PD-ABK-117

INTEGRATED RESEARCH IN AGRICULTURAL PRODUCTION AND NATURAL RESOURCE MANAGEMENT:

Agricultural Research
and Training Support (ARTS) Project,
Burkina Faso, 1990-94

Administrative Report

Purdue University & Winrock International

A.I.D. Contract # 624-0270-C-00-0012-00

PD-ABK-117

FINAL ADMINISTRATIVE REPORT

AGRICULTURAL RESEARCH AND TRAINING SUPPORT PROJECT

A.I.D. Contract No. 624-0270-C-00-0012-00

Submitted by
Purdue University

in collaboration with
Winrock International

To the
United States Agency
for International Development

August 31, 1994

ACKNOWLEDGEMENTS

We wish to express our appreciation to Dr. Jess Lowenberg DeBoer, ARTS project campus coordinator, for providing a significant amount of the detailed information contained in this report.

We also thank Ms. Wendy Shorter and Mrs. Jeri McIntyre, Secretaries, who were responsible for the preparation of the manuscript.

Our appreciation is also extended to our excellent French translator, Jean Marc Boffa, for his contribution to the French version of the report.

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List of Abbreviations and Moré Words

AID	Agency for International Development
ADRK	Kaya Regional Development Association (Association de Développement Régional de Kaya)
ARTS	Agricultural Research and Training Support
CES	Water and Soil Conservation (Conservation des Eaux et des Sols)
CGIAR	Consultative Group for International Agricultural Research
CILSS	Interstate Committee to Combat Drought in the Sahel (Comité Inter-Etats de la Lutte contre la Sècheresse dans le Sahel)
CIRAD	International Agricultural Research Center for Development (Centre International en Recherche Agronomique pour le Développement)
CMAFRT	Gardening, Fruit Tree, Root and Tuber Program (Cultures Maraîchères, Arboricultures Fruitières, Racines et Tubercules)
CNRST	National Center for Science and Technology (Centre National de Recherche Scientifique et Technologique)
CRA	Agricultural Research Center (Centre de Recherche Agricole)
CRPA	Regional Center for the Promotion of Agriculture (Centre Régional de Promotion Agricole)
CRSP	Collaborative Research Support Program
D	Donsin
DESFIL	Development Strategies for Fragile Lands
DI	Dimolo
DVA	Direction de Vulgarisation Agricole
ESFIMA	Water, Soil, Fertility, Irrigation and Agricultural Machinery Program (Eaux, Sols, Fertilité, Irrigiation et Machinisme Agricole)
FM	Farmer Management

FPP	Foster Parents Plan
FSU	Farming Systems Unit
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GREFMASS	Research Group for the Restauration and Maintenance of Soil Fertility in the Sudano-Sahelian Zone (Groupe de Recherches sur la Restauration et le Maintien de la Fertilité des Sols en zone Soudano-Sahelienne)
Ha	Hectare
ICRAF	International Center for Research in Agro-Forestry
ICRISAT	International Center for Research in the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
INERA	Institute for Agricultural Studies and Research
INRAN	National Institute for Agronomic Research in Niger (Institut National de Recherches Agronomiques du Niger)
INTSORMIL	International Sorghum and Millet
IRAT	Tropical Agronomic Research Institute (Institut de Recherches Agronomiques Tropicales)
IRBET	Institute of Botanical and Ecological Research (Institut de Recherche en Botanique et en Ecologie Tropicale)
IVRAZ	Voltaic Institute for Agricultural and Animal Science Research (Institut Voltaïque de la Recherche Agricole et Zootechnique)
K	Kamsi
Kg	Kilogram
Kw	Kawara
Ky	Kayao
LOP	Life of Project
LP	Linear Programming
Mg	Metric ton
Mm	Millimeter
MUCIA	Midwest Universities Consortium for International Activities
NGO	Non-Governmental Organization

NRM	Natural Resources Management
PAM	Policy Analysis Matrix
PDI	Integrated Development Project (Projet de Développement Intégré)
PNRA	National Agricultural Research Program
PPIB	Plan Parrainage International de Boulsa
RESPAO	Network for the Study of Farming Systems Research in West Africa (Réseau d'Etude des Systèmes de Production en Afrique de l'Ouest
RM	Researcher Managed
RSP	Production Systems Research (Recherches sur les Systèmes de Production)
SAFGRAD	Semi-Arid Food Grain Research and Development
SANREM	Sustainable Agriculture and Natural Resources Management
SOMIMA	Sorghum, Millet and Maize
SWC	Soil and Water Conservation
TA	Technical Assistance
TAT	Technical Assistance Team
TDY	Temporary Duty
Th	Thiougou
TROPSOILS	Tropical Soils
TSMM	Tropical Soil Moisture Management
USAID	United States Agency for International Development
WCASS	West and Central Africal Soil Science Association
WARDA	West African Rice Development Association
WID	Women in Development
Y	Yasso
Zaï	Manure-filled holes
Zi-pelé	Denuded Lands

INTRODUCTION

Poverty is toxic to the environment, especially in agriculture. In many rural areas the poor press on fragile lands and forest margins in search of means to produce foodstuffs for a subsistence living. Motivated by the drive to survive, the poor give little weight to near-term consequences for the environment, jeopardizing tomorrow in order to survive today.

