stock of materials (stencils, ink, ribbons, etc.) should be acquired by the Project and supplied to arrondissement literacy agents on the condition that particular emphasis be given to the production of materials for use in the CPTs and CECs. Further assistance of this kind will require concrete evidence of progress in the preparation of materials destined for these centers.

With the assistance of Project training support staff, literacy agents, and closer collaboration than is the custom from instructors and trainees, modest, but real increases are possible in the availability of relatively inexpensive reading materials for use in the CPTs and the CECs (and non-Project literacy centers).

Ditto machines (spirit duplicators) and material should be supplied to the three CPTs from Phase I during year 1 of Phase II on an experimental basis as a means of further increasing local capacities for preparation of reading materials. CPT instructors and directors should be thoroughly trained in their use. It should be further understood that the ditto machines, like the mimeograph machines supplied to arrondissement literacy offices will be used for the preparation of materials for CECs as well as the CPTs. If the results are satisfactory, all remaining CPTs should be supplied with ditto machines during years 2 through 5.

Finally, each CPT should be equipped with two limographs and all accompanying materials (and all CPT instructors and trainees should be thoroughly trained in their use). These simple printing machines will be used as an integral part of the CPT literacy training program in order to give all trainees exposure to and practical experience with a relatively simple means of reproducing teaching and reading materials in their home villages. In order to guarantee accessibility of these machines at the end of the CPT training cycle, provisions should be made for their availability on credit in the name of the GM[a] with the understanding that the CPT trainee will be responsible for its proper use, maintenance, and supplies purchased as approved by the GM administrative council.

d. Scheduling of CPT literacy classes should be reconsidered. The present manner of scheduling CPT literacy classes may require some re-examination and change during Phase II. Consideration should be given to altering current

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[a] Groupement mutualiste.

timetables (men at night; women during the early afternoons) in order to take maximum advantage of (a) cooler times of the day; and (b) trainees' energies. Literacy classes are presently squeezed into hours when agricultural work is not feasible (the early afternoons are too hot; the evenings too dark), a situation which may be far from optimal for the kind of attention and assimilation literacy training requires.

In addition, greater provisions for structured out-of-class discussion or work groups are needed. Improvements in these areas may require some reduction of field work time in the mornings, something which may be possible only if a somewhat smaller surface area is cultivated at the CPTs. In principle, alterations of this kind should prove quite acceptable if the CPTs are considered first as training centers, and secondarily as production units. Officially, the former is the case, but the present reward structure (sharing of the total harvest by all trainee households before they return to their home villages) may place greater emphasis on production per se than is warranted in CPTs. Reduced demands on the trainees for field work time would make more time and energy available for literacy training and make it the integral part of CPT training that it should be. Until the importance of literacy is reflected in total CPT programming, it will remain a marginal element.

As suggested in (a.) above, imaginative curriculum planning will combine literacy work with all other aspects of CPT training rather than segregate them as is largely the case now. As suggested above, lessons could be built around actual CPT (as opposed to textbook) situations and classes could be held, for example, in the fields as an integral part of demonstrations, be given in conjuntion with equipment assembly and maintenance lessons, be designed around women's activities in the center, etc.

Finally, altered CPT organization could relieve a situation in which literacy classes are not only tacked on, but may actually be burdensome to trainees, particularly women. More effective -- collective -- arrangements for food provisioning and meal preparation should be explored and help with childcare should be considered as means of enhancing women's capacity to participate in literacy classes. Each CPT should be equipped with a grinding mill as a means of (a) reducing meal preparation times and energy expenditures by women, thus enhancing the possibilities for their active participation in literacy classes, if interested; (b) providing the basis for experiments in cooperative organization among the trainees with immediate, collectively-shared problems as focal points. Trainees should be encouraged to consider the constraints and possible solutions, but final decisions should be left to them. The above suggestions assume a certain willingness on the trainees' part to participate in literacy classes. As mentioned above, the structure of functional literacy has real limitations and this is particularly true for women.

II. Cooperative Training in the NDD

During Phase I of the NDD, the Union Nigerienne de Credit et de Cooperation (UNCC) promoted a variety of cooperative training programs in project zones with varying degress of project support. These may be considered briefly in terms of the UNCC's involvement - direct or indirect - in particular training activities.

A. "Direct" Involvement of UNCC in Cooperative Training

UNCC has been directly involved in training programs given at different times of the year, designed specifically for elected cooperative (i.e., GM, cooperative, and cooperative market) officials. These programs are a normal part of UNCC's yearly operations throughout the Niamey Department (and Niger) and involve the training of newly elected officials and upgrading/retraining of officials already in office. These training programs involve individuals in areas where cooperative organizations are being installed and those in areas where already existing cooperatives require reorganization according to the 1978 and 1979 cooperative statutes. These training programs are carried out by UNCC agents (department and arrondissement delegates and field agents, often with assistance from the Animation Rurale service and occasionally from the National Literacy, Agricultural Services, etc.) and utilize teaching materials developed by UNCC's national training office with financial assistance from Danish Aid (DANIDA) and the International Labour Office (ILO).

These training sessions, given yearly for GM, cooperative and cooperative market officials in the project zones, have received two forms of support from NDD. First, NDD has reimbursed UNCC for expenses incurred in the provision of daily meals to individuals being trained, most of whom are required to travel from their home villages (GMs) to training sites located at Cooperative seats or UNCC's arrondissement offices. Secondly, NDD has provided partial reimbursement of fuel expenses incurred by UNCC agents as they travel from cooperative to cooperative for training purposes.

In general, training programs conducted by UNCC follow a fairly predictable pattern each year, although organizational variations may occur from arrondissement to arrondissement, substantial delays may occur from time to time, and the quality of the training provided is not certain. In addition, two specific training programs have been planned by UNCC for NDD zones, only one of which has been realized to date. One such program involves the training of 42 blacksmiths (presently underway); the other, the training of village grinding mill management committees. These will be briefly described below.

A somewhat idealized annual training schedule for UNCC appears roughly as follows.[13]

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[13] Sources for this section: UNCC, "Programme de Formation Cooperative, Annee 1980." Delegation Departmentale Niamey n.d., plus assorted UNCC Arrondissement and Department activity reports.

1. January/February - Information Visits

These consist of brief, usually one day visits to existing cooperative seats in regions where cooperatives are being installed. These early contacts serve to introduce the cooperative system, or, in cases where cooperatives exist, to introduce the new organization based on the 1978 and 1979 cooperative statutes. In addition to presenting the advantages of the cooperative system to rural producers, existing cooperative officials are provided with information on the following points so that an evaluation may occur as well:

- Planned activities for the year
- Prices of agricultural inputs
- Review of the loan reimbursements from the previous year
- Review of the previous year's marketing results

Somewhat later during this period of contact, information diffusion and cooperative promotion, those villages that decide to constitute themselves as GMs eventually elect officers and are accorded official cooperative status.

2. March/April - Training of Cooperative Officials

Newly elected GM and cooperative officials are trained at cooperative seat villages during four to seven days. In principle, training programs for GM officials cover the following points:

- Introduction to cooperative principles
- The role of the cooperative General Assembly, the Administrative Council and the Accounts Commissioners
- Organization of credit operations
- The role of peasant self-management.

GM officers trained during these programs include Presidents, Secretaries, Treasurers and two counsellors per GM. During these sessions, a series of eight cooperative training booklets prepared by UNCC and ILO/DANIDA is used.

In principle, training programs for cooperative officials cover the following points:

- Elements of cooperative organization

- Use of cooperative training booklets

- Discussion and consideration of future possible functions and orientations of cooperative organizations

- Practical presentations of extension themes

- Evaluation of development activities carried on by cooperatives.

The number of officers from each cooperative may vary, but in general, the following elected individuals may be present from each cooperative and receive training: Presidents, Vice Presidents, Secretaries, Treasurers, Counsellors (from two to six per cooperative) and Accounts Commissioners (up to six per cooperative).

3. About May (just before the onset of the rainy season) - Upgrading and retraining for formerly elected GM and Cooperative Officials.

In areas where cooperatives already exist and individuals already occupy cooperative posts, brief (about two days) retraining sessions are given in order to reinforce knowledge already acquired.

4. August/September (Prior to the Market Season) - Training/Retraining of Paid Cooperative Market Officials.

Those individuals who have been elected to positions in the cooperative market are trained/retrained in basic market operations. The number of elected officials per cooperative market receiving training varies but often includes the following posts: Market chiefs, Secretaries, Accountants, Weighers, and Guardians. Training sessions for market personnel last from five to seven days, and are held at cooperative seat villages.

5. Special Training Programs for the NDD Zone

a. Blacksmiths

Phase I called for the training and outfitting of 42 village blacksmiths by UNCC in 1979. This was not done for reasons which remain unclear. Rescheduled for March-June 1980, it was recently postponed a second time, but began late in September of this year (1980).

b. Village Grinding Mill Management Committees

A four-day training program for 20 individuals was planned for March 1980 but has not occurred to date.

B. "Indirect" Involvement of UNCC in Cooperative Training

UNCC has also been indirectly involved in cooperative training during Phase I of the NDD. This contribution, unlike that above, took the form of cooperative training content in village and CPT literacy classes rather than training programs staffed by UNCC personnel. In these cases, cooperative training materials were supplied to village and CPT literacy instructors who used them in conjunction with other teaching aids available from the National Literacy Service. It is necessary to note, however, that insofar as adult literacy in Niger has been "functional" it has been and remains closely linked with the performance by peasants of specific marketing, credit and accounting operations within the cooperative structures that GON has progressively installed throughout the country since shortly after Independence. In a more general sense, adult literacy classes have also aimed to enhance the capacity of all cooperative members - not simply elected officers - to participate more actively in cooperative operations (limited for the most part to marketing and acquisition of inputs), but priority has always been given to those persons having particular functions within the cooperatives.

As mentioned above, UNCC's contribution to cooperative training in Phase I literacy centers and CPTs was based on curriculum content - teaching materials - rather than teaching personnel except in those cases where, lacking a qualified instructor candidate, local technical service representatives (including UNCC field agents) were taken on as village literacy instructors. The disadvantage of this strategy has already been mentioned (see Section I.A.1).

The teaching materials used in literacy centers and CPTs, unlike those prepared by UNCC and ILO/Danida for cooperative officer training programs were integrated, i.e., contained lessons focused on cooperative organization, basic writing exercises, and a number of reading texts. Two brochures, prepared through close collaboration between literacy and UNCC personnel were financed by the NDD and made available in literacy centers and the CPTs. In addition, there were available in the centers on an irregular basis, pamphlets which treat the cultivation of several plant crops (millet, sorghum, etc.).

C. Results

Details provided to NDD by UNCC on training programs are sparse at best and sporadic. Aside from recording that a certain number of cooperative officials were trained (or retrained) in a given place -- "production" reports -- it is highly doubtful that UNCC carries on any systematic evaluation of its cooperative training programs. This applies to all forms of cooperative training provided directly by UNCC staff, as well as that provided through the CPTs. The recent assignment of a technical agent in charge of training to the UNCC Niamey departmental office should improve this situation in the long run. For the short run, and in the absence of evaluations, one can do little more than hope for acceptable results, for the training and retraining tasks of UNCC staff in the project zones are substantial. Precise figures are not available, but on the basis of the 41

cooperatives now included in the project zone (201 GMs) it may be estimated that the number of persons involved in UNCC training programs sometime during 1980 total about 1600. These estimations take no account of cooperative training provided by literacy instructors as part of CPT curricula.

Given the brevity of UNCC's training programs, the rapid pace with which cooperatives and GMs are being created in NDD zones, and the demonstratively limited capacity of UNCC to (a) staff cooperatives with field agents (there are presently 21 encadreurs for 41 cooperatives) and (b) provide follow-up in general, we must be extremely guarded in our expectations concerning the thoroughness of cooperative training to be provided directly by UNCC during Phase II.

Despite the apparent simplicity of the new cooperative statutes, the issues are such that a week's training plus a day or two of refresher work each year is hardly sufficient to thoroughly introduce and explain "modern" cooperation in the project zone GMs, let alone provide thorough training on all of the points invariably listed by UNCC agents in their yearly training agenda.

D. Alternatives: The indirect approach to cooperative training in CPTs and CECs

Assuming that cooperative growth will continue in the Niamey Department during Phase II of the NDD, and given the present limitations in UNCC's capacity to directly inform, adequately train, and follow-up increasing numbers of cooperative officials, an ongoing training "supplement" will be needed and this function may be performed in part by Phase II CPTs and CECs. CPT (and to an extent village level literacy centers) curricula have already provided a modest supplement to UNCC's cooperative training programs. The quality of cooperative training and orientation provided by literacy instructors in the CPTs has not been determined, but the minimal attention currently being given to these issues in literacy instructor training programs provides little ground for optimism. There is a substantial need for improvements in cooperative training presently provided by CPTs and this will require more than larger quantities of brochures. UNCC's contribution, with continued NDD support of the kind provided during Phase I (Section A above), to a reinforcement of cooperative training in CPT and CEC curricula during Phase II should consist of three key functions.

1. Training/upgrading of CPT and CEC instructors in the elements of cooperative training - to be assured through the collaboration of Project training support staff, the UNCC department training agent, UNCC arrondissement delegates and field agents. Finally, greater cooperation at the national level in training improvements should be possible through closer links between UNCC's national training office and the National Literacy Service's Literacy Agent Training Center (CFCA). It may also be expected that the Project Training Support Unit will play an important role in training improvements, both at the district and national levels.

2. Direct contributions by UNCC to CPT/CEC curricula in the form of special meetings, work groups, and presentations of cooperative principles and organization by UNCC staff. As mentioned above, with the exception of the cooperative training brochure presently being used in the CPTs, this potential contribution by UNCC has been poorly realized.

3. In addition to (2.), UNCC should contribute substantially more to the routine follow-up and evaluation of CPT/CEC cooperative training efforts in order to verify that desired information is being effectively assimilated by trainees.

Reinforcements of these contributions will be more likely during Phase II given (a) the altered organizational structure of the project, (i) its emphasis on more integrated action, (ii) the presence of a training support component; and (b) ongoing (and necessary) Project assistance with UNCC's training/upgrading expenses and with the production of teaching materials for use in Project zones. Features of cooperative organization and growth in NDD zones are discussed in Part I, Section B.2.e of the Social Soundness Analysis.

NDD Phase II Literacy (CPT) and Continuing Education Programs

Material requirements and indicative costs (including instructors' salaries)

1. Support for Arrondissement Literacy Inspections (Ouallam, Niamey, Filingue, and Say)

4	- Gestetner*-450 (manual) mimeograph machines: 5000,000 F CFA ea.	$ 9,700
20	- Cartons mimeo stenciles: 5,000 F CFA ea.	483
8	- cases mimeo ink: 10,000 F CFA ea.	386
4	- Hermes* manual typewriters, wide carriage, with Hausa/Zarma language keys: 400,000 F CFA ea.	7,730
40	- Ribbons: 1,000 F CFA ea.	193
80	- Reams of mimeo paper: 1,500 F CFA ea.	580
	TOTAL No. 1	$19,072

2. Continuing Education Centers (CEC's)

2.1 - 45 men's centers (avg. enrollment - 20 ea.; total enrollment during Phase II - 2,700)

2.1.1 Instructors' salaries:

45 x 9 mos. x 7,500 F CFA per mo. x 4 yrs. ---------- $44,021
(1215 instructor months x 7,500 ÷ 207)

2.1.2 Materials

270	- Luciole lamps (est. 6 lamps per center at a cost of about 10,000 F/center)	2,173
10	- Liters kerosene x 1215 Inst. mos. x 80 F CFA/litre ÷ 207	4,695
45	- Blackboards with supports: 9,000 F CFA ea.	1,956
90	- Tins ardoisine: 1500 F CFA ea.	652
45	- Blackboard erasers: 500 F CFA ea.	109
880	- Boxes of chalk: 500 F CFA ea.	2,125
7,100	- Notebooks (cahiers): 75 F CFA ea.	2,572
7,100	- Bic pens: 50 F CFA ea.	1,714
2,700	- Brochures: 1,000 F CFA ea.	13.043
	SUBTOTAL No. 2.1	$73,060

*Waivers will be necessary in order to obtain machines for which replacement parts and repair are readily available in Niger.

2.2 - 20 Womens' centers (avg. enrollment - 10 ea.) total enrollment during Phase II - 590

2.2.1 - Instructors' salaries

20 x 6 mos. x 7,500 F CFA/mo. x 4 yrs.----------$12,826
(354 instructor months x 7,500 ÷ 207)

2.2.2 - Materials

120	- Luciole lamps (est. 6 lamps/center at est. cost of 10,000 F/center)	966
10	- Liters kerosene x 354 ins. mos. x 80 F CFA litre	1,368
20	- Blackboards with supports: 9,000 F CFA ea.	870
40	- Tins ardoisine: 1500 F CFA ea.	290
20	- Blackboard erasers: 500 F CFA ea.	45
240	- Boxes of chalk: 500 F CFA ea.	580
1,180	- Notebooks: 75 F CFA ea.	427
1,180	- Bic pens: 50 F CFA ea.	285
590	- Brochures: 1,000 F CFA ea.	2,850

SUBTOTAL No. 2.2----------$20,507

2.3 Continuing Education Center Totals

2.3.1 Salaries - $44,021 + $12,826----------$56,847

2.3.2 Materials

Luciole lamps - $2,173 + $966	3,139
Kerosene - $4,685 + $1,368	6,063
Blackboards - $1,956 + $870	2,826
Ardoisine - $652 + $290	942
Erasers - $109 + $48	157
Chalk - $2,125 + $580	2,705
Notebooks - $2,572 + $427	2,999
Bic pens - $1,714 + $285	1,999
Brochures - $13,043 + $2,850	15,923

GRAND TOTAL, CECs (2.3)----------$94,542

3. CPTs (N=10 with 40 trainees ea; total Phase II enrollment - 1,400)

3.1 Instructors' salaries

10 x 319 instructor mos. x 24,000 F CFA/mo.----------$36,521
(315 instructor months x 24,000 ÷ 207)

3.2 Materials

3	- Ditto machines: $250 ea.----------	750
12	- Cartons ditto stencils: $5/carton----------	60
3	- Cases ditto fluid: $30/case----------	90
20	- Limographs: $20/ea.----------	400
5	- Cases mimeo ink: 10,000 F CFA ea.----------	245
4,200	- Notebooks: 75 F CFA ea.----------	1,521
4,200	- Bic pens: 50 F CFA ea.----------	1,014
10	- Cases paper: 10,000 F CFA ea.----------	483
7	- Blackboards with supports: 9,900 F CFA ea.----------	304
20	- Tins ardoisine: 1500 F CFA ea.----------	145
250	- Boxes chalk: 500 F CFA ea.----------	603
42	- Luciole lamps (at 6 lamps/CPT at an estimated cost of 10,000 F/CPT)----------	338
	Kerosene: 10 litres/mo x 315 instruction mos. x 80 F CFA/litre----------	1,217

TOTAL No. 3----------$43,691

GRAND TOTAL LITERACY TRAINING PHASE II----------$157,305

ANNEX O

DESCRIPTION OF PROJECT'S CREDIT FUND AND AGRICULTURAL INPUTS DELIVERY OPERATIONS

Background - Phase I

During Phase I of the project a credit fund account was opened at Caisse Nationale de Credit Agricole (CNCA - National Agricultural Credit Bank). The purpose of this fund was to provide the means to procure the inputs needed to make short and medium term in-kind agricultural input loans to the farmer-members of the cooperatives established by the project. The plan here was that this would be a revolving fund in that the farmers would repay on a cash basis, with interest, their loans and that the proceeds recovered would be returned to the fund for the further procurement of agricultural inputs which could again be used to make loans, - and so forth. This plan was severely frustrated due to the inavailability of the required inputs and the fact that the farmer would only reimburse the credit fund for the un-subsidized portion of the agricultural inputs loaned. Given that this portion represents only 40-50% of the actual purchase price of the inputs it was clear that the fund would rapidly be depleted. Also the acute input shortage was primarily due to the lack of available subsidy funds, i.e. the amount of inputs procured depends directly upon the amount of subsidy funds available. A primary focus of Phase II will be on overcoming these constraints by ensuring that inputs are available in a timely fashion and that the GON provides the required subsidy funds.

In view of the difficulties described above the creation of the credit fund was delayed until February 7, 1979 (13 months after the project began). At this time an initial amount of $168,612.00 was deposited. The authorized ceiling for the account was $350,000 but for reasons mentioned above the project did not deposit any additional funds into the account. Also an additional $70,000 (approx.) was deposited on May 2, 1979, into this same account for the on-farm fattening program. Again due to the problems cited above no withdrawals were made from the credit fund until Spring 1980. This late start means that none of the repayments on the agricultural input loans made are yet due. Consequently, it is still to early to fully judge the Phase I credit fund experience. The two tables which follow provide further information on Phase I credit fund transactions.

Although the above description of the Phase I credit experience may not sufficiently justify the expansion of this fund under Phase II, project management and GON officials are convinced that once the supply and subsidy limitations are overcome that the fund will serve its purpose as originally planned. The experience of the more advanced, other donor financed regional projects in Niger supports this conclusion.

Certainly, in terms of promoting the adoption of technical packages which will raise crop yields there are few alternatives to establishing a farmer credit and input supply system. Consequently, the Phase II design is obliged to provide for the expansion of this fund and for measures which will ensure its efficient and effective operation. A detailed description of how this fund will operate and related policy considerations follows.

PHASE II Credit Fund Operations

General Planning System

The operation of the Phase II credit fund will require that the Union Nigerien de Cooperative et Credit (UNCC), the CNCA and project management collaborate closely together to ensure that the project's credit/input delivery targets are achieved as scheduled. This collaboration will mean creating a particularly close working relationship between the UNCC's Centrale d'Approvisionnement (CA: this is the National Input Supply and Distribution Center) and project management. The focus of this collaborative effort will be on adherence to planning schedules which allow sufficient lead time to acquire the needed financial resources and to distribute in a timely, reliable fashion requested inputs to the farmer. Phase I experience indicates that the general planning schedule presented on the following page would be appropriate.

The Credit Request Process

The credit process begins when the farmer submits to his local cooperative a completed CNCA loan request form. Normally, the farmer is assisted with the completion of this form by the cooperative officials and the local UNCC field agent. Additional assistance will be provided during Phase II by the staff of the young farmer couple training centers (CPT's). Once the farmer's loan request is approved by his cooperative (this approval means that the cooperative accepts final repayment responsibility for the loan) the loan request is then forwarded to the district UNCC chief who in turn, after verifying and grouping the requests, sends them out to the departmental office of the UNCC. At this point a designated departmental official of the UNCC will work with the project's credit-

BASIC ANNUAL PLANNING CALENDAR FOR INPUT PROCUREMENT AND DISTRIBUTION

Procurement:

January: Establishment of input quotas for participating cooperatives for the following year.

February: Decision on what new quantities of the different inputs need to be ordered and how orders will be placed. Annual inventory of current stocks at national, district and cooperative level.

March: Verification of funding and subsidy availability. Placement of final orders.

July -

September: Receive delivery of materials fabricated in Niger.

October -

January: Receive fertilizer and other materials ordered from U.S. and elsewhere.

