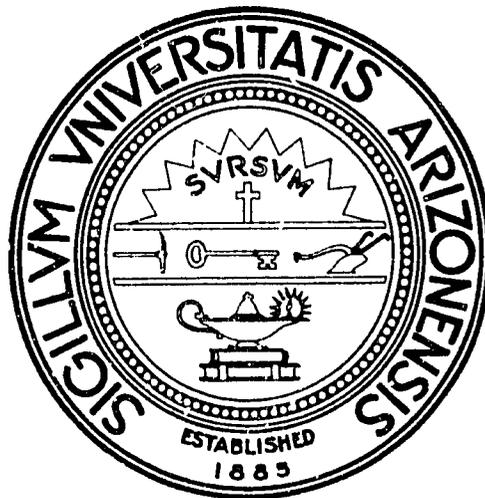


ARID/SEMI-ARID NATURAL RESOURCES PROGRAM
211(d)

THIRD ANNUAL REPORT
SUBMITTED TO
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C.

July 1, 1976 - June 30, 1977



The University of Arizona
Tucson, Arizona

November 1977

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TABLE OF CONTENTS

A. Title Page..... 1

B. Narrative Summary..... 2

C. Detailed Report..... 3

 A. Objectives Restated..... 4

 B. Review of Objectives (in terms of
 output categories)..... 6

 C. Review of Critical Assumptions..... 7

V. Accomplishments.....10

 A. Output #1: Information System.....10

 B. Output #2: New Education and Training
 Capability.....11

 C. Output #3: Increased Knowledge and
 Expanded Research Capability.....12

 D. Output #4: Expanded Advisory Capability.....15

 E. Output #5: Institutional Linkages.....16

VI. Impact of Grant Supported Activities in Achieving
Grant Purpose.....19

VII. Other Resources for Grant-Related Activities.....20

VIII. Utilization of Institutional Response Capabilities
in Development Programs.....21

 A. Requests for Assistance during Reporting
 Year.....21

 B.a. Number of Graduate Students.....21

 B.b. Number of Visitors or On-Campus
 Consultations.....23

 B.c. Use of New Research and Methodologies.....26

 C. Plans for Utilization of Institutional
 Response Capabilities.....27

IX. Next Year's Plan for Work and Anticipated
Expenditures.....28

 Output #1: Information System.....28

 Output #2: Education and Training Capability.....28

 Output #3: Knowledge and Research Capability.....28

 Output #4: Expanded Advisory Capability.....28

 Output #5: Institutional Linkages.....29

X. Involvement of Minority Personnel, Women and
Students.....30

Tables and Appendices.....	32
Table 1 - Expenditure Recapitulation by Funding Category...	33
Table 2 - Natural Resources Program 211(d) Budget.....	36
Appendix A - Natural Resources Program Travel Log.....	37
Appendix B - Seminar Series During the Third Grant Year....	44
Appendix C - Report by the West Africa Conference Review Team.....	49
Appendix D - Report by the Mexico Project Review Team.....	54
Appendix E - Report by the Technical Information Workshop Review Team.....	57
Appendix F - Niger Project Document List.....	61
Appendix G - Niger Project Village Survey Methodology.....	89
Appendix H - Questionnaires for Niger Project Surveys.....	102
Appendix I - Niger Project Agricultural Organizations List.....	139
Appendix J - Niger Project Map of Surveyed Villages.....	157

211(d) Annual Report

TITLE PAGE

	Date Due: October 1, 1977
	Date: November 1977
Grant Title:	Program for the Study of Multiple-use Planning and Management of Natural Resources in Arid and Semi-Arid Developing Areas
Grantee:	The University of Arizona Tucson, Arizona
Grant Program Director:	Jack D. Johnson, Director Office of Arid Lands Studies
AID Sponsoring Technical Office:	OST/TAB

Statistical Summary

Period of Grant:	June 1, 1974 to May 30, 1979
Amount of Grant:	\$1,045,000
Expenditures for Report Year:	342,353
Accumulated:	689,706
Anticipated for Next Year:	320,722

B. NARRATIVE SUMMARY

During the second grant year, the University designed four comprehensive projects to be undertaken in three developing countries: 1) a comprehensive regional natural resources development study in Niger; 2) a nutritional ecology study in Ghana; 3) a remote sensing applications project in Ghana; and 4) a land-use study in Peru. During the third grant year, the University initiated field work on the projects. An interdisciplinary team worked extensively on the Niger project, reviewing and analyzing field data obtained by the team and numerous other sources. A comprehensive report detailing the alternate long-term development strategies for the Department of Zinder will be presented to the Niger government in 1979. A physical anthropology graduate student is conducting 12 months of survey and anthropometric field work among villagers in northeast Ghana for the nutritional ecology project. The remote sensing project, including ground truth investigation, is almost complete, pending submission of the final report. The Peru project will be fully underway during the fourth grant year. Exchange of visits between the Program Director and the Peruvian coordinator were made in year three, during which numerous discussions were held and details were finalized.

Other third grant year activities have included continuation of work on three technical reports and bibliographies (appropriate technology, groundwater development, and rock phosphate development), continued work on the Natural Resources Handbook, and continuation of projects related to women in development, indigenous housing, and ethnicity and desertification (all of which will produce final reports). Issues 4 and 5 of the Arid Lands Newsletter were produced. The seminar series continued in the third grant year, the first series on the Application of Technology in Developing Countries (Fall 1976), proceedings of which are now available as a separate publication from the University, and the second on Environmental Factors in Development (Spring 1977). Other planned projects (i.e. Natural Resources Technology, Environmental Policy, Wildlife Management, and Energy in Development) were suspended, and the International Health Program was terminated, due to insufficient 211(d) funding and the lack of financial support from other sources within AID.

C. DETAILED REPORT

1. General Background and Description of Problem

There is a growing worldwide concern and recognition that the natural resource base is finite and, indeed, increasingly limited, and that, in the absence of adequate management, it is susceptible to rapid depletion. This recognition has arrived at a time when rapidly-growing populations are intensifying the immediate demand for more arable land, water, minerals, forest products, etc., thus creating a dilemma for many developing countries, particularly in arid regions of the world; the development of their natural resources, they feel, offers the fastest way to disengage their economic well-being from reliance on subsistence agriculture.

The University of Arizona has attempted to address arid lands resource management from a global perspective, which accounts for the present level of its international involvement and its commitment to strengthening this dimension. In accepting a 211(d) grant from AID, the University has committed itself to a course of action which will increase its capability to respond to technical assistance requests from AID, other development agencies, and the developing countries themselves.

2. Purpose of Grant

The principle purpose of the grant, as it appears in the grant document, is:

...to assist the University of Arizona establish an institutional response capability in the area of multiple-use planning and management of natural resources in arid and semi-arid regions of developing countries. The Program will focus on concepts and technologies for inventorying, assessing, and managing the resource base in a manner that optimizes overall benefits over the long term. Special importance will be attached to the socio/economic, institutional, legal, and public policy aspects of resource management.

The long range goal toward which the Program will contribute is the upgrading of developing country capabilities for assessing and implementing the best use of natural resources, including broader application of more effective techniques for identifying and appraising resources; improved planning and management strategies and procedures based on concepts of integrated, multiple-purpose resource use; and environmental protection. Such a goal is dictated by the growing worldwide awareness of the finite nature of the land and natural

resource base, and of the social and environmental costs associated with many traditional single-purpose resource development activities.

There have been no modifications of the grant purpose since the grant award.

3. Objectives of the Grant

A. Objectives Restated

1. Multiple-use management of natural resources (land, water, wildlife, forest, minerals, energy); this involves strategies and techniques for management of natural resources within a specified land area in a manner that optimizes the sustained yield of renewable resources, and provides appropriate environmental safeguards.

2. Assessment and mitigation of undesirable secondary environmental effects associated with natural resources development projects; this requires (a) an evaluation of the types and magnitude of problems associated with secondary impacts of, for example, slash-and-burn agriculture, livestock production, water development, and mining; (b) the development of knowledge and techniques for predicting secondary effects, such as ecological research, predictive models, environmental guidelines; and (c) analysis of alternative scientific, social, and legal-administrative measures which might be adopted to mitigate the impacts.

3. Application of new technologies to problems of resource surveys, assessment and monitoring; this includes the development and demonstration of various aircraft and satellite-borne sensors, computerized techniques for mapping and land classification, systems analysis, and modeling methodologies.

Five specific outputs are supportive of the three objectives just described.

1. Information System

This activity involves building upon the previously-existing Arid Lands Information System at the Office of Arid Lands Studies, the development of a catalog of natural resources expertise, which will identify both U.S. and foreign individual specialists or

research groups, the publication of an international newsletter on all aspects of natural resources pertaining to arid/semi-arid lands, and research for the preparation of state-of-the-art reports.

2. Educational and Training Capability

The general approach to this output area is to ensure that the University's graduate degree programs are responsive to appropriate resource management concerns, and that special training opportunities exist for foreign resource specialists. Central to this purpose is the adaptation and integration of existing courses, and possibly the development of new ones.

3. Knowledge and Research Capability

Increased knowledge will result from work to be conducted both at the University and in some developing countries. Individual academic departments at the University are also conducting separately-funded projects abroad; the results of these contribute to the experience being gained both by the faculty involved and by the developing country. Such efforts are encouraged and assisted by the Program.

4. Advisory Capability

The advisory capability of the University faculty increases directly in proportion to its utilization in research and training, and will continue to increase as AID, other international assistance agencies, and developing country institutions call upon the University for its specialized skills and technical knowledge. This output area is closely supported by the others, and directly represents the principal purpose of the AID grant: "To increase the University's institutional response capability."

5. Institutional Linkages

Linkages include both informal arrangement for the exchange of information and publications, and major ties between the University of Arizona and government/educational institutions in developing countries; the latter may involve faculty exchange, short courses, joint research, and substantial inter-linkage travel.

B. Review of Objectives (in terms of output categories)

1. Information System

The building-up of the Arid Lands Information System (ALIS) at the Office of Arid Lands Studies is an important and very visible objective, as is the publication of the Arid Lands Newsletter. This output directly supports all others, is feasible, and will continue to be emphasized strongly. No modifications are required in this output category, providing that the additional funding now being negotiated for ALIS can be obtained.

2. Education and Training Capability

During year one, the Program established an ad hoc Committee on Education and Training, which determined that the University's degree programs were indeed responsive to resource management concerns, and that the development of new courses was not necessary at that time. Toward the end of the second grant year, however, financial assistance was provided for the establishment of an important new Mineral Economics Program in the Department of Mining and Geological Engineering of the College of Mines. Funding for this new developing country-oriented educational program is being phased over three years into a fully state-funded faculty position. Secondly, the Remote Sensing Committee (created through the Program, but now institutionalized as an official University committee) has developed some basic courses and will offer a formal minor in remote sensing. The committee requires no Program financial support, but coordinates with the Program Office. No modifications are required in this output category.

3. Knowledge and Research Capability

Numerous faculty are involved in project execution, some of which includes on-site visits in West Africa and Peru. This category will continue to be of increasing Program importance as overseas activities continue during years 4 and 5. No modifications are required.

4. Advisory Capability

The University's advisory capability will continue to increase as a result of its utilization by AID and other agencies, and as a result of experience gained in multi-disciplinary research involved in its developing country-oriented 211(d) activities. No modifications are required.

5. Institutional Linkages

Numerous minor linkages, especially involving information exchange, have been developed in West Africa, Latin America, and Asia. Major linkages have been established in Ghana, Niger, and Peru. This output has received much emphasis, and will continue to be a valuable asset, provided such linkages can be financed after grant conclusion. No modifications are required.

C. Review of Critical Assumptions

Assumption No. 1. Students from both the U.S. and the developing countries will be interested, on an increasing scale, in the pursuit of University education programs oriented to the international aspects of natural resources planning and management (since viability of University programs depends critically on student demand).

REVIEW: The University continues to receive many inquiries on graduate degree programs, and student enrollment from developing countries continues to grow. (See Section VIII B.a.)

Assumption No. 2. Developing countries will desire and seek cooperation and linkages with the University of Arizona to the extent of providing students, information, facilities, and local support for cooperative research.

REVIEW: Indications are that many developing countries are interested in cooperation, as evidenced by many visitors from developing country institutions, correspondence requesting advice and cooperation, and the initiation of activities in various countries. One of the important findings is the desire of Francophone countries to send students to the University of Arizona, where they can develop arid lands expertise. Funding is a problem; local support in Francophone Africa is minimal, while Peruvian support is more than adequate.

Assumption No. 3. Close cooperation with AID/W will materialize on a continuing basis, so that, as development objectives, needs, and constraints change, the University will be in a position to identify and assess such changes in a timely manner. It is also assumed that AID/W, through the Office of Science and Technology, will facilitate contacts for the University with AID missions and developing country administrators. Further, that AID will play a key role in identifying training needs, helping to locate outstanding participants, circularizing missions regarding program activity, and facilitating the linking of the AID and University information systems.

REVIEW: OST has been helpful in providing the University with information it requires. The Africa Bureau has cooperated extensively, particularly in the design of project activities in Niger and with the West Africa Conference. We do feel that the expertise as now developed is not being fully utilized and this must be a major goal of the University and OST during the final two years.

Assumption No. 4. Additional funding outside the Grant can be found to support both foreign and U.S. students, as well as specialized training programs, information dissemination, and institutional linkages, particularly in the latter stages of the Program and beyond Year 5.

REVIEW: Discussions with AID/TAB and AID/AFR/CWR to date are encouraging but have not yet led to funding. Additional funding must be found or, as indicated in Table 2, Year 5 will be left with only phase-out funding and we will fall short of the research goals established for the Peru and Niger projects. We have found no funding to support students and funding for workshops have not materialized. These will be major concerns during the final two years.

Assumption No. 5. Additional research funds will be forthcoming from AID and non-AID sources by the end of Year 3 if the University is to carry out significant studies within developing countries. It is fundamental to program viability, and since a primary program purpose is to develop a research capacity at the University, an obvious necessity for maintenance of that capacity and skill level is that a demand be placed upon its use. While the University will actively solicit research funds from other sources, it is assumed that AID will call upon the University to carry out separate studies in areas related to the purpose of this grant as new requirements arise.

REVIEW: So far, no additional funding has been forthcoming from AID and only minimal funding has been received from other sources. No extensive demand is being placed upon the University by AID for the use of our natural resources and environmental expertise. This is considered a major problem at this time, and we will continue to look to AID to utilize the University of Arizona natural resource and environmental expertise.

Assumption No. 6. Resource-oriented institutions within the U.S., other developed countries, and U.N. agencies, will cooperate with the University to the extent of, at a minimum, exchanging information on relevant programs, projects, new research and development, and the existence of manpower and institutional resources.

REVIEW: Cooperation has continued with international agencies such as UNEP, FAO, UNESCO/MAB, UNITAR as well as U.S. institutions, such as the University of California at Riverside, Texas Tech, and others.

Assumption No. 7. Developing countries and international development agencies will look at the U.S. to assist with arid lands problems, since U.S. expertise and knowledge which either resides in, or can be mobilized by, the University will continue to evolve at a pace where it is capable of dealing with developing country problems, and is thereby attractive to the development community.

REVIEW: The University has perceived a definite increase in the number of requests for advice and assistance from developing country officials on arid lands problems, particularly in the area of natural resources and energy development. (See Section VIII B.b.) New arid lands institutions have been or are being created in Algeria, Iran, India, and Peru, among others; unfortunately, the University is financially unable to answer many of these requests in any substantial manner.

V. ACCOMPLISHMENTS

A. Output #1: Information System

1. Narrative description of general output

The University will inventory, evaluate, and disseminate natural resource information, building upon its existing Arid Lands Information System. In carrying out this function, the University will not duplicate information files which exist in other institutions; it will identify, describe, and catalog these, and thereby serve as a switchboard for identifying points of contact in the U.S. which can provide required information directly or through referrals.

Specific activities will include: (a) upgrading the bibliographic information service, currently operated by the Office of Arid Lands Studies, to provide an increased international dimension, and to expand its coverage of semi-arid land resource information; (b) establishment and maintenance of a "talent bank" of U.S. and international capabilities, both of individuals and institutions; (c) collection, synthesis, and appraisal of information to be used in the technological state-of-the-art reviews; and (d) distribution of a new international newsletter on natural resources management, research, and related activities.

2. Targets for Reporting Year

During Year 3, the targets were:

Continued upgrading of the Arid Lands Information System to increase the numbers and thoroughness of international information exchanges, continued dissemination of the Arid Lands Newsletter, further updates and expansion of the inventory of personnel and institutions in the U.S. and abroad with arid lands expertise, and progress towards completion of two research reports on new techniques and methodologies for problem analysis and/or solving.

3. Accomplishments

a) Reporting Year

No citations were added to the Arid Lands Information System (ALIS) during the third grant year due to the insufficiency of 211(d) funds and the delay in obtaining separate funding from AID for the information system. Issues four and five of the Arid Lands Newsletter were published and distributed worldwide during the reporting year to about 600 recipients.

Three research reports were continued during the third reporting year, and will be published during the fourth year. These reports will discuss the utilization of rock phosphates as fertilizers in West Africa, the impact of groundwater development in developing countries, and intermediate technology as it pertains to natural resources development.

b) Total expenditures.

accumulative:	\$113,653
reporting year:	6,700

B. Output #2, New Education and Training Capability

1. Narrative description of general output

The University will ensure that existing graduate degree programs are responsive to developing country resource management concerns, and will develop the capability and techniques to provide special training opportunities for developing country resource experts. The adaptation and integration of existing courses and the possible development of new ones is central to this output. Efforts will be made to make coursework relevant to the resource requirements and socio-cultural features of developing countries.

The general approach will be to identify and define training and research needs required by developing countries, utilizing several approaches (such as literature surveys, special reports, consultation with officials, study groups, and on-site visits), and to address training programs in terms of three distinct categories: formal degree work at the doctoral level only; short courses, seminars, and workshops of several weeks duration in both the U.S. and developing countries; and long-term, non-degree work, such as post-doctoral training and senior personnel training.

2. Targets for Reporting Year

During Year 3 the targets were:

To continue supporting any new courses necessary to fill gaps.

3. Accomplishments

a) Reporting Year

The grant has made financially possible the establishment of a new Mineral Economics Program in the Department of Mining and Geological Engineering, College of Mines. Financial

assistance will decrease over a three-year period, with the State of Arizona finally assuming 100 percent financial responsibility. It is strongly felt that this new program will be of great interest to developing country (as well as to American) graduate students.