- Donald Winkelmann
Director General,
CIMMYT

Poverty and the environment, as Donald Winkelmann points out, are indeed inextricably linked, and perhaps nowhere is this more true than in the fragile semi-arid lands of the Sahel where nature and people co-exist under the most tenuous of circumstances. In 1990, Purdue University signed a contract with the United States Agency for International Development as the primary contractor (Winrock International was our partner and subcontractor for a portion of the project) for an institution building project in Burkina Faso that was designed, in part, to address these linked problems.

That project, the Agricultural Research and Training Support (ARTS) project, ended its four-year life in 1994. Together with scientists from the Burkina Faso Institute of Agricultural Studies and Research (INERA), a bi-national technical team was assembled to work towards the goal of building the human capacity within INERA's Production Systems Research Program (RSP) to better serve the needs of the rural poor in that nation, particularly in the management of fragile agricultural lands. The ARTS project builds on almost 20 years of Purdue experience in farming systems research in the Sahel, including the SAFGRAD (Semi-Arid Food Grain Research and Development) Farming Systems Unit from 1979 to 1985, and a 10-year effort (1983 to 1992) at the National Agronomic Research Institute of Niger (INRAN).

Although the ARTS project has ended, much work remains to be done, and Purdue University expects to continue its involvement in the solution of the continuing problems in this part of the world. With our past experience in other parts of the world as a guide, Purdue University anticipates continued engagement over the coming years in collaborative research and scientific interaction with partner scientists in Burkina Faso. Given our commitment to rigorous, high quality education, we also look forward to opportunities to participate in both short and long term training activities in Burkina Faso and the Sahel in general.

The specific objectives of the ARTS project were as follows:

1) to improve the ability of farming systems research teams from INERA to conduct adaptive research at the farm level, including the collection and analysis of data, and the interpretation of results in a way that permits local recommendations to be made based on documented evidence;
2) to develop linkages between the Farming Systems Unit of INERA and other ministries and agencies in the Burkinabé government that are involved in agricultural research and policy making activities.

It is significant to note that over the duration of the ARTS project, the Burkinabé government was keenly interested in efforts to curb the environmental degradation and loss of natural resources that continue to occur as the result of inappropriate agricultural activities. Thus, much energy was devoted from the start of the project to the discovery, development and testing of environmentally responsible and resource conserving agricultural production technologies appropriate to the impoverished small farm sector in the Sahel.

Although much of the report which follows focuses on research activities devoted to this goal, it is important to understand that the ARTS project was principally an institution building project. The papers which follow are of particular interest in that context, since they clearly document the growing scientific maturity of the INERA/RSP participants over the lifetime of the ARTS project.

Much of the strength of the project derived from its philosophical commitment from the start to the importance of collaborative and multidisciplinary relationships at all levels - among American and Burkinabé scientists, and between participant farmers (men and women) and the technical team in the field. The preeminence of these relationships which evolved and strengthened throughout the project is clear in the co-authorship of the papers which make up this final report. Research activities involved an array of scientists from such disciplines as agronomy, soil science, animal science, forestry, natural resources, economics, and sociology.

A word about the format that we have chosen for the technical portion of the final report is warranted at this point since it departs from the traditional format commonly used in these sorts of documents. This document is by necessity a partial record of the accomplishments of the ARTS project. Some activities have yet to be completed, others remain to be analyzed and written up. What is included here is <u>not</u> simply a summary of activities over a four-year period written by the technical assistance team and the campus staff. Instead of this traditional format, many of the significant accomplishments of the ARTS project are presented in a series of "working papers" authored by the principal participants themselves - American and Burkinabé alike. This format was intentionally chosen to highlight the significant collaborative relationships that evolved as a key feature of the ARTS project over its four-year lifetime; this format was also chosen to signal the expectation that these relationships will continue for many years.

Although the technical assistance contract is over, the work is not yet finished. Agricultural research necessarily requires long term commitments. Sometimes the fruit of this labor comes only after many years of work. It is a privilege for Purdue University to be part of this process.

The final report which follows consists of two volumes, of which this is the first. This volume contains the technical portion of the final report. The second volume contains the administrative report.

Acknowledgments

It is important to note that building a research institution is a demanding task, one that requires both hard work and creativity. Many individuals contributed to making the ARTS project a success. Perhaps more than anyone else, Dr. D. Woods Thomas, former Associate Dean and Director of International Programs in Agriculture at Purdue University, should be remembered as having devoted his experience from a lifetime of institution building to structure the ARTS project and guide its early implementation. The ARTS project was Dr. Thomas' last project at Purdue, and a fitting capstone to his long career.