Distribution:

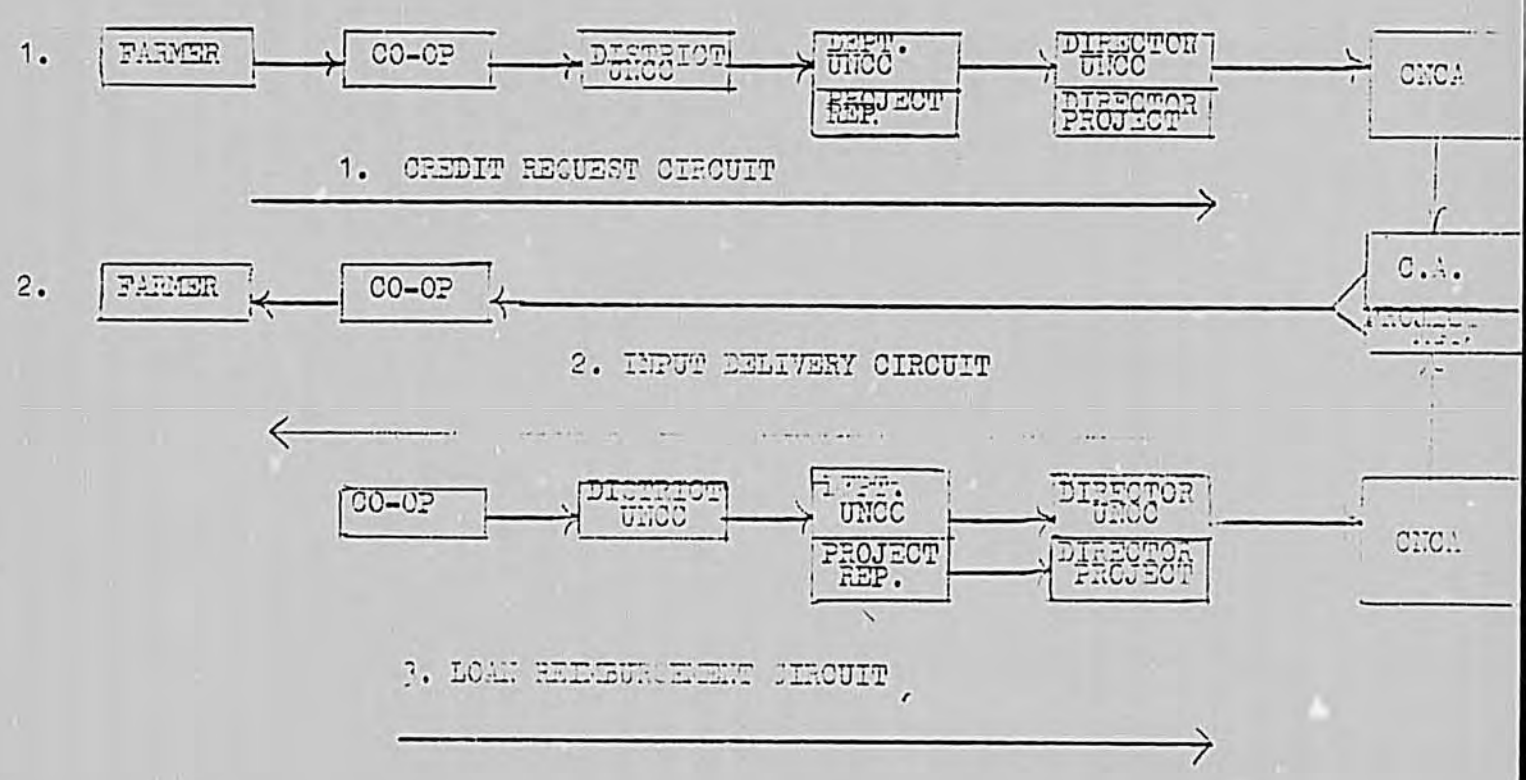
February -

April: Distribution of inputs to cooperative warehouses according to pre-established quotas.

N.B. The execution of the calendar will require monthly meetings of UNCC, CFCC, CA and project management representatives.

input supply unit chief to re-verify the accuracy of the loan requests, and, after obtaining the signed approvals of their respective directors, they will forward the loan requests to the CNCA for final approval. If at any point in this process any problems with a loan request are uncovered, it is returned to the forwarder with a written statement explaining the reasons for its return. The CNCA reviews the request, notifies the project of its approval or disapproval and advises the CA of its action. The approved request will be discussed at the next regular meeting (at least once a month) of CA and project officials. At this meeting a decision will be made as to what input stocks will be used to satisfy the loan request. If the inputs come from CA stocks, the CNCA will be invoiced for their subsidized cost. If they come from project procured stocks, the CNCA will be advised to register the inputs loaned as a receivable.

The credit request process described above is graphically presented in line 1 below. The remaining parts of the process: input delivery circuit, and the loan reimbursement circuit are also presented below as line 2 and 3. Each of these lines of activity should not take more than one month to complet Lines 2 and 3 are described below.



INPUT DELIVERY CIRCUIT

During Phase II it is planned that for at least the first three years of the project that all inputs will be purchased with new project funds or from remaining Phase I project credit funds. During this period input stocks and the credit fund will be built up and the CA's management structure and delivery system will be sufficiently strengthened to permit the UNCC and CA to eventually take over the interim role played by the project. Thus, beginning in late 1983 or early 1984 the UNCC and its C.A. will independently begin to fulfill its responsibilities by taking over those tasks previously performed jointly with the project. This will mean that at this time all reference to the project will be erased from the above scheme. Of special significance here is the important role the Mission's Agricultural Production Support (683-0291) project will have in preparing the UNCC and the CA so that they can efficiently and effectively carry out their assigned responsibilities for input procurement and distribution for all of Niger.

Immediately after the meeting where the CA/and project management decide from which stocks the loan request will be satisfied the inputs requested will be delivered to the farmer's cooperative warehouse from district and/or departmental level warehouse, or, if already on stock at the cooperative, a notice will be sent to the cooperative through the UNCC field agent authorizing delivery to the farmer. Thus the transport of all inputs to the cooperative level will be the responsibility of the project and the C.A. The agricultural service will also provide transport assistance when needed. The farmer is responsible for taking delivery of his/her inputs at his/her cooperative warehouse and transporting them to their final destination. The farmer will normally have access to a donkey or oxen cart to effect this transport.

When the farmer receives the input he/she signs for their reception and receives a copy of his/her approved loan request. An important function of cooperative officials will be to clearly explain to the farmer the terms and condition of the loan so that there will be no misunderstandings when loan repayments begin falling due. Also, in view of the time it will take to deliver the inputs, cooperative leaders will be responsible for making sure that members wishing to procure inputs submit their loan requests as far ahead of the time they need them as is possible.

Credit Repayment Circuit

When a loan payment becomes due for a member it is the responsibility of the cooperative to make payment. Normally, this will require that cooperative officials collect sufficiently in advance from the member the amount due to permit timely payment to the UNCC's local field agent and/or district chief. If payment is not received on time it is the responsibility of the UNCC officials to make every effort to collect the payment.

If the UNCC is unable to collect the payment, it will transmit a report explaining the situation to the UNCC headquarters and the project management unit in Niamey who will discuss the report and send it on to the CNCA with their comments. The CNCA will make the final decision as to what kind of final collection action should be taken.

When a loan repayment is collected it is forwarded along the usual channels, as depicted in the above scheme, for deposit into the project's credit fund account at the CNCA. The project, and eventually the C.A., can then continue to draw upon this account to make further input purchases.

Project Strategy

The project strategy hinges on the following principales :

1) The adoption of long range, advance planning which allows for sufficient lead time to acquire and distribute inputs;

2) The timely deposit of sufficient GON subsidy funds;

3) The maintenance of reserve input stocks;

4) The limiting of the number of loans accepted to those which can be reliably satisfied; and

5) The eventual turnover of the responsibility for satisfying the demands for inputs in the project zone to the UNCC and its Centrale d'Approvisionnement.

The planning calendar presented on page 8A lays out the basic pattern of activity which is required to ensure the successful application of principale one above. It will be the responsibility of project management to ensure that this calendar is adopted and correctly followed by all the parties concerned. It is possible that the adoption of the calendar will require initial funding for 2 or more years of operation.

The annual deposit of GON subsidy funds is covered by one of the covenants to the project. Under the covenant the GON agrees to finance all subsidy on agricultural inputs procured for the project. The exact subsidy amount required will be established by May 31 of each year by project management and payment by the GON into the project's CNCA farm inputs credit fund will be required by November 30 of each year. These deadlines are designed to mesh with the GON's annual budget cycle.

During Phase I the project financed the construction of 16 cooperative warehouses.

Construction of 12 new warehouses is planned for Phase II and supplementary funding has been requested for 20 additional warehouses. During Phase II the project will make every effort to maintain a sufficient quantity of input stocks in each of these warehouses. These stocks should be sufficient to cover all loan requests originating from any given cooperative. The level at which inputs stocks should be maintained at any given cooperative will require an annual decision by the project, UNCC and the CA. Once the level for a given year is decided the cooperative will be advised of their input "quota" and thus will know its loan request ceiling for that year. Given that the current development stage in Niger does not permit the provision of inputs to all farmers, the application of a quota system is the only acceptable way of proceeding at this time.

This quota system will require that the cooperative official apply certain criteria when selecting those farmer members whose loan requests will be processed. These criteria will be developed to give priority first to those farmers trained at the young farmer couple training centers(CPT's) and, secondly, to those farmers who have received training under the project's extension program. In all cases those farmers selected must be able to demonstrate a knowledge of the correct use of farm inputs and possess sufficient land upon which to apply the inputs requested. It will be the job of the UNCC, Agriculture Service and CPT extension staff to verify in their follow-up programs whether or not the farmers selected meet the established criteria.

As mentioned previously, the major purpose of the Agricultural Support Project (683-0311), which is currently being planned at the same time as this project, will be to increase the capacity of the UNCC and it's Centrale d'Approvisionnement. It is expected that through the efforts of this national project that the CA will eventually be able to handle reliably all the procurement and distribution of project inputs. Therefore this project is designed to assure a constant collaboration between project management and the CA during the early years of the project (1981-83) with the amount of responsibility given the CA being gradually increased according to the growth rate of the CA's capacity. It is planned that this gradual turnover of responsibility will be completed in 1983 or 84. At that time the UNCC will take over the role the project played in the procurement and distribution of inputs and in the management of the project created credit fund.

Project Credit/Input Procurement Fund

The amount deposited during Phase I in the project's credit fund will be increased during Phase II to permit the project to provide the agricultural inputs required by the targeted number of farmers. Thus during Phase II it is planned that the total AID contribution will be increased from [illegible],000 to approximately [illegible],193,300. The AID contribution will not be a direct cash deposit but will be derived from the farmer's repayment for inputs procured with AID funds. Thus the AID contribution to the credit fund will be primarily composed as follows:

[illegible],600 tons of fertilizer - [illegible],620,000

Animal traction equipment - $763,300

Pesticides - $340,000

Miscellaneous: grinding mills, women's program, on farm fattening etc. $400,000

Total: $3,123,300

(N.B. This does not include commodities left over from Phase I).

These amounts will be spread over the 5-year life of project as follows:

($000)

ITEM	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
Fertilizer	80,0	240, 0	440,0	860,0	-	1,620,0
An Trac Equipment	127.1	179.4	192.9	264.0	-	763.3
Pesticides	62.1	64.1	66.1	72.1	75.6	340.0
Misc.	56.0	100.0	100.0	64,0	-	400.0
TOTAL	325.2	683.5	795.9	1,260,1	75.6	3,123.3

All of the AID financed fertilizer will be imported from U.S. and all the animal traction equipment will procured at local Nigerian, state supported factories.

The GON contribution to the credit fund will consist of the procurement of animal traction equipment (approx. $150,000) and the direct deposit of the funds required to cover the subsidized portion of the inputs delivered to the farmers. This portion will be equal to the difference between the cost of the inputs delivered to the farmer and the amount that the farmer is required to repay. The exact amount of the subsidy on any given input item depends upon the GON policy in effect at the time the loan is made. During Phase II it is estimated that the annual funding amounts required for subsidies will be as follows :

($000)

FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
110.0	40[illegible].0	656.0	1,249.5	-	2,417.5

(Above includes subsidies for inputs still on stock at end of Phase I).

The above is based on current estimates of the subsidized and unsubsidized cost of the different inputs. The current estimates for individual inputs are presented below :

(U.S. Dollars)

Subsidized Items	Actual Cost (CIF Niamey)	Transfer Price To Farmer	Difference	% of Subsidy
Fertilizer				
Urea	0.52/Kilo	0.17/Kilo	0.35/Kilo	67.3
STP	0.48/Kilo	0.14/Kilo	0.34/Kilo	70.8
Donkey Hoe	73.80/Hoe	38.10/Hoe	35.70/Hoe	48.3
" Cart	238.10/Cart	133.33/Cart	104.77/Hoe	44.0
O Harness	98.76/Unit	38.10/Unit	60.66/Unit	61.3
" Cart	397.14/Cart	214.29/Cart	1[illegible].85/Cart	40.0
			Average Subsidy	[illegible]

The covenant section of the project paper includes a clause requiring the annual deposits of subsidies. Additional covenant clauses require that the GON keep all receipts from project zone farmer's cash purchases, down payments, repayments and any interest earned on project funds in the project's CNCA credit fund. Also a covenant requiring the GON to pay any shortfall in funds due to non-payment by farmers and/or to input price changes resulting directly from GON policy decisions into the project's credit fund.

Of course, the farmer will also contribute to the credit fund through his/her repayments which under current CNCA regulations will be charged a 10.0% interest rate.

CNCA

The project's credit fund is established within the regular framework of CNCA operations. Only the cooperatives that are organized under the auspices of the project and its members will be eligible to receive loans from this credit fund. The eligibility of cooperative loan applications will be certified through the loan request process discussed above. Besides meeting these eligibility criteria the loan applicant must accept the CNCA's standard terms and conditions.

The CNCA's terms and conditions vary according to the kind and amount of the loan which is being requested. The kinds of loans the CNCA makes to cooperatives and its members and their terms are basically as follows :

PURPOSE OF LOAN	Maximum Repayment Period	Maximum Amounts Loaned
1. Purchase of Ag. Inputs (fertilizer, seeds, insecticides, etc.) for the planting/growing season.	9 months	25% of the value of the proceeding year's harvest - but no more than 90% of the purchase price of the inputs requested.
2. Purchase of cattle for fattening	9 months	90% of the value of 4 animals plus their feed.
3. Grain storage until optimum marketing time	6 to 12 months	60 to 75% of the value of the grain to be stored
4. Purchase of farm equipment of a life span of less than 2 years	24 months	90% of the purchased price
5. Purchase of animal traction units	4 years	"

Purpose of Loan	Maximum Repayment Period	Maximum Amounts Loaned
6. Purchase of mechanized farm equipment	4 years	"
7. Purchase of equipment for fishing and black-Smithing.	2 to 5 Yrs.	"
8. Purchase of livestock	"	"
9. Purchase of building materials/equipment	2 to 10 yrs.	80% of the value of the buildings/equipment

The current annual interest rate for all of the above types of loans is 10.0%. Repayment plans vary according to the individual case but are normally arranged on a monthly or quarterly installment basis after a certain grace period or at a stipiulated time such as when a sale of the animal or crop products for which the money borrowed was used to produce. In all cases it is stipulated that the entire cooperative has the collective responsibility for repaying loans obtained by its members. If at any time the repayment deliquency rate reaches 10% on the total number of loans made to any given cooperative, the CNCA will stop making any further loans to this cooperative until this rate falls below 10%. These rules are largely responsible for the average 88% repayment rate on small former loans that the CNCA has recorded over the last three years.

Phase I experience with the CNCA is satisfactory. Also the other regional projects report satisfaction with their CNCA credit fund experiences. Each of these projects is being financed by a different donor: EEC, IBRD, CIDA, France and Germany. All these projects have a credit fund at the CNCA like the one this project proposes to have in its Phase III.

The success of these credit funds has been largely due to the efficient funding operation and stability of the CNCA which was established in 1966 by the Niger government. The GON continues to date to guarantee the CNCA's solvency through its National Development Bank (Banque de Développement de la République du Niger (BDRN) and the Niamey branch of the Central Bank of West Africa (B.C.E.A.O.). The overall CNCA operation is controlled by a board of directors which includes most of Niger's ministers, the director of the B.C.E.A.O. and the director of the UNCC. An annual operations report is required of the CNCA. This report is reviewed and approved by Niger's highest governmental body, the council of Ministers. This council is presided over by Niger's president.

UNCC

The Union Nigerienne de Credit et Cooperative (UNCC) is a para-statal agency which was created in 1962 to promote the cooperative movement in Niger. It's stated objectives are :

1) to develop the practice of cooperation and cooperative credit among the rural population of Niger;

2) to exercise an administrative, technical and financial control over the organization and administration of rural credit and cooperative units: and

3) to grant short and medium term loans.

In 1967 the credit section was separated from the UNCC and put under the authority of the newly created CNCA.

In the field the primary activity of the UNCC are :

1) assistance with the creation of new-cooperatives and support of old ones;

2) training of cooperative leaders;

3) the marketing of cooperative produce;

4) the proceesing of credit requests and distribution of inputs requested; and

5) the collection of cooperative loan repayments.

The UNCC involvement in the credit function of the cooperatives is on the behalf of the CNCA since the CNCA does not have any field agents and as offices in only four of Niger's seven departments.

The UNCC has a hierarchial administrative structure to facilitate its geographic decentralization and to establish linkages between its headquarters in Niamey and village cooperative groups. At present the UNCC has departmental offices in all of Niger's departments.

The UNCC's transportation and storage infrastructures are important in the GON's effort to increase food production in Niger. The UNCC's role in this effort become more important in 1974 when the GON created within the UNCC the Centrale d'Approvisionnement (CA) to procure and distribute agricultural inputs. However, the CA lacks an adecuate administrative structure and a sufficient warehouse and transportation capacity of its own to distribute inputs. As mentioned earlier in this paper it will be the purpose of the Agricultural Production Project (683-0231) to assist the CA with overcoming these shortcomings.

CONCLUSION:

The credit demand in the project zone and the rest of Niger is currently very high. The CNCA notes in its most recent annual report that small farmer credit demand for short term loans increased by 270% in 1976, another 20% in 1977 and by another 88% in 1978. This rapid increase in credit demand has created a situation where it is becoming increasingly difficult for Niger to satisfy and administrate all the credit requests received. These current deficiencies are the major reasons why Niger has requested that the donors of its different regional development projects provide the CNCA with initial credit fund allotments and the UNCC with administrative and logistical support. Therefore if the NDD project is not able to follow the example set by the older and more experienced regional projects by providing credit funds and support with inputs procurement and distribution, it is very likely that the CNCA will not be able to meet the credit demands of the cooperatives organized by the project. Consequently, it follows that, if the NDD project is not able to establish the credit fund and input delivery system as described above, that it will not be able to accomplish the major objectives of this project.

ANNEX F

NIAMEY DEPARTMENT DEVELOPMENT - (683-0205)

PERFORMANCE DURING PHASE I (1978-80)

	PROGRAM	EOP OUTPUT TARGET AS PER PP LOGRAME	OUTPUT MAGNITUDE AS OF 12/12/80
I.	Agricultural service strengthened	1. 3 arrond. office complexes built	1. 1 house, 3 offices and 3 warehouses completed
		2. 3 arrond. training centers built	2. 3 classrooms 4 houses and 2 wells completed
		3. 42 ag. auxil. field agents trained	3. 40 aide-encadreurs trained and working
		4. 90 farm couples trained in improved practices	4. i. 84 young farmers trained at CFJA ii. 100 farm couples trained at CPT's iii. 1,710 peasents given some training
		5. 1,125 demonstrations carried out	5. 1,440 ha of demonstration fields in 201 villages
		6. School gardens formed in 3 arrond.	6. 46 gardens established and School Garden books published
		7. Collection of agric. statisties	7. Baseline data collected in all project villages
II.	UNCC Co-operative services developed	1. 3 arrond. office complexes built	1. 3 offices, 3 houses and 3 warehouses
		2. 42 coop meeting centers constructed	2. 27 completed
		3. Coop level monitors trained and funct.	3. 40 aide-encadreurs trained
		4. 10 grinding mills tested and evaluated	4. 10 installed
		5. 4 tapioc/cassava flour mills tested and evaluated	5. None purchased and none installed
		6. 252 coop leaders trained and evaluated	6. 246 coop. leaders trained
		7. 2,100 village leaders trained	7. 1,005 trained
		8. Coop marketing & credit system developed	8. i. 41 coop associations formed ii. 201 villages coops formed
		9. Training of blacksmiths	9. 28 trained
III.	Farmer literacy program	1. 3 arrond. offices built	1. 3 constructed
		2. 84 literacy instructors trained & functioning	2. 142 trained
		3. 3,100 villagers receiving literacy training	3. 2,500 Reached

(Continued Target and Magnitude P. 2)

IV.	Village infor & Radio programs developed	1. 42 radio club monitors trained and functioning	1. a. 29 radio clubs formed b. 13 radio clubs programs performed c. 29 animators trained
V.	Livestock service program developed	1. Cottage poultry program tested, demonstrated and evaluated 2. Maradi Goat program tested, demonstrated and evaluated 3. On-farm cattle feeding tested, demonstrated and evaluated 4. Project area animal health program functioning	1. a. Training of 66 farmers in the use of improved chickens b. Creation of 66 village chicken coops 2. Distributed 360 goats 3. 260 cattle fattenned 4. Over 1 million CFA spent on animal medicines in 1978 no support required after this.
VI.	Village level land-use program	1. 42 field agents trained 2. Land-use and soil conservation plans developed in 425 villages 3. Initial implementation begun in 50 villages 4. Tree nurseries establ. in 15 cantons 5. Experimental fish ponds constructed and evaluated 6. None	1. 20 prospectors trained 2. Prospectors given special training by consultants but no plans developed. 3. 182,000 trees planted in 13 village woodlots and windbreaks 4. 3 nurseries established and wells completed 5. 2 ponds stocked. 6. 3 arrond. offices and houses constructed
VII.	Trial irrigation schemens	1. 6 minor irrigation schemenes installed and evaluated	1. Several proposals considered, but no activity,
VIII.	Studies Program	1. Baseline data 2. Studies in nutrition etc...completed	1. Ag. Statistics collected in all proj. villages 2. Almost all studies completed (see list of studies below)

(Continued Target Magnitude P. 3)

IX.	Comprehensive area dev. program created	1. PP discussed no target levels	1. Phase II (1981-85) planning preparations and documents completed
X.	Program management unit established with COTEDEP	1. PP does not set target levels	1. Unit consisting of 15 people is well established and functioning efficiently 2. Quarterly, annual reports and plans, Trip reports, Financial Reports and the minutes of important meetings are routinely issued 3. All commodities ordered and delivered on time

List of Major Studies and Papers Completed during Phase I

1. Feasibility of Animal Traction in the Project Zone
2. Study of the Traditional Land Tenure System
3. Socio-Economic Survey of the Project Zone
4. Evaluation of Agricultural Demonstrations - (1978)
5. Report on the the Project's Training Program
6. Survey of On-farm Grain Storage
7. Report on Project's Credit Fund
8. Report on Project's Soil Conservation Component
9. Basic Analysis of Average Farm in the Project Zone
10. Study of Rural Markets
11. Aerial Photography and Land-use Maps
12. Nutritional Survey
13. Analysis of Agricultural Inputs Problems and Related Subsidy Issues
14. Economic Analysis of Basic Agricultural Innovation Package
15. Information Collected on Roads and Water Needs in the Project Zone.
16. Evaluation of Village Grinding Mills
17. Economic Analysis of Project Components
18. Evaluation of Project and Farmer fields (1980)

ANNEX Q.

DESCRIPTION OF IMPROVED AGRICULTURAL PRACTICES FOR PRODUCTION OF MILLET AND COWPEAS TO BE EXTENDED BY NIAMEY DEPARTMENT DEVELOPMENT PROJECT

PHASE II

I. Basic Practices for Millet

1. Improved Varieties

   Millet = CIVT (Possible use of HPK in northern parts of project zone).

2. Selected Seed

3. Treated Seed

4. Soil Preparation

   Dry hoeing immediately prior to rainy season

5. Seeding Dates

   Millet = At first rain of at least 10 mm or plant dry after June 15.

6. Optimum Spacing/Plant Density (Use of marking device)

   Millet = 1 metre X 1 metre (Thinned to maximum of three plant/pocket for a density of 10,000 plants/ha).