A permanent academic Committee on Remote Sensing was created at the University as a result of 211(d) activities. The Committee has now instituted a formal minor in remote sensing, involving 11 departments and 24 course offerings, ranging from photogeology to image processing. The work of the Committee probably represents the most successful multidisciplinary academic activity yet at the University.

While the Second Annual Report described the Technical Information Workshop held in Ghana during the second grant year, the third grant year saw planning toward remote sensing and systems analysis workshops for Peru, another linkage country (the workshops were held in August 1977, and will be detailed in the fourth annual report).

The weekly seminar series continued during the third grant year. Twenty-five seminars were conducted (Fall semester 1976, and Spring semester 1977). The first series (Fall 1976), addressed The Application of Technology in Developing Countries. Speakers from both the University and other institutions discussed their experience with technology transfer problems in the developing world. The second series (Spring 1977) addressed the topic of Environmental Factors in Development. The Fall 1976, seminar papers have been published by, and are available in book form from, the University of Arizona. The seminars have served as a very important educational and informative mechanism, bringing together an interdepartment group of faculty and students interested and involved in natural resource problems. Attendance averages about 50 persons. (See Apperlix B for detailed listing of seminars.)

b) Total expenditures.

accumulative:	\$138,654
reporting year:	63,731

C. Output #3: Increased Knowledge and Expanded Research Capability

1. Narrative description of general output

The University will gain an increased understanding and capability to develop and/or adapt new resource management methodological and technological tools for application in developing countries. This will come about mainly as a result of research projects and technical consulting with AID and

other organizations. Research will be conducted at the University and in some developing countries in collaboration with the linkage institutions.

2. Targets for Reporting Year

No specific targets for year three appear in the grant document; the University has continued operation of its various projects to insure this output, the most important of all.

3. Accomplishments

a) Reporting Year

Projects underway during the third grant year, and in varying stages of completion, were:

- A handbook for natural resources development, which will provide a general overview to agriculturalists, anthropologists, climatologists, economists, engineers, geologists, geographers, biologists, and others in academic institutions, federal agencies, and private industry. Several students worked part-time on the handbook preparation.

A remote sensing project for northeast Ghana, which has collected data on burning, water distribution, overgrazing and deforestation, and agricultural cultivation practices, in support of the Northeast Ghana Savannah Research Project. The final report will be completed during the fourth grant year. Collaboration with a developing country institution is involved.

- A research report on rock phosphate for fertilizer, which will: 1) review new exploration techniques; 2) review mining methods; 3) discuss processing for fertilizer; 4) discuss international trade; 5) analyze application by developing countries; 6) analyze agricultural use in developing countries; and 7) review research needs. The report neared completion during the third grant year, and will be edited and published during the fourth grant year.

- A systems analysis and remote sensing applications project for Peru, which will assist in the development of a land-use plan for the "lomas" region of the arid Peruvian coast ("lomas" are hills which receive ocean dew, have a particular vegetation, and a fragile ecology). During the third grant year, the principal investigator and the 211(d) Program Director held technical discussions in Lima, and the project, including remote sensing and systems analysis workshops, was to commence at the beginning of the fourth grant year. This is the second most active project involving field work, and represents the second geographic linkage area. Extensive collaboration with developing country institutions is involved.

- An assessment of regional natural resource development in Niger, which will study the interaction of natural resource utilization in the Department of Zinder, including the social, economic, and ecological constraints, with the ultimate purpose of providing the Niger government with data on alternative strategies for enhancing the long-term quality of life. This has been the most ambitious 211(d) activity of all, involving faculty from political science, marketing, engineering, and agriculture, and other specialists (research assistants) in anthropology, economics, and systems ecology. A major field survey was undertaken midway through the grant year involving five persons, and field work will continue through the fourth grant year and into the fifth. A final document will be ready for the Niger government in early 1979. Project-generated documents appear as appendices to this report. Extensive collaboration with developing country institutions is involved.

- An intermediate technology project, including an extensive literature search and review, methods of measuring intermediate technology, and a study of decision-making and delivery systems. The project was essentially completed during the third grant year. The literature review, and a bibliography of intermediate technology centers, will be edited and published during the fourth grant year. Collaboration with developing country institutions is involved.

- A nutritional ecology study for northeast Ghana, to determine the interrelationships between patterns of agricultural practices and nutritional status. The main objective is to identify present patterns of population-resource interaction that are conducive to good health, as well as to poor health, thus providing guidelines for the modification of present patterns in development programs. A research assistant was dispatched to the field for 12 months of data collection. He will complete field work during the fourth grant year. Collaboration with a developing country institution is involved.

- A study of the role and importance of women in natural resources development, which should provide a means by which the University can add a new dimension to its development projects, particularly in Africa. Field work was undertaken in Africa during the third grant year, and further research and the preparation of a report and a bibliography will occur in the fourth grant year. Collaboration with developing country institutions is involved.

- An indigenous housing project to review research on the construction of low income housing units in developing countries, and to recommend improved government policies in developing economical and comfortable low-income housing units, particularly in the arid zones. The project was essentially completed in the third grant year, and a final report is expected during the fourth year. Collaboration with developing country institutions is involved.

- An international health program, with the aim of integrating the expertise of the College of Medicine into the overall natural resource development activities of the University, ultimately creating a center of competence in public health, preventive medicine, tropical diseases, nutrition, medical anthropology, and community medicine. Funding was terminated at the end of the third grant year, although the established center of competence requires continuation funding. Collaboration with developing country institutions is involved.

- A research report on the impact of groundwater development in arid lands, which is focusing on two case studies; the first on the impact of groundwater development on the Papago Indian Tribe, and the second on groundwater development in Pakistan. The report was close to completion at the end of the third grant year, and publication will occur early in the fourth grant year.

- A study of the relationship between ethnicity and the process of desertification, which will collect and compare published data on the social, economic, and ecological conditions of peoples located in areas of the world where desertification is most noticeable. The study will produce a model of the role of culture in the desertification process. The study is expected to be completed during the fourth grant year.

b) Total expenditures

accumulated:	\$335,495
reporting year:	230,875

D. Output #4: Expanded Advisory Capability

1. Narrative Description of General Output

The major objective of this output is to enhance the competence of faculty for advisory services to AID, and other organizations, in support of resource management programs. Such services will be provided on a negotiated basis under separate funding arrangements, and subject to scheduling considerations.

2. Targets for Reporting Year

No specific targets, except for availability of prepaid consulting, were set for the third year. The grant document states: "The evolution of this capability will be gradual, pending the emergence of a body of knowledge and a critical mass of staff members experienced and knowledgeable in the development sector."

3. Accomplishments

a) Reporting Year

The University has pursued its responsibilities under an AID contract for technical consulting services related to the Northeast Ghana Savannah Research Project. This three-year contract is helping maintain the University's competence in semi-arid lands management in West Africa, and will ensure the University's continued involvement in an important project. The University also assisted the U.S. Department of State in its preparations for, and participation in, the 1977 UN World Desertification Conference. Most costs are paid by the AID African Bureau with the University providing some 211(d) prepaid advisory services. The University has not received additional AID contracts to utilize the expertise being developed in spite of several offers and attempts by the University to assist AID in natural resources development programs.

b) Total Expenditures

accumulative:	\$10,000
reporting year:	6,053

E. Output #5: Institutional Linkages

1. Narrative Description of General Output

The University will pursue three basic types of linkages: domestic, international, and developing country. Domestic includes AID, other 211(d) and AID contractors, universities, research institutions, and federal and state agencies involved in natural resources management. International includes specialized U.N. bodies, such as UNDP, UNEP, and FAO, and other multi-national organizations. Developing country linkages will take two forms: "minor" linkages, which will involve informal exchanges of information and occasional visits; and "major" linkages, which will involve formal agreements with institutions in specific countries for joint research, training programs, and possible faculty exchange.

2. Targets for Reporting Year

During Year 3, the targets were:

To continue collaborative linkages with developing country institutions, and to formalize two new ones.

3. Accomplishments

During the third year of grant operations, the University continued four collaborative linkages with developing country institutions; one with the Council for Scientific and Industrial

Research (CSIR), in Ghana, one with the University of Science & Technology in Kumasi, Ghana, another with the National Office for the Evaluation of Natural Resources (ONERN), in Peru, and the fourth with the National Agrarian University of La Molina, in Peru. The two Peruvian institutions are involved in the land use systems analysis project being undertaken by the University on the Peruvian coastal desert.

Three new major linkages were established in Niger during the third grant year: the Ministry of Planning, the Niger Center for Research in the Social Sciences, and the Center for Research on International Development. Minor linkages in Niger were established with: the Rural Engineering Section (Ministry of Rural Development), the National School of Administration, and the National Union for Credit and Cooperation. These linkages are a result of the natural resources development analysis project in the province of Zinder, Niger.

Informal ties have been maintained with the following international organizations: the United Nations Environment Programme (UNEP) the U.N.'s Food and Agriculture Organization (FAO), the World Bank (IBRD), the Interamerican Development Bank (IDB), and the Organization of American States (OAS). During year three, new minor linkages were established with the United Nations Institute for Training and Research (UNITAR), New York, the Office of Overseas Scientific and Technical Research (ORSTOM), France; the Ministry of Agriculture of Sudan; the SOBA Agricultural Research Station, Sudan; the State Organization of Soils and Land Reclamation, Iraq; the Department of Geography, University of Sydney, Australia; the National Agricultural School, Morocco; the Ministry of Tourism and Environment, Upper Volta; the Department of Civil Engineering, University of Kuwait; the Natural Resources Research Institute, Chile; the University of Engineering and Technology, Pakistan; the National Institute for Agricultural Research, Tunisia; the National Institute of Agricultural Technology, Argentina; the National Patagonia Center, Argentina; the Central Soil and Water Conservation Research and Training Center, India; Corporation for Production Development, Chile; the Department of Geography, University of Wollongong, Australia; and the David Livingstone Institute, University of Strathclyde, United Kingdom.

Linkages have also been maintained with domestic institutions, such as the Engineering Experiment Station at the Georgia Institute of Technology, with which the University signed an agreement for the exchange of information, research findings, and seminar speakers. Close ties are also being maintained with the Dry Lands Research Center at the University of California, Riverside, and the International Center for Arid and Semi-Arid Lands Studies at Texas Tech University, Lubbock.

b) Total expenditures

accumulated:	\$90,144
reporting year:	35,000

VI. IMPACT OF GRANT SUPPORTED ACTIVITIES IN ACHIEVING GRANT PURPOSE

In our first Annual Report, we indicated that the major impacts during the first year of grant operations were an assessment of our capabilities, the bringing together of faculty from various disciplines, an increase in faculty awareness of developing country problems and approaches to solutions, and the expansion of the information system. The same activities have continued, thus intensifying these impacts; further, we can now emphasize additional activities during years two and three which support the general grant purpose. The management of the program and the review of project designs by the Management Committee have established a core of personnel able to deal with the complex decision-making involved in multidisciplinary efforts. These faculty and staff will now be available to assess, oversee, and review natural resource projects. It should be emphasized that the capabilities of this group did not arrive quickly or easily, but evolved over a three-year period after more than one hundred and fifty meetings and the investment of much time and effort. The devotion that these faculty have demonstrated in support of the Program is perhaps the strongest impact one could wish for in an interdepartmental endeavor of this kind.

The bringing together of faculty and the increase of their awareness of developing country problems, which were impacts during the first year, matured during the second year into the design of field research activities by interdisciplinary groups of faculty. (The design of interdisciplinary projects can be very complex, and some of these had to evolve through different stages of perception, information input, and review; the experience gained in these types of activities is hard to come by, and is a very definite impact on the grant purpose.) The third year saw the implementation of the research project designs in the field, and the beginning of a continuous review process by this same cadre of faculty. Some projects are being reduced, expanded, or reoriented as a result of these reviews, which are now adding further to the competence of the faculty involved.

In addition, other activities which contribute to grant purpose have been: building-up and increased utilization of the information system; continuation of the weekly seminar series; publication of the weekly Program Bulletin; publication of the Arid Lands Newsletter; and a French instruction program for West Africa project personnel.

VII. OTHER RESOURCES FOR GRANT-RELATED ACTIVITIES

The University was the recipient of a three-year AID contract to provide technical advisory services in connection with the Northeast Ghana Savannah Research Project being conducted by Ghana's Council for Scientific and Industrial Research. W. Gerald Matlock, International Agriculture, and Jack Johnson (Program Director), Office of Arid Lands Studies, are principal consultants in the contract. Jack Johnson was also contracted to assist the State Department in planning the U.S. position for the 1977 U.N. World Desertification Conference, held in Nairobi in August 1977.

Another related activity has been the Laboratory of Native Development, Systems Analysis, and Applied Technology (NADSAT) at The University of Arizona. The NADSAT program was created and funded to enable utilization of University of Arizona expertise in the transfer of resource planning and management technology to American Indian reservations in the arid Southwest. These two programs, NADSAT and the 211(d) activities, are closely related; the expertise and experiences gained in developing countries are quite relevant to the problems of Indian reservations, and vice-versa.

VIII. UTILIZATION OF INSTITUTIONAL RESPONSE CAPABILITIES IN DEVELOPMENT PROGRAMS

A. Requests for Assistance during Reporting Year

No requests for assistance were received during the third grant year.

B.a. Number of Graduate Students

The total number of foreign students enrolled in academic programs at the University in the Spring of 1977 was 1,273 (up from 1,090 during the previous reporting year), representing 96 countries. Of these, 511 were graduate students, 366 of which were from the following 62 developing countries (undergraduate students from these countries are also indicated):

	<u>Graduate</u>	<u>Undergraduate</u>
Afghanistan	5	2
Algeria	3	6
Angola	0	3
Argentina	1	3
Bangladesh	1	0
Belize	0	1
Bolivia	0	2
Botswana	1	0
Brazil	28	5
Burma	0	1
Cambodia	0	1
Chad	0	4
Chile	7	6
Colombia	3	3
Dominican Republic	0	2
Ecuador	1	1
Egypt	4	1

El Salvador	1	0
Ethiopia	4	3
Ghana	4	0
Guatemala	0	1
Guyana	2	1
Honduras	0	1
India	15	2
Indonesia	0	3
Iran	29	49
Iraq	19	0
Ivory Coast	1	3
Jamaica	1	5
Jordan	8	13
Kenya	4	1
Korea	6	7
Kuwait	11	12
Lebanon	4	15
Libya	26	22
Malaysia	2	1
Mexico	71	165
Morocco	1	2
Mozambique	2	0
Nicaragua	1	1
Nigeria	6	6
Oman	1	3
Pakistan	4	14
Panama	1	5

Paraguay	2	1
Peru	4	16
Philippines	6	4
Qatar	1	0
Saudi Arabia	29	49
Sierra Leone	2	0
Sri Lanka	0	1
Sudan	14	2
Syria	0	2
Tanzania	2	0
Thailand	7	6
Togo	3	0
Trinidad	1	1
Tunisia	3	0
Turkey	7	4
Uganda	1	0
United Arab Emirates	0	9
Venezuela	6	53

B.b. Number of Visitors or On-Campus Consultations

Following is a list of 32 foreign specialists interested in natural resources who visited Program personnel during the third grant year. (This list does not include the many foreign scientists and administrators who visited other University units and for which the Program has no record.)

AL-KUBAISI, Mohamed, President, State Organization of Soils and Land Reclamation, Baghdad, Iraq;
August, 1976

BISHAY, Adli, Head, Materials Engineering, The American University of Cairo, Cairo, Egypt;
June, 1977

BRAUN, Rolando H., Acting Director, Argentine Institute for Research on Arid Zones (IADIZA), Mendoza, Argentina;
August, 1976

CALUILLLO, Guillermo, National Agronomy School, Chapingo, Mexico;
November, 1976

CHAVEZ VALLES, Leonel, National Agronomy School, Chapingo, Mexico;
November, 1976

DARAG ALI, Ali, Deputy Director, Department of Range Management, Ministry of Agriculture, Khartoum, Sudan;
June, 1977

DAVID, Lazlo, Head, Water Resources Development Division, National Water Authority, Hungary;
November, 1976

del CASTILLO DAVILA, Tito Javier, Professor of Chemistry, University of Guadalajara, Guadalajara, Mexico;
August, 1976.

FAUCK, Roger, Inspector General of Research, Office of Overseas Scientific and Technical Research (ORSTOM), Paris, France;
April, 1977

KRISSIAMBA, Ali, Assistant Librarian, Interafrican Committee for Hydrologic Studies, Ouagadougou, Upper Volta;
January, 1977

GUPTA, Raj Kumar, Head, Division of Plant Sciences, Central Soil and Water Conservation Research and Training Center, Dehra-Dun, India;
April, 1977

JONES, Alan, Senior Lecturer in Photogrammetry, Department of Geography, University of New England, Armidale, Australia;
April, 1977.

KADRY, L.T., Land and Water Technical Officer, U.N. Food and Agriculture Organization (FAO), Rome;
June, 1977

EL DIN, A.G. Seif, Senior Research Officer, GUM Research Division, Ministry of Agriculture, Khartoum, Sudan;
June, 1977

- EL KAROURI, Mohamed, Director, SOBA Agricultural Research Station, Khartoum, Sudan;
April, 1977
- EL MOKHTAR OULD ZAMEL, Mohamed, National Assembly of Mauritania, Nouakchott, Mauritania;
June, 1977
- FORSYTHE, Warren, Research Professor of Soils, Tropical Research Center, Inter-American Institute of Agricultural Sciences (IICA), Organization of American States (OAS), Turrialba, Costa Rica;
March, 1977
- HANNA, Augustine B., Director General, Department of Scientific Research, State Organization of Soils and Land Reclamation, Baghdad, Iraq;
August, 1976
- LANGFORD-SMITH, Trevor, Head, Department of Geography, University of Sydney, Sydney, Australia;
September, 1976 - January, 1977
- LOPEZ OCAÑA, Carlos, Director, Arid Zones Research Center (CIZA), National Agrarian University of La Molina, Lima, Peru;
January - February, 1977
- MISHRA, P.R., Plant Scientist, Central Soil and Water Conservation Research and Training Center, Dehra-Dun, India;
April, 1977
- NARJISSE, Hamid, Head, Department of Animal Science, National Agriculture School, Rabat, Morocco;
December, 1976
- Ouedrago, Ismael, Assistant Director, Forests and Environment Service, Ministry of Tourism and Environment, Ouagadougou, Upper Volta;
November, 1976
- PICKETT, James, Director, David Livingstone Institute, University of Strathclyde, Glasgow, United Kingdom;
June, 1977
- RIMAWI, Walid, Head, Department of Civil Engineering, University of Kuwait, Kuwait;
August, 1976
- SANCHEZ, U., Raul A., Natural Resources Research Institute, Santiago, Chile;
December, 1976

SHEIKH, M. Islam, Vice-Chancellor, University of Engineering and Technology, Lahore, Pakistan;
May, 1977

SILVA ARACENA, Eduardo, Assistant Director of Agricultural Development, Corporation for Production Development, Santiago, Chile;
December, 1977

STA M'RAD, Mohamed, Director, National Tunisian Institute for Agricultural Research, Tunis, Tunisia;
April, 1977

SOURROUILLE, Ernesto A., Director, OAS Arid Zones Program, National Institute of Agricultural Technology (INTA), Puerto Madryn, Argentina;
June, 1977

VELASCO SUAREZ, Jorge, Coordinator, OAS Arid Zones Program, National Patagonia Center, Puerto Madryn, Argentina;
June, 1977

YOUNG, R.W., Senior Lecturer, Department of Geography, University of Wollongong, Wollongong, Australia;
January, 1977

B.c. Use of New Research and Methodologies

Systems methodology has become an integral part of project planning. During year two, a faculty member was retained from the Department of Systems and Industrial Engineering to apply systems theory to project designs, implementation, and general grant management. The natural resources analysis project for West Africa received original input from him as it matured to its present form. The major project in the other linkage country, Peru, also a natural resource analysis utilizing a systems methodology approach, was designed by another member (and former head) of the same department.