USAID funds and on-the-ground support made this project possible. The support of Wilbur Thomas, USAID Mission Director in Ouagadougou at the start of the project, Thomas Luche, USAID Mission Director/Ouagadougou at the conclusion of the project, F. Rudolph Vigil, Agriculture Development Officer (ADO), Dennis McCarthy, ADO, and Greg Farino, ARTS project manager in Ouagadougou, is gratefully acknowledged.

The collaboration of the men and women residents of the project village sites in Burkina Faso [Donsin, Thiougou, Kamsi, Tiano, Yasso, Dimolo, Kawara, Kayao]

was essential to success. We hope that these people gained as much from the collaboration as RSP and Purdue staff.

An institutional building project demands the patience and perseverance of all participants, and especially the national scientists and administrators involved in the work. Integrating a team of expatriate scientists into an existing research program and guiding its activities for the long term benefit of the institution is a difficult task. The following people deserve special credit for doing just that: Célest Bélem, INERA Director General during the ARTS project; Souleymane Ouédraogo, RSP chief of program since 1992; Sibiri Taonda, former RSP head; Daniel Kaboré, RSP central zone coordinator; and Estanislasse Sankara, RSP western zone coordinator. Each of these individuals played a key role in making the ARTS project a success.

The foundations of project success were laid by the early members of the technical assistance team and the campus support staff in the first two years. Robert Deuson, ARTS project economist and Chief of Party, William Fiebig, ARTS project agronomist, and Herbert Ohm, campus coordinator, initiated the activities that bore fruit in many ways over the life of the project, including the working papers contained in this volume.

Many institution building projects suffer from lack of continuity as activities start and stop with arrival and departure of project staff. In addition to reinforcing the RSP sociology effort with quantitative skills and rigorous methodology, Edward Robins, ARTS project sociologist, who was with the project over its entire four-year lifetime, provided that needed continuity. Robins played a particularly important role in helping to bridge the difficult transition period at midterm of the project.

In some ways, the ARTS project was like a relay race. Technical assistance responsibilities were handed off at midterm to a largely new set of participants who then carried the project to completion. Michael Bertelsen, ARTS project economist

and Chief of Party, John Dickey, ARTS project agronomist, and Jess Lowenberg-DeBoer, campus coordinator, helped to nurture and bring to completion the project activities in the last two years.

In the shadows away from the spotlight, ARTS project administrative personnel Katy Ibrahim (Purdue) and Delphine Romba (Burkina Faso) and their staffs labored long hours, sometimes performing miracles, to provide the support essential for project success.

In addition to those mentioned here by name, there are many others who played large and small roles during the project. The best possible tribute to these efforts will be the continued growth and productivity of agricultural systems and resource management research at INERA. That is our earnest hope and expectation.

David J. Sammons
Associate Dean and Director
International Programs in Agriculture
Purdue University
August 31, 1994

Agricultural Research and Training Support (ARTS) Project
Burkina Faso
Technical Assistance Contract
Final Administrative Report
Executive Summary

The ARTS project was a USAID funded institution building project at the Institute of Agricultural Studies and Research (INERA) of Burkina Faso, West Africa. Purdue University was the primary contractor for the technical assistance (TA) portion of this project. WINROCK International was a subcontractor. The technical assistance was focused on INERA's Production Systems Program (RSP). Researchers in other INERA programs became involved in ARTS project activities because of the multidisciplinary nature of RSP work.

The ARTS Project built on almost 20 years of Purdue experience in farming systems research in the Sahel, including the SAFGRAD/Farming Systems Unit from 1979 to 1986 in Burkina Faso, and a 10-year effort (1983-1992) at the National Agronomic Research Institute of Niger (INRAN).

The general objectives of the ARTS Project were (USAID, 1989):

1) to improve the capabilities of farming systems research teams to collect farm level data, process it, analyze it and make recommendations based on it, and

2) to develop organizational linkages between the farming systems unit and other ministries and agencies involved in agriculture and related policy making.

To achieve those objectives the project financed:

a) improvements to INERA's network of research centers, long-term technical assistance, short-term technical assistance and staff training,
c) equipment, vehicles, supplies, and operating costs of priority research programs, and
d) cost of periodic training of extension staff.

The TA contractor was responsible for long- and short-term technical assistance, as well as on-the-job and short-term non-degree training (point b).

The ARTS project provided 4617 days of short-term training for INERA personnel from July, 1990 to July, 1994. Slightly less than half of the short-term training time was used by researchers (47%). The main focus of researcher training was research

methodology (e.g. statistics, linear programming, GIS) and research planning. About 37% of short-term training time was continuing education for technicians. Clerical staff, accountants and drivers also received training.