7. Cultivation

   1st - 8-10 days after seeding

   2nd - 10-15 days after first cultivation

   3rd - 10-15 " " second "

8. Thinning

   Thin to three plants per hill approximately twenty one days after first rains

9. Fertilization

   - Manure or Compost: six tons to the hectare (when available) spread prior to dry hoeing;
   - Phosphorous: 15 units of P_2O_5 applied in the form of 34 kilos of triple super phosphate broadcast before dry hoeing
   - Nitrogen: 22.5 units in two split applications of 25 kilos each of urea banded around the hills at the time of second and third weedings.

10. Rotation

- Depending on land availability and farmer needs, 1:1 or 1:2 millet cowpeas rotation.

II. Optional Fertilization Practices

- Phosphorous:

  "One time" corrective application of 65-75 Units of P_2O_5/ha applied in the forms of 150 kilos/ha of triple super phosphate or 300-400 kilos of raw Tahoua Phosphate;

- Nitrogen:

  For higher rainfall areas (above 500 mm) increased use of nitrogen of up to 45 Units of N applied as described above.

III. Optional Animal Traction Package

A. Donkey Traction

- Donkey
- Donkey hoe
- Donkey cart
- Donkey collar

B. Oxen

- Pair of oxen
- Five shank cultivator
- Plow
- Cart and tire repair accessories
- Yoke and Chain

C. Seeders.

IV. Basic Techniques for Cowpeas

1. Improved Variety: TN 8863
2. Selected Seed
3. Treated Seed (Fungicide/Insectide)
4. Soil Preparation

   Dry hoeing

   Hoeing at planting
5. Seeding Dates

   Second rain of at least 10 mm
6. Optimum Spacing/Plant density (use of marking device)

   30 cm x 60 cm (maximum 3 seeds/pocket for a density of 55,000 plants/ha).
7. Cultivation

   1st - 15 days after seeding

   2nd - three weeks after first
8. Fertilization

   15 units of P_2O_5 applied in the form of 34 kg/ha triple super phosphate broadcast at the time of dry hoeing or immediately prior to planting.
9. Rotation with millet (1 - 10)
10. Pest Control:

    - Treatment against insects as needed following pest control service guide lines.

V. Optional on Farm Storage of Cowpeas

- Storage in jute sacks (100 kilo) with plastic liners treat with one tablet of phostoxin per sack and seal tightly.

Annex R

Procurement of Construction Services

Past experience has shown that local Nigerien construction firms have a reasonable capacity for constructing the types of structures that this Project will finance. It is proposed that local firms be used to construct these facilities in order to expand this indigenous capacity. This is a reasonable proposal both in terms of development objectives for Niger and because this is a small construction activity for which the U.S. and other Code 941 countries will have little or no interest. The selection of local Nigerien contractors will be performed in accordance with standard local competative practices.

683-0240

VOLUME III

UNCLASSIFIED

PROJECT PAPER

ENVIRONMENTAL ANNEX

NIGER

NIAMEY DEPARTMENT

DEVELOPMENT PROJECT

PHASE II

683-0240

USAID/NIGER

AGENCY FOR INTERNATIONAL DEVELOPMENT

UNCLASSIFIED

ANNEX A

INITIAL ENVIRONMENTAL EXAMINATION

Project Country: NIGER

Project Title: Niamey Department Development - Phase II (683-0240)

Funding: $11,300,000 (FY 81 - FY 85)

Life of Project: 5 years beginning in FY 1981 through FY 1985

IEE Prepared by: Mark Wentling, Project Officer/USAID/Niger

Environmental Action Recommended: a) An Environmental Assessment of Pesticide Usage by the project.

b) Negative Determination of all other project activities.

Concurrence: _____ DATE: 26 May 1980

Jay P. Johnson
Mission Director
USAID/Niger

BUREAU ENVIRONMENTAL OFFICER'S DECISION:

James Hester, AFR/DR/SDP Approved James S. Hester

Disapproved _____

Date 11 February 81

Clearance:
GC/AFR:EDragon _____

I. - Description of Project:

This project is the second phase of a long range program of rural development in the Department of Niamey, a region which was severely affected by the 1968-74 Sahel drought. It is one of seven departemental rural development projects initiated by the GON since 1974. The project is designed to continue the pursuit of the development activities initiated during Phase I. Major emphasis will be given to institutionalizing at the village level organizations capable of obtaining and providing on a timely basis the agricultural inputs and credit required to increase crop production.

This concentration on crop production will involve the continued reinforcement of: the 41 village cooperative associations (201 villages) created under Phase I and the creation of 17 new associations (99 villages); the agricultural extension services and the young farmer couple training centers; the National Cooperative Service (UNCC) network and its farm implement production centers (DARMA); and the National Agricultural Bank (CNCA). Also the project components aimed at an integrated development program which were initiated during Phase I will be continued and new efforts will be undertaken to extend them more efficiently and effectively to a greater number of people. These components include the following activities: soil conservation/tree planting; facilitating the vaccination of farm livestock; on-farm fattening programs; literacy classes; radio clubs; grinding mills; and school gardens. All these activities will involve the retraining of existing village agents and the training and equipping of many new village agents. This will include the training of village blacksmiths, coop managers and leaders, farmer demonstrators and farm couples leadership training.

Project implementation will continue to be coordinated by the management unit created under Phase I. This management unit coordinates project activities with the existing GON service agencies and is under the authority of the Prefet of the Department of Niamey. All major planning and budget documents must be approved by the Niamey Department's Development Committee (COTEDEP) which is composed of representatives of all the GON departmental agencies, the district development committees (COTEARS) and important traditional Chiefs. The Ministry of Rural Development has direct responsibility for this project and the Ministry of Plan monitors project progress and the project's financial operations.

II. - Examination of Nature, Scope and Magnitude of Environmental Impacts:

(In terms of items on the attached Impact Identifiection and Evaluation Form)

A. Land Use

It can reasonably be expected that some significant positive effects on soil fertility will occur in those fields where farmers have adopted the improved agricultural production package being promoted by the project. These effects will primarily be due to the application of super triple phosphate (STP) and urea fertilizers. The current annual recommended application rates of these essential components of the project's improved production package are as follows: Millet - 34 kgs STP per hectare and 50 kgs urea per hectare; cowpease - 34 kgs STP per hectare.

A major objective of the project is to have the improved agricultural production package used by at least ten percent of the farms in the project zone by the final year of project implementation (1985). If 10% of the farms adopt the recommended practices by the end of this project, approximately 1200 tons of urea and 1224 tons of STP would be applied on 36,000 hectares at the above mentioned application rates in 1985. The estimated area receiving the recommended application of fertilizers represents less than 2% of the total arable land of the project zone.

After serious consideration of the following five factors, it was concluded that the above described fertilizer application rates will not have detrimental environmental effects.

1) The limited extent and low rate of planned fertilizer application;

2) The positive impact this fertilizer application will have on soil fertility in the project zone and thus increase crop production;

3) The rapid absorption of fertilizer into the predominately sandy soils of the project zone.

4) The small quantity of rainfall which percolates into Niger's subsoil; and,

5) The absence of major bodies of water in the project zone into which fertilizers would wash. (The project zone is defined as excluding the channel of the River Niger and an area of 5 kilometers extending on either side of the channel).

Soil fertility will also be enhanced by the reduction of soil erosion in those areas where the project will carry out is soil conservation activities. These activities include primarily the planting of village tree lots, and protective windbreak belts. It is estimated that 300,000 trees will be planted during the five year phase of this project.

B. Water Quality

There will not be any significant alteration or periodicity of flow storage, location or quality of water.

C. Atmospheric

There will not be any significant changes in air quality.

D. Natural Resources

There will not be any significant changes to either the rates of use or the stocks of non-renewable natural resources. For reasons mentioned under A above, this project will contribute to increasing the standing mass of vegetation through improved crop production practices and soil conservation activities.

E. Cultural

This project will not result in any significant alterations of physical symbols or dilutions of cultural traditions. It is expected that such project activities as local language literacy instruction could have the positive effect of maintaining interest in cultural traditions.

F. Socio-Economic

The goal of the project is to raise rural incomes and to improve rural standards of living. The achievement of this goal will certainly lead to improvements in the socio-economic conditions of the population. It is expected that these improvements will have the positive effect of reducing the number of people who migrate out of the zone each year in search of employment.

G. Health

The health of the population will be enhanced by the improvements in nutrition which will result from increased food supply levels.

H. General

The project will not create changes which may become national or international controversies.

I. The Possible Impact from the Use of Pesticides in the Project Zone.

1. Pesticide Use in the Project Zone

The use of pesticides in Niger is the responsibility of the National Plant Protection Office (Office National de Protection Vegetale). This office is under the direction of the Ministry of Rural Development's Agricultural Service. It receives considerable technical and financial assistance from Canada and from West Germany. This office is responsible for the supervision of the use of pesticides used in Niger, monitoring the effect of pesticide use and assisting the GCN with the development of an integrated crop pest management program. The AID supported CILSS integrated pest management project is assisting this office develop such a pest management program.

A major function of the National Plant Protection Office is to control serious insect attacks which threaten to cause heavy losses of food crops. When an insect attack occurs, this office mobilizes resources available to eliminate or reduce the crop damage caused by the invading pest. In localized attacks, portable sprayers or dusters are used to combat the infestation; in the case of larger more generalized attacks aerial application is employed.

Crop protection activities of this nature usually take place at the request of the district or departmental officials, acting on information provided by extension agents, village chiefs or concerned farmers. Given the urgent nature of these attacks and that the lines of communications are within the Agriculture Service, the NDD project does not become involved in the treatment of such attacks. Although no AID funds are used to purchase pesticides in support of this crop protection activity, funds from the Nigerien contribution to the project will be employed occasionally to finance the cost of pesticide use.

In addition to the use of pesticides for controlling serious insect attacks, the majority of farmers in the project zone routinely protect seeds with fungicide applications. THIORAL is the most commonly used fungicide with the usual application rate being about 25 grams per 10-15 kilograms of seed. The Nigerien Agriculture Service reports that it sold approximately 250.000 - 25 gram packets of THIORAL (6.3 metric tons) in the Niamey Department in 1977. THIORAL is also available on the local market for about 15 cents per 25 gram packet and it is thought that the actual use rate is considerably higher than reflected in the Agricultural Services' report of direct sales to farmers. Use in the project zone (about half of the Niamey Department is estimated in 1977 to be at about 125,000 packets or slightly above 3 metric tons. Such a utilization rate would indicate about 8-9 grams applied per cultivated hectare in the project zone.

Lastly cowpea production has been rapidly increasing in general for Niger and also within the project zone. Cowpeas tend to be more susceptable to insect infestation both while growing and when harvested

than either millet or sorghum. Cowpeas are usually treated with LINDANE or FENITHROTION as a growing crop and with PHOSTOXIN for post harvest storage. Farmers in order to realize benefits from growing cowpeas will most likely increase purchases of pesticides for application on crops. UNCC and others involved in the marketing and storage of cowpeas will also need to increase use of pesticides to safeguard the crop in storage.

2. Description of Estimated Pesticide Use Directly Within the Framework of the Project.

a) Farm Couple Training Centers (CPTs)

During Phase I three CPTs were created and the establishment of seven more such centers is planned during this second phase project. Each of these centers is located on a forty hectare tract of land. The GON contribution to the project will finance through and under the supervision and direction of National Plant Protection Office, the stocking of certain quantities of pesticides and the procurement of portable sprayers, dusters and protection safety equipment for these ten centers. The stocks of pesticides will be used to treat insect attacks on the center's fields, for seed protection and to train participating farmers in the proper use and application of these pesticides. For the five year life of the project, it is estimated that the maintenance of such stocks will probably mean at the very most the procurement of the following quantities of insecticides:

- FENITHROTION (simethyl triophosphate, also known as sumithion or folithion) 400 liters;

Cancelled. → - HCH (25% BHC powder) 12 tons;

- THIORAL (thiram plus heptachlor) 300 kilograms.

Both HCH and THIORAL are inexpensive and readily available to the farmer on the open market.

FENITHROTION is applied by a portable, motorized backpack type sprayer on growing millet and cowpeas in the case of serious insect attacks at the rate of one quarter liter per hectare. In the case of millet, this provides protection primarily for a complex of grasshopper pests and for cowpease provides protection from a complex of stem borers and aphids. Risks to the user are minimized by wearing of a respirator, rubber gloves, boots and aprons. All users will have completed training courses given by the National Plant Protection Office.

In addition to FENITHROTION, HCH is also used on standing millet for the control of grasshoppers at the rate of 1-10 kilograms per hectare. Application will be through the use of gasoline powered, backcarried dusters. Users will be provided with all the requisite equipment and trained as in the case of the use of FENITHROTION.

THIORAL will be used as a dye-marked fungicide to protect seeds at the rate of 25 grams per ten kilograms of seed. Application is by shaking seed and fungicide together in a sack. This procedure is an essential part of the technical package to be promoted by the project.

Treatment of insect attacks in millet is unpredictable. Little treatment has been required during the last two crop years. It is thought that this is due largely to the widespread aerial spraying which Niger undertook in 1978. Crop research has indicated that for cowpeas, one or two treatments per crop cycle is required to avoid substantial crop losses.

The selection of the above insecticides is based on several years experience by the National Plant Protection Office. It considers these pesticides very efficient and that their usage is almost obligatory if food self-sufficiency in Niger is to be realized. Their use to date indicates no significant environmental impact and no significant effects are anticipated on non-target species. It was noted during Phase I of the project that the greatest hazard of the use of these pesticides was to the applicator. This observation prompted the project to purchase protective equipment and materials for use by the Agriculture Service personnel. Providing such equipoment and training in pesticide application will be a standard practice of the second phase of the Niamey Department Development project.

b) Extension Program

Part of the GON contribution to the project will finance the same three pesticides noted above under the project's farmer credit program. Again these pesticides will be acquired through the National Plant Protection Office. Only farmers who have received training in the use of these pesticides will be eligible for pesticide loans. Such loans will only be made to those farmers whose local cooperative has the proper application equipment.

The targeted number of farmers to benefit directly from the Phase II project is 6,000. It is estimated that the maximum amounts of pesticides to be financed by the GON contributed credit fund over the five year life of project are as follows:

FENITHROTION - 8,300 liters to treat approximately 33,500 hectares of cowpeas

BHC HCH - 200 tons on an estimated 17000 hectares of millet

THIORAL - 2.5 tons treating sufficient seed to plant 67,000 hectares of millet and 33,500 hectares of cowpeas.

3. USEPA Registration Status and Toxiciological Hazards

a. Fenithrotion: The National Plant Protection Office reports that this pesticide has a very low toxicity level and that the acute oral LD level is 500 milligrams per kilogram. It is believed that this pesticide is currently registered without restriction by USEPA.

BHC

b. HCH (wettable25% BHC powder active ingredients: hexachlorecyclohexane) BHC was registered for seed treatment on sorghum (same or similar use as millet) but has received voluntary cancellation of reregistration on all crops based on oncoginicity, fetotoxicity and reproductive effects in mice and rats. Acute oral toxicity is dependent on the amounts of various isomers present. Most are with low acute toxicity but some with high chronic toxicity. Current USEPA status indicates that a notice of rebuttable presumption against registration (RPAR) has to be issued.

cancelled for arthropods

c. Thioral (Thiram plus heptachlor): Thiram is registered for use on sorghum and millet. On the basis of teratogenicity this material has been accepted for intensive scientific review under the rebuttable presumption against registration or continued registration (RPAR) program. The acute oral toxicity of this material to mammals is in the 385-865 mg/kg range, placing it in a moderate to low classification of acute toxicity.

Heptachlor is registered for use as seed treatment on sorghum (same or similar use as millet). Registration on sorghum will be effectively cancelled or denied on July 1, 1983. Nature of intent to cancel is based on oncogenicity and reduction in non-target species.

4. Evaluation and Recommendation for Each of the Three Pesticides

a. Fenithrotion: In view of the USEPA registration status for this pesticide, the low rate of its application and the application precautions and controls taken, the use of the pesticide is recommended.

b. HCH (BHC): BHC has been used extensively in Niger and many other parts of Africa with no indication of adverse environmental impact. It is a pesticide with which most Nigerien farmers are familiar. It is used on products which are not immediately intended for consumption. The application rates of 1-10 kg per hectare on immature plants is relatively low. In view of the difficulties in assessing the chronic toxicity of technical grade BHC the greatest risk will be to the applicators. Given that the project plans to overcome this risk by the use of protective clothing, the controls placed on this product by the National Plant Protection Office and the above, it is recommended that this pesticide be used but in view of the USEPA regulatory status of BHC, it is also recommended that research be undertaken to find alternative pesticides.

c. Thioral (Thiram plus heptachlor): This material is used in extremely low dosages. It is used on products not intended for consumption. Its use to date indicates no significant environmental impact and no significant effects are anticipated against non-target species. Thus it is apparent that the only potential risk is to the applicator. This risk is greatly reduced by the use of proper seed treatment methods. Given the above and the current unrestricted registration status of thiram and heptachlor it is recommended that their use be continued. However, with respect to the pre-RPAR status of thiram and the effective cancellation of heptachlor in 1983, it is also recommended that research be encouraged to find alternative materials for seed treatment. ?

References:

1. "Discussion of Import of Pesticide Usage in the Niger Cereals Project", George A. Schaefers, PhD, NYS Agricultural Experimental Station, Geneva, NY 14456, August 4,1978.

2. "Report on Mission to USAID/Niger", by Dr. Rale G. Bottrell, UC/AID Pest Management and Related Environmental Protection Project, October 7, 1979.

3. Agriculturel Sector Assessment, "Plant Protection - The Use of Pesticides", Section C, pps. 25-30, USAID/Niger, January 1980.

III. Recommended Environmental Action

It is estimated that the elimination of pesticide use in the project zone would reduce production by at least 25% (other estimates are as high as 50%). Such a decrease would be devastating to the nutrional well being of the inhabitants of the project zone.

It is clear that the GON must continue using pesticides at least in the short term future, to avoid such devastating consequences. It is also clear that the GON is continuing attempts to reduce potential hazards of the pestcide use as evidenced by its acceptance of Canadian and German assistance to the National Plant Protection Office (which decides GON pesticide policy), GON participation in the CILSS Integrated Pest Management Project, and its support of the USAID-Canadian financed OPG, Tapis Vert (an experimental project which focuses on increasing production without the use of chemical additives).

Thus it is recommended that:

a. A Negative determination be made for this project for all project activities except the financing and the use of pesticides.

b. Given the pesticides currently being used in Niger, the probability of their continued use over the next three to five years and their USEPA registration status, it is recommended that an environmental assessment be made.

It is suggested that this Environmental Assessment be carried out at the same time as the PP design to insure that the project includes the appropriate actions and funding to minimize user hazards and any possible detrimental environment effect identified during the course of the Environmental Assessment.

Given the nature of the other project activities it is recommended that the Environmental Assessment be limited to the issue of pesticides.

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. . . . . .N

d. Changing soil character. . . . . .L+

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. L

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. . . . . .

LEGEND

N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

ANNEX B

Pesticide Section of the

INITIAL ENVIRONMENTAL EXAMINATION

Project Country: Niger

Project Title: Niamey Department Development Project II (683-0240)

Funding: FY(s) 1981-85 $ 13,582,000

Period of Project: 5 years beginning in FY 1981 through FY 1985

IEE Prepared by: Dr. Patricia Matteson

Environmental Action Recommended:

It is recommended that a negative determination be made and no further environmental action is required.

Concurrence:

Jay P. Johnson
Director
USAID/Niger

Date: 19 Dec 1980

BUREAU ENVIRONMENTAL OFFICER'S DECISION:
James Hester, AFR/DR/SDP

APPROVED

DISAPPROVED

DATE

Clearance:
GC/AFR:EDragon

Pesticide Section of the
Initial Environmental Examination

(Niamey Department Development Project, Phase II, Project No. 683-0240)

As indicated on the attached Impact Identification and Evaluation Form this Project will have few impacts upon the natural environment except for those which are invariably associated with programs designed to increase food crop production. This increased food production can be expected to contribute to the nutritional status and longevity of the population which in turn will result in net increases in the total populations. Since the GON's strategy for food self-sufficiency is predicated on gains in productivity of presently cropped land there will be little or no land clearing associated with this project. Soil fertility, water-holding capacity and levels of soil organic matter are low over much of the project area, and decreasing soil productivity is a recognized problem. Fertilizer use is coupled with closer spacing of plants, and causes increased weed growth. Increased plant cover means that less rainfall percolates away uncaptured by the vegetation and that wind and water erosion are minimized; more organic matter will be returned to the soil, improving its composition and fertility. Thus fertilizer use can help halt the processes of soil degradation. The relatively low level of use of agricultural pesticides envisaged for this project will have relatively little effect on the chemical composition of the ground and surface water and its ecological balance, and upon chemicals in the atmosphere. Since the core of the program is the extension to the farmer of a package of improved agricultural practices for growing millet and cowpeas with the necessary inputs plus credit to purchase them, their adoption will slightly dilute cultural traditions for growing crops and change economic/employment patterns with resultant changes in population and associated cultural patterns.

Planned Pesticide Use

As indicated above, certain pesticides are required for immediate use in the project for the protection of cowpeas, sorghum, millet and peanuts. These include thiram, diazinon, and malathion.

1. USEPA regulatory status of the required pesticides thiram, diazinon and malathion are all registered by the USEPA for the same or similar uses without restriction.

2. Basis for selection of the required pesticides:

a. Thiram (Arasan 50-Red) is to be used as a protective fungicide for the treatment of seeds of millet, sorghum, cowpeas and peanuts. Although thioral (a mixture of thiram and heptachlor) was originally requested by the Nigerien Agricultural Service for use in this project, virtually all U.S. registered uses of heptachlor have either been cancelled or are being phased out by EPA. Furthermore, the effectiveness of thiram (the active ingredient of Arasan) has been compared with thioral (thiram-and-heptachlor) and other seed treatment chemicals by INRAN, the Nigerien National Agricultural Research Institute, and resulted in the following ranking of the four most effective seed treatments:

1. TMTD (Thiram)
2. Orgeatrix (carboxin/maneb/lindane)
3. Cuprosan SD (copper/maneb/zineb)
4. Thioral (thiram + heptachlor)

Accordingly, thiram (Arasan 50-Red) has been selected for use in this project.

b. Diazinon was selected for use, primarily on millet, because it is the least toxic insecticide that is effective against the entire spectrum of millet pests and because it is already being bought and used in the Nigerien national plant protection program. At a cost of approximately 1000 CFA/ha., it is one of the cheaper alternatives.

c. Malathion was selected for use on all NDD II crops because it is relatively nontoxic to humans. It is effective against a broad spectrum of pests, and it has already been used in the context of the Niger government's national plant protection program.

3. The extent to which the proposed pesticide uses are part of an integrated pest management program:

At present, not enough research has been done to institute an effective IPM program for any Nigerien crop. Economic criteria for pest control have not been established; the real value of natural enemies is not known; there has been no effort to seek ecologically selective pesticides; and there is no organized systematic pest population monitoring system for any crop. A major obstacle slowing progress with IPM in Niger is the lack of properly-trained crop protection specialists. NDD II will incorporate as much IPM practice as possible under present circumstances. In the research component which has been designed into the project, these pesticides as well as others will be evaluated and compared economically and minimum effective dosages determined. Traditional nonchemical pest control methods will be evaluated and incorporated into extension recommendations. In this context the other pesticides to be evaluated for possible future use in the project are exempt from the provisions of Rule 16, The Environmental Procedures (see Para 216.3(b)(2)(iii), AID Handbook 3, APP 4B). The procedures to be followed in conducting these evaluations are extensively discussed in other documents entitled "Detailed Study of Pesticides to be Routinely Used and/or Field Evaluated for Possible Use", "Suggested Guidelines for IPM - Oriented extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides." Pest resistant crop varieties will be used when they become available; at present, no significant degree of resistance to the major pests has been bred into cowpeas, millet and sorghum.

Cultural practices that discourage pest infestations will be recommended to farmers as part of the extension package. When economic injury level information and pest population monitoring methods are developed by INRAN, IITA, ICRISAT, or the planned FAO/CILSS Sahel IPM Project, NDD II will use these techniques to plan crop protection activities. Except for cowpeas, crops will presently be treated with insecticide only when pest infestations occur.