Remote sensing has also become an integral part of grant activities, and represents a useful tool for resource inventory and evaluation. The remote sensing project is assisting decision-making in the Northeast Ghana Savannah Research Project by providing data on land-use patterns and the extent of burning in the area.

The input of social science methodology has been considerable. Four social scientists (plus two health specialists) have served on the Management Committee of the Program, representing political science, public administration, anthropology, and history.

Ten faculty (and several students) in the social sciences are involved as investigators or research specialists in six separate research projects, representing anthropology, political science, history, education, and economic geography. The project leader of the largest activity underway, the Niger project, is a social scientist.

C. Plans for Utilization of Institutional Response Capabilities

It is hoped that, during the remainder of the grant term, AID will call upon the University from time to time to assist in the planning and/or executing of resource management projects in developing countries. This has not yet occurred. It is also anticipated that, both before and after 211(d) grant expiration, multinational organizations and some developing countries themselves will call upon the University for institutional assistance.

The University has acquainted various U.S. AID Missions and AID/W Bureau personnel with University capabilities; it is hoped that these contacts will call upon the University as the need for such services arise. Further, the University is a member of the Consortium for International Development (CID), which also provides services to AID.

IX. NEXT YEAR'S PLAN FOR WORK AND ANTICIPATED EXPENDITURES

Output #1, Information System

During the fourth grant year, the information system will continue to grow and will continue to disseminate information in the form of answers to requests, computerized searches, and exchange documents. The degree of such activities will depend on the allocation of new AID funding currently being negotiated. Three research reports will be published, one on intermediate technology, the second on rock phosphate development, and the third on the impact of groundwater development. The Arid Lands Newsletter will continue to be published and distributed world-wide. Work will continue on the talent bank for identifying natural resource expertise.

Estimated budget: \$3,000

Output #2, Education and Training Capability

During the fourth year, the grant will continue to support the establishment of an important new program in mineral economics in the Department of Mining and Geological Engineering, College of Mines. The Program will include courses in the economics of non-metals, the economics of coal, nuclear or alternate energy sources, the economics of petroleum and natural gas, operations research and statistical decision theory in mineral exploration, and forecasting for mineral industries.

New developing country workshops on remote sensing and systems analysis will be held in Peru early in the fourth grant year. The seminar program at the University will continue, with the first series (Fall 1977) to concentrate on nutrition in economic and social development.

Estimated budget: \$45,000

Output #3, Knowledge and Research Capability

The fourth year of grant operations will see continuation of the field activity of all research projects (see Section V. C.3).

Estimated budget: \$252,722

Output #4, Expanded Advisory Capability

The University's advisory capabilities will continually increase through 211(d) projects, as well as any separately-funded projects.

Estimated budget: -0-

Output #5, Institutional Linkages

Emphasis on linkages will lessen during year four, as numerous major and minor linkages were formalized during years one through three. This output will now concentrate on strengthening ties with those already-existing linkages in Ghana, Niger, and Peru.

Estimated budget: \$20,000

X. INVOLVEMENT OF MINORITY PERSONNEL, WOMEN, AND STUDENTS

A. No male minority personnel were involved in Program activities during the third grant year. Minority women personnel are included in the next section, but, in accordance with AID reporting guidelines, are not separately identified.

B. Women have a significant role in Program activities. The following list represents women employed on 211(d) funds during the third grant year.

Abrams, Mary	Ho, Barbara
Artus, Helen Marie	Johnson, Kathleen
Bagley, Nancy	Keith, Susan
Barnhill, Margaret	Lason, Amy
Brownmiller, Sara	Leis, Bertha
Buskirk, Anna	Leisure, Marse
Butter, Margaret	Michael, Mary
Carayon-Williams, Ann	Niethammer, Carolyn
Collion, Marie Helen	Osment, Jeannie
Don, Sharon	Pratt, Miranda
Dufner, Margaret	Schutte, El Donna
Elias-Cesnik, Anna	Spicer, Moir
Ferguson, Nancy	Stallard, Ninfa
Freidinger, Lorayne	Stewart, Bonnie
Frondorf, Anne	Vaughan, Pamela
Garrettson, Julie	Werner, Jayne
Henderson, Holly	Wodnicki, Janice

In addition, the following academic women participated actively in Program activities during year three:

Myra Dinnerstein, Chairperson, Women's Studies Committee. Dr. Dinnerstein also served on the West Africa Conference Planning Committee. Additionally, she is the principal investigator in a project concerning the study of women in African development, and serves on the Program's Management Committee and the three-person Steering Committee, which meets weekly.

Helen Ingram, Director, Institute of Government Research, and Associate Professor, Department of Political Science. Dr. Ingram served on the Management Committee, and was also a member of the Steering Committee.

Patricia Paylore, Assistant Director, Office of Arid Lands Studies. Miss Paylore's activities related to the Program are numerous, and include many years work creating the Arid Lands Information System. Her contributions during the third grant year included editing the West Africa Conference proceedings, the desertification seminars publication, and the Arid Lands Newsletter.

C. Students have also played a significant role in Program activities. The following list represents 24 graduate and undergraduate students, both male and female, employed on 211(d) funds during the third grant year (some also appear in the above list of women).

Abrams, Mary
Arnould, Eric
Artus, Helen Marie
Bagley, Nancy
Barnhill, Margaret
Batista, Julio
Brownmiller, Sara
Buskirk, Anna
Butter, Margaret
Carayon-Williams, Ann
Castaño, Eugenio (Colombian)
Cleveland, David
Conn, Jeffrey
Crabtree, James
Dufner, Margaret
Ferrell, William
Francl, Leonard
Frondorf, Ann
Gilroy, James
Glapke, Emmanuel (Ghanaian)
Gordon, Holly
Gottlieb, Norman
Grisillo, Steven
Henderson, Douglass
Henry, Charles
Ho, Barbara
Hoover, Barbara
Jamail, Milton
Johnson, Kathleen
Johnson, Kenneth
Keith, Susan
Koffi, Yao (Ivory Coastan)
Mignon, George
Muñoz Castro, Salvador (Mexican)
Osment, Jeannie
Parlette, Edward
Robinett, Mark
Roehler, Robert
Santa Anna, Otto
Smith, Steven
Stewart, Bonnie
Vaughan, Pamela
Villareal, Francisco (Mexican)
Weaver, Harry
Whittam, Tom
Williams, James
Wodnicki, Janice

TABLES

AND

APPENDICES

TABLE 1

Expenditure Recapitulation by Funding Category

<u>Fund number</u>	<u>Title</u>	<u>Year One</u>	<u>Year Two</u>	<u>Year Three</u>	<u>Cum Totals</u>
5010-2021-01	Program Office	\$39,079	\$45,792	\$39,118	\$123,989
5010-2021-02	Information Systems	43,060	51,938	22,030	117,028
5010-2021-03	Handbook for Agricultural and Natural Resources Development of Arid and Semi-Arid Lands	0	12,502	16,043	28,545
5010-2021-04	Seminar Series	10,268	8,025	9,562	29,621
5010-2021-05	Management Committee	5,836	4,646	2,490	12,972
5010-2021-06	Language Training	0	3,393	2,526	5,919
5010-2021-07	Assistance in Developing Training and Education Capability in Mineral Economics at the University of Arizona	0	0	8,324	8,324
5010-2021-08	West Africa Conference	0	13,377	7,600	20,977
5010-2021-09	Scientific and Technical Information Workshop	0	24,752	4	24,756
5010-2021-10	Application and Evaluation of Remote Sensing in Tamne River Basin, Ghana	0	8,690	20,816	29,506
5010-2021-11	Exploration for and Development of Phosphate Rock for Indigenous Fertilizer	0	3,360	8	3,368
5010-2021-12	Design of a Natural Resource Management System for a Region in Peru	0	3,360	19,758	23,118

5010-2021-13	An Assessment of Regional Natural Resource Development in Long-Term Planning for Niger	8,876	5,426	108,998	123,310
5010-2021-14	Intermediate Technology for Natural Resources Development	0	3,315	10,681	13,996
5010-2021-15	Nutritional Ecology and Natural Resource Development in West Africa	0	2,546	11,681	14,227
5010-2021-16	Women and Natural Resources Management in Arid and Semi-Arid Lands	0	32	6,008	6,040
5010-2021-17	Indigenous Housing	0	5,460	109	5,569
5010-2021-18	Technology for Natural Resources Development	0	0	216	216
5010-2021-19	Evaluating and Projecting the Impact of Large-Scale Copper Mining Operations in Southern Arizona and Northern Mexico	0	23,892	90	23,982
5010-2021-20	Environmental Policy	0	490	2,662	3,152
5010-2021-21	Linkage Development	5,685	7,840	2,159	15,694
5010-2021-22	Advisory Services	2,947	1,000	6,053	10,000
5010-2021-23	Program for Establishing a Center of Competence Relating to Health and Natural Resources Development	0	0	38,088	38,088
5010-2021-24	Wildlife Management and Conservation in Arid and Semi-Arid Developing Countries	0	0	0	0

5010-2021-25	Impact of Ground- water Development in Arid Developing Countries	0	0	3,517	3,517
5010-2021-26	Institutional Support	0	0	0	0
5010-2021-27	Planning for Arid Lands Research and Training Institutions	0	0	0	0
5010-2021-28	Energy and Natural Resources Develop- ment	0	0	0	0
5010-2021-29	Desertification and Ethnicity: A Cross- Cultural Survey of Man's Role in Land Degradation	0	0	3,808	3,808
		<u>\$115,751</u>	<u>\$229,836</u>	<u>\$342,359</u>	<u>\$689,712</u>

TABLE 2
NATURAL RESOURCES PROGRAM 211(d) BUDGET

	First Year Actual Dollars	Second Year Actual Dollars	Third Year Actual Dollars	Fourth Year Estimate Dollars	Fifth Year Estimate Dollars	Five Year Total Dollars
Salaries & Wages	69,931	134,539	233,442	187,108	15,000	640,020
Fringe	7,692	16,147	25,335	28,066	2,250	79,490
Technical Service, Consultants & Stipends	5,700	8,482	3,000	4,500	2,000	23,682
Operations - mimeo, office, rentals, etc.	10,185	26,373	27,450	35,549	11,000	110,557
Capital	3,433	4,132	7,938	5,562	-0-	21,065
Travel	18,810	40,163	45,194	59,937	6,082	170,186
TOTAL INPUT	115,751	229,836	342,359	320,722	36,332	1,045,000

	AID			AID			AID			AID			AID					
	Man	\$	\$	Man	\$	\$	Man	\$	\$	Man	\$	\$	Man	\$	\$			
	Months	AID	Other*	Months	AID	Other*	Months	AID	Other*	Months	AID	Other	Months	AID	Other			
Information System	48.0	51,513	12,000	34.0	55,440	15,000	4.4	6,700	35,000	1.6	3,000	75,000	.7	1,500	75,000	88.7	118,153	212,000
Education & Training	10.5	17,854	2,000	38.0	57,069	3,000	41.9	63,731	10,000	24.3	45,000	25,000	4.7	10,000	30,000	119.4	193,654	70,000
Research	12.0	21,133	62,000	62.5	83,487	75,000	151.7	230,875	115,000	136.2	252,722	300,000	6.9	14,832	500,000	369.0	603,049	1,052,000
Advisory Services	0.5	2,947	2,000	0.5	1,000	3,000	4.0	6,053	6,000	--	-0-	10,000	--	-0-	10,000	5.0	10,000	31,000
Linkages	13.0	22,304	4,000	15.0	32,840	5,000	23.0	35,000	-0-	10.9	20,000	-0-	4.7	10,000	-0-	66.6	120,144	9,000
TOTAL OUTPUT	84.0	115,751	82,000	150.0	229,836	101,000	225.0	342,359	166,000	173.0	320,722	410,000	17.0	36,332	615,000	649.0	1,045,000	1,099,000

* 60,000 Faculty, OALS, other University Commitment
 12,000 AID Ghana
 6,000 State Department Desertification
 86,000 NADSAT and NASA related activities
 2,000 Guayule

166,000

APPENDIX A

APPENDIX A
 AID NATURAL RESOURCES PROGRAM
 TRAVEL LOG
 July 1, 1976 - June 30, 1977

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
7/4/76-7/29/76	M. Dinnerstein	\$2,533.48	Education 1,533.48 Linkages 1,000.00	To West Africa to discuss research projects involving women in development
7/11/76-7/21/76	J. Johnson	706.00	Education 306.00 Research 400	To Washington, D.C. & Atlanta, Ga. to meet with AID officials, grant contractors, mission directors; to lecture at Georgia Tech & attend a conference
7/24/76-8/11/76	J. Johnson	2,205.04	Advisory Services 1,205.04 Education 1,000.00	To Geneva and Washington, D.C. to participate in U.N. seminar and to meet with AID officials.
8/30/76-9/1/76	J. Johnson	482.00	Research	To Washington, D.C. to meet with Dr. Clifford Pease, AID Office of Health regarding International Health Program.
8/30/76-9/2/76	A. Nichols	579.30	Research	Same
8/30/76-9/1/76	F. Lambrecht	420.50	Research	Same
8/30/76-9/1/76	P. Pearson	89.50	Research	Same
8/30/77-9/1/76	J. Morrissey	117.75	Research	Same

AID NATURAL RESOURCES PROGRAM

TRAVEL LOG

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
9/3/76-9/3/76	F. Lambrecht	3.50	Research	To Phoenix to meet with Az. State Health Department regarding International Health Program.
9/6/76-9/10/76	K. Foster	436.45	Information System	To Washington, D.C. to meet with AID officials regarding funding of Information System.
9/8/76-9/10/76	M. Michael	428.55	Information System	To Washington, D.C. to meet with AID officials regarding funding of Information System.
9/17/76-3/31/78	D. Cleveland	766.00	Research	To Ghana for field research on Nutritional Ecology Project.
9/19/76-9/29/76	J. Johnson	896.88	Advisory Services	To Washington, D.C. to meet with State Department officials regarding U.N. Desertification Conference and to meet with AID officials.
9/23/76-9/26/76	E. Weber	352.70	Research Linkages	To Afghanistan to attend Conference on Rural Life, with AID officials.
9/30/76-10/1/76	D. Mouat	36.00	Research	To Flagstaff, Az., to confer with USGS personnel on image processing procedures for Ghana Remote Sensing Project.
9/30/76-10/1/76	R. Schowengerdt	36.00	Research	Same.
10/1/76-10/6/76	C. Buxton	116.00	Research	To Los Angeles, Ca., to contact persons doing research on West Africa, and to collect information on project site.

AID NATURAL RESOURCES PROGRAM

TRAVEL LOG

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
10/18/76-10/23/76	C. Buxton	554.75	Research	To New York and Washington, D.C. to meet with United Nations, World Bank, AID and Department of State Officials.
11/2/76-12/7/76	G. Matlock	1,926.24	Research 926.24 Linkages 500.00 Advisory 500.00	To West Africa to attend various meetings with AID and UN officials regarding natural resources development.
11/2/76-11/9/76	J. Johnson	1,068.94	Research 300.00 Education 300.00 Linkages 468.94	To Boston, Md., and Washington, D.C. to attend African Studies Association conference and to discuss 1977 Desertification Conference.
11/2/76-11/9/76	C. Buxton	720.00	Research 300.00 Education 420.00	To Boston, Md., to attend African Studies Association meeting.
11/2/76-11/6/76	J. Crow	608.00	Research 308.00 Education 300.00	Same.
11/4/76-11/25/76	J. Conn	2,398.53	Research	To Ghana for field work on Remote Sensing Project.
11/7/76-11/30/76	D. Mouat	2,732.54	Research	Same.
11/17/76-12/4/76	W. Wymore	292.80	Research	To Lima, Peru, to discuss Peru Project with local officials.
11/19/76-11/19/76	R. Greenwell	9.50	Linkages	To Phoenix, Az., to visit Salt River Project.

AID NATURAL RESOURCES PROGRAM

TRAVEL LOG

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
1/3/77-1/5/77	J. Johnson	489.50	Research	To New York to consult with UNITAR officials regarding long-range planning for utilization of arid lands in developing countries.
1/7/77-2/7/77	C. Buxton	3,272.94	Research	To Niger and Belgium for field research on Niger Project, and to interview EEC development officials.
1/8/77-1/31/77	J. Crow	2,405.47	Research	Same.
1/8/77-2/3/77	J. Werner	3,369.34	Research	To Niger and France for field research on Niger Project, and to interview development specialists at the University of Bordeaux.
1/8/77-2/5/77	N. Ferguson	2,856.85	Research	To Niger and Belgium for field research on Niger Project, and to interview EEC development officials.
1/9/77-2/3/77	R. Fazzolare	2,376.49	Research	Same.
2/7/77-2/11/77	A. Nichols	80.00	Research	To New York and Washington, D.C. to visit Weatherhead Foundation, and for Robert Woods Johnson Fellowship and Health Policy Fellowship Interviews.
2/20/77-2/21/77	R. Bulfin	215.65	Research	To Denver, Colorado to attend AAAS Conference.