Six RSP researchers received long-term training. Three studied for M.S. degrees at U.S. land-grant universities. The others were in third cycle doctorate programs at the National University of Côte d'Ivoire. The long-term training was managed by the USAID Ouagadougou mission. The role of the TA in long-term training was informal and advisory and related mainly to the choice of graduate training program and to advising trainees who did their thesis research in Burkina Faso.

The on-the-job training was primarily in the form of collaboration of short and long-term TA in the on-going research conducted by RSP. The project supplied some computer hardware, software, aerial photos and other items to support the collaboration and training, but the procurement (item c) for RSP was handled through the Ouagadougou USAID mission.

A growing body of publications provides evidence of the increased RSP scientific capacity. One hundred and twenty two documents were produced by ARTS Project participants, including 74 working papers and reports. The RSP working paper series started in 1992 now has 16 papers. Articles are being submitted for review in refereed scientific publications. A separate technical report is being produced which collects working papers written by project collaborators.

Linkages were developed with both research and extension organizations. In Burkina Faso relationships were reinforced with the CRPAs and the University of Ouagadougou. On an international level, links were strengthened with the International Agricultural Research Centers (e.g. WARDA, ICRISAT, IITA) and with various Collaborative Research Support Programs (CRSPs).

U.S. based Purdue University staff were closely involved in short-term training and research collaboration. Faculty of Purdue Agricultural Department supplied 299-person days of short-term training in Burkina Faso and 60-person days in the U.S. About two-thirds of the 53.6 person weeks of short-term technical assistance under the project was supplied by Purdue staff.

Agricultural Research and Training Support (ARTS) Project
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I. Introduction

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A growing body of publications provides evidence of the increased RSP scientific capacity. A separate technical report is being produced which collects working papers written by project collaborators. It should be noted that in the context of the project the research publications are essentially a by-product, just as a thesis is the by-product of a Master of Science degree program. The project was not designed with the objective of maximizing the short-term gain of scientific knowledge, but rather with the goal of increasing the capacity of national scientists for the long-run benefit of science, technology and development in Burkina Faso.

This report is organized to provide in the second section a brief overview of the project context including Burkinabé agriculture, INERA history and the genesis of the project. The third section summarizes project financial resources. The fourth section provides an overview of project staffing, including long-term TAT, short-term technical assistance and Burkinabé staff. The fifth section outlines long- and short-term training activities. The sixth section reviews collaborative research activities and on-the-job training. The final section provides recommendations.

II. Background

Burkina Faso is a landlocked country in the semi-arid region of West Africa known as the Sahel. It is a former French colony which gained independence in 1961. French is the official language. It is one of the world's poorest nations, with $300/capita Gross National Product (World Bank, 1994), 132/1000 infant mortality rate and a life expectancy at birth of 48 years.

About 90% of the Burkinabé population depends on agriculture for their livelihood. Agriculture provides 44% of GDP (World Bank, 1994) and almost all of the exports. Dense rural population in the Central Plateau has led to soil degradation as fallow periods were shortened, overgrazing, and the cutting of woodlands for fuel and construction material. The deterioration of the natural resource base has led migrants from the Central Plateau to other parts of Burkina Faso where the cycle threatens to repeat itself. The conservation and sustained productivity of natural resources is a priority for Burkina Faso. In such a context agricultural research is essential to economic development.

During the colonial and early post-colonial period, most agricultural research was done by expatriate scientists representing international agricultural research organizations (e.g. IRAT, ICRISAT) or projects (e.g. SAFGRAD, FSU). National scientists received some formal and on-the-job training during this period.

In 1981 the Voltaic Institute for Agricultural and Animal Science Research (IVRAZ) was created. In 1985 IVRAZ was reorganized and INERA created. INERA is one of the specialized institutes of the National Center for Scientific and Technological Research (CNRST), which is an administrative organization (*Etablissement public de l'Etat à caractère administratif*) under

the supervision of the Ministry of Higher Education and Scientific Research. INERA has the responsibility of planning, implementation and coordination of on-going national agricultural research programs and the coordination of agricultural research undertaken or funded by international organizations and donors. Forestry and environmental research are in another CNRST institute, the Institute of Botanical and Ecological Research (IRBET), also created in 1985. A more complete overview of the structure and history of agricultural research in Burkina Faso is available in the ARTS project paper (USAID, 1989).