4. The proposed method or methods of application, including availability of appropriate application and safety equipment.

Applications will be made by project personnel or by farmers who have received NDD II credit buy pesticides. Both of these groups will have had instruction in the safe use of pesticides. The materials will be applied at the rates and intervals prescribed on the manufacturer's labels.

Field pesticides will be applied with hand-pump or "Fontan" knapsack sprayers or manual dusters, depending on the insecticide formulation used and the target pest species. ULV sprayers may be considered for adoption at some future date. Sprayers will be stored at farmer cooperatives and for each sprayer, two sets of safety apparel (goggles, masks, filters, aprons, gloves, boots) will be available.

NDD II project managers will enforce, among project personnel and farmer cooperators, the use of essential protective apparel, proper storage and of pesticides and maintenance of application and safety equipment, and proper disposal of used pesticide containers and left-over pesticides. Project personnel will ensure that instructions and precautions, including statements regarding the time of re-entry into the field after pesticide application and the number of days between application and crop harvest, as specified on the product label, are enforced.

5. Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazards:

All pesticides are potentially hazardous to humans and the environment and should be treated with great caution regardless of their relative toxicity.

The pesticides required for use in NDD II - Arasan, diazinon and malathion - are used widely in the USA by farmers, homeowners, gardeners, livestock owners, and others and can be purchased and applied without restriction. Each is relatively acutely nontoxic to warmblooded animals, based on its acute oral toxicity value (LD50), and is considered to be relatively safe for use by humans if used according to the label instructions.

None of the chemicals chosen is the subject of present or foreseen USEPA regulatory action.

Diazinon and malathion are toxic to cold-blooded animals in general, and thus represent a danger to bees, other beneficial insects, and fish. High dosages may harm wild birds, livestock and game and (in the case of diazinon) may have phytotoxic effect.

All of these potential hazards can be minimized by adopting appropriate safety procedures and dosages and by applying the pesticides selectively and judiciously, based on actual need. Millet and sorghum are wind-pollinated and cowpeas and peanuts largely self-pollinated, so the proposed use patterns present little threat to bees and other pollinators and to successful setting of seed. No bush will be sprayed, and wildlife is sparse in farmed areas, so the potential impact on game is small. Permanent bodies of water are extremely few and the project area does not adjoin the Niger River (Niger's only year-around stream), so these pesticides will not contact aquatic ecosystems to any significant degree.

6. The effectiveness of the required pesticides for the proposed uses:

See para 2 above. The pesticides have been previously tested and/or used in Niger, and additional specific details concerning their recognized range of effectiveness were drawn from U.S. data where pests and cropping situations are similar to those in the project area. The pesticides will be applied according to instructions on their manufacturers' labels. Therefore, it is assumed that their use will adequately control pests unless pesticide-resistant strains are present in Nigerien pest populations. No such resistant strains have been reported thus far.

7. Compatibility of the required pesticides with target and nontarget ecosystems:

See para 5 above.

8. The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology and soils: See Project Area Description.

9. The availabililty and effectiveness of other pesticides or nonchemical control methods:

See paras 2 and 3 above, and separate documents "Plant Protection in Niger, with Special Reference to Niamey Department and NND II Project Design," and "Suggested Guidelines for IPM - Oriented Extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides."

10. The requesting country's ability to regulate or control the distribution, storage, use and disposal of the required pesticides.

See separate document. "Plant Protection in Niger, with Special Reference to Niamey Department and NDD II Project Design."

11. The provisions made for training of users and applicators:

All NDD II pesticide use will be supervised by the project agronomist and a staff or consultant entomologist. Enhanced supervision and training components have been designed into Phase II of this project, with a view, among other goals, to ensure the safe, judicious use of pesticides.

These senior staff will familiarize themselves with the appropriate safety measures for project pesticide use, and proper application procedures, and make sure that these guidelines are observed by staff and carefully extended to farmers. CPT extension staff will have attended yearly plant protection short courses given to Niamey Department/Agricultural Service staff by the Plant Protection Section. The farmer-training curriculum at CPTs will emphasize the proper use of pesticides and correct spraying techniques, including potential hazards and precautions to minimize these hazards. Stress will be laid on the proper use of safety apparel and devices and also proper procedures for disposing of used pesticide containers and leftover pesticides. It is the responsibility of project staff to see that this part of the curriculum is carefully and effectively communicated for farmers, and that any subsequent observed misuse of

pesticides be corrected.

Only farmers who have received such training at CPTs will be eligible to receive pesticide purchase credit and access to project-supplied pesticides.

12. The provisions made for monitoring the use and effectiveness of the pesticides:

An applied research component has been designed into Phase II of the NDD expressly to test the cost-effectiveness of the various components of the recommended package of improved agricultural practices, including pesticide use(s). This is fully discussed in the Project Paper and in separate documents entitled "Detailed Study of Pesticides to be Routinely Used and on Field Evaluation for Possible Use." "Suggested Guidelines for IPM - Oriented Extension Recommendations, Pesticides Safety Precautions, Equipment and Training, and UNDD II Testing of Pesticides."

Pesticides used by farmer graduates of CPTs will be observed by project extension agents during routine visits, and monitored closely as one aspect of the evaluation of the effectiveness of the project's training/extension component. A heavy emphasis on such evaluation has been designed into Phase II of the NDD. Misuse of pesticides will be noted and corrected. Senior staff will, in turn, make sure that CPT staff and extension agents are competent with reference to pesticide use, and that the proper procedures are followed by them.

V. SUMMARY AND CONCLUSION

Most impacts of project activities have been identified as significantly beneficial over the long-term. The project promises to increase agricultural production by small farmers within the project area. Potential benefits should outweight the potential negative impacts on the human environment.

IMPACT IDENTIFICATION AND EVALUATION

Impact Areas and Sub-areas

A. LAND USE

1. Changing the character of the land through:

   a. Increasing the population _____ L

   b. Extracting natural resources _____ N

   c. Land clearing _____ L

   d. Changing soil character _____ M

2. Altering natural defenses _____ N

3. Foreclosing important uses _____ N

4. Jeopardizing man or his works _____ N

5. Other factors _____ N

B. WATER QUALITY

1. Physical state of water _____ N

2. Chemical and biological states _____ L

3. Ecological balance _____ L

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

C. ATMOSPHERIC

1. Air additives _____ L
2. Air pollution _____ N
3. Noise pollution _____ N
4. Other factors _____ N

D. NATURAL RESOURCES

1. Diversion, altered use of water _____ N
2. Irreversible, inefficient commitments _____ N
3. Other factors _____ N

E. CULTURAL

1. Altering physical symbols _____ N
2. Dilution of cultural traditions _____ L
3. Other factors _____ N

F. SOCIOECONOMIC

1. Changes in economic/employment patterns _____ L
2. Changes in population _____ L
3. Changes in cultural patterns _____ L
4. Other factors _____ N

G. HEALTH

1. Changing a natural environment _____ N
2. Eliminating an ecosystem element _____ N
3. Other factors _____ N

H. GENERAL

1. International impacts _____ N
2. Controversial impacts _____ N

H. GENERAL (cont'd)

3. Larger program impacts _____ N _____

4. Other factors _____ N _____

ANNEX C

Niamey Department Development Project

Phase II (NDD II)

USAID/Niger Project 683-0240

NIGER

Detailed Study of Pesticides to be Routinely Used

and/or Field Evaluated for Use

I. INTRODUCTION

A. Description of the Project

The 1981-1985 Niamey Department Development Project, Phase II (NDD II) (683-0240 in the AID system), is an integrated rural development project in four arrondissements of Niamey Department, Niger. As stated in the NDD II Logical Framework (September 1980), its purpose is to institutionalize a process of rural development through the establishment of self-managed village organizations and participating individual cultivators capable of achieving increased food production on a self-sustaining basis. The long-term goal is to contribute toward food self-sufficiency in Niger.

The NDD II will support local cooperatives and the Nigerien government rural services such as literacy, health and nutrition, marketing, delivery and distribution of inputs, and extension, with appropriate emphasis on the role of women. The core of the program is the extension to the farmer of a package of improved agricultural practices for growing millet and cowpea with the necessary inputs plus credit to purchase them. These improved agricultural practices, identified by INRAN, Niger's national agricultural research institute, include: rotation of high-yielding varieties of millet and cowpea; the use of a fungicide seed treatment; appropriate spacing of stands, weeding and thinning; the application of chemical fertilizer (urea and triple-phosphate);

two treatments of cowpeas with insecticide; animal traction on farms of appropriate size; and on-farm cattle fattening. This package of improved practices will be taught to farmers and their wifes at ten Farm-Couple Training Centers (CPTs) in the Project Zone. At the end of Phase II, the NDD will have trained 600 cultivators and the spread effect of this technology and the improved government services in and around their home villages will directly affect an estimated 6000 people who plant approximately 12,000 ha. of cowpea and millet in Niamey Department.

The projected increase in annual millet production of at least 9,000 tons and cowpea production by more than 4,400 tons would have a value of approximately $2,300,000 annually and would reduce the chronic cereals deficit in the project zone by approximately 30 per cent.

Further details on NDD II may be found in the "Abbreviated Project Identification Document (PID) for Niamey Department Development Project Phase II (683-0240)," 1980.

B. Reason for the Initial Environmental Examination

Amended Regulation 16 of the Code of Federal Regulations, Part 216, Environmental Procedures (effective date June 28, 1976, as amended May 3, 1978), provides guidelines for preparation of an Initial Environmental Examination of the reasonably foreseeable effects of a proposed action of an AID project on the human

environment. The function of the IEE is to provide the basis for a threshold Decision as to whether an Environmental Assessment or an Environmental Impact Statement will be required.

The IEE has been prepared based upon material contained in this Special Study and has been incorporated into the NDD II Project.

II. THE ENVIRONMENTAL SETTING

A. Location, Size and Topography

A landlocked country, the Republic of Niger is the largest state in West Africa, with an area of 489,190 mi.^{2} It is 2/3 desert. Most of that area is uninhabitable. The remainder is savanna, suitable mainly for livestock raising and limited agriculture. In the north-central region is the volcanic Air Massif, attaining heights of up to 5,900 ft. Massifs along the Libyan border average about 2,600 ft. The Niger River flows for 300 mi. along the southwest border. A portion of Lake Chad is situated in the eastern part of the country (it is also bordered by Chad, Cameroon, and Nigeria).

B. Climate

Every year from April to July, a warm, wet tropical weather front gradually moves inland N-NE to Niger from the West African coast. It starts to recede again in August and is replaced by a front of cool dust-laden air that blows off of the Sahara and covers Niger during the dry season. On the average, rainfall in the Air Massif is limited to 7 inches annually, and most of this comes during a single two-month period. In the south, rainfall averages 22 inches annually, varying from about 9 inches at Zinder to 30 inches at Niamey;

the rainy season is from June through September, with most rain in July and August. From November to February, the weather is dry and cool. The temperature ranges from 29.4°C (85°F) during the dry season to 40.5°C (105°F) during the humid season. Niger is one of the hottest countries in the world, particularly in the north, where the intense heat often causes the rain to evaporate before it hits the ground.

C. Soils

Nigeri soil resources are rather poor, and deteriorating. Most soils are 85-90% sand. These are young or dunal soils, still evolving from sedimentary rocks. They are characterized by medium to high acidity, low organic matter content, and little capacity to retain water and soluble fertilizer (low cation exchange capacity). They are highly susceptible to wind and water erosion. Millet, cowpea, and peanuts can grow on them.

A second soil type is the isohumic or fadam soil of inter-dunal depressions, basins, and along temporary watercourses. These are richer in clay and humus, finer-textured, hold water better, and are more fertile. Crops with high water and nutrient requirements, such as corn, sorghum, and sugar cane, are grown in these areas.

There is also a significant amount of land featuring a heavy indurated latertic crust. The hardened layer may be at or near the surface, or covered by a sandy layer of variable depth. If this crust is continuous and at or near the surface, the soil is of no value for agriculture.

D. Fauna, Flora and Desertification

As in much of West Africa, Nigerien wildlife represents only a remnant of former populations. Hunting and habitat destruction have virtually eradicated game from populated areas. Large game remain in Niger's one national park, Parc W, around Tillabery (north of Niamey), and in and around the Air Massif. The latter area still shelters large populations of antelope, among them two endangered species, the scimitar-horned onyx and the addax. Other endangered species (as of 1975) included the African wild dog, the slender-horned gazelle, the African slender snouted crocodile, and the Nile crocodile. More common are other species of antelope, lion, water buffalo, giraffe, leopard, hyena, monkey, warthog, and a rich bird, reptile, amphibian and insect fauna.

Three ecological zones, corresponding to annual rainfall belts, cover Niger: the Sudano-Sahelian Zone, with 500-550 mm of rainfall; the Sahelian, with 200-500 mm; and the Saharan, with 200 mm or less. The northern desert has vegetation only after rare rainfalls. The savanna includes a vast variety of herbaceous vegetation, with such useful trees as bastard mahagony, kapok, baobab, and the shea-nut. Forested domain is only about 437 sq. mi (1,150 km^2), or less than 1% of the land surface. The trees planted are mostly teak and eucalyptus. (Round wood production was estimated at 2.4 million $meters^3$ in 1973.)

The mixed forest and grassland that once predominated over the southern section of Niger is gradually disappearing because of

increasingly common overexploitation of natural resources. The expansion and intensification of cultivation at the northern agricultural limits, combined with overgrazing, result in widespread, progressive desertification. In some areas, the time in bush fallow has been greatly reduced or even eliminated as a result of the need to grow more food crops. Many soils unsuited for cultivation because of slope, erosion conditions, shallow soil, or frequently inadequate rainfall, are planted and then deteriorate. The edge of the Sahara has been steadily moving southward, characterized by a lack of vegetation, severely eroded areas, exposed rock, surface accumulations of salt, and active sand dunes.

E. Hydrology and Irrigation

The Niger River is Niger's only permanent stream. Dry-season crops and those with a higher water and nutrient requirement can be planted along the river and by ponds, some of which are permanent. At present, about 26,000 ha., largely in small plots, are irrigated by traditional methods. Some 5,000 ha., mainly in the Niger and Komadougou valleys, are under managed irrigation. Potential increase in irrigated area is confined to about 15,000 ha., predicated on construction of a dam at Kandaji which won't be functional until 1990 or later. There are small oases in the north, most in the Air Massif.

F. Population

The 1980 population of Niger is estimated at 5,272,000, and is mostly in the south, below the 350 mm isohyet. In the southeast,

population density is about 15/km^2; in the river areas it is 60-70/km^2. In 1972, Niamey, the capital, had approximately 85,000 inhabitants. The towns of Zinder, Maradi, and Tahoua also have populations over 20,000. More than 92% of the population is rural; 47% of the population is under 15 years of age.

Agriculture is the main income source for 85-90% of Nigeriens, and the source of employment for 98%. Structural shifts in the population due to a high birth rate and outmigration from rural areas will decrease the percent of people in agriculture relative to the total, and will put pressure on the productivity of the rural sector. The annual growth rate of the total population is 2.7%, but that of the agricultural population is only 1.8%. Where one person fed 2.5 people in 1970, one will have to feed three in 1990.

G. The Agricultural Sector

Only 30 million (24%) of Niger's 126.7 million hectares are agriculturally "useful." The rest is unsuitable because of a harsh climate with annual rainfall below 350 mm, high temperatures and rapid evaporation, or rock outcrops, shallow soil, steep slopes, excessive erosion, or shifting sands. The "useful" area lies largely south of the 350 mm isohyet and extends in a band some 1,500 km long and 200-250 km wide (between 13-15° latitude) from the border with Upper Volta and Mali, in the SW corner of the country, to the Chadian border on the east. Within this zone lie about 15 million arable ha. Recognizing the drought hazard and the increasing conflict

DOCUMENT

between sedentary farmers and nomads in search of pasture, the government established a northern limit of crop production ("Limit Nord de Cultures") in 1954 which roughly coincided with the 350 mm isohyet. It was revised in 1961 due to northward pressure by cultivators. In recent years, population pressure requiring additional land for food crops has pushed the cultivation "limit" to the 300 mm isohyet in most places, and even further around Tanout. In some areas, the concept is largely ignored. Studies in Zinder Department show 192 km^2 presently under cultivation north of the limit.

A notable exception to the general demographic pressure on land resources is in the Say Arrondissement. Due to the presence of tsetse fly and onchocerciasis in the region, population densities have remained comparatively low. The WHO program to control the vector of the disease (blackfly) now makes the area more amenable to exploitation. Say is in a relatively high rainfall zone and has much better soils than many other areas in Niger. Estimates of exploitable farmland are in or above the 1/2 million ha. range. Therefore, Say has the potential of adding over 1/4 million tons to the nation's cereal production.

Agriculture is based on millet and cowpea for local consumption and cowpea, peanuts, and cotton for export. The typical agricultural unit is the small family farm (most commonly, in Niamey Dept., 2-3 ha) using traditional agricultural techniques. Few tractors and little animal traction or fertilizer are in use, no soil conservation measures are taken, and farmers themselves use few pesticides.

Thioral, a thiram-and-heptachlor seed treatment, is widely applied. Otherwise, plant protection is effected by a rigorous, heavily-financed government program geared to terrestrial and aerial insecticide application whenever infestations are reported (see Annex to Project Paper "Plant Protection in Niger, with Special Reference to Niamey Department and NDD II Project Design").

Livestock raising accounts for about 10% of the GNP, and until the Sahelian drought the figure was 20% and animal numbers were increasing by 3% per year. From 1970 to 1974, however, the herds were decimated, and meat and milk production (though not hides!) declined accordingly. Numbers of livestock have risen again, and account for 18% of exports, though denial of access to traditional migration corridors and shrinking rangeland present an increasing constraint: less fallow land means less grazing land and fodder.

In the face of drought and periodic food shortages, cash crop production has declined in favor of food crops--with the exception of cowpeas, which can play both roles. The most significant change in Niger's agricultural sector in the last 10 years has been the decline in volume and value of peanut exports. Introduced in 1944, by 1967 production was 298,000 tons and shelled peanuts, peanut cakes, and peanut oil brought in 70% of export earnings. By 1973, production dropped to 100,000 tons. Cotton was introduced in 1956 to reduce Niger's export dependence on peanuts. Prior to the drought years, production was approximately 6,000 tons annually. It has shown a steady decline since 1975, but the government hopes that

increased irrigated area will reverse this trend. Cowpea production has been increasing since 1966, with areas cultivated up 50% and yield up threefold. In 1975 the value of cowpea exports surpassed that of cotton, and in 1976 they accounted for 8% of foreign exchange earnings. Nigeria is the major market for Nigerien cowpeas and livestock. This trend has declined in recent years due to increased home consumption.

Forty-Five to Fifty percent of cropland is planted to mono-cropped cereals (millet, sorghum, corn), and 45% to cereals inter-cropped with cowpeas or peanuts. Production of millet, the staple food of most of the people, depends heavily upon rainfall. Thus, because of the Sahelian drought, production decreased from one million tons in 1969 to 648,000 tons in 1973. Similarly, sorghum production (342,000 tons in 1969) was down to 129,000 tons in 1973, and rice production (40,000 tons in 1970) was down to 22,000 tons. National grain stocks had virtually disappeared in 1975, but since then there has been a fluctuating, but upward, trend in the total quantity of food grains produced, which presently is marginally higher than pre-drought levels. The 1980 crop will be excellent. In 1979, a 3-month grain supply was on hand (300,000 tons, at 250 kg per capita), mostly in the form of on-farm reserves.

Bad weather, especially low or inconsistent rainfall, could lead to massive food shortages, especially in urban and nomadic zones. Cereal production has exceeded consumption in only 11 of the 19 years since 1970. The increase in food production that has been

necessary to meet population growth has probably been met largely by expanding acreages. 4.5 - 6 million ha. are currently cropped, and this will have grown to approximately 8 million ha by 1990. As area cropped expands, more marginal land is cropped and increased areas in zones of lower and less reliable rainfall are exploited. Fallow is shortened, fewer animals can be kept, and fertility declines. Productivity (kg/ha. yields) appears to have fallen steadily during the past two decades. This further exacerbates the pressure to expand acreage. Provided rainfall is consistent, expanding acreage cropped should be able to maintain adequate cereals production to meet food needs through 1990. Unless productivity can be increased, regular food shortages can be expected thereafter. If the current situation remains unchanged, a deficit amounting to 40% of production will develop by 2000. To maintain self-sufficiency, productivity per ha. must rise by 2%/year; a rise of 3.1%/year will be necessary if Niger is also to have a minimal marketable surplus.

The Government of Niger's strategy for food self-sufficiency over the next two decades is predicated on gains in productivity of presently cropped land. These are to be achieved through a series of geographically specific "Productivity Projects," such as NDD II, aimed at modernizing the farm sector. They are centered around the use of improved cereal varieties, modern cropping practices, chemical fertilizers, insecticides and animal traction, and the eventual attainment of a livestock/cropping integration. Government service improvements in farm input and credit distribution, marketing, and

extension are envisioned as part of such projects. Indeed, greater efficiency in these service areas are vital to their success.

References for this section:

1. "Niger Agricultural Sector Assessment." Warren Enger, ed. USAID, 1980.

2. CILSS/USAID Sahel IPM Program document, 1978.

3. Worldmark Encyclopaedia of the Nations.

III. DESCRIPTION AND IMPACT OF ACTIONS ON THE ENVIRONMENT OTHER THAN PESTICIDE USE

A. Fertilizer Use

Demand for and use of fertilizer by Nigerien farmers appears to be increasing. Traditional farmers already are using fertilizer to a limited extent. As described in the Project Paper, a major component of the NDD II is the effort to expand fertilizer use in the project zone. It is hoped that 12,000 ha. will be affected.

1. Potential Beneficial Impacts

No studies on yield response and cost effectiveness have been done for the project zone. Work elsewhere in Niger indicates substantial millet yield increases with fertilizer use as recommended by NDD II. The project recommendations were developed through a 1967-73 series of agronomy trials at INRAN, Tarna/Maradi on sandy dunal soils similar to those of the project zone. 1966-67 multi-locality trials on such soils showed yield increases of 25-89%.[1] In his final report to the INRAN Niger Cereals Project (February, 1980), Research Agronomist and Soil Specialist C. B. Brown states that improved agricultural techniques coupled with fertilizer use can more than double yields of cereals in Niger.

Soil fertility, water-holding capacity and levels of soil organic matter are low over much of the project area, and decreasing soil productivity is a recognized problem. Fertilizer use is coupled

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[1] "Synthese des Resultats Experimentaux II" INRAN, MDR. Campgne Agricole 1977.

with closer spacing of plants, and causes increased weed growth. Increased plant cover means that less rainfall percolates away uncaptured by the vegetation, and that wind and water erosion are minimized; more organic matter will be returned to the soil, improving its composition and fertility. Thus fertilizer use can help halt the processes of soil degradation.

2. Potential Negative Impacts

Improper use or prolonged heavy use of fertilizer in a given area may produce a negative impact. Some of the known interactions in the environment are as follows:

- On permeable soils having low organic matter content, excessive application of fertilizer nitrogen may send some nitrate into drainage waters, especially under conditions of high rainfall. Heavy accumulation of nitrates in underground water has occurred in some areas. If excessive, the nitrates in the water may render it unsafe for human consumption; they may harm health.

- Excessive amounts of fertilizers (which are salts) may injure growing plants under certain conditions.

- Fertilizers are known to interfere with some soil microbes. Use of ammonium-containing fertilizers, for example, will suppress bacteria. But the long-term ecological effects of fertilizer applications in various environments are poorly known.

The NDD II-recommended levels of fertilizer use have been tested in Niger and will be carefully extended to farmers with demonstrations of correct practices. Chances of improper use or overuse are thus minimized. These facts coupled with yield increases

and halt to soil degradation attributable to fertilizer use, indicate that the benefits of this project component will far outweigh any possible negative impacts.

B. Construction

NDD II envisions the construction of 7 CPTs (Farm-Couple Training Centers), a number of cooperative centers (small buildings/ warehouses) in the Say Arrondissement, and a project headquarters (office, warehouse, garage) in Niamey.