AID NATURAL RESOURCES PROGRAM

TRAVEL LOG

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
2/20/77-3/5/77	J. Johnson	1,189.02	Education 500.00 Advisory Services 689.02	To Denver, Colorado, Santiago, Chile, and Lima, Peru, to attend AAAS meeting, attend regional U.N. Desertification meeting, and to discuss Peru Project with AIG/Lima and Peruvian officials.
2/22/77-2/26/77	T. Downing	156.72	Education	To Denver, Co., to attend AAAS meeting.
2/23/77-2/27/77	J. Conway	49.12	Education	To Denver, Co., to attend AAAS meeting and to man special information center at meeting.
2/23/77-2/27/77	S. Grisillo	196.12	Education	Same.
2/23/77-2/27/77	J. March	49.12	Education	Same.
3/30/77-4/3/77	J. Crow	404.00	Education	To Phoenix, Az., and Lincoln, Neb., to participate in meetings of the Western Political Science Association, and the Western Assoc. of Africanists.
3/30/77-3/31/77	R. Altschul	255.84	Education	To Lincoln, Neb., to attend Western Assoc. of Africanists meeting.
4/17/77-4/20/77	N. Ferguson	214.13	Education	Riverside, Ca., to attend the International Symposium on Rainfed Agriculture in Semi-arid Regions.

AID NATURAL RESOURCES PROGRAM

TRAVEL LOG

Dates of Trip	Traveler(s)	Cost	Budget Category	Purpose
4/26/77-5/5/77	J. Johnson	936.83	Advisory Services	To Washington, D.C. to continue research for U.N. Desertification Conference at the State Department.
5/28/77-6/13/77	L. Cockrum	664.00	Education	To Sacramento, Ca., to attend UNITAR Conference on Alternative Strategies for Desert Development and Management.
6/4/77-6/10/77	J. Johnson	453.71	Education	Same.
6/10/77-7/1/77	G. Matlock	2,539.55	Research	To West Africa to attend various meetings with AID and U.N. officials regarding natural resources development.
6/14/77-6/17/77	J. Johnson	683.00	Advisory Services	To Washington, D.C. to continue efforts with U.S. Department of State in preparation for U.N. Desertification Conference.
6/16/77-8/20/77	M. Dinnerstein	1,733.00	Research	To New York to do library research on bibliography of African women in development.

APPENDIX B

APPENDIX B

SEMINAR SERIES DURING THIRD GRANT YEAR

Series on:

The Application of Technology in Developing Countries

<u>Date</u>	<u>Speaker</u>	<u>Affiliation</u>	<u>Title</u>
Sept. 2, 1976 (Fall semester begins)	Robert Bulfin	Dept. of Systems and Industrial Engineering, The University of Arizona	"The Role of Technology in Developing Countries: An Overview"
Sept. 9, 1976	Kenneth Barnes	Dept. of Soils, Water and Engineering, The University of Arizona	"Appropriate Technology in Food Production"
Sept. 16, 1976	Ross Hammond	Engineering Experiment Station, Georgia Institute of Technology	"Industry-Related Appropriate Technology"
Sept. 23, 1976	Norman Hillberry	Dept. of Nuclear Engineering, The University of Arizona	"The Atoms for Peace Program as an Experiment in Technological Assistance"
Sept. 30, 1976	Hugh Miller	Office of Foreign Secretary, National Academy of Engineering	"Some Criteria for Choices of Technology for Developing Countries"
Oct. 7, 1976	Wayne Wymore	Dept. of Systems and Industrial Engineering, The University of Arizona	"On the Introduction of Modern Agricultural Technology into a Developing Country"

Oct. 14, 1976	Hans Guggenheim	The Wunderman Foundation	"Dual Technology: The Puzzle of Progress"
Oct. 21, 1976	Simon Ince	Depts. of Hydrology and Water Resources, and Civil Engineering and Engineering Mechanics, The University of Arizona	"The Appropriateness of Appropriate Technology, or Can the Carabao Happily Coexist with the Gasoline Engine"
Oct. 28, 1976	Henry Arnold	Office of Science and Technology, Bureau for Technical Assistance, U.S. Agency for International Development	"Some Emerging Modes of Technology Exchange in the U.S. Foreign Assistance Program"
Nov. 4, 1976	Wayne Collins Carl Hodges	Environmental Research Laboratory, The University of Arizona	"Controlled Environment Agriculture, a High Level Technology -- Of Any Value to Developing Countries?"
Nov. 18, 1976	Len Berry	Graduate School of Geography, Clark University	"Remote Sensing and Developing Countries: Potential and Problems in the Transfer of a Technology"
Dec. 2, 1976 (Fall semester ends)	Robert Bulfin	Dept. of Systems and Industrial Engineering, The University of Arizona	"Technology in Developing Countries: The Future"

Series on:

Environmental Factors in Development

Jan. 20, 1977 (Spring semester begins)	Donald Wells	Dept. of Economics, The University of Arizona	"Economic Development for Oil Producing Countries: The Lessons of Recent World Prominence"
Jan. 27, 1977	Eric Ross	Dept. of Sociology and Anthropology, Mount Holyoke College	"The State of Nature and the Nature of the State: An Anthropological Perspective on the Ecology of Development"
Feb. 3, 1977	Frank Lambrecht Andrew Nichols	Dept. of Family and Community Medicine, The University of Arizona	"The Health Impacts of Development"
Feb. 10, 1977	Jean Circiello	Office of External Relations (Region Nine), Environmental Protec- tion Agency	"National and International Environmental Agencies: Activities and Information Services"
Feb. 17, 1977	Melvin Marcus	Dept. of Geography, Arizona State University	"Geographic, Climatic, and Resource Factors in Development"
March 3, 1977	Robert Altschul	Dept. of Geography, Regional Development, and Urban Planning, The University of Arizona	"Population and Transporta- tion Factors in African Development"

March 10, 1977	James Horsfall	Connecticut Agricultural Experiment Station	"The Green Revolution: History, Utilization, and Consequences"
March 24, 1977	Erwin Fuller	Office of International Activities, Environment- al Protection Agency	"Environmental Aspects of the Development Process: Is the Choice Pollution or Poverty?"
March 31, 1977	Luis Enrique Wah Ruiz	Camara Nacional de la Industria de Transforma- ción	"Development and Environ- mental Degradation: A Developing Country Perspective"
April 7, 1977	William Ittelson	Dept. of Psychology, The University of Arizona	"The Psychology of Technological Innovation"
April 14, 1977	Clark Bloom	Dept. of Public Administration, The University of Arizona	"The Impacts of Government Structure and Bureaucracy on Development"
April 21, 1977	Roy Rappaport	Dept. of Anthropology, The University of Michigan	"Adaptive and Maladaptive Development"
April 28, 1977 (Spring semester ends)	Roger Caldwell	Council for Environ- mental Studies, The University of Arizona	"An Overview of Environmental Factors in Development"

APPENDIX C

REPORT BY THE WEST AFRICA CONFERENCE REVIEW TEAM

ARID/SEMI-ARID NATURAL RESOURCES PROGRAM

Team Members:

**John Fischer
Simon Ince
Andrew Nichols, Chairman**

**May, 1977
University of Arizona**

REPORT BY THE WEST AFRICA CONFERENCE REVIEW TEAM

A. Project Work Plan

1. Was there sufficient thoroughness and preparation in the planning process? There was good advance planning and statement of program objectives, and good interdisciplinary planning communication. Objectives could have been stated in more measurable terms. In future, do not hold African conferences in Colonial Room.
2. Were stated objectives met? Insofar as objectives stated, they were met. It is possible that only superficial attention was given to some of the more general issues. Certain lack of objectivity occurred on the part of some attendees in dealing with Conference issues.
3. Was the plan well prepared and followed? It was generally well organized, but it was too formal and there was not enough time for discussion. There was good planning and execution of social events, with possible exception of manner in which tickets to meal functions were distributed.

B. Project Output

1. Was there a published output? The Conference proceedings were published by the Program Office, representing a most impressive achievement.
2. Was it the right output? In form, the output was appropriate to the Conference.
3. Was the output of sufficient quality? Generally, it was well edited and of good quality. Not all participants were given final transcripts for review before publishing, which should have been done. Also, there were minor oversights, such as a failure to list the conference co-chairman in the list of attendees.
4. Is there opportunity for additional output? No further output is indicated.
5. What has been the utilization of output? Five hundred copies of the proceedings were published, of which 137 were distributed free and 35 have been sold. This indicates less than enthusiastic response to the Proceedings.

C. Natural Resources 211(d) Program Goals

1. How did the project contribute to meeting program goals? The Conference was enlightening to attending University of Arizona faculty and students, and other participants, enhancing the capability of faculty and others to respond to the needs of developing countries.

Also, the Conference was of value as a publicity and public relations instrument for promoting the image of The University of Arizona as an institution with interest and expertise in African affairs.

2. Should other similar conferences be held? With adequate resources, intermittent conferences of this type are of value. A similar regional Peruvian conference may be worthwhile.
3. If the Conference were done again, what should be different? In general, there should be more discussion, (as opposed to long, formal presentations). A more critical analysis of issues should be encouraged.
4. Was this really a high priority project? As a public relations and potential fund-raising venture, the Conference was of value. As the 211(d) Program developed, however, the Conference bore little relation to our principal site of program activity in West Africa.

D. Comparison to Other University of Arizona Activities

1. Was this project in harmony with University of Arizona quality standards for faculty activities? In general, the Conference was in harmony with the University of Arizona quality standards.

E. Financial Considerations

1. Were adequate bookkeeping and record keeping procedures followed? The bookkeeping procedures appear in order. See attached budget breakdown.
2. Was the Conference cost-effective? In view of the enormous problems facing sub-Saharan West Africa, and the billions of dollars to be invested there by AID and other donor agencies, the Conference was very useful in bringing together many specialists in the subject area, sensitizing University faculty with these problems, and promoting the expertise of the University of Arizona generally. The Conference can therefore be labelled as successful from a cost-effective viewpoint. Hopefully, future conferences of this magnitude can be funded from supplemental resources.

STATUS REPORT

FUND: 5010-2021-08

NAME: West Africa Conference

DATE: 4-30-77

CATEGORY	BUDGET	ENCUMBRANCE	SPENT	BALANCE
Salaries	\$1345.00	\$ -0-	\$ 1345.00	\$ -0-
Wages				
Fringe	199.00	-0-	199.00	-0-
Consultants	6039.00	-0-	6039.00	-0-
Operations	7159.00	-0-	7159.00	-0-
Equipment & Supplies				
Travel	6482.00	-0-	6482.00	-0-
Library				
Publications				
Rentals				
Technical Service				
Capital				
Overhead				
Other				
TOTALS	\$21224.00	\$ -0-	\$ 21224.00	\$ -0-

Blanket Balances:

APPENDIX D



THE UNIVERSITY OF ARIZONA

TUCSON, ARIZONA 85721

COLLEGE OF MINES

DEPARTMENT OF MINING AND
GEOLOGICAL ENGINEERING

BUILDING #12
TELEPHONE: (602) 894-1001

May 16, 1977

MEMORANDUM

To: W. G. Matlock
Chairman AID 211(d)
Management Committee

Subject: Review and Elaboration of AID 211(d)
Project: "Evaluating and Projecting the Impact of Large-Scale
Copper Mining Operations in Southern Arizona and Northern
Mexico."

In response to your memorandum dated March 24, 1977, we have reviewed the subject study in light of the guidelines which you suggested. Bob Altschul agreed to act as the third reviewer to assist Clark Bloom and myself. The comments contained herein summarize our discussions on the project.

In general, we reaffirm our earlier evaluation of this study (ref. letter from O'Neil, Bloom, and Wayne Wymore to Bob Seale dated July 12, 1976). The Mexican summer project was an experiment, our first substantial attempt to an interdisciplinary field project under the 211(d) grant, and as such it was an appropriate and useful activity. In retrospect, now that our ability to organize and conduct such projects has matured, we can see a number of shortcomings in the subject study. However, in 1975 there was broad support for getting into the field and actually doing something -- gaining some experience rather than passively waiting for calls for assistance from LDC's.

Our response to the specific questions contained in your memorandum are listed below.

1. Project Work Plan. The project objectives are clearly stated and the work plan was fairly well designed. The project, however, has two quite different objectives: (1) preparation of guidelines for the development of mining communities -- a results-oriented objective; and (2) the examination of multidisciplinary team interactions in the field -- a methodological objective. These were to be achieved in a four-week period by a team that was assembled on very short notice. This was a very tall order.

2. Project Output. Looked upon as the results of a multidisciplinary reconnaissance, the output was adequate and useful. It is clearly not a definitive work in either of the two primary objective areas, but

Memo to W. G. Matlock
Page 2
May 16, 1977

given the constraints cited above, it should not have been expected to be.

The problems associated with community development around large, new minerals operations are of major concern to many LDC's. The opportunity for further useful work in this field is excellent; however, the likelihood of additional output from the subject study is low.

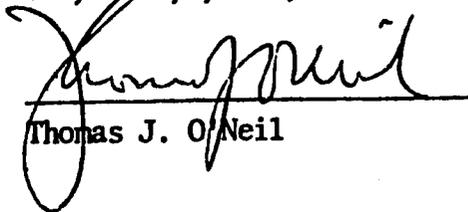
3. NR 211d Program Goals. There is no question that the project contributes to the 211d goals of developing faculty expertise to respond to natural resource management problems in LDC's. We definitely have faculty and experience to draw upon in this area when the need arises. For example, uranium production is a key industry in Niger, and it is possible that experience gained in this study would be valuable to the Niger team.

If this area of investigation were to be resumed we would focus on the development of the guidelines and not burden the team with any primary responsibilities in assessing multidisciplinary team performance. A more deliberate selection of team members, better preparation, and a more realistic schedule would also be desirable. A better working bibliography is necessary, as is a closer integration of the participants' expertise with the specific problem at hand.

We feel that this project addresses a high priority issue and is an entirely appropriate area of inquiry for the AID 211d program.

4. Comparison to Other U. A. Activities. Not knowing what quality standards are referred to, we find it difficult to formulate a specific response. However, the Mexican Summer Project, although unlikely to gain any international acclamation, is certainly no embarrassment to the University. Furthermore, any perceived shortcomings can largely be attributed the embryonic state of the 211d program in the Spring of 1975.

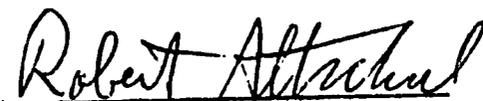
Very truly yours,



Thomas J. O'Neil



Clark Bloom
Public Administration



Robert Altschul
Geography, Area Development
and Urban Planning

APPENDIX E



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

SYSTEMS AND INDUSTRIAL ENGINEERING DEPARTMENT

July 8, 1977

MEMORANDUM TO: Dr. W. G. Matlock, Chairman, AID 211(d) Management Committee

FROM: Dr. D. G. Schultz, Systems & Industrial Engineering

Dr. E. Lamar Smith, Jr., School of Renewable Natural Resources

REGARDING: Review of AID 211(d) Project "Scientific and Technical Information Workshop"

This review of the AID 211(d) project "Scientific and Technical Information Workshop" was undertaken at the request of the Management Committee by Lamar Smith and Don Schultz, with the latter acting as chairman. Jack Johnson was considered as a third committee member because he had been in Ghana to view the workshop in action. Because of his position as the overall AID Project Director, he was not placed on the committee and was not asked to review this report before it was published. However, in preparation for the report discussions were held both with Jack Johnson and with Nancy Ferguson, an active project member.

The evaluation follows the guidelines spelled out by Dr. Matlock in his May 23 memo asking us to undertake this task.

1. Project Work Plan

The project work plan was well spelled out in advance on the large "Work Plan" sheets that resulted from last year's planning session. The specific project objectives stated at that time were:

- (a) Present short course/workshop on techniques for management of scientific and technical information.
- (b) Prepare instructional manual (text) for short course/workshop on techniques for information management.
- (c) Provide short-term and on-going advisory services for Ghanaian scientific and technical institutions on information management.
- (d) Advise C.S.I.R. (Ghana) on methods and strategies for establishment and management of a specialized literature collection to support on-going projects in the arid and semiarid Upper Region.
- (e) Assess documentation available in West Africa germane to arid and semiarid natural resources development projects.

Dr. W. G. Matlock
Page 2
July 8, 1977

All of these items have been accomplished in a satisfactory and professional manner, with the exception of a portion of item c. Here a partial objective was to provide on-going advisory services, and apparently this will not happen. Why this will not happen is a direct function of the budget. The information system is no longer tied to the 211(d) project, and there are simply no additional funds.

Had the funding been continued, there is a reason why on-going advisory services may not have been provided as might be expected. A basic problem with this project is that no permanent University of Arizona faculty were involved. Thus, the planning, and even scheming, necessary to ensure the future funding did not take place and probably could not take place.

2. Project Output

The project output was the short course itself, along with the 104 page handbook that was the working document for the course. This output was well received, even to the extent that a written request has been received to translate the handbook into French.

There was no published output that appeared in a journal, and the opportunity for additional output has probably disappeared with the funding.

The trip report written for the project provides a very detailed account of activities and contacts made by the team. However, it would have been of more value to the University of Arizona's 211(d) program if a summary of recommendations as to further University of Arizona activities under 211(d) or other funding had been made. In particular, it would be useful to know whether more such workshops would be a worthwhile activity and under what conditions. It is also not clear what benefits were obtained for the University of Arizona from the tour of Francophone countries or what possible future involvement the University of Arizona could or should pursue in those countries.

3. NR 211(d) Program Goals

This was a very specific project whose goals were well documented in the "Work Plan" sheets that were approved by both the Management Committee and, we understand, AID in Washington. In particular, the project did meet the goals of the original grant document in that our extensive knowledge of information systems was transferred to an LDC through linkages that had been established as a result of the grant. The objective that was not met concerned the development of increased competency among University of Arizona faculty in problems of the LDC's. No University of Arizona faculty were involved.

4. Comparison to Other University of Arizona Activities

It appears that the immediate results of the project compare very favorably with other activities sponsored by the 211(d) grant. The project was carried out in an LDC country at their request, was well attended, and well received. Subsequent requests for translation of the handbook and further help in developing their information systems are evidence of this fact. The inability to follow up because of budget problems is not necessarily the fault of the project group. Other projects are lacking follow-up as well, for exactly the same reason (lack of funding), whether or not University of Arizona faculty had been involved or not.