INERA is organized in 6 commodity and 2 resource based programs. The natural and human resource based programs are:

* Production Systems Research (RSP)
* Water, Soil, Fertility, Irrigation and Agricultural Mechanization (ESFIMA)

The commodity-based programs are:

* Rice (Programme Riz)
* Sorghum, Millet and Maize (SOMIMA)
* Legumes and Oilseeds (Oléagineux et Protéagineux)
* Animal Production (Production Animale)
* Cotton (Programme Coton)
* Gardening, Fruit Trees, Roots and Tubers (CMAFRT)

INERA scientists are distributed among the agroecological zones of Burkina Faso, based at seven agricultural research centers (CRA). These centers are located at:

Kamboinsé- near Ouagadougou, mid-Central Plateau
Farako-Bâ - near Bobo-Dioulasso in the West
Saria - near Koudougou on the western Central Plateau
Katchari - near Dori in the Sahelian northern region
Kouari - near Fada N'Gorma in the East
Di - near Tougan in the Northwest
Ngoloko - near the Ivoirian border

RSP has divided the country into five general agro-ecological zones (Figure 1). RSP teams are functioning at Kamboinsé (Central Zone), Farako-bâ (West zone) and Di (Northwest zone). Additional teams are in the process of being organized at Kouari (East Zone) and Katchari (North Zone).

RSP and ESFIMA are considered "horizontal" programs linking scientists in the commodity programs to the world of Burkina Faso's natural resources and farmers. The general mission of RSP is to describe and analyze farming systems. Specifically, RSP's objectives are to:

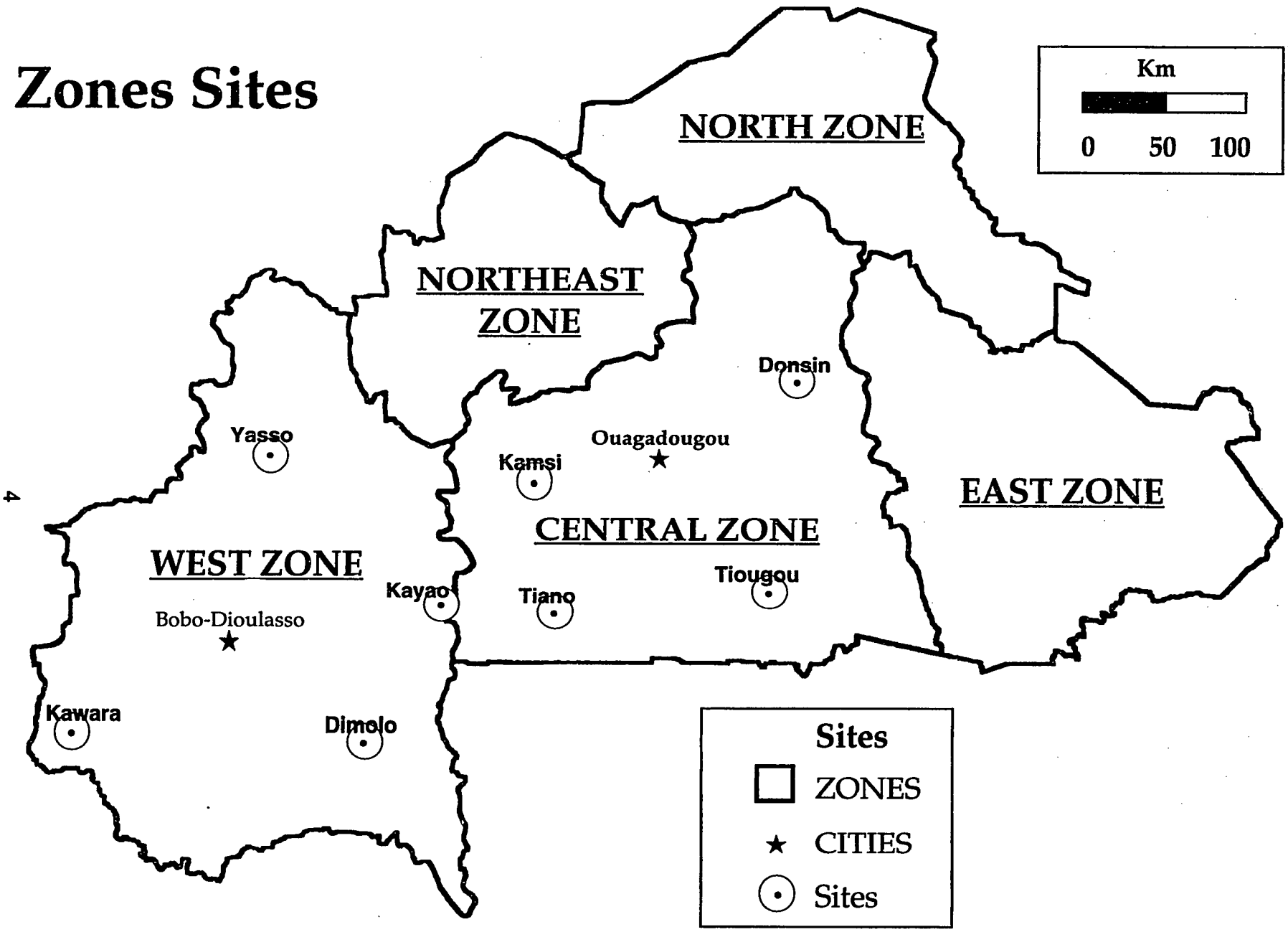

Figure 1. Burkina Faso, INERA/RSP

* describe the agro-ecological zones and farming systems,
* identify key constraints to secure, sustainable and productive management of natural, capital and labor resources,
* identify and evaluate managements systems, including agricultural technology, to alleviate key constraints,
* adapt technology to farm needs and conditions, and
* communicate results to development entities for transfer to farmers.