This construction will entail the clearing of some native vegetation from construction sites, and also disturbance of the soil. The area and amount of native vegetation and agricultural land affected will be small. It should cause no significant environmental impact except on the construction sites themselves.

C. Animal Traction

1. Potential Beneficial Impacts

Niger is short of farm labor at busy times during the growing season (planting, weeding, harvest). Ox-drawn plows can cultivate and weed larger areas while the presence of the oxen help fertilize the soil. This is a step in the desired integration of livestock and field crops into a single farming system. This innovation is useful only on large farms (larger than 6 ha.), which are in the minority in the project area. Thus extension of this technology may only be done at certain CPTs.

2. Potential Negative Impacts

Deep and repeated cultivation of sandy soils contribute to wind and water erosion problems, and ox-drawn ploughs would be more disruptive in this respect than traditional hoeing. In addition, the labor-saving aspects of animal traction will encourage the planting of a greater proportion of a farmer's land in any given season, and less land will be fallow. Both these factors could lead to soil degradation if countermeasures are not taken.

The fertilizer and closely-spaced stands recommended in the project package will help prevent erosion and loss of soil fertility. The recommended millet-cowpea rotation cropping pattern also contributes to soil fertility and lessens the necessity for fallow periods.

In view of these factors, the potential yield increase from an increase in ha. planted per season by one or two people should outweigh any negative impacts of the use of animal traction.

D. Beef Fattening

At present, cattle are given to nomads to herd, and sometimes cover great distances in search of grazing and water. Under these circumstances, they sustain periodic heavy weight losses, take years to reach a marketable size, and their milk and manure are not available to the farmer. A secondary component of project activities will be a program to encourage the on-farm fattening of cattle and the cultivation of cowpea for forage.

1. Potential Beneficial Impacts

Cattle kept on the farm yield milk and manure and reach a slaughter age quickly. This resource would enhance the quality of the diet and the cash income of farmers and improve soil fertility close to their homes.

2. Potential Negative Impacts

Unless enough forage is stored by the farmer, cattle kept on the farm during the dry season represent extra stress on the sparse dry-season vegetation that is not under grazing pressure from nomadic animals at that time of year. Overgrazing or gathering of native vegetation by the farmer during that period might irretrievably damage local flora and contribute to desertification of a marginal area.

Since the project teaches farmers to grow cowpea for forage, potential negative impact on local flora will be minimized. In view of the benefits derived from on-farm fattening, the overall long-term effects of this project component should be favorable.

IV. ENVIRONMENTAL EXAMINATION OF PLANNED PESTICIDE USE

A. NDD II Pesticide Use and Its Economics

NDD II requires pesticides for the following purposes:

1) A fungicide seed treatment for millet and cowpea (incidental use on sorghum and peanut is probable).

2) Two insecticide treatments for monocropped cowpea, the first just before flowering; primarily against thrips, pod borer, pod-sucking bug, flower beetles, and aphids.

3) Occasional insecticide use on millet, sorghum and peanuts when significant pest infestations are seen to exist. The major millet and sorghum pests are stem borers, cecidomyid larvae which mine seeds, grasshoppers, noctuids (especially Rhaguva spp., which mine millet heads near harvest time), scarab and meloid beetles that eat the flowers, sucking bugs and aphids. The major pest of peanuts is Aphis craccivora. (For more detailed information on crop pests, see separate paper, "Crop Pests in Niger.")

Items (1) and (2) are part of the improved agricultural practices package that will be extended to farmers.

No information on the economics of routine fungicide seed treatment is available for the project zone. It is a difficult cost/benefit ratio to assess because the usefulness of fungicide would vary with moisture conditions from year to year. All agricultural research institutes in Niger, Nigeria, and upper volta, use treated seeds for their field trials. The best indication of the usefulness of fungicide in the project zone is the wide acceptance

it has found among farmers. At present, the majority of farmers routinely use Thioral (thiram and heptachlor) at the rate of 25 gm/10 kg of seed. The Nigerien Agriculture Service reports that it sold approximately 250,000 25-gm packets (6.3 metric tons) of Thioral in Niamey Department in 1977. It is also available on the local market for about 15 cents per 25-gm packet and it is thought that the actual use rate is considerably higher than reported in the Agriculture Service's records of direct sales to farmers.[2]

Insect pests are the major consistent constraint on high cowpea yields in West Africa. In the absence of insect protection, farmers harvest an average of 250 kg/ha. Effective crop protection increases yields of monocropped cowpea in the West African savanna by a factor of 4 to 10. The following table contrasts 1978 farmer's field yields obtained from local and improved (VITA 5) cowpea lines with and without flowering and post-flowering insect protection in Funtua, Kaduna State, (northern) Nigeria:[3]

TREATMENT	VARIETY	Yield KG/HA	Yield GM/STAND
1. CONTROL Unsprayed	Local	32.6	2.91
	VITA-5	8.0	0.28
2. Protection after flowering with Permethrin & Endosulfan	Local	480.0	34.78
	VITA-5	2,640.0	80.98
3. Protection after flowering with Endosulfan	Local	880.0	65.67
	VITA-5	1,880.0	81.03

(2) Draft IEE for NDD II, Mark Wentling, May 1980.

(3) IITA Research Highlights, 1979.

In 1979, entomologists with IITA's Upper Volta Cowpea Improvement Program experimented with insect protection at various stages in crop growth. They found that a single application of insecticide at flowering increased yield more (from 785 to 1684 kg/ha.) than a single application at the seedling or post-flowering stage. Of the combinations of any two applications, one at flowering and one post-flowering (similar to NDD II recommendations) gave the best result, though 76 per cent of the combined effect was from the application at flowering:[4]

COWPEA YIELD, kg/ha
with insecticide applications

S_2: at flowering; monocrotophos 40 DAP @ 700 g a.i. ha^{-1}
and endosulfan at 48 DAP @ 1000 g a.i. ha^{-1}

S_3: post flowering; endosulfan at 58 DAP @ 1000 g a.i. ha^{-1}

		S_2 -	S_2 +	Mean
S_3	-	452	1517	984
	+	1119	1851	1485
Mean		786	1684	

[4] Annual Report, 1979.

Cowpea is both a valuable, protein-rich food and an export crop that commands a good price locally and which will have a large export market in Nigeria for the foreseeable future. Given the kind of yield increases cited above, two insecticide applications will almost certainly pay for themselves, even if expensive chemicals are chosen. At present, no economic injury level data is available for the major cowpea pests, and minimum prophylactic insecticide applications are the only viable alternative in the face of consistent heavy damage. Two insecticide applications is a modest and appropriate recommendation. In Nigeria, where pest problems are more severe than in Niger, recommendations are for weekly insecticide applications after flowering (a total of approximately six).

Routine insecticide applications on millet, sorghum, and peanuts are <u>not</u> economic, especially given the low prices and low yields currently obtained by the Nigerien farmer for cereals and the patchiness and variability of insect infestations. It is the opinion of Rene Beique, CIDA plant protection consultant to the government of Niger 1978-80, that treatment of insect pest outbreaks on these crops turns a small profit. No data exists, and the applied research program of NDD II will collect information on the economics and efficacy of insecticides applied when pest infestations of millet become apparent. The project will apply insecticide to millet on CPTs and demonstration fields <u>only</u> under those circumstances.

B. Applied Research

An applied research component with heavy emphasis on pesticides was designed into NDD II for two purposes: 1) economic assessment of the various components of the recommended package of improved agricultural practices. This has not yet been done in the project zone; and 2) testing pesticides economically and for effectiveness and safety (residue levels, applicator exposure, etc.). This must be done before pesticides heretofore new to Niger can be confidently extended to farmers and recommended to the Nigerien government for general use. The data can also be used to justify AID use of some realatively safe, effective pesticides widely used in Niger and elsewhere in West Africa, but which are not currently registered for the same or similar uses in the U.S. by the EPA. It is hoped that the research results will be helpful to AID projects and to national governments throughout the Sahel where the major crops are the same.

Consistent with Regulation 16, Part 216--Environmental Procedures, this will be controlled experimentation involving the procurement and use of pesticides only for research or limited field evaluation purposes by or under the supervision of project personnel. Project personnel will be supplied with toxicological and environmental data necessary to safeguard the health of research personnel and the quality of the local environment in which the pesticides will be used. Finally, treated crops will not be consumed by humans or animals. Experimental produce will be used by the Niger Cereals Project for seed. Under these circumstances no Environmental Assessment of pesticide use is required, regardless of the current

EPA status of the materials in question.

This applied research will be supervised and executed by the project agronomist and his staff, and planned either by a staff entomologist (strongly recommended) or consultant economic entomologist(s).

C. Environmental Examination

Paragraph 216.3 (b)(1)(i) of Environmental Procedures establishes the procedures used here for evaluating the risks and benefits of the planned pesticide use.

1. The USEPA Registration Status of the Requested Pesticides.

Table A below lists pesticides recommended for NDD II, and their current USEPA status. Since all these pesticides have already been tested or used by the Nigerien government, it is hoped that they will be approved for immediate project use.

Table B lists pesticides recommended for testing in the applied research program, and their current EPA status. Specific information and recommendations concerning each are in the next section.

Only pesticides registered by the USEPA for the same or similar uses (without active or proposed regulatory action) are requested for immediate use in NDD II. Pesticides recommended for testing under the restrictions specified above can be used for that purpose regardless of their current USEPA status, and without further risk/benefit analysis than that contained in this IEE. Thus, the current regulatory status of the pesticides proposed for use in the NDD II project does not require the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

TABLE A: PESTICIDES RECOMMENDED FOR IMMEDIATE NDD II USE

PESTICIDE	LD_{50} MG/KG	USEPA STATUS	CROP ON WHICH TO BE USED			
			Cowpea	Sorghum	Millet	Peanut
1. Arasan 50-Red (thiram) fungicide seed treatment; wettable powder formulated for dry treatment of seed.	oral (rat) 780	Registered without Restriction	X	X	X	X
2. Diazinon-wettable powder, oil and emulsifiable solution, granules, or ULV	oral (rat) 300-400; dermal (rabbit) 3600	Registered without restriction	X	X	X	X
3. Malathion-emulsiable concentrate, wettable powder, dust, ULV	oral (rat) 1375; dermal (rabbit) 4100	Registered without restriction	X	X	X	X

TABLE B: PESTICIDES TO BE TESTED IN THE APPLIED RESEARCH PROGRAM

	PESTICIDE	LD_{50} MG/KG	USEPA STATUS	CROPS ON WHICH TO BE USED			
				Cowpea	Sorghum	Millet	Peanut
1.	Orthene (acephate) 75% soluble powder	oral (rat) 866-945	Tolerances & labels now exist for use on dry and succulent beans, soybeans, and cotton.	X	X	X	X
2.	Cypermethrin (ripcord) emulsifiable concentrate, dust, ULV	technical product: oral (rat) 130 dermal (rabbit) 2000 emulsifiable conc. product as marketed oral (rat) 535 dermal (rabbit (1782 ULV formulation as marketed oral (rat) 6487.5	No US registration	X	X	X	X
3.	Fenitrothion emulsifiable concentrate, wettable powder, granules, ULV, dust, 1% oil-based liquid spray	oral (rat) 250-500	Not registered for field crop use (forest insects only); tolerance established on wheat gluten imported from Australia.	X	X	X	X

2. The Basis for Selection of the Requested Pesticides

a) Arasan 50-Red (thiram)

Arasan is registered for use on millet, sorghum, cowpeas, and peanuts; it colors seed red, thus reducing chances that humans will mistakenly consume treated seed; it is formulated for dry treatment of seed, and suitable for use with small quantities of seed--thus it is appropriate for use by Nigerien farmers, who are accustomed to using thioral similarly; it is a wettable powder and may be applied as a suspension--exactly the kind of material required for use in the Niger Cereals Project seed-treating machinery.

Packaging: DuPont's 2-lb. containers are a convenient size for Niger Cereals Project use (Harry Dickherber, personal comment). For extension to farmers, it will be desirable to make this fungicide available in small packets, similar to the 25-gm. packets of thioral (for 10 kg. of seed) that have found wide acceptance. This format is conveniently-sized, inexpensive to the consumer, easy to use, and avoids storage problems. The potential West African market for Arasan packaged thus is huge--most seed treatments currently widely-used and available have been or will be cancelled by the EPA, and USAID (and perhaps other aid donors) will have to adopt a substitute for their agricultural projects and urge its adoption for national plant protection programs.

NOTE: DS/AGR should calculate the exact amount of Arasan to be contained in the small packets. It should be the amount

recommended on the label for 10-12 kg. of millet and cowpea seed. Perhaps 25 gm is correct. Dr. M. J. Lukefahr, the IITA grain legume entomologist, wrote that Arasan 75 at 2 gm/kg of seed is effective as a cowpea seed treatment at Ubadan, Nigeria.

The small packets should be as cheaply produced as possible in order to keep cost to consumers low (all components of the recommended package of improved agricultural practices must pay for themselves without government subsidy). DS/AGR has some Thioral packets as a reference. The packets must be reasonably sturdy and waterproof. DS/AER should investigate the possibility of contracting the packaging to African firms that currently package Thioral and Aldrex seed treatments (Aldrex is produced by Shell, Nigeria). Perhaps this could be arranged with the cooperation of American affiliates of these firms.

Thiram (the active ingredient of Arasan) has been tested against Thioral (the thiram-and-heptachlor compound we wish to replace) by INRAN, the Nigerien national agricultural research institute. In 1976, comparative testing resulted in the following ranking of the four most effective seed treatments:[5]

1° - TMTD (thiram)
2° - Orgeatrix (carboxin/maneb/lindane)
3° - Cuprosan SD (copper/maneb/zineb)
4° - Thioral (thiram and heptachlor)

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[5] Synthèse des Résultats Expérimentaux. INRAN, MDR, Campagne Agricole 1977.

A 1977 study contrasting the average germination of millet and sorghum ten days after planting showed thiram-treated seed with better germination than seed treated with Thioral:

GERMINATION

		P_3 Kolo Millet	CIVT Millet	L.30 Sorghum	a4d4 Sorghum
TMTD (thiram)	150g	6	7	4	6
	200g	6	8	4	6
	250g	6	7	3	6
	300g	7	8	3	6
Thioral	150g	6	6	3	6
	200g	6	7	3	6
	250g	5	8	3	7
	300g	5	6	3	7

(It is not known whether the data reported here show a statistically significant superiority of thiram over Thioral.) Finally, 1977 yields from thiram-and Thioral-treated plots of P_3 Kolo and CIVT millet were comparable.[5]

In view of this favorable Nigerien data, it is hoped that the Nigerien Agricultural Service will accept Arasan 50-Red for immediate NDD II use as a substitute for thioral.

There are two other possible substitutes for thioral that are presently without active or proposed EPA regulatory action: carboxin (Vitavax) and chloroneb (Demosan). The EPA

is currently evaluating data concerning these compounds, and developing a regulatory position with reference to them. They are less acutely toxic than thiram: oral LD_{50} values (rat) are >11,000 mg/kg for chloroneb and 3820 mg/kg for carboxin. Label and packaging information are unavailable to the author at the time of writing, and DS/AGR should inquire whether either is currently available in a small-packet format. Both are used on cowpea at IITA, Ibadan, Nigeria. Arasan (thiram) was chosen in preference to them because it is satisfactory in every respect as a substitute for thioral, it has been tested in Niger with good results, both Demosan and Vitavax are phytotoxic at high dosages, and Vitavax has performed poorly in comparison with Thioral in INRAN tests (no Niger data is available for Demosan). Dr. M. J. Lukefahr of IITA writes that Demosan inhibits cowpea germination if the dose is too high. A 1979 experiment by Hassane Hamma, plant pathologist and chief of the plant protection section at INRAN contrasted the performance of five seed treatments on millet, sorghum, cowpea and peanuts. Cowpea and peanut data were unavailable; per cent germination 21 days after planting millet and sorghum treated with 4 dosages of each compound is presented in the tables below:

Sorghum

Fungicide	Doses	% Germination
Benlate	A1	65,63
	A2	68,66
	A3	62,66
	A4	57,33
Dithame M45 (Maneb)	B1	73,33
	B2	71,33
	B3	78
	B4	73,33
Pelt 44 (Thiophanate-methyl)	C1	70,66
	C2	61,33
	C3	62,66
	C4	65,33
Vitavax	D1	57,66
	D2	63,33
	D3	14,13
	D4	12
Thioral	E1	63,33
	E2	62
	E3	62,66
	E4	72,66

Millet

Fungacide	Doses	% Germination
Benlate	A1	82,86
	A2	74,66
	A3	57,33
	A4	51,85
Dithane M 45	B1	65,18
	B2	67,33
	B3	70
	B4	82,66
Pelt 44	C1	58
	C2	63,70
	C3	71,85
	C4	77,04
Vitavax	D1	64
	D2	54
	D3	45,18
	D4	37,04
Thioral	E1	67,33
	E2	72
	E3	70,66
	E4	78

The performance of Vitavax is inferior to that of Thioral, and germination of both millet and sorghum is inhibited by the higher doses of Vitavax.

b) Diazinon

(In this and the following sections, these references are listed by number:

1. Farm Chemicals Handbook, 1980. Meister Publishing Co., Willoughby, Ohio.

2. Bailly, R. & G. Dubois, eds. 1980 Index Phytosanitaire. Association de Coordination Technique Agricole, Paris.

3. Beique, Rene. 1980 Cours de Protection des Vegetaux. Institut Pratique de Developpement Rural, Kolo, Niger.

4. "Insect and Mite Pests of Grain Sorghum--Management Approaches." Texas Agricultural Extension Service Leaflet.

5. Guidelines for the Control of Insect and Mite Pests. USDA Agricultural Handbook #554, April, 1979.

6. Insect Control Guide. 1979. Florida Agricultural Extension Service.

7. "Managing Insects on Texas Peanuts." Texas Agricultural Extension Service Leaflet.

8. "Notes fur quelques Pesticides utilises au Niger--Conseils en l'Epandage aerien de Pesticides." 1979 Protection des Vegetaux, Niamey, Niger.)

Diazinon is recommended for immediate NDD II use, primarily on millet, because it is the least toxic insecticide that is effective against the entire spectrum of millet pests and because it is already being bought and used in the Nigerien national plant protection program. At a cost of approximately 1000 CFA/ha., it is one of the cheaper alternatives.

Nigerien government publications mention the use of 10% granules at 10-15 kg/ha. against serious pests of millet and sorghum: la chinille mineuse (Rhaguva spp.), Atherigona (a muscid fly that mines young plants), and the borer Chilo (3). An emulsifiable concentrate is effective against sucking insects, bean fly and leaf beetles (8). Dr. George Shaefers proposed diazinon as an alternative for use in the Niger Cereals Project (1979) because it is effective against grasshoppers and stem borers. It performs well on millet and sorghum in Niger at Present (H. Dickherber, Niger Cereals Project, pers. comm.). U.S. extension and plant protection publications recommend it for use against borers in cereals (5), peanuts (7) and sugar cane (2), and against sorghum midge (4)(5), grasshoppers (5), aphids on sorghum (6) and beans (5,6), cutworms on soybeans and foliage feeders on peanuts (5) and root maggots on beans (5).

Diazinon is being tested this year (1980) in comparison with other insecticides against sorghum pests by Dr. Leyni Maiga, INRAN, Tarna/Maradi.

c) Malathion

Malathion is recommended for immediate use on all NDD II crops because it is relatively nontoxic to humans, it is effective against a broad spectrum of pests, and it has already been used in the context of the Niger government's national plant protection program.

Niger government publications point out its low toxicity and the fact that it can be used in the field up to one week before harvest, and mention its effectiveness against hemipterans, beetles, Lepidoptera larvae, flies, and mites. More specifically, 1 kg/ha. of powder or 75g/hl. are recommended for aphids and mites, and 100g/hl or 1400g/ha of powder are recommended for legume insects (8).

U.S. pesticide publications confirm that this chemical is appropriate for use where a high degree of safety to mammals is desired (1). Malathion is recommended for tropical legume crops (2), sorghum midge (4), grasshoppers on cereals and soybeans (5), aphids on cereals (5,6), peanuts (3,6) and beans (5), thrips on peanuts (7) and soybeans (5), leaf beetles on soybeans and leafhoppers on beans (5).

d) Orthene (Acephate)

Tolerances and labels now exist for the use of this insecticide on dry and succulent beans, cotton, and soybeans in the U.S. It has never been used in Niger. An ADI (Acceptable

Daily Intake) has been established for Acephate by the FAO/WHO Joint Meeting on Pesticide Residues, and there is an ADI in the U.S.

Orthene has moderate persistence, with residual systemic activity of approximately 10-15 days at suggested use rates. It is effective against aphids, Lepidoptera larvae, lace bugs, leaf miners, leaf rollers, leafhoppers and thrips (1), and for Heliothis and stink bugs attacking soybeans (5).

Because of its systemic activity, orthene may perform better than diazinon against such hard-to-reach major millet pests as stem borers, Rhaguva spp., and seed midges. It is strongly recommended that this insecticide be tested and economically evaluated against millet and cowpea pests. The results, if favorable, should be given to the Nigerien Agriculture Service along with a recommendation that it be adopted for general use, possibly as a substitute for diazinon if it is more cost-effective.

Its low toxicity recommends it for incorporation into the NDD II extension package if it proves effective and economically justified. Before it can be used on peanuts, sorghum and millet, however, measurements will have to be taken of residue levels under actual use conditions (to document compliance with the ADI). This will entail setting up special supervised field trials at the normal dosage and 2x dosage to make sure the ADI would not often be exceeded. The laboratory tests for residues are rather expensive--about $150 per sample--and NDD II should set aside $5000 for such tests on this and other insecticides being evaluated. Information on residue

data to be collected, and how to collect it, can be obtained from Dr. Carroll Collier, AID DS/AGR. It is possible that the manufacturer would cooperate in such field trials. This information could then be used as the basis for an EA justifying the safe use of orthene by NDD II and other West African AID projects with similar use patterns (millet, sorghum, and peanuts as well as beans).

e) Cypermethrin (Ripcord)

This is one of the synthetic pyrethroid insecticides, a group which has proved to be very effective against cowpea pests in West Africa at low dosages of active ingredient per hectare. They are relatively nontoxic to humans in formulations for field use, and thus are among the safer compounds for extension to LDC farmers.

IITA has been experimenting with these compounds in southern Nigeria for several years, in both high-volume and ULV formulations. The following results have been reported in IITA annual reports (Ambush/permethrin, Sumicidin/fenvalcrat, and decamethrin/Decis are also synthetic pyrethroids):

1976

High volume insecticide applications. During 1976 emphasis was on identifying effective insecticides with low mammalian toxicity in order to find safer insecticides. Efforts were also made in identifying insecticides which are effective in controlling cowpea pests at lower dosages, so that the cost of insecticide may be reduced. Table 12 indicates cowpea grain yield obtained by treatments of various insecticides on Prima cowpea in a field trial.

Insecticides were applied at 10 DAP and subsequently four more applications at 10-day intervals. The pest complex consisted mainly of leafhoppers and M. testulalis. Gammalin at 1000 gr a.i./ha per application and synthetic pyrethroid, Decis, which has low mammalian toxicity at a low dosage of 50 gr. a.i./ha per application had the best yields.

TABLE 12. Yield of Prima cowpea under different insecticide applications, second season, IITA

Insecticide	Dosage*	% Pod damage by Maruca	Yield kg/ha
Gammalin	1000	23.3	844
Decis	50	47.8	673
Nuvacron	500	34.3	415
Rogor	500	82.5	37
Thuricide	1000	85.3	23
Control		85.3	13
S.E.±		7.2	20.4
C.V.		35.0	73.0

*Grams a.i./ha/application applied five times.