In summary, and in retrospect, it seems that from the outset the project should have involved a University of Arizona faculty member in something other than an administrative position. That the project did not is probably more the fault of the Management Committee than the project group itself. Now, given that no faculty member was involved, how was the project conducted? The answer is "very well."


Donald G. Schultz


E. Lamar Smith, Jr.

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APPENDIX F

NATURAL RESOURCE PLANNING IN NIGER

(Planification des Ressources
Naturelles au Niger)

DOCUMENT LIST FOR THE UNIVERSITY OF ARIZONA / NIGER STUDY

Liste de documents pour l'Université d'Arizona
Etude du Niger

by N. Ferguson
par

University of Arizona
Université de l'Arizona
Tucson, Arizona
U.S.A.
Etats-Unis

Document List for the University
of Arizona / Niger Study

Section 1

Documents dealing specifically with the
Departement of Zinder

Section 2

Documents on Niger

Section 3

Documents on the region of West Africa
and the development process

SECTION 1

DOCUMENTS DEALING SPECIFICALLY WITH
THE DEPARTEMENT OF ZINDER

1. Anonymous. 1977. 3M : Evaluation de la Campagne Agricole 1976. Unpublished. 47 p. plus annex (N-263, N-264)
2. Anonymous. 1976. Réunion trimestrielle des cadres de la santé, de l'animation et de l'alphabétisation, 28-30 Décembre 1976. République du Niger, Département de Zinder. 18 p. (N-170)
3. Anonymous. 1976. Enquête matrones traditionnelles et femmes du village, Arrondissement de Gouré. In : Animation au développement, Centre de Gouré, rapport de fin d'année, 1975-76. p.16-18. République du Niger, Département de Zinder. (N-202).
4. Anonymous. 1976. Prévisions budgétaires 1976 et 1977 (for Zinder Département by arrondissement). Unpublished. 3 p. (N-186).
5. Anonymous. No date. Projets en cours ou à l'étude dans le département de Zinder. Unpublished. 5 p. (N-185).
6. Baier, Stephen Brock. 1974. African Markets in the Colonial Period : A history of Commerce in Damagaram (Central Niger, 1880-1960). Ph. D. Dissertation, University of Wisconsin, Madison 312 p.
7. Baron, Albert E. 1976. The "3-M" Project in Zinder. Unpublished Trip Report, December 27, 1976. 6 p. (N-125)
8. Chefou, A. 1976. Enquête et études réalisées. In : Animation au développement, Centre de Mirriah, rapport annuel d'activités 1975-1976. p.6-14. République du Niger, Département de Zinder, Arrondissement de Mirriah. (N-211).
9. Collins, John Davison. 1974. Government and groundnut marketing in rural Hausa Niger : the 1930's to the 1970's in Magaria; Ph. D. Dissertation, John Hopkins University. 402 p.
10. Delvoie Philippe. 1977. Annuaire Statistique Départemental. 1976. Edition provisoire. Service Départemental du Plan, Zinder, Ministère du Plan, République du Niger. 72 p. (N-234)

11. Delvoie Philippe. 1976. Liste des documents et données disponibles sur le Département de Zinder. Unpublished memorandum. 6 p. (N-191)
12. Département de Zinder, Préfecture de Zinder, République du Niger. 1976. Compte rendu de la réunion du Comité Technique Départemental : Zinder, 15 Juillet 1976. 33 p. (N-143)
13. Département de Zinder, République du Niger. 1975. Programmation de l'Aménagement et de l'équipement des Centres Urbains - Population supérieure à 2,500 habitants. Unpublished ; 9 p. (N-272)
14. Département de Zinder, République du Niger. 1974. Note sur le Projet 3M ou Projet de Développement rural du Département de Zinder. Unpublished. 7 p. (N-253)
15. Département de Zinder, Service d'animation, République du Niger. 1974. Rapport des Activités : Rôle des Femmes dans le Projet 3M. Unpublished 15 p. (N-235).
16. Fenn, M.G. 1968. Projet PNUD/FS de Développement de la production animale et des ressources en eaux dans l'est du Niger : Perspectives en matière d'investissements et d'expansion. Food and Agriculture Organization of the United Nations, Rome EA:SF / 68-23.4.68, 82 p. (N-244).
17. Foulani, P. 1972. Optimisation de l'installation de désinfection par irradiation des mils, sorghos et niebes à l'usine de So.Tra.Mil à Zinder (Niger). In : Radiation Preservation of Food ; Proceedings of a Symposium, Bombay 1972, International Atomic Energy Agency and the Food and Agriculture Organization of the United Nations. p. 563-575 . (N-228).
18. Gaoh, Tiemou S. / Politopoulos, G. 1977. Inventaire des Projets du Département de Zinder. Service Départemental du Plan, Zinder, Ministère du Plan, République du Niger. 15 p. (N-300).
19. Habou, Akilou. 1975. Rapport annuel 1975 : Département de Zinder, Service de l'élevage et des industries animales, statistiques . Unpublished manuscript. 40 tables. (N-135).
20. Hadou, Idao. 1975. La gestion administrative de développement du Département de Zinder. République du Niger, Niamey, Ecole Nationale d'Administration. 36 p. (N-270).
21. Harouna, Mossi. 1976. Rapport d'évaluation des activités de la Campagne 1975-1976. République du Niger, Arrondissement de Magaria. 11 p. (N-233).
22. Institut Pédagogique pour le Développement Rural, Kolo, Niger. No date. Rapport collectif des stages des élèves de 2ème année - Evaluation stages commercialisation autogérée : eaux et forêt génie rural. Unpublished. 3 p. (N-137).

23. Institut Pédagogique pour le Développement Rural, Kolo, Niger. No date. Rapport collectif du stage de vulgarisation : 1975. Unpublished. 18 p. (N-136).
24. Issia, Akilou. 1976. Animation au développement, Centre de Matameye, rapport de fin de période, année : 1975-1976. République du Niger, Département de Zinder, Arrondissement de Matameye. 38 p.
25. Ministère de la Coopération, Direction de l'Aide au Développement, République Française, Paris. 1974. Bilan hydrique efficace et prospective décadaire des besoins en eau des cultures pluviales en zone Soudano-Sahélienne : cahier opérationnel, Zinder, République du Niger. 74 p. (N-126).
26. Ministère de l'Economie Rurale et du Climat, République du Niger. 1975. Mise en valeur des Mares du Département de Zinder. Unpublished. 19 p. (N-261).
27. Ministère de l'Economie Rurale, Commissariat Général au Développement, République du Niger. 1971. Projet de développement rural du département de Zinder : augmentation des ressources agricoles des arrondissements de Mirria, Magaria, Matameye. Report and Annexes, Vol. I : 75 p., Vol. II : 74 p. (N-28, N-29).
28. Ministère de l'Economie Rurale, Service du Génie Rural, République du Niger. No date. Note sur les projets d'aménagement de mares présentés par les cadres du département de Zinder. 4 p. (N-138).
29. Politopoulos, Charilaos / Gaoh, T.S. 1977. Note sur l'importance économique de la route Zinder-Tanout-Agadez et de la route Dungass-Wacha-Hamdara. Service Départemental du Plan, Zinder; Ministère du Plan, République du Niger, Projet PNUD NER 75007 - 42 p.
30. Powell, J., and D.E. Pedgley. 1969. A year's weather at Termit, Republic of Niger. Weather 24 (7) : 247-254. (N-144).
31. République du Niger, Niamey. No date. Eaux et Forêts. Unpublished. 15 p. (N-141).
32. République du Niger, Niamey. No date. La commercialisation des produits agricoles par les marchés autogérés ; les organismes stockeurs ; et les marchés traditionnels. Unpublished. 11 p.; 9 p.; 7 p. (N-142).
33. République du Niger, Niamey. No date. Opération 3M. Unpublished. 21 p. (N-209).
34. République du Niger, Niamey. No date. Génie Rural. Unpublished. 13 p. (N-168).
35. République du Niger, Niamey. 1971. Conférence des Cadres, Département de Zinder, 27-29 Mai 1971. 260 p. (N-140).
36. Rupp, Marie-Anne. 1976. Report of the sociological study conducted in the districts of Tanout, Dakoro, Agadez from March 30 to April 30, 1976. Unpublished. 44 p. (N-179).

37. Salifou , André. 1971. Le Damagaram ou Sultanat de Zinder au XIX Siècle. Etudes Nigériennes 27. 320 p. (N-139B) .
38. Service de Développement Régional et d'Aménagement du Territoire (S.D.R.A.T.), Zinder. 1975. Programme provisoire de collecte des données de base (memo from the Préfet du Département de Zinder to the Ministère d'Etat chargé du Développement). Unpublished. 20 p. (N-210).
39. Thomson, J.T. 1973. Trouble case investigation of a problem in Nigerien rural modernization : forest conservation. Indiana University, Department of Political Science, Studies in Political Theory and Policy Analysis. 47 p. (N-11).
40. United Nations Development Program, and Food and Agriculture Organization of the United Nations. 1970. Niger : les eaux souterraines, développement de la production animale et des ressources en eau dans l'est du Niger. AGL : SF/NER 7, Rapport Technique 1, MR/A8457/11.70/F/1/150. 50 p. (N-8).
41. United Nations Development Program, and Food and Agriculture Organization of the United Nations. 1970. Niger : rapport intérimaire , développement de la production animale et des ressources en eau dans l'est du Niger. AGL : SF/NER 7, Rapport intérimaire 1, MR/A8461/11.70/F/1/60. 31 p. (N-9).
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APPENDIX G

NATURAL RESOURCE PLANNING IN NIGER

**(Planification des Ressources
Naturelles au Niger)**

METHODOLOGY OF THE VILLAGE SURVEY

by Dr. H. Henderson

Methodology of the Village Survey

1. The Nature of the Sample

The following report discusses methodological approaches to the village survey and outlines our probable research format. We plan to use two main types of sampling procedures a) opportunistic or accidental sampling, and b) probability sampling. In opportunistic sampling, the researcher uses his prior knowledge of the community to identify and select representatives from the population universe who possess certain distinctive qualifications, e.g. of age, sex, occupational status or prestige. When we interview the village elders, the chief and other notables, we will be using this type of sampling and its associated techniques of relatively open-ended questions, accompanied by observation, journal keeping on community events etc. (Bennett and Thaiss: 317)

The advantages of opportunistic sampling lie in the fact that it can be flexible, eclectic and informal, and that interview schedules may be arranged through contact with friendly community consultants. In some circumstances, it has been argued that opportunistic sampling may be more efficient than probability sampling in that it identifies pertinent characteristics of informants in a situation where an adequate sampling frame cannot be constructed until much preliminary study has been done (Honigmann: 278).

The disadvantages of non-probability sampling lie in the fact that the parameters of the sampled universe are poorly drawn, situationally variable and idiosyncratic. Because of these latter factors, the study cannot easily be replicated. There is also the danger that the researcher will talk primarily to those who want to talk and thus not get an adequate sampling of the universe.

The main methodological focus of the village survey will be

probability sampling which requires that every unit in the universe under study will have the same probability of being studied. Units are to be selected at random. Advantages of such a method lie in the higher confidence that the sampled responses are non-idiosyncratic and that statistical manipulation of the data, as required by our project proposal, is possible.

Disadvantages may lie, however, in the hesitancy of people to talk to an interviewer they have not met in another social context, or their hesitancy about the questionnaire format, being unaccustomed to having their opinions requested. Furthermore, if resistance is high to random sampling and non-collaboration reaches 10 percent of the total sample, there will be a lack of confidence in results (Honigmann: 278).

The villages to be surveyed by probability sampling of compounds have themselves been selected by non-probability methods, i.e. they have been chosen from certain watershed areas to control for climatic variation. We must note that the results obtained from sampling three villages, Gourbobo, Falenko and Garake, while telling us a good deal about the sampled universe of the three villages may not be entirely representative of the larger "target universe"-- the Department of Zinder.

2. The Sample in Gourbobo, Falenko and Garake

Upon arrival in Zinder, appointments will be set up to visit with each village chief, prior to sampling the village. At the meeting with the chief and other dignitaries the formal purpose of the project will be explained by Henderson and Arnould. It will be emphasized that the villages have been specifically selected because of their ethnic composition, unique environmental situation and any other qualities we may have previously ascertained the village is proud of. We will stress that we are looking for the villagers opinions on matters con-

concerning farming, marketing and development. The village chief will always be included in the sample of families drawn and will be kept informed of the progress of the survey (Norman: 13). Only villages whose leaders are sympathetic with the objectives of the research will be studied. Support will also be obtained from the District Agricultural Office, the local Prefect, and the traditional ruler, if necessary.

During the open meeting, Arnould and Henderson will let themselves be questioned about their personal background, research support and future plans of operation (Schwab: 412-3). We will also emphasize that the responses to the questionnaire will be kept confidential.

Official goals of the village survey as presented to the chief will include 1) finding out how people farm and market right now 2) how they obtain firewood, water, fertilizer and use their other material resources at the present moment 3) how they would like to see these material resources improved as part of a possible government development plan 4) understanding contemporary life in order to help promote those aspects the people feel are beneficial and improve on other aspects which are not so satisfactory.

Sampling Techniques

Mapping

After our general introduction, Henderson and Arnould will spend a day or two walking around the villages and farm areas, with interpreters allotting numbers in consecutive series to each compound (number of houses enclosed by a wall). Maps should show not only house-compounds but paths, burial grounds, shrines, livestock areas, wells, and storage areas for community use. Distinctions in sizes of compound may be color coded, and compounds with entryways will be indicated with special markings (Melbin: 263). Other significant distinctions will be discussed prior to

mapping with Collion and interpreters. Walking around the village will give us a visibility to the population, especially those who were not present at the meeting with the chief. It will also show people that we intend to go beyond requesting simple normative statements, and want more detailed responses which may be verifiable (Charlick: personal communication with E. Arnould). Map making should be accompanied by some photographing of compounds and public areas. Once the compounds have been numbered on our maps, the job of picking the sample begins.

Techniques for Picking the Random Sample

After the mapping process has been completed for each village, a few days may be spent acquiring demographic information on the village and administering the questionnaire to non-randomly selected villagers to find out some of the range of variation in regard to ethnicity, class or occupation within the population.

After this initial mapping and interview stage, Collion, Arnould and Henderson will meet to discuss the number of compounds to be sampled from each village. If there is a great deal of variation within one village, the number sampled ~~will~~ will be higher than otherwise expected. It will be noted that the villages to be surveyed range in size from approximately 350 for Garake to 1400 for Falenko and that some adjustment in population sampled needs to be made to take account of these variations (McCullough: personal communication).

Perhaps the easiest way to pick the random sample was suggested by M. Seligson who proposed that we select every third ^{compound} (or other number) and plan to interview the compound head and his wife. Another method would be to place the numbers of the compounds on cards, shuffle and pick individual numbers at random. If we want a 10 percent sample, for example we will take from the shuffled stack every tenth card.

In some areas, Norman had the village heads select the master sample by drawing names of family heads at random out of a tin. Each name was read aloud to bystanders as drawn. Having the heads pick the sample of families allayed any possible criticism of the researchers by the villagers(1973:13-14).

M.G. Smith, working in Zaria, used tax rolls for the basis of his sampling(Smith :339). This would provide us with a sample aimed at individuals, rather than compounds. I think the previously cited methods for compound sampling are more appropriate for the research time allotted us. The sample area will be 5 percent or 10 percent larger than necessary to enable us to skip to another house if a compound head refuses to cooperate. General policy, however, will be to return for the interview at another time, if the selected head is not at home, rather than omitting him at the first attempt. Each day, lists for interviewers will include extra items.

Who Will Be Interviewed? And Where?

Prior to interviewing, attempts will be made to contact the compound head, explain our project, and obtain consent for the interview. If possible, interviews with the head should be held in his field, thus giving privacy and farming information. If the compound is preferable, a rough time should be given. Similar arrangements should be made for the compound head's wife. This latter interview presents problems if we do not have a female interviewer who could meet with the woman in her quarters. If she is interviewed in the presence of her husband, she may not give spontaneous replies. If the interview of the wife is held at the same time as that of the husband, perhaps his could be held in the entryway or outside the house. Smith(340) assured

privacy for the interviews by giving his questionnaire in the entrance of a hut of a compound in the village allotted to him by the chief. This approach might be considered by the team for some interviews.

Even if he is not selected by the random sampling method, the chief should be among the first in the village to be given the questionnaire. He will then be able to assure villagers that the questionnaire is not dangerous. People may feel flattered to give their opinions on the same questions that were asked of the chief. In general, we are not anticipating a lot of difficulty in getting people to answer the questionnaires. Caldwell found in Ghana that interviews became "ceremonial occasions" in which there was little difficulty getting responses from the head of the household if politenesses were observed. Chiefs and elders both told the interviewers that no one had ever discussed really important matters with them before(25).

By following the procedure of interviewing household heads and their wives, we will, of course, be cutting down on the total sample of households(though the number of individuals in the village interviewed will be approximately 70-100). It is hoped that we will interview in at least 35 compounds per village, assuming that the villages are of relatively equal size, with populations around 1000. It has been suggested that a sample of approximately 20 percent of households per village would be statistically adequate(personal communication: E. Henderson).

The rationale for interviewing husband-wife pairs is to see if there is complementarity in the male/female economic spheres as an aid in assessing the economic situation of the household. Exceptional individuals will also be interviewed, if located through general discussion with the chief. Such interviews will be conducted by Henderson or Arnould and may be in the form of questionnaires or a more open-ended format.

To ignore people such as the religious specialist, the most prosperous farmer, the village midwife etc. would, I think, give us an inadequate view of the dynamics of village life. All interviews, not selected by the random sampling method, will be kept separate.

It has been suggested by Seligson that we try to cover each village, one by one, using all of our people power to get the job finished quickly, thus avoiding contamination of the responses as the questionnaires are discussed. This method might be attempted after an initial mapping and pre-testing stage in each village.

Ferguson should also be informed of village survey activities when possible. If she is in a village with Henderson or Arnould, and is informed of the compounds selected for the random sample, she may be able to do some checking of farm holding by those compound members. Detailed land use maps would also be desirable.

Norman used aerial photographs of villages taken at the middle of the dry season (Feb. or March) when vegetation was at its lowest density. Enlargements were made for use in the field and the boundaries of fields farmed by each individual were delineated on enlarged aerial photographs.

The Interviewers

Upon arrival in Zinder, Arnould, Henderson and Collion will begin working with the interviewers arranged for by Collion. Work will begin with checking the questionnaire for proper translation, clarity of meaning, avoidance of specially awkward questions. Pretests will be arranged.