RSP methodology requires that identification of constraints and evaluation of solutions are to be done in collaboration with farmers, commodity researchers and development organizations.

RSP was created in February, 1985. It was originally staffed with a mixture of national and French (CIRAD) researchers. Researchers from SAFGRAD/IFAD were added in March, 1985. The initial RSP program was strongly influenced by the Purdue University/SAFGRAD Farming Systems Unit (FSU), which functioned from 1979 to 1986. The FSU had a regional (multicountry) mandate, but all its field work was done in Burkina Faso. Because of the unfortunate end of the Purdue University funding just as the national program was being created, the FSU team had relatively little chance to work with the newly formed RSP. The newly formed RSP worked for an initial year in the FSU villages. It later did reconnaisance surveys and chose new villages. The RSP program closely followed the FSU model of baseline surveys and on-farm trials.

The ARTS project was conceived to support research and training activities for the RSP Central and Western Teams. The focus on the Central and Western Teams was intended to concentrate resources and to achieve a critical mass in those areas. Other teams benefited indirectly through short-term training and access to TAT advice. During the ARTS project period, the Northwest team had support through CIRAD and from the Dutch government.

The RSP research strategy involves a multi-year effort in several villages chosen to be representative of the agro-climatic zone (Table 1). Except for Tiano, the RSP villages were selected before implementation of the ARTS project. Tiano was selected in 1993. In both the Central and Western zones, the selection process involved first dividing the area into zones and subzones using agro-ecological and socio-economic information from secondary sources. A rapid appraisal survey was conducted to choose villages within the subzones.

The rapid appraisal in the Central zone was guided by the hypotheses that natural resource degradation was the most serious problem on the Central Plateau and that the rate of out-migration was an index of the severity of degradation. Emigration was taken as an indication that "local farming systems had reached the threshold of their productivity and could no longer support the people living there," (Robins, 1990). Thus the Central Zone villages chosen in 1990, Donsin, Kamsi and Thiougou, represent three stages of natural resource degradation: extreme, advanced and moderate respectively.

Table 1. RSP village research sites in the Central and West Zones.

Zone and Village	Average Annual Rainfall* ---mm---	Animal Traction Use**	Principal Crops	Natural Resource Degradation	Migratory Trend
Central Zone					
Donsin	647	Absent	Sorghum Millet	Extreme	Historic and continuing emigration
Kamsi	741	Little	Sorghum Millet	Advanced	Recent emigration
Thiougou	723	Dominant	Sorghum Millet	Moderate to advanced	Recent emigration
Tiano	848	Dominant	Sorghum Maize	Moderate to advanced	Recent immigration
West Zone					
Yasso	802	Dominant	Sorghum Maize Cotton	Moderate	Historic and continuing immigration
Kayao	819	Dominant	Sorghum Maize Cotton	Moderate	Recent immigration
Kawara	1010	Little, but increasing	Maize Sorghum Rice	Slight	Historic immigration
Dimolo	1015	Little, but increasing	Maize Sorghum Yam	Slight	Recent trickle of immigration

*Post 1969.
**Animal traction for crop production use.

The fourth Central Zone village, Tiano, was selected in 1993 to represent the case in which population density is currently low and natural resources are in relatively good condition; but because of rapid immigration to the area, degradation may occur in the near future.

The choice of villages in the Western Zone was made to represent major agro-ecological and socio-economic conditions. Unlike the Central Zone, the choice was not guided by a hypothesis concerning the primary problem in the region (Robins, 1990). The Western Zone RSP team stated that their work in the villages was intended to build a database that would lead to a better identification of constraints and potentials. They did not want to bias results by their choice of villages according to a hypothesis that may later prove to be faulty.

III. Technical Assistance Budget

Both USAID and the government of Burkina Faso provided resources for the ARTS project. The technical assistance portion of the ARTS project funded by USAID was budgeted at $4,261,341 (Table 2). Actual expenditures are expected to be $3,949,941.95 or about 93% of the budgeted amount.

About 43% of the expenditures under the TA contract were through the subcontract with WINROCK, primarily for costs associated with providing the TAT sociologist for life of the project and the TAT economist during the first two years of the contract.