1977

Insecticides--high-volume application. Nine insecticides were compared for control of cowpea pests (Table 10). All were applied at 500 g a.i./ha except for the synthetic pyrethroids--Decis, Ambush and Sumicidin which were applied at the rate of 25.0, 50.0 and 100 g a.i./ha respectively. Insecticides were applied at 25, 35, and 45 DAP on Prima cowpeas. The number of leafhoppers, and the damage caused by flower thrips and pod borers were significantly lower in all the insecticide treatments than in the controls. Yields were low, but plots sprayed with the three synthetic pyrethroids and Nuvacron gave better yields than those treated with other insecticides. Sumicidin was particularly effective for control of pod borers. Decis, Nuvacron, Actellic, Miral and Viydate were effective for control of flower thrips.

Efficiency of different insecticides applied as high volume spray against cowpea pests. Second season, 1977, IITA

Insecticide	g a.i. ha per application	No. of Leafhoppers per plant	% Damage by thrips on flower buds	% Damage of pod borer on pods	Yield kg ha
Sumicidin	100	21.7	15.0	4.7	577
Ambush	50	15.0	10.0	15.7	518
Decis	25	16.0	8.7	25.0	412
Nuvacron	500	15.0	7.7	43.7	403
Actellis	500	14.3	8.7	38.3	374
Versuchs	500	18.3	10.0	56.3	298
Miral	500	11.7	7.0	28.3	269
Baygon	500	21.7	15.0	42.0	139
Viydate	500	10.0	9.7	51.0	116
Control		66.6	32.7	100.0	0
S.E.		1.3	1.0	1.6	15.8
C.V.		33.9	47.2	28.8	23.8

Ultra-low Volume (ULV) application: Because synthetic pyrethroids are of low mammalian toxicity, four which are commercially available as ULV formulations (Decis, Ambush, Ripcord and Sumicidin) were tested against the standard insecticides recommended for cowpea pests in a replicated field trial on a farmer's field on Odo-Ogun, a village northwest of IITA.

The insecticides were applied at 33, 44, and 55 DAP. Treatments with synthetic pyrethroids and Nuvacron gave good results. Thiodan was the least effective (Table 11).

Table 11. Yield of VITA-5 under different ULV insecticide applications on a farmer's plot. Second season, 1977.

Insecticide	a a.i. ha per application	Yield kg/ha
Ripcord	70	960
Nuvacron	500	793
Decis	25	690
Sumicidin	250	683
Ambush	50	525
Thiodan	500	423
Control		175
C.V.		33.6

1978

Comparison of insecticides applied at high volume for control of cowpea pests (IITA. 1978.)

Insecticides	Dosage g a.i. ha application	% damage by Leafhoppers on foliage	Ootheca on leaves	Maruca on pods	Thrips on flower buds	Thrips Count on 10 flowers	Yield kg ha
Decis	12	6.7	11.7	30.7	18.3	53.7	542
Decis	25	7.7	7.7	37.3	12.4	51.8	818
Permithrin	25	4.3	12.7	25.3	8.2	29.3	922
Permithrin	50	7.7	7.0	26.7	7.0	17.4	917
Sumicidin	50	8.3	8.3	16.0	11.0	31.8	708
Sumicidin	100	5.3	8.5	10.0	6.7	26.4	519
Moncrotophos Combi	500	6.7	8.4	23.3	3.0	2.7	981
Methomyl	500	9.3	20.3	12.7	8.3	21.6	817
Control		33.3	25.0	45.3	33.4	159.7	399
		0.7	1.5	1.7	1.0	6.6	33.9
		38	62	35	44	78	24

There is an excellent chance that one of the synthetic pyrethroids would be superior to malathion as the pesticide extended in NDD II for regular use on cowpea. As with orthene, they are not currently registered for use on any of the NDD II crops in the U.S.--thus, residue data would have to be collected as the basis for an E.A., and this would be simplest for either permethrin or fenvalerate since ADIs have been established in the U.S. and both have been granted crisis exemptions for food crops. Permethrin also has a provisional maximum residue level (MRL) on beans established by the joint meeting of FAO/WHO on pesticide residues.

Permethrin is not recommended for NDD II trial because the author has tested it on farmers' cowpea fields in northern Nigeria and found that it is not very effective against pod-sucking bugs (the major pest in that area), and that its use tended to trigger late-season aphid infestations. ICI has withdrawn it from the Nigerian market in favor of cypermethrin, which was found effective for cowpea protection in 1979 field trials at Zaria, (northern) Nigeria by Dr. Ashok Raheja, Ahmadu Bello University entomologist. Weekly ULV applications after flowering were best, and World Bank projects in Nigeria are planning to extend it to farmers on that basis. (Such a heavy application rate should not be necessary in Niger, where pest problems are less severe.) Fenvalerate (Pyrin or Sumicidin) is generally

less effective than the other synthetic pyrethroids, even in much larger doses (see IITA data above).

Either cypermethrin or decamethrin would seem the superior choice for use in Niger on cowpeas. Cypermethrin (Ripcord) is desirable for possible future inclusion in the NDD II extension package. It is very effective at low dosages (see IITA data above), and has been successfully tested in Nigeria.

Since there has been no ADI established in the U.S., DS/AGR should advise NDD II staff about what field data will be necessary as background for an EA, and how to collect it (residues, applicator exposure, etc.). This data collection should be carefully supervised and done soon, as the effectiveness of this compound in Niger is likely to be confirmed.

NOTE: Because cypermethrin, like other synthetic pyrethroids, is comparatively expensive, COST-EFFECTIVENESS in relation to the alternatives (malathion, diazinon, orthyene, fenitrothion) should be the criterion for its incorporation into the NDD II extension program. In any case, an EA justifying its use by project personnel would be helpful for this and other USAID projects.

Another observation that should be carefully made when testing Ripcord is whether its use leads to outbreaks of secondary pests such as aphids, by being relatively harder on small beneficial species.

f) Fenitrothion

Fenitrothion is currently being used on a large scale in Niger, applied both on the ground and (more often) by airplane, for pests of millet and cowpea. It is being supplied by foreign donors, is only moderately acutely toxic, and is relatively inexpensive.

It is recommended for cost-benefit testing by NDD II as a possible future component in the extension package. It is likely to be employed in Niger for the foreseeable future and it would be helpful to justify its use by AID personnel in an EA. Again, DS/AGR should advise on the type of data collection necessary to do so. The tolerance established on wheat gluten imported from Australia should provide a starting point.

3. The Extent to Which the Proposed Pesticide Use is Part of an Integrated Pest Management Program

Reliance on a single pest control method such as a chemical pesticide does not always provide lasting protection. Experience has shown the desirability of spreading the burden of pest protection over a variety of methods--biological, physical, and chemical--integrated and used on the basis of anticipated economic, ecologic and social consequences. The approach is known as "Integrated Pest Management" (IPM).

Highly desirable components of many IPM systems include the use of crop plants that genetically resist or tolerate pest

populations; the use of naturally-occuring biological organisms such as predators, disease agents, and parasites; and the use of cultural or habitat management practices such as crop rotation, destruction of postharvest crop residues, selection of planting time, and selection of appropriate crop mixes. Some of the most effective non-chemical IPM techniques are traditional. An objective of IPM is to identify and maximize the use of natural biological, environmental, and traditional control methods known to be effective. Pesticides are used only when definitive data demonstrate their economic advantages as supplements to the non-chemical methods; their use is based on economic criteria that determine when and where control is truly justified. Further, pesticides that pose minimal risks to humans, other nontarget organisms, and the environment, are sought and encouraged.

At present, not enough research has been done to institute an effective IPM program for any Nigerien crop. Economic criteria for pest control have not been established; the real value of natural enemies is not known; there has been no effort to seek ecologically selective pesticides; and there is no organized systematic pest population monitoring system for any crop. A major obstacle slowing progress with IPM in Niger is the lack of crop protection specialists properly trained in the ecological principles of pest management.

Pesticide use by NDD II will incorporate as much IPM practice as possible under present circumstances. The pesticides will

be evaluated and compared economically and minimum effective dosages determined. Traditional nonchemical pest control methods will be evaluated and incorporated into extension recommendations. Pest-resistant crop varieties will be used when they become available; at present, no practically dependable resistance to the major pests has been bred into cowpeas, and millet and sorghum breeders in the Sahel are not evaluating this aspect of their lines, although there is potential for progress. (Beique (3) suggests that contarinia and Atherigona are promising targets on sorghum and millet, and observes that Rhaguva spp. do less damage to dense-headed millet and that H2D2 millet seems to be resistant to the borer Chilo pyrocaustalis.) Cultural practices that discourage pest infestations will be recommended to farmers as part of the extension package. When economic injury level information and pest-population monitoring methods are developed by INRAN, IITA, ICRISAT, or the planned FAO/CILSS Sahel IPM Project, NDD II will use these techniques to plan crop protection activities. Except for cowpea, crops will presently be treated with insecticide only when pest infestations occur (see IV. A.).

4. The Proposed Method or Methods of Application, Including Availability of Appropriate Application and Safety Equipment

Applications will be made by project personnel or by farmers who have received NDD II credit to buy pesticides. Both of these

groups will have had instruction in the safe use of pesticides (See IV.C. 11. below). The materials will be applied at the rates and intervals prescribed on the manufacturer's labels.

Field pesticides will be applied with hand-pump or "Fontan" knapsack sprayers or manual dusters, depending on the insecticide formulation used and the target pest species. ULV sprayers may be considered for adoption at some future date. Sprayers will be stored at farmer cooperatives and for each sprayer, two sets of safety apparel (goggles, masks, filters, aprons, gloves, boots) will be available.

NDD II project managers will enforce, among project personnel and farmer cooperators, the use of essential protective apparel, proper storage anc maintenance of pesticides and application and safety equipment, and proper disposal of used pesticide containers and left-over pesticides. Project personnel will ensure that instructions and precautions, including statements regarding the time of re-entry into the field after pesticide application and the number of days between application and crop harvest, as specified on the product label, are enforced.

5. Any Acute and Long-Term Toxicological Hazards, Either Human or Environmental, Associated with the Proposed Use, and Measures Available to Minimuze Such Hazards

All pesticides are potentially hazardous to humans and the environment and should be treated with great caution regardless of their relative toxicity.

The pesticides requested for use in NDD II--Arasan, diazinon and malathion--are used widely in the USA by farmers, homeowners, gardeners, livestock owners, and others and can be purchased and applied without USEPA restriction. Each is relatively acutely nontoxic to warmblooded animals, based on its acute oral toxicity value (LD_{50}), and is considered to be relatively safe for use by humans if used according to the label instructions. The pesticides chosen for experimentation and possible future NDD II use are of the same order of low acute toxicity, and they are proposed for experimentation only because their cost-effectiveness in Niger must be proven, and to collect data to justify their use in the absence of USEPA registration for NDD II crops. The absence of such registration is not necessarily a sign that a certain pesticide is undesirable; world marketing arrangements and the long USEPA registration process for a wide range of crops mean that many relatively safe, effective, and widely-used chemicals will not yet have achieved registered status in the U.S.

None of the chemicals chosen is the subject of present or foreseen USEPA regulatory action.

Diazinon, malathion, cypermethrin, orthene and fenitrothion are toxic to cold-blooded animals in general, and thus represent a danger to bees, other beneficial insects, and fish. High dosages may harm wild birds, livestock and game and (in the case of diazinon) may have phytotoxic effects.

All of these potential hazards can be minimized by adopting appropriate safety procedures and dosages and by applying the pesticides selectively and judiciously, based on actual need. Millet and sorghum are wind-pollinated, and cowpea and peanut largely self-pollinated, so the proposed use patterns present little threat to bees and other pollinators and to successful setting of seed. No bush will be sprayed, and wildlife is sparse in farmed areas, so the potential impact on game is small. Permanent bodies of water are extremely few and the project area does not adjoin the Niger River (Niger's only year-around stream), so these pesticides will not contact aquatic ecosystems to any significant degree.

6. The Effectiveness of the Requested Pesticides for the Proposed Use.

This is discussed under IV.C. 2. above. The pesticides requested for immediate NDD II use have been previously tested and/or used in Niger, and additional specific details concerning their recognized range of effectiveness were drawn from U.S. data where pests and cropping situations are similar to those in the project area. The requested pesticides will be applied according to instructions on their manufacturers labels. Therefore, it is assumed that their use will adequately control pests unless pesticide-resistant strains are present in Nigerien pest populations. No such resistant strains have been reported thus far.

7. Compatibility of the Proposed Pesticides With Target and Nontarget Ecosystems.

See IV.C. 5., above.

8. The Conditions under which the Pesticide is to be Used, Including Climate, Flora, Fauna, Geography, Hydrology and Soils.

See II. above.

9. The Availability and Effectiveness of Other Pesticides or Nonchemical Control Methods

See IV.C. 2 and 3., above, and Project Paper Annexes "Plant Protection in Niger, with Special Reference to Niamey Department and NDD II Project Design," and "Suggested Guidelines for IPM-Oriented Extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides."

10. The Requesting Country's Ability to Regulate or Control the Distribution, Storage, Use and Disposal of the Requested Pesticide.

See Project Paper Annex "Plant Protection in Niger, with Special Reference to Niamey Department and NDD II Project Design."

11. The Provisions Made for Training of Users and Applicators

All NDD II pesticide use will be supervised by the project agronomist and a staff or consultant entomologist. Enhanced supervision and training components have been designed into Phase II of this project, with a view, among other goals, to ensure the safe, judicious use of pesticides.

These senior staff will familiarize themselves with the appropriate safety measures for project pesticide use, and proper application procedures, and make sure that these guidelines are observed by staff and carefully extended to farmers. CPT extension staff will have attended yearly plant protection short courses given to Niamey Department Agricultural Service staff by the Plant Protection Section. The farmer-training curriculum at CPTs will emphasize the proper use of pesticides and correct spraying techniques, including potential hazards and precautions to minimize these hazards. Stress will be laid on the proper use of safety apparel and devices and also proper procedures for disposing of used pesticide containers and left-over pesticides. It is the responsibility of project staff to see that this part of the curriculum is carefully and effectively communicated to farmers, and that any subsequent observed misuse of pesticides be corrected.

Only farmers who have received such training at CPTs will be eligible to receive pesticide purchase credit and access to project-supplied pesticides.

12. The Provisions Made for Monitoring the Use and Effectiveness of the Pesticides

An applied research component has been designed into Phase II of the NDD expressly to test the cost-effectiveness of the various components of the recommended package of improved agricultural practices, including pesticide use (5). This is fully discussed

in section IV. B. and in the Project Paper Annex, "Suggested Guidelines for IPM-Oriented Extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides."

Pesticide use by farmer graduates of CPTs will be observed by project extension agents during the routine visits, and monitored closely as one aspect of the evaluation of the effectiveness of the project's training/extension component. A heavy emphasis on such evaluation has been designed into Phase II of the NDD. Misuse of pesticides will be noted and corrected. Senior staff will, in turn, make sure that CPT staff and extension agents are competent with reference to pesticide use, and that the proper procedures are followed by them.

V. SUMMARY AND CONCLUSION

Most impacts of project activities have been identified as significantly beneficial over the long term. The project promises to increase agricultural production by small farmers within the project area. Potential benefits should outweigh the potential negative impacts on the human environment.

RECOMMENDED THRESHOLD DECISION:

Negative. An Environmental Assessment or an Environmental Impact Statement are not required.

ANNEX D

NDD II PROJECT DESIGN
WITH RELATION TO PESTICIDE USE

I. USAID REGULATION 16

USAID Regulation 16, Part 216 -- Environmental Procedures, became effective on June 28, 1976, as the result of a court order in the United States, and was amended in compliance with that court order on May 3, 1978. Regulation 16 was adopted to protect the environment of developing countries and the health of those countries' people. It applies to any project and in which funds may be used for the procurement and/or the application of pesticides. In the case of non-compliance, a project will not be approved for funding by USAID/Washington. USAID fundings for Phase II of the Niamey Department Development will therefore be contingent on a certification of compliance with Regulation 16.

Regulation 16 discourages the use of USAID funds for projects that procure or use pesticides that are not registered for the same or similar purposes by the US Environmental Protection Agency (USEPA) in the United States. The Project Paper, which is a technical analysis of the project to be submitted to USAID for funding approval, contains an Initial Environmental Examination which describes proposed pesticide use by the project and attempts to justify this use. When the IEE contains a proposal for the use of:

A. Any pesticide <u>other than</u> one registered in the U.S. for the

same or similar use as that proposed in the project, or for general use, or

B. Any pesticide for which a notice of rebuttable presumption against registration (RPAR), notice of intent to cancel registration, or notice of intent to suspend registration has been issued by the USEPA, a formal, technically sophisticated and well-documented Environmental Assessment (EA) must be prepared evaluating the risks and benefits of the proposed pesticide use and the possible alternatives. This assessment must be submitted as part of the Project Paper and approved by USAID/Washington with comment by the USEPA before the U.S. Government can commit funds to the project.

The regulation allows the following exceptions to the above rule, suspending the requirement of an Environmental Assessment,

A. When USAID is a minor donor to a multi-donor project. USAID is considered a minor donor when

1. AID's total contribution to the project will not exceed either $1,000,000 or 25% of the estimated project cost; and

2. AID does not, under the terms of the agreement governing its contribution, control the planning or design of the multi-donor project.

B. Under emergency conditions. Emergency conditions shall be deemed to exist when it is determined by the USAID Administrator in Washington, in writing, that

1. A pest outbreak has occurred or is imminent; and
2. Significant health problems (either human or animal) or significant economic problems will occur without the prompt use of the proposed pesticide; and
3. Insufficient time is available before the pesticide must be used to evaluate the proposed use in accordance with the provisions of Regulation 16.

C. When the pesticides in question are to be used for research or limited field evaluation purposes by, or under the supervision of, project personnel. Treated crops will not be used for human or animal consumption unless appropriate tolerances have been established by the USEPA or recommended by FAO/WHO, and the rates and frequency of application together with the prescribed post-harvest intervals, do not result in residues exceeding such tolerances.

II. USEPA STATUS OF PESTICIDES PRESENTLY USED IN NIAMEY DEPARTMENT AND THE NDD PHASE I

The table on the following page lists the principal pesticides used by the Department of Agriculture and by the NDD Phase I in Niamey Department, and their present EPA status.

PESTICIDE	USEPA STATUS
HCH (25% BHC)	(BHC) pre-RPAR*, and registration voluntarily cancelled on all crops by the manufacturers based on oncogenicity, fetotoxicity, and reproductive effects (chronic toxicity).
LINDANE (Gamma-20)	RPAR based on oncogenicity, teratogenicity, reproductive effects (chronic toxicity), and acute toxicity.
DIAZINON	Registered for use on sorghum (and therefore millet, a similar use) without restriction.
DIMETHOATE (Systoate, Asthoate)	RPAR based on oncogenicity and mutagenicity (chronic toxicity).
FENITROTHION	Registered for forest insect control only.
45-12 (Endrin/DDT)	All field crop insecticides containing DDT have been cancelled.
PEPROTHION (Methyl parathion/endosulfan/ DDT)	All field crop insecticides containing DDT have been cancelled.
HEPTACHLOR (in Thioral)	Cancelled by July 1, 1983.
<u>Pesticides being tested as HCH substitutes</u>	
BAYGON (Unden)	Not registered for food crops and no new registrations anticipated in the near future.
DECAMETHRIN (Decis)	Believed not yet registered for the same or similar uses (Washington's confirmation pending).

* RPAR means that USEPA intends to deny registration of the pesticide after a waiting period during which rebuttals of that decision may be submitted.

Seven of the eight principal pesticides used by the Niger Department of Agriculture and NDD II would require preparation of an EA to consider justifying their use or purchase with USAID supported NDD II project funds. USAID/Washington informed the USAID Niger Mission that trying to adequately justify the use of such chemicals as heptachlor and BHC in an EA would require visits to Niger by several pesticide specialists and a long delay before consideration of the funding request. USAID therefore engaged the services of an environmental expert to find approved substitutes for the undesirable chemicals for use in NDD II.

Substitutes for use in NDD II and of potential value in other projects have been tentatively identified, but the GON feels, with justification, that they must be tested for dependability before their use. Pesticides intended for extension to farmers by NDD II must also be tested for safety and economic viability.

III. PROPOSED DESIGN FOR NDD II PESTICIDE USE

USAID/Niger believes that pesticide use in other Sahelian countries may be similar to that in Niger. Other USAID-supported projects that are currently under consideration in Niger or in such Sahelian countries, or extensions of existing projects, will encounter difficulties complying with Regulation 16. With this in mind, the USAID design team for NDD II

proposes the following for consideration by USAID and the GON:

A. In consultation and perhaps cooperation with the USAID-supported Niger Cereals Research Project, the CILSS/USAID Sahel IPM Program and INRAN, NDD II will

1. Conduct applied pesticide research under the supervision of project personnel, and
2. Attempt through said research to
   a. confirm the identification of effective substitute pesticides that are reasonably safe for applicators and registered for the same or similar uses by the USEPA, and
   b. collect data on applicator exposure, residues, safety, proper dosages and effectiveness of pesticides which may prove to be safe and effective substitutes but which have not yet been registered for use on field crops by the USEPA. This data can be used to justify the use of such pesticides by the NDD with a detailed and convincing EA that will be acceptable to USAID.
3. Transfer grain grown on fields that are used for applied pesticide research to the seed multiplication centers under the National Cereals Project. Such grain will then be processed and treated for use as seed by the seed multiplication centers, thus avoiding consumption

of the grain by humans or animals.

B. Safe and effective pesticides identified by the research program described above will be incorporated into the NDD II package of improved agricultural practices subject to

1. Economic evaluation and justification of their use, and
2. Approval of their use in the project by the GON and USAID. (USAID approval for inclusion of such pesticides in the NDD II extension package may require the filing of an amended IEE and, if pesticides not registered by the EPA are to be used, the submission of a risk/benefit analysis in the form of an EA.)

C. Pending

1. Identification of substitute pesticides acceptable to GON and USAID, that are then adapted for general use in the project zone, and
2. Exhaustion of stocks of unapproved pesticides, or the complete phasing-out of such pesticides for general use in the project zone.

USAID will require an agreement with the GON (in the form of a covenant in the convention between USAID and the GON) that, with the exception of pesticides accepted for NDD II use and extended by the project to farmers,

1. All plant protection in the project zone will be

effected by or under the supervision of Agriculture Service personnel unconnected with NDD II, and

2. No project resources, including personnel, vehicles, equipment, or funds will be used for the purchase or use of pesticides, except if the Administrator, AID determines that emergency conditions exist as in (I) above. He may be aided in this determination by other international organizations such as WHO and FAO.

This NDD design proposal is offered as a constructive step toward approval of the NDD II, and toward a long-term solution of the problems posed by USAID Regulation 16 for this and other USAID Sahel agricultural projects that procure or use pesticides.

We respectfully submit this proposal to the GON and urge its timely acceptance.

ANNEX E

NDD II September 1980

SUPPLEMENT TO PROJECT PAPER

Suggested Guidelines for IPM-Oriented Extension Recommendations, Pesticide Safety Precautions, Equipment and Training, and NDD II Testing of Pesticides

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I. IMPLEMENTING AN INTEGRATED PEST MANAGEMENT APPROACH

A. Traditional insect control methods, such as burning Coleopteres in the field, should be preferred to pesticide use and assessed for incorporation into the NDD extension package.

B. Experimental data routinely taken for field crop pesticides should include not only yields, but also comparative counts of each major pest for the different treatments: a) as early in the season as their presence can be detected; and b) again during the period of major crop damage. This will aid in interpretation of experimental results and facilitate the development of Economic Injury Level standards that will ultimately enable project personnel and farmers to avoid unnecessary pesticide applications. Observation methods and/or early detection of some major pests:

MILLET

1. Rhaguva spp., "la chinille des chandelles du mil": the small larvae mine flowers, and can be detected by their frass--small white granules emitted from the flowers--before they grow large enough to start mining the surface of the seedhead.

2. Geromyia Penniseti (millet) and Contarinia sorghicols (sorghum), "les cecidomyies.": the larvae of these midges mine seeds. Large numbers of adults on the young seedheads mornings and evenings are a sign of an impending infestation (as with other

pests listed here, no numerical standards for a significant number exist for West Africa). Slipping a clear plastic bag over the seedheads quickly can capture them for counting. See "Insect and Mite Pests of Grain Sorghum--Management Approaches," Texas Agricultural Extension Service leaflet.