A disturbing point is the absence of a female interviewer who speaks Hausa. This may inhibit female responses to the questionnaire (Ardener 1959). In Zinder, attempts will be made to find at least one such interviewer, perhaps a secretary, if only on a limited basis. Some

use might also be made of female Peace Corps volunteers on an informal basis.

training of interviewers will involve having them give the questionnaire to each other and role playing difficult ~~situations~~ interview situations e.g. the political argument, the garrulous respondent, the respondent who tries to answer for others in the compound, the suspicious respondent. Discussions will include suggestions on how to postpone a talkative person's comments until the end of the interview when they are usually ready to rest, and how to stop the interview if the situation becomes untenable. McCullough has suggested that Henderson, Arnould, Collion and the Hausa interviewers each have a list of items to be completed a) in each village b) in each compound c) during and after each interview. Each interviewer might also carry with him/her a set of written instructions on how to answer questions, handle difficult problems etc.

The question has been raised as to whether Henderson and Arnould will accompany the interviewer-translators. The suggestion was made by Seligson that the Hausa interviewers should conduct the survey, with spot checking done by Arnould and Henderson. Henderson and Arnould would be responsible for checking that the interviewers are doing the job properly, consulting with and debriefing them after each interview, scheduling the next day's interviews, making contingency plans, and interviewing the chief, local dignitaries. Seligson suggested that at least four interpreters should be hired per village, three to do the village survey, one to accompany Henderson and Arnould. Ferguson will also be in need of interpreter services. Seligson thought there would be too much duplication of efforts if Henderson and Arnould had to be present while each interview was taking place. Robert Netting, however, and other anthropologists felt much would be gained by the presence of

Henderson, Arnould, Collion who could make observations about the compound^{and down} questions that received long or short responses. They would also be a constant check on maintenance of thorough interviewing techniques. After each interview enquiries could be made as to substantive replies that had been given by the respondent.

Norman found that two enumerators were able to interview 15-20 farming families every 3-4 days(9). From this and other ~~in~~ information, we estimate that our interviewers should be able to do at the maximum four interviews per day.

Problems with the Interviews

Some common difficulties cited by researchers

1. People are not able to understand how they were picked for the survey and not their neighbors.
2. Residents of a compound are often a corporate group and may require unanimous approval of group before permission is given for survey.
3. People in some areas of West Africa(not especially Hausa) refuse to list their wives and children for fears of added taxes or conscription. Compound head may have trouble giving ages of members of family and may not want to talk about names of first wife or first child (Norman:29).
4. Gordon suggests that while community should be blanketed with information about the questionnaire and the project, respondent should not be given an opportunity in advance to refuse to be interviewed(1975: 312)
5. Household head may not have information about the time spent in the fields and the yield of fields under the jurisdiction of other household members(Norman: 27). Or, as Charlick has pointed out, the Maj. Gida will often say he has no individual fields, but that all are collective(Personal Communication). The information will have to be obtained through probing who works on the fields, who partakes of the products.
6. Farmers are sometimes reluctant to disclose all crop sales. They did not want others to know about their liquidity position.
7. Data on Livestock is difficult to collect, especially cattle, because of the tax in Nigeria.
8. Certain types of data are "uncollectable"(Norman: 29) especially data on ~~the~~ loans and debts. "Attempts to collect such data might

jeopardize the whole study, and even if collected, it would be unreliable"(Norman:29). But lack of this information is a deficiency in the Norman study. Some of the information was obtainable when interviewers knew the farmers better.

9. The only sure way to find out information about the size of fields is to measure them yourself. This is expensive and time consuming.
10. Serious difficulties may be encountered in collection of data pertaining to income and expenditure.
11. Reluctance to discuss ritual procedures and illnesses.
12. Hill says it is doubtful if reliable statistics on income and expenditure(as distinct from production and consumption) could ever be obtained in a Hausa village because of extreme secrecy surrounding various transactions(58). Husbands and wives are often ignorant of spouse's economic affairs. So how can the fieldworkers get the truth?

Complaints about interviewers should be discussed with the village chief. All interviews will be conducted in Hausa, but the answers will be written in French.

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APPENDIX H

QUESTIONNAIRES FOR NIGERIAN PROJECT SURVEYS

I. Village Surveys

- A. Ta Maza (Questionnaire for Men,
In Hausa)**
- B. Ta Mata (Questionnaire for Women,
In Hausa)**
- C. Tambayoyin Sarki Da Sauran Shugabanin
Mutane (Questionnaire for Village
Leadership, In Hausa)**

**II. Inventaire Du Marche Nigerien (Nigerian
Market Survey)**

(QUESTIONNAIRE FOR MEN, IN HAUSA)

TA MAZA

Enquêteur _____

1. takarda

/ /
1

2. lumbar tambaya

/ / / /
2 3 4

3. Sunan K'auye _____

/ /
5

4. Ranar Tambaya

/ / / / / / / /
6 7 8 9 10 11

5. Shekaron mai bada amsa
sa rayi
dattijo
tsoho

/ /
12

6. Shekara nawa gareka ? _____

/ / /
13 14

7. Fadi sunayen mutane na gidan nan da dangartakarka da su

/ / /
15 16

/ / /
17 18

/ / /
19 20

/ / /
21 22

/ / /
23 24

8. Wad'anne amfanin gona suka fi kyau a shuka ?

/ / /
25 26

9. Me kake shuka wad'annan a gonarka ?

gero (hatsi) i _____ a'a' _____
 acca (dawa) i _____ a'a' _____
 gyad'a i _____ a'a' _____
 wake i _____ a'a' _____
 tumatir i _____ a'a' _____
 albasa i _____ a'a' _____
 auduga i _____ a'a' _____
 tattasai i _____ a'a' _____
 taba i _____ a'a' _____

wad'ansu amfani
 (kamar shinkafa, dankali, barkono, melo, kabewa)

i _____ a'a' _____
 'ya'yan itatuwa i _____ a'a' _____

/// // // // //
 27 28 29 30 31

10. Da bana da bara yausha kafi shuka wad'annan amfanin gona ?

gero (hatsi) _____
 acca (dawa) _____
 gyad'a _____
 wake _____
 tumatir _____
 albasa _____
 auduga _____
 'ya'yan itatuwa _____
 tattasai _____
 taba _____

wad'ansu amfani _____
 (kamar shinkafa, dankali, barkono, melo, kabewa)

// 32
 // 33
 // 34
 // 35
 // 36
 // 37
 // 38
 // 39
 // 40
 // 41
 // 42

11. Bad'i zaka shuka wad'annan amfanin gona fiye da ko k'asa da bana ?

gero (hatsi) _____ auduga _____
 acca (dawa) _____ tattasai _____
 gyad'a _____ taba _____
 wake _____ wad'ansu amfani _____
 tumatir _____ 'ya'yan itatuwa _____
 albasa _____

/// 43-44
 /// 45-46
 /// 47-48
 /// 49-50
 /// 51-52
 // 53

12. Daga ina ka sami irin da ka shuka a bana ?

///
54 55

13. Me kake yiwa gonarka don taki ?

///
56 57

14. Gonarka ta yi saura a bana ?

i _____ a'a' _____

///
58

15. Idan kana da saura, dom me ba ka shuka ba ?

///
59

16. Kana cikin k'ungiyar manoma na gari ?

i _____ a'a' _____

///
60

17. Dom me ka shiga ?

Dom me ba ka shiga ba ?

///
61

18. Kana cikin k'ungiyar masu aikin gayya ?

i _____ a'a' _____

///
62

19. A shekarar da ta wuce kayi aikin gayya

a gandu _____ ? ko a gonarka _____ ?

///
63 64

20. Wane ne abokin zancenka game da aiken gona ?

/ /
65

21. Ka kan yi hasarar abinci maiyawa da kake ajiye a rumbu ?

i _____ a'a' _____

/ /
66

22. Wad'anne suka fi maka barna,

k'wari _____ ko b'era _____ ?

/ /
67

23. Da doki da garma wanne ka fi so ?

/ /
68

24. Akwai kayan noma ko injinan noma da kake so amma a yanzu
ba ka da su ?

i _____ a'a' _____

/ /
69

/ / /
70 71

25. Wa yake nome gandun mutane ? _____

/ / / /
72 73 74

26. A wane lokaci ake nome shi ? _____

/ / / /
75 76 77

27. A bara ka biya 'yan kodago (dān barema) domin su yi aiki a gonarka ?

i _____ a'a' _____

/ /

78

28. Wa yake kiwon dabbobinka ?

/ / / /
79 80

takarda

/ /

lumbar tambaya

/ / / / /

2 3 4

29. Shanu _____ ko tumaki _____

ko awakai _____ suna kiwo a gonarka ?

/ / / / /

5 6 7

Wa yake da su. ? _____

Nawa ne ne? _____

/ / / / /
8 9 10

30. A shekarar da ta wuce ka saida dabba _____

/ / 11

ko ka yanka dabba _____ domin ka

/ / 12

(a) sai tufa _____

/ / 13

(b) sai abinci _____

/ / 14

(c) yi lahiya _____

/ / 15

(d) yi arme _____

/ / 16

(e) da sauransu _____

/ / 17

31. Ka tab'a samo abincin dabbobinka a gona _____

ko ka taba saya _____ ?

/ / / /
18 19

32. Awa nawa ka kan yi kafin ka samo musu _____
Idan kuma saya ka ke, nawa ka ke b'aidawa ? _____

/ /
20

/ /
21

33. Wa ya ke bawa mutanen gida abinci idan tsabar rumbu ta
k'are ?

/ / /
22 23

34. Wace sana'a ka kan yi banda noma ?

/ / / /
24 25 26

35. Wa yake d'ebo ruwa domin amfanin gida?

/ /
27

36. Sau nawa akan d'ebo ruwa a sati domin amfanin gida ?

/ /
28

37. Akwai sabuwar hanyar jan ruwa a yanzu wacce ta bambanta da
yadda ake jan ruwa a da ?

/ /
29

Idan akwai wacce hanyar jan ruwa kafi so _____

/ /
30

Mene ne dalilinka _____

/ /
31

38. Wa yake fad'ar lokaci _____

da farashi _____

da kuma inda _____

za'a sayar da amfanin gona ?

/ / / /

32 33 34

39. Ka bada amsoshin wad'annan tambayoyi game da kayayyaki
ko amfanin gona da ka ke sayarwa ?

amfanin gona _____

/ / / /

35 36 37

sau nawa akan yi ciniki _____

/ / / /

38 39 40

wurin da kasuwa take _____

/ / / /

41 42 43

farashi _____

/ / / /

44 45 46

mai sayarwa _____

/ / / /

47 48 49

40. Ta k'ak'a akan kai amfanin gona da za'a sayar kasuwa ?

/ / /

50 51

41. Awa nawa ne daga gida zuwa kasuwa ?

/ /

52

42. Me ya kansa ka sayi abinda ka ke saya _____

Tokacinda ka ke saya ? _____

/ / /

53 54

43. Ka bada amsoshin wad'annan tambayoyi game da kayayyaki ko amfanin gona da ka kan saya:

amfanin gona _____ **///**
55 56 57

sau nawa a kan yi cin'ki _____ **///**
58 59 60

farashi _____ **///**
61 62 63

wurin da kasuwa take _____ **///**
64 65 66

mai saye _____ **///**
67 68 69

(Game da kowane amfanin gona, dan Allah ka gaya mana sau nawa ka kan sayeshi, da wurin da ka ke samunsa, da farashinsa da masu sayensa)

44. Wane kayayyaki ka ke son saya amma ba a samu a kasuwa ?

_____ **///**
70 71 72

45. Ka tab'a sayan wata gonarka domin ka sami kudi ?

i _____ a'a' _____ **///**
73

46. Wace wuri ka fi zuwa daga nan garin ? _____

Awa nawa ne daga nan ? _____ **///**
74

Sau nawa ka kanje a sati ? _____ **///**
75

47. Yawon awa nawa kake a sati ko a rana ? _____

mene ne babban dalilinki na yawa ? _____ **///**
76 77

takarda

lambar tambaya

/ /
2 3 4

48. Awa nawa ne daga nan zuwa babban garin Arrondissement ?

/ /
5

Zuwa Zindar ? _____

Sau nawa a shekara ka kan je Zinder ? _____

/ /
6
/ / /
7 8

49. Asalinka kai mutumin nan k'auyen ne ?

i _____ a'a' _____

/ /
9

50. Idan ba haka bane, don me ka zo wannan k'auye ?

/ /
10

51. Ka tab'a balaguro daga nan k'auyen domin ka yi aiki a wani gari ?

i _____ a'a' _____

Domin ka cin rani ? i _____ a'a' _____

/ /¹¹
/ /¹²

52. Akwai wanda ka aiki a wani wuri a mutanen gidanka nan ?

i _____ a'a' _____

/ /
13

53. Me su kan yi maka ?

/ / /
14 15

54. Wane abu ne wajibi wanda dole kai zaka yiwa iyalinka a koyaushe ?

/ / / /
16 17 18

Wane abu ne wajibi wanda dole kai za ka yiwa jama'ar gida ?

/ / / /
19 20 21

55. Kana da bara wanda ya kan sai kayanka ?

i _____ a'a' _____

/ /
22

Me kuke wa juna ?

/ / / /
23 24

56. Kana da patron ? i _____ a'a' _____

/ /
25

Me ku ke wa juna ?

/ / / /
26 27

57. Ka gaji wata sarautar gargajiya ?

i _____ a'a' _____

/ /
28

Idan haka ne, to mene ne ma'anarta a zamanin yau ?

/ / / /
29 30

58. Wad'anne daga cikin nan kake makamashi da su ?

ice i _____ a'a' _____

/ / 31

gawayi i _____ a'a' _____

/ / 32

Petrol i _____ a'a' _____

/ / 33

kashin dabba i _____ a'a' _____

/ / 34

59. Wad'anne kake saya ? _____

35 36

Wad'anne kake yi ? _____

37 38

Wad'anne ka ke samu ? _____

39 40

Idan saya ka ke, to nawa ne kud'insu ?

41 42 43

60. A wane lokaci ka ke amfani da ice, _____

gawayi, _____ Petrol, _____

ko kashin dabba ? _____

44 45 46 47

61. A yini ka kan yi amfani da kan ice nawa ? _____

48

mudun gawayi nawa ? _____

49

kwalabar Petrol nawa ? _____

50

kashin dabba nawa ? _____

51

62. Wane makamashi kuma ka ke amfani da shi domin girki

_____ ko fitila ? _____

52 53

63. Da bana da bara yausha ka fi wahala wajen samun ice _____

_____ ko Petrol ? _____

54 55

Don me ?

56

64. Wa yake samowa iyalinka ice ?

57

65. Sau nawa akan nemo ice a sati ?

/ /
58

66. Mutane nawa sukan ci abinci tare da kai ?

/ /
59

67. Ka tab'a hira da wad'annan mutane:

- (a) ma'aikaton gidan gona i _____ a'a' _____
(b) sous-prefet i _____ a'a' _____
(c) jami'in UNCC i _____ a'a' _____
(d) matrone i _____ a'a' _____

/ / 60
/ / 61
/ / 62
/ / 63

68. Ka karb'i rancen kud'i a bana ?

i _____ a'a' _____

/ /
64

69. Wane ne ya baka rancen ?

- d'an'uwanka _____
abokinka _____
d'an kasuwa _____
mai bada bashi _____
kungiya (UNCC) _____

/ / 65
/ / 66
/ / 67
/ / 68
/ / 69

70. Idan ka tab'a rance mene ne k'aidodinsa ?

/ / /
70 71

Wani ya tsaya make ? i _____ a'a' _____

akwai riba ? i _____ a'a' _____

A cikin wane lokaci ka biya ? _____

/ / 72
/ / 73
/ / 74

71. Idan ka tab'a rance, mene ne dalili ? Ka karb'a ne domin
- (a) ka sai iri i _____ a'a' _____ / / 75
- (b) ka sai taki i _____ a'a' _____ / / 76
- (c) ka yi alheri i _____ a'a' _____ / / 77
- (d) ka biya haraji i _____ a'a' _____ / / 78

takarda

/ / 1

lumar tambaya

/ / / /
2 3 4

72. Ka kanyi amfani da dabarun da animata ko ma'aikatan gida gona suke koyawa ?

i _____ a'a' _____

/ /
5

73. Wane irin shirye shirye kake saurara a rediyo ?

/ / / /
6 7 8

74. Ka iya karatu da rubutu a harsunan

Arabiyya i _____ a'a' _____

/ / 9

Hausa i _____ a'a' _____

/ / 10

Faranshi i _____ a'a' _____

/ / 11

75. Idan da a ce ka sami gado jaka 20 me zaka yi da su ?

/ / /
12 13

76. Wa zai lura da kai idan ka tsufa ?

/ /
14

77. Wane irin ci gaba ka ke san ganin ya faru a k'auyen nan ?

/ / / /
15 16 17

(QUESTIONNAIRE FOR WOMEN, IN HAUSA)

TA MATA

Enquêteur _____

1. takarda

//
1

2. lumbar tambaya

// // //
2 3 4

3. Sunan K'auye _____

//
5

4. Ranar Tambaya _____

// // // // // //
6 7 8 9 10 11

5. Shekarun mai bada amsa

budurwa _____

babbar mace _____

tsofuwa _____

//
12

6. Shekara nawa gareke ? _____

// //
13 14

7. Fad'i mutanen da ke cin abincin tare dake a wannan gida
da kuma dangartakarki da su ?

// //
15 16

// //
17 18

// //
19 20

// //
21 22

// //
23 24

8. Wad'anne amfanin gona suka fi kyau a shuka ?

// //
25 26

9. Me ki ka shuka a gonarki ba a ?

Kin shuka wad'annan:

gero (hatsi) i _____ a'a' _____ albasa i _____ a'a' _____

// // // 27-29

acca (dawa) i _____ a'a' _____ auduga i _____ a'a' _____

// // // 29-30

gyad'a i _____ a'a' _____ tattasai i _____ a'a' _____

// // // 31-32

wake i _____ a'a' _____ taba i _____ a'a' _____

// // // 33-34

9.

tumatir i _____ a'a' _____	/ / / 35
wad'ansu amfani i _____ a'a' _____ (kamar barkona, dankali, shinkafa, melo, kabewa)	/ / / 36

'ya'yan itatuwa i _____ a'a' _____	/ / /
	37

10. Da bara da bana yausha ki kafi shuka wad'annan amfanin gona kuma ?

gero (hatsi) _____	wake _____	/ / / 38-39
acca (dawa) _____	tumatir _____	/ / / 40-41
gyad'a _____	albasa _____	/ / / 42-43
auduga _____	wad'ansu amfani _____	/ / / 44-45
tattasai _____	'ya'yan itatuwa _____	/ / / 46-47
taba _____		/ / / 48