IV. Project Personnel

A) Long-term technical assistance

The ARTS project provided for three long-term technical assistants: an agricultural economist, an agronomist and a sociologist. The technical assistance team (TAT) was assigned to work under the direction of the RSP Program Head at the RSP headquarters in Kamboinsé. In addition to their disciplinary responsibilities, they assisted in:

* preparation of the overall RSP Program research plans
* identifying opportunities for U.S. university and faculty involvement in RSP research,
* establishment of an RSP publications program,
* preparation of RSP training programs for extension personnel,
* coordination and implementation of RSP short-term training, and
* promoting linkages with other organizations involved in agricultural research or extension.

The disciplinary responsibilities of each long-term technical assistant were to:

* collaborate with RSP researchers in defining and implementing an applied research program in the discipline,
* provide scientific guidance as needed to RSP researchers in their discipline, and
* identify short-term technical assistance and training needs in their discipline.

Table 2. Burkina Faso Arts Project (Contract No. 624-0270-C-00-0012-00) WINROCK.

	Expenditures to Date 2/10/90-8/31/94	Estimated Expenses to Close Project	Total Estimated Expenses Life of Project	Arts Budget	Expenses vs. Budget
Salaries & Wages	561,084.86	3,000.00	564,084.86	590,192.00	96%
Fringe Benefits	169,156.81	1,000.00	170,156.81	166,176.00	102%
Allowances	195,446.93	4,307.20	199,754.13	243,888.00	82%
Travel	411,500.98	50,000.00	461,500.98	572,393.00	81%
Supplies	21,480.35	25.00	21,505.35	22,551.00	95%
Non-Expendable Equip.	45,069.53	0.00	45,069.53	45,070.00	100%
Other Direct Costs	138,166.22	2,000.00	140,166.22	173,997.00	81%
Local Cost Financing	201,735.12	31,000.00	232,735.12	294,009.00	79%
Indirect Cost	363,517.98	*39,444.00	402,961.98	440,610.00	91%
Sub-contract-Winrock	1,623,314.64	44,487.36	1,667,802.00	1,667,802.00	100%
Sub-contract-Florida	44,204.97	0.00	44,204.97	44,653.00	99%
TOTAL	$3,774,678.39	$175,263.56	$3,949,941.95	$4,261,341.00	93%

*Includes estimated IDC adjustment of $19,114 to be charged when project is closed. Purdue University's IDC rates increased from 28% to 30% (on campus) and from 21.6% to 23% (off campus) effective 7/1/91. IDC increase will be applied to all charges incurred after 6/30/91, since all budgeted IDC funds have not been expended.

The agricultural economist also served as team leader and had the following additional responsibilities to:

* serve as administrative and program leader for the TAT and other staff, including short-term technical assistants and administrative support staff,
* serve as TAT spokesman and representative with USAID and other organizations,
* assist in recruitment and placement of project staff, including logistics required for the TAT,
* initiate required program documentation for USAID, and

* work closely with the USAID Project Officer to ensure that project inputs are provided in a timely and efficient manner.

The TAT was provided by Purdue University and WINROCK (Table 3). The long-term project staff were (in alphabetical order):

Michael Bertelsen - Agricultural Economist/Team Leader for the last two years of the technical assistance contract. He received his Ph.D. in 1978 from Virginia Polytechnic Institute and State University. He has long-term experience in Morocco, Haiti, Honduras and Paraguay. His position at Purdue University was Visiting Assistant Professor.

Robert Deuson - Agricultural Economist/Team Leader for the first two years of the project. He received his Ph.D. in 1982 from the University of Minnesota. He has long-term overseas experience in Niger, Morocco and Egypt. Deuson was Assistant Professor in the Purdue University Department of Agricultural Economics from 1984 to 1990.

John Dickey - Agronomist for the last two years of the technical assistance contract. He received his Ph.D. in 1990 from Purdue University. Dickey spent two years in the Peace Corps in Burkina Faso as assistant maize agronomist with the SAFGRAD/IITA team. He speaks Mooré fluently. His position at Purdue University was Visiting Assistant Professor.

William Fiebig - Agronomist for the first two years of the project. He received his Ph.D. in 1990 from the University of Florida. He has long-term overseas experience in Mauritania, Congo and Zaire. His position at Purdue University was Visiting Assistant Professor.

Edward Robins - Sociologist for the 4 years of the ARTS technical assistance contract. He received his Ph.D. in 1972 from Tulane University. He was social science officer for USAID in Rwanda from 1983 to 1988. Robins is Professor of Anthropology at the University of Wisconsin-River Falls.

B) Short-term technical assistance

A total of 53.6 person-weeks of short-term technical assistance was requested by RSP and supplied by Purdue University and Winrock (Table 4). Project coordinator time in Burkina Faso was included in the short-term technical assistance table because both Ohm and Lowenberg-DeBoer devoted most of their effort in-country to technical matters. About 34.6 person-weeks of the short-term technical assistance time, or about 63% of the total, was supplied by Purdue University faculty.

C) Burkinabé employees

The project employed three Burkinabé administrative support employees (Table 5): an administrative assistant, a secretary and a driver.

Table 3. Long-Term Staff.