3. Stem borers: local entomologists and the NDD entomologist should try to identify early detection methods usable by farmers (light traps being too expensive).

COWPEA

1. Thrips: inspect flower buds just as peduncles begin to lengthen. If many buds have dropped off of the peduncles, it is probably due to a heavy thrips infestation. Try to develop a practical damage-rating system.

2. Pod borer (*Maruca testulalis*): If a large proportion of flowers are infested with small (~1 mm) *Maruca* larvae early in the flowering period, substantial damage is likely. % infestation can be recorded (# of flowers infested/100 flowers).

3. Pod-sucking bugs can most easily be counted by taking numbers observed visually per X no. of cowpea stands.

These are meant as general guidelines and it is hoped that entomologists from CILSS/FAO, INRAN, IITA, and ICRISAT will be able to enlarge upon them and advise for other major pests (large beetles, aphids, and hemipterans in general can probably be handled with some sort of visual sampling unit).

C. Minimum effective dosages of pesticides should be determined and recommended.

D. Only pesticides which pay for themselves (in increased yield) at the recommended doses should be extended to farmers.

E. If pest-resistant varieties of cowpea and millet are identified by INRAN, IITA, or ICRISAT, they should be used by NDD and pesticide recommendations reduced accordingly.

F. If economic injury level information and pest population monitoring methods are developed by INRAN, IITA, ICRISAT or the FAO/CILSS Sahel IPM Project, these techniques should be taught to farmers for their use in making crop protection decisions.

G. Pesticides should be applied to millet only when pest infestations occur. (See B. above for observation methods.)

H. Cultural practices that discourage pest infestations should be extended to farmers. Among them are:

1. Weed removal near fields reduces stem borer populations.
2. Stem borers can be killed by drying crop residues in the hot sun before they are used as building material or animal feed. Unused residues should be burned or turned under the soil deeply.
3. Dense, early planting of peanuts discourages aphid attacks.
4. Early, uniformly-maturing cereals tend to escape the buildup of seed midge populations.

II. PESTICIDE SAFETY PRECAUTIONS

A. Field Crop Pesticides

1. Two sets of safety apparel will be available with every sprayer for NDD staff or farmer use (sprayers and safety equipment for farmers will be maintained and stored at cooperatives). These will consist of goggles, mask, filters, apron, gloves and boots. Safety apparel should ALWAYS be worn during spraying operations. This should be taught to farmers at CPTs and enforced by--and demonstrated by--project personnel.
2. Precautions specified on manufacturer's pesticide labels should be observed, including statements regarding the time of re-entry into the field after Pesticide application and the number of days between application and crop harvest.
3. Project staff and CPT farmer-trainees should be carefully instructed about correct use of sprayers, especially with reference to wind conditions. This will reduce applicator exposure to pesticides.
4. Farmers and staff should be carefully instructed about safe methods of mixing the recommended dosages of pesticide for field application, and the correct proportions of insecticide and water for the various chemical dilutions. Locally-available containers (i.e. evaporated milk cans or

mackeral cans) could be used as easy-to-remember standard measures.

B. Arasan Seed Treatment

1. Farmers should tie a cloth over their nose and mouth while treating seed, so as to avoid breathing the fungicide dust.
2. Fungicide and seed should be mixed with a stick or other implement in an enamel basin. Calabashes and (to a lesser extent) plastic containers will adsorb poisons and could be dangerous if reused for other purposes. The enamel basin should be washed thoroughly before reuse.
3. Handling of fungicide and treated seed with bare hands should be avoided. Hands (and other parts of the body or clothes) that have been in contact with the fungicide should be immediately and carefully washed.

III. EQUIPMENT

A. Sprayers

1. The "Fontan." This is the sprayer presently used by NDD. Its advantages are delivery of a good droplet size and the fact that it can handle any form of pesticide. Some often-overlooked points of proper maintenance:
   a) The Fontan's air filter attachment is rather flimsy and gets easily knocked off or awry in the field. Care should be taken that it is tightly in place and

fitted with a clean filter. Otherwise, engine life is reduced by two-thirds.

b) Models with spark plugs on top are best. The best way to stop the engine is to turn off the petrol feed and let it die. When the engine is turned off with the choke (a frequent mistake), spark plugs on the bottom of the sprayer get flooded with oil and must then be cleaned.

c) The petrol/oil mixture must be correct.

2. Ultra-Low Volume (ULV) Sprayers. The "Fontan" sprayer used by the project at present is very expensive ($5,000), heavy and unwieldy, complicated to repair, and has a short lifespan (approximately 2 years) under project conditions. ULV sprayers, designed to deliver pesticides in an aerosol (breeze-born small droplets), are being used in many developing countries, especially where labor and/or water are not plentiful. They are light, handheld, and run on ordinary flashlight batteries. Advantages: 1) Superior pesticide delivery/crop coverage when sprayer is properly used. 2) No mixing of pesticides with water--and therefore no hauling of water to the field--is necessary. Special concentrated spray formulations are packaged (in a convenient size) for direct use. 3) Large areas can be sprayed quickly; one person

can spray the average Niamey Department farm in two to three hours. 4) Ease of transport and manipulation. 5) Inexpensive: in 1979, sprayers were sold to farmers at cost by the World Bank in northern Nigeria for 16 naira ($30.00 U.S.). Batteries must be changed often and are an added expense.

Disadvantages: 1) Unsafe for use with toxic pesticides by unsophisticated applicators since concentrated chemicals are delivered in a form easily inhaled/assimilated by humans. 2) The technology is still being perfected. A particular problem is the lack of an indicator to show the user when the battery power has dropped below necessary levels for effective operations. General sprayer design and performance are being rapidly improved by Prof. G. W. Matthews and graduate students at Imperial College, Field Station, Silwood Park, Ascot, Berks. SL5 FPY, U.K. Major improvements should become available with the next 2-3 years, including a battery strength indicator, far better battery life and superior delivery of the pesticide, which will lower pesticide dosages.

USAID should consider conversion to use of these sprayers after they have been improved. If, in the meantime, the "Fontans" seem inappropriate, hand-pump knapsack sprayers are a third alternative.

B. Sprayer Maintenance

1. No equipment should be extended to farmers without provision of repair services and spare parts. When sprayers become available at local cooperatives for the recipients of pesticide purchase credit, each CPT should carry a stock of spare parts and have a repair facility with a mechanic available who is specifically trained in the repair of these machines.

   Training in the repair of "Fontans" can be obtained through the Canadian aid mission to Protection des Vegetaux. The project should buy and stock a selection of spare parts.

   If another type of sprayer is adopted for project use, the manufacturer should be asked to train repair personnel and instruct project staff concerning proper methods of pesticide application with the new equipment.

2. Coop officials should be held responsible for proper maintenance and storage of sprayers, pesticides and safety equipment. This should be continuously monitored by project staff, and coop officials should be paid for responsible caretaking of project equipment.

IV. TRAINING

See Section IV.C. 11. of the "Detailed Study of Pesticides to be routinely Used and/or Field Evaluated for Possible Use."

V. PESTICIDE TESTING

A. Personnel Requirements

The importance of applied pesticide research to the NDD project and to other AID agricultural projects in the Sahel justifies the employment of a full-time entomologist. Barring this, a consultant economic entomologist should be hired for approximately six weeks to advise the project agronomist, generate the experimental design (including methodology for taking the required observations), and give instructions for correct statistical analysis of the resulting data.

B. Data Collection for Economic Analysis

Labor input (person-hours) and expense required per ha. for each spray technology and pesticide tested (at the dosages found to be most effective) must be carefully recorded.

C. Time Frame

Insecticides new to Niger should not be recommended to the Nigerien government nor extended by the NDD without data from two to three growing seasons. During this period, they should have been assessed against the major pests of the crop(s) for which

they are intended, and their use justified economically. Field crop pest infestations vary from year to year and place to place. It is quite possible that, in some years, insect pest infestations will be inadequate for testing insecticides on a certain crop (INRAN entomologists at Tarna-Maradi have encountered this situation). Therefore ("worst-case" projection), it may take as long as the entire 5-year life of the NDD II project to identify safe, dependable, economic pesticides for certain crops/pests. NDD II should simply incorporate desirable pesticides into its technical package extension/credit system as they are identified.

D. Pesticides

1. Pesticides should be ordered on a yearly or biannual basis in order to avoid degradation during storage under tropical conditions. This will also avoid unnecessary outlays for pesticides that prove unsatisfactory for inclusion in the NDD improved agricultural package, or which are replaced by more effective chemicals.

2. Chemicals <u>not</u> registered for the same or similar uses in the U.S. may be found safe and effective under Nigerien conditions. (For example, synthetic pyrethroid insecticides are not yet registered for many field crop applications in the U.S.) In anticipation of this, applicator exposure and residue data should be collected during the last year of testing so that a risk/benefit analysis of the pesticide use (in the form of an

Environmental Assessment) can be easily and convincingly prepared. DS/AGR will advise concerning the type of data necessary and appropriate ways of collecting and analyzing it.

3. The manufacturers of the pesticides must provide toxicological and environmental data necessary to safeguard the health of research personnel and the quality of the local environment in which the pesticides will be used. Project personnel should request this data and plan their activities in reference to it.

E. Experimental Layout and Techniques

1. Agricultural conditions vary considerably in different parts of the project zone, and we wish to develop high-quality data at every CPT because it will be the only reliable source of information on the special pesticide requirements of that particular environment. Also, insect pest infestations are often patchy. For these reasons, experimental treatments should be replicated, with control plots, several times on each CPT, and if possible, these replicates should be scattered over the entire 40 ha. CPT area. Cowpea experimental plots can be planned and laid out before the growing season starts. For testing insecticides against millet pests, which may occur patchily and intermittently, comparative plots can be created where incipient infestations are detected early in the season (see I.B.). The entomology consultant or staff entomologist should generate complete and detailed designs for both types of experiment, and the analysis of the resulting data.

2. The experimental designs should be simple enough so that the results can be analyzed with a pocket calculator by project staff.

3. To minimize insect pest immigration to experimental plots from other treatments or untreated areas, individual experimental plots should be as large as is practicable. Large plots (at least 25 x 25 m) are required for treatments with ULV and "Fontans" sprayers. Observations and yield data should be taken from the central area of the plots.

4. To avoid pesticide drift, a) experimental plots should be separated by wide buffer zones of weeds or unsprayed crops, and b) spraying should not be done under wind conditions that favor drift from one experimental plot onto others.

VI. SOURCES OF ADVICE AND COOPERATION

1. Drs. M. J. Lukefahr and S. R. Singh
   Entomologists, Grain Legume Improvement Program
   IITA
   Oyo Road, P.M.B. 5320
   Ibadan, Nigeria

   Telephone: 413440
   Telex: TROPIB NG 31417
   Cable: TROPFOUND IKEJA

   NOTE: IITA gives an annual French/English cowpea production training course for African technicians.

2. Dr. Rathore
   Entomologist
   SAFGRAD/USAID/IITA Cowpea Improvement Program
   Kamboinse, Ouagadougou, Upper Volta

ANNEX F

NDD II September 1980

SUPPLEMENT TO PROJECT PAPER: Plant Protection in Niger with Special Reference to Niamey Department and NDD II Project Design

Only gross loss estimates exist for the impact of crop pests in Niger. According to CILSS reports and interviews, grasshoppers and birds take 25-50% of the millet crop, 10-50% of sorghum is lost to *Striga*, 5-15% to diseases, and 5-15% to storage pests, and rosette virus can reduce peanut harvests by up to 50%. A list of Nigerien pests by crop is appended to this paper.

In the face of these losses, the periodically famine-sticken nation has adopted food self-sufficiency as a national goal, and devoted large amounts of government revenue and foreign aid to the development of a national plant protection program. At present, this program uses large quantities of pesticides that have been banned in many developed countries. This report describes that effort and discusses possible ways to legally integrate the NDD II and other agricultural projects supported by responsible foreign donors into the national program.

I. PLANT PROTECTION PROGRAMS AND RESEARCH

A. Projet Nigero-Allemand Protection des Végétaux

This plant pathology project was initiated in April, 1978 in conjunction with the Deutsche Gesellschaft für technische Zusammenarbeit (GTZ) GMBH. The first two years

have seen the basic infrastructure for a pathology program put in place: a headquarters building/laboratory and a repair workshop in Niamey and smaller facilities at Zinder and Tillabery have been constructed; vehicles and equipment have been obtained; a field trial ground has been prepared; and stipends have been offered for the training of Nigerien counterparts to the GTZ staff. The latter consist of a project leader, a field researcher, and a newly-arrived vehicle and equipment mechanic. A vacant plant pathologist's position has remained unfilled. The February 1980 project assessment noted serious problems with lack of candidates for counterpart training and the inability of the Nigerien government to contribute promised services and efficient administrative liaison.

A six-year extension of the project has been recommended, in two 3-year phases. Proposed for the next phase are continued infrastructure development, four more substations, training of Protection des Végétaux (PV) personnel, development of an extension program, and commencement of field research. Experiments suggested include cultural methods for controlling Striga, identification of disease-resistant crop varieties, and some entomology trials--trap cropping and testing of synthetic pyrethroid insecticides against vegetable pests.

B. Projet Nigero-Canadien de Protection des Végétaux

The entomology component of the national plant protection campaign has evolved in three phases since 1970 with Canadian aid and counsel. The project has three Canadian staff at present. An entomologist working for Pluritec Consultants, Quebec, advises the PV staff in Niamey and two researchers, a millet entomologist and an insect taxonomist, are at the Tarna-Maradi INRAN research station. Phase III (1977-1982) is funded for 13 million Canadian dollars, 10 million from the Canadian International Development Agency (CIDA) and the balance from the Government of Niger (GON). This series of projects has established a headquarters in Niamey and an equipped laboratory at Tarna-Maradi, and four quarantine inspection posts. Depots for pesticide and equipment storage are planned for Niamey, Dosso, Maradi and Zinder. Vehicles, sprayers, large quantities of insecticides, and, more recently, aerial application equipment, facilities, and personnel, have been supplied.

Emphasis was placed on training personnel, since the shortage of trained Nigerien staff at all levels hinders the execution of a safe and effective plant protection program. However, Nigerien recipients have not been identified for most of the scholarships offered, and only one of five trainees at Canadian universities completed

the planned degree. Canadian staff help train agricultural agents at the Institut Practique de Developpement Rural (IPDR), Kolo, and give in-country short-course training to about 250 extension aides every year.

C. Biological Control of the Date Palm Scale

The Church World Service continues to fund a biological control program against *Parlatoria blanchardi* based at a laboratory in Agadez. Since the successful introduction of the predatory coccinellid beetle *Chilocorus bipustulatus*, dates are again an economic crop. This project is a section of INRAN (see below).

D. Organisation commune de la Lutte antiacridienne et de Lutte antiaviare (OCLALAV)

OCLALAV, with its headquarters at Zinder, is responsible for the control of locusts and bird pests.

Aerial applications of parathion are directed against the roosts and nesting colonies of graminivorous birds.

Fenitrothion and dieldrin are applied by airplane and UNIMOG "exhaust sprayers" when prospective locust outbreaks are detected. OCLALAV fields 5 prospecting teams that canvass known locust reproduction areas. There has been no serious problem with locusts in recent years. The last plague of *Shistocerca gregaria*, which breeds in the desert area W and NW of Agadez, was in 1954. *Locusta migratoria migratoroides* reproduces only in Mali and on the southern

shore of Lake Chad. There is currently (1980) an infestation at the latter location, but other locust-control organizations are dealing with it.

A Centre for Overseas Pest Research (COPR)/OCLALAV team has been in Niamey since 1975, studying grasshoppers along the Niger River between Gao (Mali) and Gaya. The Groupement d'Etudes et de Recherche pour le Developpement de l'Agriculture Tropicale (GERDAT) did grasshopper research at Maradi for two years.

E. The CILSS/USAID Sahel Integrated Pest Management Program

Niger is a member of the Comité permenant Interetats pour la Lutte contre la Secheresse au Sahel (CILSS), and is participating in the researching and development of a Sahel-wide IPM program. The main components will be a surveillance system to signal serious insect attacks (8 observation posts in Niger), bioecological research, the development of loss profiles (Senegal and Niger are the "pays pilotes" of this component), the development of an IPM extension program, nematode research (ORSTOM, Dakar), and training of staff. Specialists in mixed cropping, surveillance and experimentation, legume and cereals entomology, and plant pathology will be employed, each with a counterpart.

F. Institut national des Recherches d'Agriculture Nigerien (INRAN)

Before 1975, because of lack of trained Nigerians,

agricultural research was contracted to French firms, notably IRAT. This organization operated two research stations, one at Kolo/Niamey and one at Tarna/Maradi, and several field stations. In 1975 the Government of Niger (GON) assumed responsibility for agricultural research, creating INRAN.

Seven sections are currently operating at the Tarna/Maradi research station:

--- selection and plant genetics

--- plant protection (pathology and entomology)

--- general agronomy

--- peanuts

--- agricultural machinery

--- animal technology

--- hydrology and water conservation

There is a biological control laboratory at Agadez (mentioned above), a sugarcane station at Tillabery, a rice station at Kolo, stations at Tara and Bengou, and support facilities at Ouallam, Kallapate, Kawara and Magaria.

The staff of the Tarna/Maradi subsection are:

--- Dr. Leyni, Chief; sorghum entomology

--- Mr. Ousmane Bako; cowpea and peanut entomology

--- Mlle. Hélène Guèvremont; millet entomology

--- M. Paul Bouchard; taxonomist

Although the German and Canadian advisors to the Nigerian plant protection program have increasingly urged conversion to an IPM approach, INRAN research at present does not reflect this. There is no work being done on the natural enemies of pests, or economic injury levels. Millet and sorghum breeders do not include insect resistance in their trials, but instead confine themselves to comparing precocity, yield, and seed quality. Some research on pest resistance in cowpea has been carried out in conjunction with the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria. Staff entomologists' efforts center on pesticide trials, and are beginning to emphasize less toxic chemicals such as the synthetic pyrethroids.

II. PLANT PROTECTION OPERATIONS

A. National Staff and Operations

The Plant Protection Division (Protection des Végétaux, or PV) of the Agriculture Service, Ministry of Rural Development, is responsible for all pesticide use in Niger, and for plant quarantine. PV is based in Niamey and has no independent structure in the field; field activities are carried out by Agriculture Service agents. There is a shortage of competent, trained personnel. For the most part, the field personnel are low-level technicians who have had short-course training in the identification and

general characteristics of the common pests, control measures, and use and care of pesticide equipment. They are, as a group, often not equal to the proper execution of their duties.

The PV budget has mushroomed from 65 million CFA in 1978 to 90 million in 1979 and 200 million in 1980. This is not applicable to field staff, who are employees of the Ministry of Rural Development. It is being used for vehicles, insecticides, sprayers, spare parts, safety equipment, and airplanes.

Aerial applications were made on 20,000 ha in 1976 in an effort to control stem borer in millet and sorghum. In 1977, 110,000 ha were sprayed with fenitrothion for the control of grasshoppers and locusts and in 1978 the area jumped to 330,000 ha, nearly all of which was to combat the desert locust. In 1979 there was a diminution of grasshopper and locust attacks (attributed by PV to the effectiveness of the 1978 campaign), and the area sprayed dropped to 67,000 ha.

The long-term goal of PV is to transfer plant protection responsibility to farmers, intervening only in case of serious, large-scale insect infestations. At present, a seed treatment (Thioral, thiram/heptachlor) and HCH powder are distributed to farmers by government agriculture personnel for unsupervised use. All other insecticides are

applied by farmers under the supervision of field personnel, who bring insecticide and sprayers to areas where insect attacks have been reported.

Maintenance and storage of sprayers, insecticides and safety equipment on the local level are poor. Equipment is neglected, stored unwashed and unprotected, and not repaired promptly. Old stocks of insecticide leaking from decomposing drums poisoned a number of goats in one Niamey Department village recently.

There is no systematic appraisal of insect attacks before treatments commence, nor an evaluation of results. Observers remark that a goodly proportion of plant protection activities are "political."

Preharvest intervals when spraying is prohibited are reasonably well-observed with liquid pesticides, but sometimes farmers merely switch to HCH for use up until harvest. Farmers often do not know the correct application methods and dosages for HCH, and it is overused. Widespread misuse of pesticides is indicated by the results of residue testing of foodstuffs purchased in Nigerian markets in 1978 by GTZ researchers (to be repeated in the near future). The report cautions against drawing conclusions from a single set of samples. However, a problem appears to exist: 51% of samples taken of vegetables, fruit, grain, beans, peanuts and tea were found to be

contaminated and unfit for sale (German residue standards). This included 13 of 13 grain samples (rice, corn, sorghum, millet; some imported) and three of five cowpea samples. HCH and Lindane accounted for most of the contamination, but fresh vegetables also included excessive residues of Aldrin, Dieldrin, Heptachlorpoxid, Heptachlor, Chlordane, Endrin, and DDT.

Only a very few farmers have been trained at CFJAs or rural development projects to use pesticides properly. Government field supervision of pesticide application is sometimes inadequate. A 1980 Dosso Department spraying demonstration for the Pluritec plant protection assessment team involved faulty handling of pesticides that was potentially very dangerous to the applicator. Agriculture agents sometimes do not supervise farmer/sprayers closely enough, or insist on the use of protective equipment. Two farmer deaths from Lindane poisoning (Zinder Department) and one case of acute Diazinon poisoning (Konni) came to the attention of officials in 1980. In all cases, farmers presumably spraying under supervision reportedly refused to wear their face masks because the masks are hot and uncomfortable.

Such incidents and the general misuse of pesticides reflect public ignorance about the toxicity, especially the chronic toxicity, of pesticides. HCH is commonly

applied to produce in markets and is rubbed into the scalp for delousing. Interviewees reported seeing Shelltox sprayed on fresh produce and meat, plates of food, and (by nurses) patients in a hospital before the doctor's examination. Children are sometimes allowed, in the presence of their parents, to play in fields still dripping from an insecticide application.

III. PESTICIDES

There are no pesticide laws in Niger, nor laboratories for residue analysis, though PV officials would welcome training and equipment aid for opening such a laboratory. Decisions on which pesticides to buy are made within the Agricultural Service.

The table on the following page lists the principal pesticides used in Niger and their USEPA registration status. Seven of the eight have had or will soon have their registrations cancelled, or are not registered for the same or similar uses in the U.S. PV plans to depend chiefly on five of these (Unden, HCH, Fenitrothion, Lindane, and Asthoate) for the foreseeable future.

Pesticide	USEPA Status
HCH (25% BHC)	(BHC) pre-RPAR*, and registration voluntarily cancelled on all crops by the manufacturers based on oncogenicity, fetotoxicity, and reproductive effects (chronic toxicity).
LINDANE (Gamma-20)	RPAR based on oncogenicity, teratogenicity, reproductive effects (chronic toxicity), and acute toxicity.
DIAZINON	Registered for use on sorghum (and therefore millet, a similar use) without restriction.
DIMETHOATE (Systoate, Asthoate)	RPAR based on oncogenicity and mutagenicity (chronic toxicity).
FENITROTHION	Registered for forest insect control only.
45-12 (Endrin/DDT)	All field crop insecticides containing DDT have been cancelled.
PEPROTHION (Methyl parathion/endosulfan/ DDT)	All field crop insecticides containing DDT have been cancelled.
HEPTACHLOR (in Thioral)	Cancelled by July 1, 1983.
<u>Pesticides being tested as HCH substitutes</u>	
BAYGON (Unden)	Not registered for food crops and no new registrations anticipated in the near future.
DECAMETHRIN (Decis)	Not registered in the U.S.

* RPAR means that USEPA intends to deny registration of the pesticide after a waiting period during which rebuttals of that decision may be submitted.