11. Bad'i zaki shuka wad'annan amfanin gona fiye da ku k'asa da na bana ?

gero (hatsi) _____	auduga _____	/ / / 49-50
acca (dawa) _____	tattasai _____	/ / / 51-52
gud'a _____	taba _____	/ / / 53-54
wake _____	tumatir _____	/ / / 55-56
albasa _____	wad'ansu amfani _____	/ / / 57-58
'ya'yan itatuwa _____	(kamar, barkono, dankali, shinkafa, melo kabewa)	/ / / 59-60

12. Daga ina kika sami irin da ki ka shuka bana ?

_____	/ / /
	61 62

13. Me kike sawa a gonarki don taki ?

_____	/ / /
	63 64

14. Kina da saura a gonarki a bana ?

i _____ a'a' _____	/ / /
	65

15. Idan kina da saura, dom me ba ki yi shuka a ciki ba ?

/ / /
66

16. Kina cikin kungijar manomar na gari ?

i _____ a'a' _____

//
67

17. Dom me ki ka shiga ko

Dom me ba ki shiga ba ? _____

//
68

18. Ki kan yi aiki a gandu ?

i _____ a'a' _____

//
69

19. Da wa kike maganar cikin garka ?

//
70 71

20. Ki kan yi hasarar abincin da kika ajiye a rumbu ?

//
72

21. Wad'anne su ka fi b'arna, k'wari _____

ko b'era ? _____

//
73

22. Wa yake miki aiki a gona? _____

//
74 75 76

23. Akwai kayan aiki ko injinan noma da kike so amma a yanzu
baki dasu ? i _____ a'a' _____

//
77
//
78 79

takarda

lumar tambaya

//
1
//
2 3 4

24. Wa yake kiwon da dabbobinki ?

/ / /

5 6

25. Shanu _____ ko tunkiyoyi _____
ko awakafi _____ suna kiwo a gonarki ?

/ /
7

26. Wa yake da su? _____
Nawa ne ne? _____

/ / / /
8 9 10

27. A shekarar da ta wuce kin saida _____ dabba ko
kin yanka _____ domin ki

- (a) sai tufa i _____ a'a' _____
(b) sai abinci i _____ a'a' _____
(c) yi lahiya i _____ a'a' _____
(d) yi arme i _____ a'a' _____
(e) da sauransu i _____ a'a' _____

/ / 11

/ / 12

/ / 13

/ / 14

/ / 15

28. Kin tab'a samo abincin dabbobinki a gona ? i _____ a'a' _____
ko kuwa kin tab'a saya ? i _____ a'a' _____

/ / 16

/ / 17

29. Ki kan yi awa nawa kafin ki samo musu ?

Idan kuma saya ki kan yi kina b'adda nawa ?

/ / /
18 19

30. Wa ya kan bawa mutanen gida abinci idan tsabar rumbu ta k'are ? _____
 _____ / / /
 20 21
31. Wace irin sana'a ki kan yi banda aikin noma ? _____
 _____ / / / /
 22 23 24
32. Wa ya kan d'auko ruwa domin amfanin gidanku ? _____
 _____ / /
 25
33. Sau nawa a kan d'auko rawa a sati domin amfanin gida ? _____
 _____ / /
 26
34. Akwai subuwar hanyar jan ruwa a yanzu wacce ta bambanta da yadda ake jan ruwa a da ?
 i _____ a'a' _____ / /
 27
35. Idan akwai, wacce hanyar jan ruwa ka fi so ? _____
 Mene ne dalilinki ? _____ / / /
 28 29
36. Wa yake fad'ar lokaci da _____
 da farashi _____
 da kuma inda _____
 za'a sayar da amfanin gona ? / / / /
 30 31 32
37. Ki bada amsoshin wad'annan tambayoyi game da kayayyaki ko amfanin gona da kike sayarwa ?
 Amfanin gona _____ / / / /
 33 34 35
 saunawa a kan yi ciniki _____ / / / /
 36 37 38

37.

Farashi _____

/ / / /

39 40 41

wurin da kasuwa take _____

/ / / /

42 43 44

mai sayarwa _____

/ / / /

45 46 47

38. Ta k'ak'a akan kai amfanin gona da za'a sayar kasuwa ?

/ / /

48 49

39. Awa nawa ne daga gida zuwa kasuwa ?

/ /

50

40. Me ya kansa ka sayi abinda ka ke saya ?

/ / /

51 52

41. Me ya kansa lokacinda ka ke saya ? _____

/ /

53

42 . Ki bada amsoshin wad'annan tambayoyi game da kayayyaki ko amfanin gona da kikan saya:

amfanin gona _____ / / / /
54 55 56

masu saye _____ / / / /
57 58 59

farashi _____ / / / /
60 61 62

wurin da kasuwa take _____ / / / /
63 64 65

(Game da kowane amfanin gona don Allah ki gaya mana sau nawa ki kan saye shi, da wurin da kike samunsa, da farashinsa da kuwa masu sayensa; a sami bayani d'ai d'ai kan abinci, da makamashi)

43. Wane kayayyaki ki ke son saya amma ba'a samu a kasuwa ? / / / /
66 67 68

44. Wace wuri ki kafi zuwa daga nan gari ? / /
69

45. Awa nawa ne daga gidanki ? / /
70

46. Sau nawa ki kanje a sati ? / /
71

47. Yawon awa nawa ki kan b'ata a sati _____ / / / /
ko a rana ? _____
72 73

48. Menene babba dalilinki na yawo ? _____

1/1
74

49. Awa nawa ne daga nan zuwa babban garin arrondissement ?

Zuwa Zindar _____

1/1/1
75 76

50. Sau nawa a shekara ki kan je Zindar ?

1/1
77

takarda

lumbar tambaya

1/1
1

1/1/1/1
2 3 4

51. An haife ki a wannan k'auye ne ?

1/1
5

Idan ba haka ba ne, dom me ki kazo wannan k'auye ?

1/1
6

52. A gidanku akwai wad'anda suke aiki a wani wuri ?

i _____ a'a' _____

Idan akwai, me su kan yi miki ?

1/1
7

1/1
8

53. Wane abu ne wajibi da ke zaki yiwa iyafinki a yau da kullum ? / / / /
9 10 11

54. Wane abu ne wajibi da ke zaki yiwa mutanen gidanku a yau da kullum ? / / / /
12 13 14

55. Dole ne mata su yi zaman kansu a wani lokaci ? / /
i _____ a'a' _____
15

A wane loto haka ta kan faru ? _____

/ / / /
16 17 18

56. Idan kina da ciki (juna biyu) wa ya ke baki taimako idan baki da lafiya ? / /
19

57. Ta yaya hukumar gari ta ke sanin ra'ayinku ? / /
20

58. Wad'anne daga cikin nau kike makamashi da su ?

ice i _____ a'a' _____

/ / 21

gawayi i _____ a'a' _____

/ / 22

Petrol i _____ a'a' _____

/ / 23

kashin dabba i _____ a'a' _____

/ / 24

59. Wad'anne ki kan saya ne? _____

/ / 25-26

Wad'anne ki ke sami ? _____

/ / 27-28

Wad'anne ki ke yi ? _____

/ / 29-30

Nawa ne kud'insu ? _____

/ / 31-32

60. A wane lokaci ki ke amfani da ice _____

/ /

gawayi fa _____

33

Petrol fa _____

/ /

da kashin dabba fa ? _____

34

/ /

35

/ /

36

61. A yini ki kan yi amfani da kan ice nawa ? _____

/ /

mudun gawayi nawa ? _____

37

kwilabar Petrol nawa ? _____

/ /

kashin dabba nawa ? _____

38

/ /

39

/ /

40

62. Wane makamashi kuma ki ke amfani da shi domin girki _____

ko fitila ? _____

/ /

41 42

63. Da bana da bara yausha ki kafi wahala wajen samun ice ?

i _____ a'a' _____

/ /

ko Petrol i _____ a'a' _____

43

/ /

44

Dom me ?

/ /

45

64. Wa yake samowa iyalinki ice ?

///
46 47

65. Sau nawa akan nemo ice a sati ?

///
48

66. Ki fad'i lokutan da ki kan dafa abinci daga cikin lokatan nan:

asubahi _____

futowar rana _____

lokacin walaha _____

da hantsi _____

da tsaar rana _____

da azahar _____

da la'asar _____

da magariba _____

da lisha _____

///
'49 50 51 52

67. Awa nawa ki kan yi wajen dafa abinci a rana ?

///
53

68. Ku ka dafa abinci ke da wasu mutane a murhu d'aya ?

i _____ a'a' _____

mutane nawa ne ? _____

///
54
///
55

69. Suwa ki ke dafawa abinci a gida ?

///
56 57

70. Kin tab'a hira da wad'annan mutane:

(a) ma'aikaton gidan gona i _____ a'a _____

/// 58

(b) sous - prefet i _____ a'a _____

/// 59

(c) jami'in UNCC i _____ a'a _____

/// 60

(d) matrone i _____ a'a _____

/// 61

71. Kina cikin kungiyar adashi ?

///
62

i _____ a'a _____

72. Kin tab'a karb'ar rance daga k'ungiyar shekara da ta wuce ?

i _____ a'a _____

///
63

73. Wad'anne daga cikin nan suka baki rance

'yan 'uwanki _____

abokanki _____

masu bada rance _____

'yan kasuwa _____

UNCC _____

///
64 65

74. Idan kin tab'a karb'ar rance, mene k'a 'i'dodin rancen ?

/// 66

Akwai wanda ya tsaya miki ? i _____ a'a _____

/// 67

Akwai bada riba ? i _____ a'a _____

///
68

A cikin wane lokaci zaki biya ? _____

///
69

75. Kin karbi rance domin ki

sayi iri i _____ a'a _____

//
70

sayi taki i _____ a'a _____

//
71

bada kyauta i _____ a'a _____

//
72

biya haraji i _____ a'a _____

//
73

wad'ansu amfani i _____ a'a _____

//
74

76. Ki kan yi amfani da debarun da matrone su ke koyawa ?

i _____ a'a _____

// 75

Me nene ?

// 76

77. Wane irin shirye shirye ki ke saurara a rediyo ?

//
77 78

78. Kin iya karatu da rubutu a harsunan

Arabiyya ? i _____ a'a _____

//
79

Hausa ? i _____ a'a _____

//
80

Faranshi ? i _____ a'a _____

//
81

takarda

//
T

lumar tambaya

//
2 3 4

79. Idan da a ce kin sami gado jaka 20 me zaki yi da su ?

//
5 6

80. Wa zai lura da ke idan kin tsufa ? _____

_____ $\frac{1}{7}$

81. Wane irin ci gaba ki ke san ganin ya faru a k'auyen nan ?

_____ $\frac{1}{8} \frac{1}{9} \frac{1}{10}$

(QUESTIONNAIRE FOR VILLAGE LEADERSHIP, IN HAUSA)
TAMBAYOYIN SARKI DA SAURAN SHUGABANIN MUTANE

1. takarda / /
1
2. lumbar tambaya / / /
2 3
3. sunan k'auye _____ / /
4
4. ranar tambaya / / / / / / / /
5 6 7 8 9 10
5. Ranka ya dad'e, a ina mutanenka na cikin wannan k'auye
su ke bid'ar ruwa:
- (a) lokacin damina / / / /
11 12 13
- (b) lokacin bazara / / / /
14 15 16
6. Ranka ya dad'e, mutanenka suna bid'ar ruwa a tafki ko
kogi
- idan haka ne _____ / / 17
- tafkin k'arami ne _____
- ko babba? _____
- wata nawa mutanenka ke amfani da tafkin ? / /
- daga ina suke bid'ar ruwa idan tafkin ya k'afe ? / / /
7. Wa yake kula da rijiyoyi ? / / /
21 22
8. Mutanenka su kan yi amfani da ruwan rijiya wajen ban ruwa ?
- i _____ a'a' _____ / /
23

9. Akwai isassun rijiyoyi a k'auyenka domin amfanin kowane gida ?

i _____ a'a' _____

/ /
24

10. Ana barin filani (bororo) su yi amfani da rijiyoyi ?

/ /
25

11. Ira hanyoyin k'auyen nan su ka nufa ?

/ / / /
26 27 28

Manyan kamiyon suna iya amfani da wad'annan hanyoji ?

i _____ a'a' _____

/ /
29

12. Wa yake rabawa bak'i fili ?

/ /
30

13. Wa yake sasanta tarzomar fili a nan gari ?

/ / /
31 32

14. Aikin gona ya canja a 'yan shekaran nan ?

/ / /
33 34

15. Wane aiki yara su ke a gona ?

/ / / /
35 36 37

a _____

b _____

c _____

16. A wad'anne amfanin gari mutanenka su kan yi aikin gayya ?

/ / / /
38 39 40

a _____

b _____

c _____

17. Mutanenka sun amince su ba makiyayi dabbobinsu kiwo ?

i _____ a'a' _____

/ /
41

18. Mutanenka su kan bawa Bafiltani kiwo ?

i _____ a'a' _____

/ /
42

19. Kafin ayi fari, akwai dabbobi fin yanzu ?

i _____ a'a' _____

/ /
43

20. Wace san'a mutanenka kan yi bayan girbi ?

/ / / /
44 45 46

21. Wace shagali mutanenka kanyi bayan girbi ?

/ / / /
47 48 49

22. Mutanenka su kan yi shagalin bud'en daji ?

i _____ a'a' _____

/ /
50

23. Mutanenka da yawa sun yi balaguro lokacin fari ?

i _____ a'a' _____

/ /
51

Su nawa ne ? _____

/ / / /
52 53

24. Duk mutanenka sun dawo bayan an gama fari ?

i _____ a'a' _____

///

54 55

25. Akwai UNCC domin amfanin mutanenka ?

i _____ a'a' _____

//
56

26. Akwai wajen da OPVN su ke saida kaya a wannan gunduma ?

i _____ a'a' _____

//
57

27. Kungiyar ciniki UNCC suna da kamiyon ?

i _____ a'a' _____

//
58

28. Kungiyar ciniki ce take d'aukan kaya zuwa kasuwa ?

i _____ a'a' _____

//
59

29. Kungiyar ciniki tana da wajen tara kaya ?

i _____ a'a' _____

Ina ? _____

///
60 61

30. Yaushe ake fara saida gyad'a ?

///
62 63

31. Ina ne Kasuwar gyad'a ? _____

///
64 65 66

32. Mata su kan yi ciniki a maimakon mazejensu ?

i _____ a'a' _____

/ /
67

33. Maza su kan yi ciniki a maimakon matansu ?

i _____ a'a' _____

/ /
68

34. Idan miji ya saki matarsa, wa yake da ikon dabbobi ?

/ / /
69 70

35. Wa yake tara haraji a nan k'auyen ?

/ / /
71 72

36. Mene ne aikin animata (ko ma'aikaton gidan gona)
a wannan k'auye ?

a _____

b _____

c _____

/ / / /
73 74 75

37. Yaya ake zab'ar animata (ko ma'aikaton gidan gona) ?

/ /
76

takarda

/ /
1

Tumlar tambaya

/ / /
2 3

38. Wanene jami'in kungiyar ciniki ? _____

/ /
4

39. Yaya ake zab'ensa ? _____ $\frac{1}{5} \frac{1}{6} \frac{1}{7}$

40. Wad'anne jami'an hukuma sukafi zuwa nan ? $\frac{1}{8} \frac{1}{9} \frac{1}{10}$

41. Me ya kan kawo su ? _____ $\frac{1}{11} \frac{1}{12} \frac{1}{13}$

42. Akwai jam'an hukumar solda a nan k'auyen ? _____ $\frac{1}{14} \frac{1}{15} \frac{1}{16} \frac{1}{17}$

i _____ a'a' _____

43. A cikin mutanenka manoma akwai attajirai da yawa ?

i _____ a'a' _____ $\frac{1}{18}$

Su nawa ne ? _____ $\frac{1}{19}$

44. Mene ne yafi ba mutanenka wahala a cikin sana'arsu ? $\frac{1}{20} \frac{1}{21} \frac{1}{22}$

(NIGERIAN MARKET SURVEY)
INVENTAIRE DU MARCHÉ NIGERIEN

1. Numéro de la carte 11
2. Nom du marché 1111
3. Où est le marché relatif à l'emplacement des villages avoisinants ?
- | Nom du village | Distance | Chemin | |
|----------------|----------|--------|------|
| _____ | _____ | _____ | 1111 |
| _____ | _____ | _____ | 1111 |
| _____ | _____ | _____ | 1111 |
4. Infrastructure routière ? _____
- _____
- _____ 11111
5. Moyens de transports: No. de camions _____ 111
(camions nawa ne ?)
- No. d'ânes _____ No. de bicyclettes _____ 1111
(jakoki nawa ne ?) (Kekuna nawa ne ?)
- No. de voitures _____ No. de chameaux _____ 11111
(motoci nawa ne ?)
- No. de chevaux _____ Autres moyens ? _____ 11111
(Dokuna nawa ne ?)
6. No. d'étalages _____ 1111
(Pumfa nawa ne ?)
7. No. de magasins _____ 111

8. No. de boutiques _____ (kantiwa nawa ne ?) IIII
9. No. d'abattoirs _____ II
10. Longueur du marché _____ III
 Largeur du marché _____ III
11. No. de vendeurs _____ III
 No. de vendeuses _____ III
12. Durée du marché _____
13. Jours du Marché : Samedi _____ Lundi _____
 Mardi _____ Mercredi _____ Jeudi _____
 Vendredi _____ Samedi _____ Dimanche _____ III
14. No. d'acheteurs (estimation) _____ IIII
15. Qu'est-ce que l'acheteur emmene typiquement chez lui du marché ?
- 1 _____ 2 _____ IIII
- 3 _____ 4 _____ IIII
- 5 _____ 6 _____ IIII
- 7 _____ 8 _____ IIII
- 9 _____ 10 _____ IIII

16. Numero de la carte _____ 11

17. Nom du marché (sunan kasuwa) _____ 1111

18. Inventaire des produits vendus (voir fiches ci-jointes)

<u>Produit</u>	<u>No. de vendeurs</u>	<u>No. de vendeuses</u>	<u>Quantité par vendeur</u>	<u>Prix</u>
_____	_____	_____	_____	_____
			111111111111	
_____	_____	_____	_____	_____
			111111111111	
_____	_____	_____	_____	_____
			111111111111	
_____	_____	_____	_____	_____
			111111111111	
_____	_____	_____	_____	_____
			111111111111	

NATURAL RESOURCE PLANNING IN NIGER

-140-

ORGANIZATIONS SERVING THE
AGRICULTURAL SECTOR IN
NIGER

(by Bonnie A. Stewart)

University of Arizona
Tucson, Arizona
U.S.A.