IV. PLANT PROTECTION IN NIAMEY DEPARTMENT AND THE NIAMEY DEPARTMENT DEVELOPMENT PROJECT, PHASE I

The pesticides listed above are presently used by Niamey Department Agriculture Service personnel. The following table estimates the scale of field applications for the period 1977-79.

	1977		1978		1979	
Pesticides	amount	ha. treated	amount	ha. treated	amount	ha. treated
HCH kg	73,980	14,796	70,770	14,154	54,034	10,807
LINDANE l.	1,855	1,855	990	990	200	200
DIAZINON l.	200	400	100	200	100	200
DIMETHOATE l.	820	820	200	200	795	795
FENITROTHION l.	7,530	30,120	21,680	86,720	?	
PEPROTHION l.	--	--	2,496	2,496	4,220	4,220
45-12 l.	549	549	335	335	--	--

NDD Phase I occurs in two contexts:

1. There are two pesticide components in the NDD package of recommended agricultural practices: a seed treatment with Thioral (Thiram and Heptachlor) at the rate of 25g/10-12 kg of seed; and the spraying of sole crop cowpea twice, the first treatment at flowering. These techniques were taught to trainees at the Farm-Couple Training Centers (CPTs), and applied in project demonstrations. Cowpea was usually treated with Peprothion (Methyl parathion/Endosulfan/DDT), but Dimethoate, Fenetrothion, or Lindane were sometimes applied. Insecticide was also applied

to millet at CPTs and on demonstration plots--usually HCH, but sometimes Unden, Fenitrothion or Dimethoate. The 1979 NDD annual report listed pesticides used as: 2080 25-gm packets of Thioral, 1850 l of Peprothion, and 3,000 kg of HCH. Among the project's goals is the provision of recommended pesticides and credit for their purchase to farmers in the project zone who have been trained at CPTs or the CFJA to use them. This system is not yet in operation.

2. One of the stated aims of Phase I of the NDD was to support the activities of the Agriculture Service and other government services in the project zone. Their personnel were integrated into the structure of the project. Forty Agriculture Service field agents staff CPTs and plant demonstrations for the NDD. Their salaries, as well as the expense of pesticides, sprayers and safety equipment, are counted as part of the GON's contribution to the overall project budget. The Agricultural Service still depends on this staff and equipment for carrying out its tasks in Niamey Department, including that of plant protection. NDD staff, pesticides, sprayers, and vehicles are routinely mobilized to effect insecticide treatments where insect attacks have been reported by extension agents, village chiefs, or concerned farmers. At present, the Agricultural Service does not have enough staff, vehicles, or equipment unconnected with the project to carry out these operations independently.

Occasionally senior project administrators have objected to the inconvenience and hindrance of project operations caused by the unpredictable disappearance of staff and vehicles. In reply, a Nigerien law was cited which gives the government the right to enlist even private citizens and their vehicles to cope with emergencies. Given Niger's periodic food shortages, the government chooses to consider the threat of any crop loss due to insect attack as an emergency, at least where NDD resources are concerned.

V. NDD II PROJECT DESIGN WITH RELATION TO PESTICIDE USE

A. USAID Regulation 16

NDD I project funding of the purchase and use of insecticides (as described above) was clearly in contravention of USAID Regulation 16, Part 216--Environmental Procedures. This regulation became effective on June 28, 1976, as the result of a court order in the United States, and was amended in compliance with that court order on May 3, 1978. Regulation 16 was adopted to protect the environment of developing countries and the health of those countries' people. It applies to any project and in which funds may be used for the procurement and/or the application of pesticides. In the case of non-compliance, a project will not be approved for funding by USAID/ Washington. USAID funding for Phase II of the Niamey

Department Development will therefore be contingent on a certification of compliance with Regulation 16.

Regulation 16 discourages the use of USAID funds for projects that procure or use pesticides that are not registered for the same or similar purposes by the US Environmental Protection Agency (USEPA) in the United States. The Project Paper, which is a technical analysis of the project to be submitted to USAID for funding approval, contains an Initial Environmental Examination which describes proposed pesticide use by the project and attempts to justify this use. When the IEE contains a proposal for the use of:

1. Any pesticide <u>other than</u> one registered in the U.S. for the same or similar use as that proposed in the project, or for general use, or
2. Any pesticide for which a notice of rebuttable presumption against registration (RPAR), notice of intent to cancel registration, or notice of intent to suspend registration has been issued by the USEPA, a formal, technically sophisticated and well-documented Environmental Assessment (EA) must be prepared evaluating the risks and benefits of the proposed pesticide use and the possible alternatives. This assessment must be submitted as part of the Project Paper and approved by USAID/Washington with

comment by the USEPA before the U.S. Government can commit funds to the project.

The regulation allows the following exceptions to the above rule, suspending the requirement of an Environmental Assessment,

1. When USAID is a minor donor to a multi-donor project. USAID is considered a minor donor when
   a. AID's total contribution to the project will not exceed either $1,000,000 or 25% of the estimated project cost; and
   b. AID does not, under the terms of the agreement governing its contribution, control the planning or design of the multi-donor project.
2. Under emergency conditions. Emergency conditions shall be deemed to exist when it is determined by the USAID Administrator in Washington, in writing, that
   a. A pest outbreak has occurred or is imminent; and
   b. Significant health problems (either human or animal) or significant economic problems will occur without the prompt use of the proposed pesticide; and
   c. Insufficient time is available before the pesticide must be used to evaluate the proposed use in accordance with the provisions of Regulation 16.
3. When the pesticides in question are to be used for research or limited field evaluation purposes by, or

under the supervision of, project personnel. Treated crops will not be used for human or animal consumption unless appropriate tolerances have been established by the USEPA or recommended by FAO/WHO, and the rates and frequency of application together with the prescribed post-harvest intervals, do not result in residues exceeding such tolerances.

B. Proposed Design for NDD II Pesticide Use

The pesticides used by the Niger Department of Agriculture and NDD I would require preparation of an EA to consider justifying their use or purchase with USAID supported NDD II project funds. USAID/Washington informed the USAID Niger Mission that trying to adequately justify the use of such chemicals as heptachlor and BHC in an EA would require visits to Niger by several pesticide specialists and a long delay before consideration of the funding request. USAID therefore engaged the services of an environmental expert to find approved substitutes for the undesirable chemicals for use in NDD II.

Substitutes for use in NDD II have been tentatively identified, but the GON feels with justification that they should be tested for dependability before their purchase for widespread use. Pesticides intended for extension to farmers by NDD II must also be tested for safety and economic viability.

USAID/Niger believes that pesticide use in other Sahelian countries may be similar to that in Niger. Other USAID-supported projects that are currently under consideration in Niger or in such Sahelian countries, or extensions of existing projects, will encounter difficulties complying with Regulation 16. With this in mind, the USAID design team for NDD II proposes the following for consideration by USAID and the GON:

1. In consultation and perhaps cooperation with the USAID-supported Niger Cereals Research project, the CILSS/USAID Sahel IPM Program, and INRAN, NDD II will
   a. Conduct applied pesticide research under the supervision of project personnel, and
   b. Attempt through said research to
      1) confirm the identification of effective substitute pesticides that are reasonably safe for applicators and registered for the same or similar uses by the USEPA, and
      2) collect data on applicator exposure, residues, safety, proper dosages and effectiveness of pesticides which may prove to be safe and effective substitutes but which have not yet been registered for use on field crops by the USEPA. This data can be used to justify

the use of such pesticides by the NDD with a detailed and convincing EA that will be acceptable to USAID.

c. Transfer grain grown on fields that are used for applied pesticide research to the seed multiplication centers under the National Cereals Project. Such grain will then be processed and treated for use as seed by the seed multiplication centers, thus avoiding consumption of the grain by humans or animals

2. Safe and effective pesticides identified by the research program described above will be incorporated into the NDD II package of improved agricultural practices subject to:

a. Economic evaluation and justification of their use, and

b. Approval of their use in the project by the GON and USAID. (USAID approval for inclusion of such pesticides in the NDD II extension package will require the filing of an amended IEE and, if pesticides not registered by the EPA are to be used, the submission of a risk/benefit analysis in the form of an EA.)

3. Pending

a. Identification of substitute pesticides acceptable

to GON and USAID, that are then adapted for general use in the project zone, and

b. Exhaustion of stocks of unapproved pesticides, or the complete phasing-out of such pesticides for general use in the project zone.

USAID will require an agreement with the GON (in the form of a covenant in the convention between USAID and the GON) that, with the exception of pesticides accepted for NDD II use and extended by the project to farmers,

a. All plant protection in the project zone will be effected by or under the supervision of Agriculture Service personnel unconnected with NDD II, and

b. No project resources, including personnel, vehicles, equipment, or funds will be used for the purchase or use of pesticides, except if the Administrator, AID determines that emergency conditions exist as in (I) above. He may be aided in this determination by other international organizations such as WHO and FAO.

This NDD design proposal is offered as a constructive step toward approval of the NDD II, and toward a long-term solution of the problems posed by USAID Regulation 16 for this and other USAID Sahel agricultural projects that procure or use pesticides.

VI. COOPERATION AMONG AGRICULTURAL AID DONORS IN NIGER CONCERNING PESTICIDE USE

Present patterns of pesticide use in Niger will inevitably come increasingly into conflict with national laws of foreign donors that fund agricultural projects including the procurement and use of pesticides.

This problem has developed only recently. Because of variations in donor nation laws concerning pesticide purchases and use abroad, and lack of coordination between donors (both individual nations and multidonor agencies), a chaotic situation exists. Many of the pesticides that USAID (and, probably CIDA) must endeavor to find substitutes for in Niger are supplied by foreign donors. In 1979, Niger received the following insecticides in large quantities: HCH, Unden, Lindane, Fenitrothion, and Dimethoate from Canada; Trichlorfon from Austria; and Fenitrothion from BADEA (FAO). The World Bank integrated rural development project in Maradi Department uses insecticides containing Endrin and DDT.

It is strongly recommended that foreign agricultural aid donors in Niger and other developing countries cooperate with each other and with the host countries to encourage the phasing-out of highly toxic or environmentally harmful pesticides in national plant protection programs, and their replacement with effective chemicals that all donors can legally purchase and/or use with their project funds.

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5. "Untersuchungsergebnisse der Proben aus Niger." Walter Ulsperger, Pesticide-Residue Project, Darmstadt. 1979.

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7. Visits and interviews.

Department of State

INCOMING TELEGRAM

PAGE 01 NIAMEY 00485 281404Z 060516 AID1359
ACTION AID-35

ACTION OFFICE AFDR-04
INFO AAAF-01 AFFW-04 AADS-01 DSST-01 CH3-01 RELO-01 MACT-01
DO-01 AFDA-01 /018 A4 731

INFO OCT-01 /036 W
172075 3114532 /67

R 281358Z JAN 81
FM AMEMBASSY NIAMEY
TO SECSTATE WASHDC 0325

UNCLAS NIAMEY 00485

AIDAC FOR MARK WENTLING, AFR/DR/SWAP

E. O. 12065: N/A
SUBJECT: PESTICIDES AND PESTICIDE EQUIPMENT

1. ESTIMATED PESTICIDE NEEDS FOR 1981 ARE AS FOLLOWS:

ITEM	QUANTITY
ARASAN 50 RED (THIRAM)	100 KILOS
DIAZINON 48 PERCENT EMULSIFIABLE CONCENTRATE	800 LITERS
MALATHION WETABLE POWDER 2 PERCENT A.I.	1,000 KILOGRAMS

2. PROJECTIONS FOR YEARS 82 - 85

	82	83	84	85
ARASAN 50 RED THIRAN	300 KILOS	500 KILOS	1,000 KILOS	1,500 KILOS
DIAZINON	2,400 KG.	4,000 L.	6,400 LITERS	10,000 L.
MALATHION WETABLE POWDER	4 METRIC TONS	7 M.T.	10 M.T.	15 M.T.

3. PREFERRED PACKAGING AS FOLLOWS:
ARASAN PACKETS OF 25 GRAMS
DIAZION FOUR LITERS OR ONE GALLON CONTAINERS
MALATHION REASONABLY BREAK PROOF CONTAINERS OF FIVE TO TEN KILOS.

4. REALIZE PACKAGING SMALL QUANTITIES MAY BE COSTLY. IN VIEW OF THIS POSSIBILITY, WE NEED MORE INFO ON AVAILABILITY AND COST OF DIFFERENT SIZE CONTAINERS TO DETERMINE AT WHAT POINT CONVENIENCE OF SMALLER CONTAINERS NOT ECONOMICALLY JUSTIFIABLE.

5. IF AVAILABLE EXPERTISE CAN RECOMMEND MORE ECONOMIC OR CONVENIENCT FORMULATIONS OPEN TO SUGGESTIONS PARTICULARLY FOR MALATHION.

6. IF CONSIDERING PURCHASES LARGE QUANTITIES SHOULD HAVE INFORMATION ON EFFECT OF LONG TERM STORAGE UNDER LOCAL CLIMATIC CONDITIONS ON CHEMICAL COMPOSITION OF PRODUCT.

7. FOR FUTURE REFERENCE WOULD APPRECIATE LATEST FARM CHEMICAL HANDBOOK AND 1980 PESTICIDE LABEL BOOKS FROM MAJOR PESTICIDE MANUFACTURERS E.G. SHELL, CIBA GEIGY, ETC.

8. INVESTIGATE PURCHASE OF SMALL QUANTITIES (ONE TREATMENT OF 50 - 100 HA) OF PESTICIDES RECOMMENDED FOR EXPERIMENTAL USE AS PER MATTESON REPORT TABLE B P. 26. ORTHENE (ACEPHATE) 75 PERCENT SOLUABLE POWDER AND CYPERMETHRIN (PIPCORD) EMULSIFIABLE CONCENTRATE, DUST, ULV

9. INVESTIGATE PURCHASE OF DISCS FOR MEASUREMENT OF EXPOSURE OF APPLICATOR TO PESTICIDE.
10. RE SAFETY EQUIPMENT, RECOMMEND A MINIMUM OF 20 SETS OF EQUIPMENT PER CPT SIMILAR THAT ORDERED UNDER PIO/C 683-205-9-80059.

11. INVESTIGATE PURCHASE CONVENTIONAL AND ULV BACK PACK SPRAYERS. BISHOP

ANNEX G

Pesticide Specifications

CROP PESTS IN NIGER

A. Insects (by crop)

Crop	Name	Instar	Damage	Remarks
Millet	*Rhaguva albipunctella* *R. bordati* *R. graminivorella* (LEP: Nostuidae) "la chenille les chandelles du mil"	larva (1-2) older	eat flowers, mine surface of seedhead, cutting lower peduncles; hidden between stalk and cut flowers; spiral path the length of the seedhead	Major pest. Not abundant until recently (1974); losses est. 20-25%; one generation per year; pupates 5-20 cm. deep in soil; eggs laid on young seedhead; infestations can be recognized early by frass-little white granules--emitted from flowers by small larvae; worse in damp weather
	Geromyia penniseti (DIPT: Cecidomyidae) "cecidomyie du mil"	larva	eats flowers	Larva spend the dry season in the flowers of heads left in the field; adults produced just as first new heads appear; as many as 5 generations/year; difficult to reach with pesticides
	Mylabria, *Coryna* (COL: Meloidae) "Mylabres," "cantharides"	adults	eat flowers	Also eats cowpea flowers; said to respond to same pesticides as grasshoppers

	Schizonicha africana, Pachnoda spp. Anomala plebeja (COL: Scarabaeidae) "caleoptères"	adults	eat flower parts and young milky grains	Attack at night; 1980 infestation more widespread and more serious than usual
Sorghum	Contarinia sorghicola (DIPT: Cecidomyidae) "la cecidomyie"	larvae	eat ovary of flowers	Many generations per year; hard to reach with insecticides; major pest
	Aphis sacchari (HOM: Aphididae)	all instars	suck plant juices	
Sorghum & Millet	Atherigona soccate (DIPT: Muscidae) "la mouche du sorgho"	larva	meristem and leaves of young plants	Mostly on sorghum; major pest

Cnilo pyrocaustalis *C. partellus* (LEP: Pyralidae) "le foreur des tiges du mil"	larva	stem borer	Major pest
Dysdercus volkeri (HEM: Pyrrhocoridae) "punaise rouge du cotonnier"	nymphs and adults	sucks young milky seeds	Also attacks cotton and other Malvaceae; Baobabs are secondary hosts
Haimbachia ignefusalis (LEP: Noctuidae) "boreur" ou "foreur du mil"	larva	stem borer	Major pest
Busseola fusca (LEP: Noctuidae) "borer de mais"	larva	stem borer	3-4 generations/year; diapauses in dry stalks; major pest

Sesamia calamistis *S. cretica* (LEP: Noctuidae) "borer rose"	larva	stem borer	Adults diapause in dry stalk; 5-6 generations/ year; major pest
Spodoptera littoralis *Heliothis* sp., *Agrotis* spp. (LEP: Noctuidae)	larva	defoliator	Also attack cowpea, cotton
Nezara viridula *Agonosceles leontyii* *Acrosternum acutum* (HEM: Pentatomidae)	adult	sucks milky seeds	Also attacks cowpea
Epilachna similis (COL: Coccinellidae)	adult	defoliator	

	Penegrinus maidis Rhopalosiphum maidis (HOM: Aphididae)	all instars	suck plant juices	
	Forficula senegalensis (DERMAPTERA)	all instars	chews plants	
Cowpea	Melanagromyza phaseoli (DIPT: Agromyzidae)	larva	mines stems and leaves of seedling	
	Ootheca mutabilis (COL: Chrysomelidae)	adult	chews holes in leaves of young plant	Virus vector; seldom does significant physical damage
	Empoasca sp. (HOM: Cicadellidae)	nymph and adult	sucks plant juices (leaves)	Usually not a serious pest in Africa; also attacks cotton
	Aphis craccivora (HOM: Aphididae)	nymph and adult	sucks plant juices (stems and pods; more seldom, leaves)	Virus vector; seldom a serious pest otherwise

	Megalurothrips sjostedti (Thysanoptera)	nymph and adult	sucks plant juices from buds, flower peduncles, flowers	Economic damage done to flower buds and peduncles; causes bud abortion; a severe attack prevents flowering of the crop; major pest
	Maruca testulalis (LEP: Pyralidae)	larva	eats flowers; larger instars mine pods	To detect level of infestation, look for tiny (less than 1 mm) larvae in flowers early in the season; major pest
	Anoplochemis curvipes Mirperus jaculus Clavigralla tomentosicollis (HEM: Coreidae)	nymphs adults	pod-sucking bugs; cause young pods to shrivel and drop; shrivel seed in mature pods	Major pests; also attacks cotton and peanuts
Peanuts	Aphis craccivora (HOM: Aphididae) "puceron de l'arachide"	nymphs adults	suck plant juices; stunt young plants and hinder fruit set	Rosette virus vector; major pest; also attacks Malvaceae, Consulvulaceae, Cucurbitaceae, Solanacear; adults diapause in cracks in the soil; less serious in dense plantings

	Bemisia sp. (DIPT: Aleurodidae)	adults	suck juices of leaves	
	Creontiades tellini (HEM: Miridae)	nymphs adults	sucks fruits	
Cotton	*Aphis gossypii* (HOM: Aphididae) "puceron du melon" "puceron du coton"	nymphs adults	suck plant juices	Wide host range - Cucurbitaceae, Malvaceae, Solanaceae; virus vector
	Spodoptera littoralis (LEP: Noctuidae) "le ver du cotonnier"	larva	defoliator	Wide host range
	Heliothis armigera (LEP: Noctuidae) "chenille du coton"	larva	prefers reproductive parts of the plant	Wide host range

	Earias biplaga (LEPIDOPTERA)	larva	flowers, seeds; causes premature flower drop	Wide host range; economic injury level; 8-15 capsules attacked per 100 plants; pupates 25-30 mm deep in soil; 7-8 generations/year; more abundant in wet weather
	Podagria sp. (COL: Chrysomelidae)	adult	flowers	
Citrus	Coccidus viridus (HOMOPTERA) "la cochenille verte du citronnier"	nymphs adults	suck juices of all plant parts, including roots	
Malvaceae, Peas, Beans, Cassava	Bemisia tabaci (HOM: Aleurodidae) "la mouche blanche du Tabac"	adults	larvae mine leaves; adults suck leaf juices	Virus vector
Date Palm	Parlatorea blanchardii (HOMOPTERA) "cochenille blanche du Palmier dattier"	nymphs adults	suck juices of fronds, and in severe attacks, fruit and leaf bases	Worse towards the center of an oasis; successfully controlled by an Agadez-based biological control program using Chilocorus bipustulatus (Coccinellidae) and neuropterans

General Field Crops	Myzus persicae (HOM: Aphididae)	nymphs adults	suck plant juices	
	Grasshoppers (ORTHOPTERA: families Acrididae, pyrgomorphidae) Oedalus senegalensis O. nigeriensis Ailopus simulatrix Hieroglyphus daganesis Kraussaria angulifera Cataloipus sp. Zonocerus variegatus Cantatops axillaris Gastrimargus agricana Kraussela amabile Acrotylus spp. Locusts: Locustidae Locusta migratoria migratoroides Shistocerca gregaria	nymphs and adults	general defoliators	
Stored Products	Lasioderma serricorne (COL: Anobiidae) "coloptere des cigarettes"	---	26-90 day cycle	6-11 generations; attacks tobacco, flour, cereals, peanuts, beans

Oryzaephilus surinamensis (COL: Silvaniidae) "cucugide dentelé du grain"		25 day cycle or less	Cereals, flour (especially wheat flour); adults live up to 3 years
Tribolium confusum (COL: Tenebrionidae) "ver de la farine"	larva	31 day cycle	Flour, chocolate; adults live 6 months
Callosobruchus maculatus (COL: Bruchidae)	larva	bores holes in peas 25-33 day cycle	Beans of all kinds; adults lay eggs on mature pods in the field; larvae bore into peas in storage; eggs laid on seed surface; adults live 10 days--several months
Sitophilus oryzae S. zea (COL: Curculionidae) "charançon du riz" "charançon du mais"	larva	26 day cycle	Cereals on the field and in storage; adults live 5 months in humid tropics

Sitrotroga cerealella (LEP: Gelechiidae) "alucite des céréales"	larva	35-37 day cycle	Cereals on the field and in storage; adults live a few days; major pest in arid areas
Ephestia cautalle (LEP: Pyralidae) "teigne de l'amandier"	larva	30-145 day cycle	Cereals, nuts, dried fruit, coffee, skins; adults live 10-12 days; can be major pests
Plodia interpunctella (LEP: Pyralidae) "pyrale des fruits"		24-31 day cycle	Dry fruit, cereals, flour products, nuts, sugared materials; adult lives 24-31 days (diapause extends this period to 50-60 days); can be major pest

B. Diseases (by crop)

The plant pathogens of current economic importance in Niger are:

-- Millet

Sclerospora graminicola, mildew; *Tolyposporium penicillariae*, grain smut

-- Sorghum

Sphacelotheca sorghi

Tolyposporium ehrenbergii, smut

-- Cowpea

viruses, bacterial diseases

Cercospora sp.

-- Peanuts

Puccinia arachidis, rust; first appeared in Niger in 1977

Rosette virus

Cercospora sp.

Also present and of potential importance:

-- Cassava

Zanthomonas manihotis

-- Bambara groundnut

Macrophomina

-- Sugarcane

Ustilago scitaminea

-- Rice

Phyricularis oryzae (almost eliminated 1979/80 by planting resistant varieties; an as yet undefined disease)

-- Vegetables

Cucumber mosaic virus of peppers, heavy nematode infestations

C. Weeds (by crop)

-- Millet & Sorghum

Striga hermonthica

S. lutea

-- Cowpea

Striga gesneroides

-- General

sedges, genus Cyperus

D. Birds

The three most damaging bird pests in Niger are:

Quelea quelea, black-faced dioch

Ploceus cucullatus, village weaver

Passer luteus, golden sparrow

E. Rodents

Praomys natalensis (Muridae)

Arvicanthis niloticus (Muridae)

Gerbillus agag (Cricetidae)

G. gerbillus (Cricetidae)

Taterillus gracilis (Cricetidae)

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