TABLE OF CONTENTS

	<u>Page</u>
Marketing Services	1
Financial Services.....	4
Agricultural Extension Services.....	7
Agricultural Research Services.....	9
Educational Services.....	11

MARKETING SERVICES

<u>ORGANIZATION:</u>	<u>FUNCTION(S):</u>	<u>TARGET GROUP(S):</u>
Office des Produits Vivriers du Niger-OPVN; (National Organization for Life- Giving Products, literal translation) Established 1963 ¹	<ol style="list-style-type: none"> 1. Purchase food grain from farmers at harvest time 2. Stock grain and then sell the grain during the year at prices which recover the cost, but are lower than off season market prices 3. Objective: price stabilization¹ 	<ol style="list-style-type: none"> 1. Farmers-producers of food grain 2. Consumers-buyers of food grain
Société Nigérienne de Commercialisation de L'Arachide-SONARA; (Nigerian Society of Commercialization of Peanuts) Established 1962 ²	<ol style="list-style-type: none"> 1. A mixed enterprise entrusted with the monopoly to sell ground nuts to oil mills in Niger, mixed enterprises and to export markets 2. Prices paid annually are fixed by the Ministry of Economic Affairs, Trade and Industry 3. SONARA purchases farm products from the UNCC vis a vis the village cooperatives (see below)² 	<ol style="list-style-type: none"> 1. Nigerienne ground nut oil producers 2. Nigerienne mixed enterprises 3. Foreign consumers
Union Nigérienne de Crédit et de Coop- eration-UNCC; (Nigerian Union of Credits and Cooperatives) Established 1962; reorganized in 1967, when the banking and credit activities were transferred to the CNCA ¹	<ol style="list-style-type: none"> 1. Promote and <u>establish cooperatures</u> and train their representatives 2. Assist cooperatives in <u>marketing</u> their products 3. Purchase farm inputs from the Direction de l'Agriculture (MEF) and resell them to the farmers³ 4. Provide cooperatives with <u>technical assistance</u> 5. <u>Manage</u> irrigation schemes and other governmental projects 6. Finance the handling, storage and transportation costs of supplying and <u>distributing farm inputs</u> 7. Organize loan applications and in some areas collect repayment⁴ 	<ol style="list-style-type: none"> 1. Farmers-products of agricultural commodities 2. Rural villages (cooperatives) 3. Consumers- (of inputs for agricultural production)

MARKETING SERVICES

ORGANIZATION:

FUNCTION(S):

TARGET GROUP(S):

Main Functions: (in summary)
Marketing farm products
Supplying inputs for farmers
Distributing inputs to farmers

Organizational Divisions of the UNCC
Which are Responsible for Carrying out
The Above Stated Functions:

Cooperative Division: (their responsibilities include):

1. promoting the establishment of cooperatives
2. providing technical assistance to the farmers
3. providing accountant services for cooperatives
4. supervising credit agreements
5. arranging financing for marketing of crops
6. the cooperative division functions as a middleman between the cooperative and marketing agencies⁵

Production Division: (see "Agricultural Extension Services - UNCC")

Administrative Division: (see "Financial Services - UNCC")

Commerçants (Merchants)	<ol style="list-style-type: none"> 1. Purchase agricultural products after the harvest 2. Resell products six months later, when supply is depleted and prices are higher⁶ 	<ol style="list-style-type: none"> 1. Farmers 2. Consumers
Marchants de Marchés Locales (Local Market Traders-usually women) ⁷	<ol style="list-style-type: none"> 1. Sell dairy products (sheep and goat products - and other products) 2. Purchase food and other household items 	<ol style="list-style-type: none"> 1. Rural consumers 2. Rural producers
Société Nigérienne d'Exportation des Ressources d'Animaux-SONERAN; (Livestock Products Marketing Company) Established 1968	<ol style="list-style-type: none"> 1. Mixed enterprise 2. Holds monopoly on export sales 3. In charge of meat sales from slaughter houses (IMF-African 	<ol style="list-style-type: none"> 1. Producers 2. Sellers/slaughterhouses 3. Export markets

ORGANIZATION:

Société Nationale de Commerce et de
Production - COPRO-NIGER;
(Trading Company)
Established 1962

FUNCTION(S):

1. Organized as a joint stock company with major shares belonging to public or semi-public bodies:
Govt. 33%
UNCC 15%
BDRN 15%
2. Maintains stability of food prices
3. Operates system of wholesale and retail outlets
4. Maintains 50 shops in rural areas where coops do not operate
5. Attempting to stimulate diversification of agricultural production by organizing the marketing of new products - (IMF-African Surveys, p.440)

MARKETING SERVICES**TARGET GROUP(S):**

1. Public and semi-public organizations
2. Consumers
3. Producers/farmers

FINANCIAL SERVICES

ORGANIZATION:

Union Nigérienne de Crédit et de
Coopération-UNCC; (Nigerian Union of
Credit and Cooperatives)
Established 1962; reorganized 1967

FUNCTION(S):

TARGET GROUP(S):

ADMINISTRATIVE DIVISION:(3 LEVELS)

GMV Groupement Nutualiste Villageois
(Village Cooperative Section)

1. examines members demands for credit and reports their decision to the coopeative
2. decides on operations to be effected at the village level⁸

1. Farmers/rural population
2. Villages

Cooperatives (GMV delegates represent their respective villages at the cooperative meetings)

1. market farmers production
2. provide storage facilities
3. provide training and extension services to farmers⁹
4. responsible for submitting requests to the UNCC headquarters via the Ministry of Rural Economy (MER) for required farm inputs
5. responsible for the distribution of farm inputs to the GMV¹⁰

1. Farmers
2. GMV

ALC Association Locale de Cooperation
(Local Cooperative Association which includes different cooperatives meeting as a whole)

1. Administers credit operations; assumes village support as collateral for loans
2. decides on issues concerning common interests of joint cooperatives¹¹

1. Farmers
2. Cooperatives

Cooperative Division: (see "Marketing Services - UNCC")

Production Division: (see "Agricultural Extension Services - UNCC")

FINANCIAL SERVICES

ORGANIZATION:	FUNCTION(S):	TARGET GROUP(S):
Banque de Développement de la République du Niger-BDRN; (Développement Bank of the Republic of Niger) Established 1961	<ol style="list-style-type: none"> 1. Administers primarily medium and short term credit (commercial and development purposes) 2. Established the Agricultural Development Fund in 1968, which: <ol style="list-style-type: none"> a) finances cowpeas seed development b) finances programs to introduce sesame seed cultivation c) finances young farmers training centers to buy oxen and farm implements d) finances the rehabilitation of irrigation schemes¹² 	<ol style="list-style-type: none"> 1. Farmers 2. Training centers for farmers 3. Agricultural development programs
Crédit du Niger (Niger Credit Bank) Established	<ol style="list-style-type: none"> 1. Provides low interest loans to less privileged with no collateral for the purchase of land 2. Commercial financing for clients with pre-existing facilities and resources¹³ 	<ol style="list-style-type: none"> 1. Less privileged 2. Commercial entrepreneurs
Caisse Nationale de Crédit Agricole-CHCA; (National Agricultural Credit Fund) Established	<ol style="list-style-type: none"> 1. The major agricultural credit agency since 1968 2. Medium and short term loans for agricultural production development 3. Short term advances to UNCC to finance primary marketing of groundnuts, cotton and rice, and purchase of farm inputs 4. Short term loans to other government and semi-public corporations to finance marketing of different agricultural products¹⁴ 	<ol style="list-style-type: none"> 1. Cooperatives 2. Young farmers 3. Training center graduates 4. Individuals 5. UNCC 6. Government and semi-public corporations
Ministère des Affaires Economiques, du Commerce et de l'Industrie (Ministry of Economic Affairs, Trade and Industry)	<ol style="list-style-type: none"> 1. Fixes the annual price paid to producers for ground nuts. 2. Cooperatives are licensed by the government to buy ground nuts from producers and resell to SONARA 	<ol style="list-style-type: none"> 1. Farmers 2. Cooperatives 3. SONARA

FINANCIAL SERVICES

ORGANIZATION:

Caisse de Stabilisation des Prix des
Produits du Niger-CSPPN;
(Price Stabilization Fund)
Established

FUNCTION(S):

1. Public fund
2. After 1965-66, they fixed floor and ceiling prices for groundnuts therefore determining SONARA's profit margin
3. Receiver receipts from various operations and receives payments of price subsidies under the EEC program of groundnut products aid. (IMF-African Surveys, p. 411)

TARGET GROUP(S):

1. Farmers, producers
2. SONARA

AGRICULTURAL EXTENSION SERVICES

ORGANIZATION:	FUNCTION(S):	TARGET GROUP(S):
Ministère de l'Economie Rural (Mer): (Ministry of Rural Economy) Established	Four Directorates of MER: a) the Directorate of General Agriculture b) Livestock and animal industries c) Water resources and forests d) Civil works Functions of the Directorate of General Agriculture as defined by Decree No. 8/MER 9 June 22, 1966: 1. To organize and increase production 2. Performs technical preparation or agricultural development plans and supervise execution 3. Protects crops through phytosanitary inspection, control packing and storing of agricultural products 4. Teaches farmers modern agricultural techniques 5. Works with cooperative and marketing agencies to improve the quality of agricultural production 6. Traditional extension agents 7. Supplies and distributes agricultural inputs to farmers ¹⁵	1. Farmers/rural population 2. Cooperative agencies 3. Marketing agencies 4. Governmental agencies
Union Nigérienne de Crédit et de Coop- eration-UNCC; (Nigerian Union of Credit and Coop- eratives) Established 1962; Reorganized 1967	Production Division: 1. Responsible for cotton production 2. Provides 41 extension agents in cotton producing areas, for 405 villages ¹⁶ Administrative Division: (see "Financial Services-UNCC") Cooperative Division: (see "Marketing Services-UNCC")	1. Farmers/rural population 2. Villages

AGRICULTURAL EXTENSION SERVICES

ORGANIZATION:

FUNCTION(S):

TARGET GROUP(S):

Ministère de la Promotion Humaine
(Ministry of Human Promotion)
Established

The "animation" program:

1. A study of the target area is made
2. Meetings are then organized with traditional leaders and governmental representatives to determine rural development problems, list possible solutions and investigate possible governmental aid
3. Training of local personnel to implement local development programs¹⁷

1. Villages
2. Village leaders
3. Farmers/rural population

Ministère L'Education Nationale
(Ministry of National Education)
Established

The "alphabetization" program:

1. Trains cooperative personnel
2. Promotes literacy programs¹⁸

1. Farmers/rural population
2. Cooperative personnel

AGRICULTURAL RESEARCH SERVICES

ORGANIZATION:

Institut National de Recherches Agronomiques
du Niger-INRAN; (National Institute of
Agronomic Research of Niger) 19

FUNCTION(S):

1. Carries out principle research programs in Niger (and in other West African countries)
2. Principle research stations:
 - a. Tarna (near Maradi)
 - b. Kolo (near Niamey)
3. Sub-stations:
 - a. Nagarfa
 - b. Kawara
 - c. Kale-Pote
 - d. Sumiri
4. Field trials are carried out at 30 locations in various depts:
 - a. Niamey - 8
 - b. Bosso - 4
 - c. Tahoua - 5
 - d. Maradi - 4
 - e. Zinder - 5
 - f. Diffa - 4
5. Research Programs include: 20
 - a. Copping techniques for irrigated rice to improve productivity (Niamey)
 - b. Study of soil-moisture-plant relationships: water economy (Niamey)
 - c. Study of insect predators of food commodities (Niamey)
 - d. Experimental agronomic work on sugarcane (Tillabery)
 - e. Improvement of agricultural crops and livestock: sorghum, groundnuts, onion, bovine herds, millet, soils (Maradi)

TARGET GROUP(S):

1. Farmers/rural population
2. Villages

Ministere l'Education National (Ministry of
National Education) 21

1. "Alphabetization" program:
 - a. promotes literacy program
 - b. trains cooperative personnel (see also Agricultural Extension Services)

1. Farmers/rural population
2. Cooperative personnel

AGRICULTURAL RESEARCH SERVICES

ORGANIZATION:

FUNCTION(S):

TARGET GROUP(S):

Ministère de l'Economie Rurale
M.E.R.; (Ministry of Rural
Economy)

1. MER is a participating institution in numerous research programs sponsored by: INRAN, and various French research institutes, such as: Centre Technique Forestier Tropical Niger-CTFT (livestock and forests); Institut Français de Recherches Fruitières d'Outre-Mer-IFAC (horticulture); Institut de Recherches des cotons et des textiles Exotiques-IRCT (cotton)²²; Compagnie Française pour le Développement des Fibres Textiles-CFDT (textiles); Laboratoire Vétérinaire de Niamey; Office de la Recherche Scientifique et Technique Outre-Mer-Mission-ORSTOM in Niamey (hydrology)²³
2. MER administers the SERVICE DE L'ELEVAGE ET DES INDUSTRIES ANIMALES which conducts research on disease prevention and control of livestock. This institution includes the following divisions:
 - a) Six research and demonstration stations:
 - 1) Toukonnou- Azewak cattle breeding
 - 2) Kirkissoya - Cattle feeding
 - 3) Maradi - Poultry
 - 4) Mirriah - Poultry
 - 5) Niamey - Poultry
 - 6) Maradi - Goats
 - b) The Service de l'Elevage operates a laboratory, a clinic and a pharmacy in Niamey.
 - c) For each Departement in Niger, there is typically five or six local units operated by the Service de l'Elevage²⁴

1. Farmers/rural population
2. Herders

EDUCATIONAL SERVICES

ORGANIZATION	FUNCTION(S):	TARGET GROUP(S):
Université de Niamey (University of Niamey); 25 Established in 1971	1. Department as of 1974: a. School of Science b. School of Education c. A higher School of Agriculture d. Institute for Research in Mathematics Teaching e. Institute for Research in Human Sciences. 2. Total enrollement in university in 1974-75 was: 1,060 (of this total, 800 students were enrolled in universities abroad).	1. Future government officials 2. Future researchers and teachers 3. Future development planners
Lycée (equivalent of U.S. high schools) 25	1. Lycée in Niamey 2. Technical Lycée in Maradi 3. Total enrollement in 1974-75 in the lycées and colleges was: 11,580.	1. Young adults between the ages of 16 to 18 (approx.)
College 25	1. Technical college in Maradi 2. Teacher training colleges - there are five of these colleges in Niger under the respon- sibility of the Ministry of National Education.	1. Future teachers 2. Those needing Technical training
Ecole Nationale d'Administration du Niger (National School of Administration of Niger); 24 Established in 1963	1. Trains civil servants 2. Trains other officials	1. Future civil servants 2. Future government officials
Centre de Formation des Jeunes Agriculteurs (Center for training of young farmers)	1. Training young farmers in the use of animal traction.	1. Young farmers around the ages of 14 and older.
Primary Schools (equivalent to the elementary levels in the U.S. system); and the Centre d'Ensei- gnement Supérieur (secondary schools- equivalent to the U.S. Junior High School) 25 Established in 1971.	1. Total enrollement in 1974-75 was approx. 114,447 2. Primary and secondary schools are the resp- onsability of the Ministry of National Education.	1. Children up to the approx- imate ages of 10 years for the primary schools. 2. Children from approx. 11 to 15 years of age for the second- ary school.

FOOTNOTES

- ¹AID, "Development Assistance Program FY 1975 Upper Volta and Niger" (Department of State, March 1975), p. 34; Craig Buxton, "Evolution of Subsistence Production and Exchange in Niger" (Unpublished manuscript, 1977), pp. 20-21.
- ²Buxton, Ibid., p. 21; International Monetary Fund (IMF), Surveys of Africa Economics Vol. 3, Chapter 10, "Niger" (Washington, D.C., 1970), p. 411.
- ³UNCC for NCP, CAO Quan Coop/Credit advisor, "Reports of Cooperatives and Credit Situation in Niger 1976" (Niamey, Niger, May 1976), p. 35; Buxton, Ibid.; AID, Op. Cit., p. 25.
- ⁴AID, Ibid.
- ⁵Ibid., pp. 25,33.
- ⁶Buxton, Op. Cit., p. 20.
- ⁷Ibid., p. 21.
- ⁸UNCC for NCP, CAO Quan Coop/Credit advisor, Op. Cit., pp. 6-8; Craig Buxton, "Economic Development Planning in Niger" (Unpublished manuscript, 1977), p. 12.
- ⁹UNCC for NCP, Ibid., pp. 8-9; Buxton, Ibid., pp. 12-13.
- ¹⁰AID, Op. Cit., pp. 25,33; UNCC for NCP, Ibid.
- ¹¹UNCC for NCP, Ibid., p. 9 (See also page 10 for a listing of existing cooperatives, by Department and Arrondissement); Buxton, "Economic Development Planning in Niger", Op. Cit., pp. 12-13.
- ¹²AID, Op. Cit., pp. 24,24; Buxton, Ibid., p. 9.
- ¹³Buxton, Ibid.
- ¹⁴AID, Op. Cit., p. 16; Buxton, Ibid.; UNCC for NCP, CAO Quan Coop/Credit advisor, Op. Cit., pp. 33-35, 40.
- ¹⁵AID, Ibid., pp. 24, 31-32.
- ¹⁶Ibid., p. 25.
- ¹⁷Ibid., pp. 31-32.
- ¹⁸Ibid.

- 19 AID, Op. Cit., p. 26.
- 20 FAO, Directory of Agricultural Research Institutions and Projects in West Africa - Pilot Project (Rome: FAO), pp. 110-114.
- 21 Ibid., pp. 31-32.
- 22 Ibid., pp. 522-525
- 23 The World of Learning 1975-76, Vol. One, 26th Ed. (London: Europa Publications Limited, 1975), p. 910
- 24 AID, Op. Cit., p. 41, 51
- 25 Republique du Niger aux Etats Unis d'Amerique , Niger (Washington D.C.: Embassy of Niger, 1977), p. 20

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APPENDIX J

ZINDER DEPARTMENT
SURVEYED VILLAGES
NIGER NATURAL RESOURCES PLANNING TEAM
UNIVERSITY OF ARIZONA
1977

-158-