Name	Affiliation	Inclusive Dates	Person-Years	Field/Assignment
Robert Deuson	Winrock	7/1/90-6/30/92	2	Chief of Party/Economist
William Fiebig	Purdue University	7/1/90-6/30/92	2	Agronomist
Edward Robins	Winrock	7/1/90-8/31/94	4	Sociologist
John Dickey	Purdue University	7/1/92-8/31/94	2	Agronomist
Michael Bertelsen	Purdue University	11/15/92-8/31/94	2	Chief of Party/Economist

Table 4. Short-Term Technical Assistance.

Name	Affiliation	Dates of Visit	Person-Weeks	Purpose of Visit
James Ahlrichs	Purdue University	08/12/92-09/1/92	3.0	Assist the RSP with soils research
Deirdre Birmingham	WINROCK	09/17/90-10/08/90	3.1	Training needs assessment
Jacqueline Brux	University of Wisconsin-River Falls	07/13/91-08/05/91	3.4	Women in Development

Table 4 Continued

Name	Affiliation	Dates of Visit	Person-Weeks	Purpose of Visit
J. Lowenberg-DeBoer	Purdue University	07/29/92-10/02/92	9.4	Interim Chief of Party leadership for the ARTS project
		03/27/93-04/13/93	2.6	Review ARTS project and conduct LP workshop
		08/29/93-09/18/93	3.0	Provide administrative & technical backstopping for the ARTS project
		06/16/94-06/26/94	1.6	To assist with data analysis, end of project reporting and closure of the ARTS project
Daniel Deybé	WINROCK	05/09/91-02/10/91	4.0	GAMS Short Course
Amadou Diop	Rodale	09/22/93-10/02/93	1.6	Natural Resources Workshop
Jonathan Landeck	Rodale	09/22/93-10/02/93	1.6	Natural Resources Workshop
John Lichte	University of Florida	03/09/92-03/20/92	1.7	Research Program Planning
Mark McGuire	Independent Consultant	02/01/93-02/20/93	2.9	Provide recommendations for geographic information systems (GIS) for Purdue University/ARTS/RSP

Table 4 Continued

Name	Affiliation	Dates of Visit	Person-Weeks	Purpose of Visit
Herb Ohm	Purdue University	03/04/90-03/22/90	2.6	Project Implementation Team
		08/14/91-09/1/91	2.6	As campus coordinator of the ARTS project he assisted team in reviewing workplans and collaborative research with the host institution, IRA
		02/05/92-02/21/92	2.4	Meet with Purdue University ARTS staff regarding evaluation of project & planning for 92 work
		06/27/92-08/03/92	5.4	Interim Chief of Party for ARTS project
John Russell	University of Florida	03/09/92-03/20/92	1.7	Research Program Planning
Wallace Tyner	Purdue University	01/31/93-02/06/93	1.0	Provide training on development of work plans for the Burkina Faso project
			Total weeks 53.6	

Table 5. Personnel Employed by ARTS Office Kamboinsé, Burkina Faso.

Name	Position	Dates
Delphine Romba	Administrative Assistant	07/01/90-08/31/94
Bohena Aminata	Secretary	05/01/92-04/30/93
Charles B. Ilboudo	Driver	05/01/92-08/31/94
Augustine Kaboré	Secretary	05/01/93-08/31/94

D) U.S. Administration

The Purdue University campus staff for the ARTS project included a one-third administrative assistant, a one half-time secretary and a one quarter-time campus coordinator (Table 6). This office was responsible for arranging TAT, Purdue University short-term and Purdue University administrative travel, for purchasing supplies and services related to technical assistance and for shipping. A major part of the work load in the final two years of the project was linked to purchase of computers, software, satellite images and aerial photos. The workshops on research planning by University of Florida personnel and on natural resource management by Rodale staff (Annex A, Table A.1) were administered through the Purdue University campus office.

The campus coordinator was responsible for overall supervision of the campus support activities, for project administration, and for technical backstopping. The coordinator was a tenured Purdue University faculty member and served as the main point of contact between Purdue University and INERA. The campus coordinator facilitated involvement by Purdue University faculty and other U.S. scientists in collaborative work with INERA. He traveled regularly to Burkina Faso for both administrative and technical backstopping.

About 7.7 weeks of administrative visits were spread through the 4-year life of the project (Table 7). Dr. Pierre Antoine, ARTS project coordinator for WINROCK, visited regularly. The visits by Ohm and Lowenberg-DeBoer are included in Table 3 under short-term technical assistance because the bulk of their time in Burkina Faso was devoted to technical matters.

Table 6. Purdue University Administrative Staff

Name	Position	Dates
Katy Ibrahim	Administrative Assistant	05/01/90-08/31/94
Theresa Walker	Secretary	06/01/90-09/23/90 05/15/94-10/27/94
Heather O'Brien	Secretary	10/17/90-11/08/91
Herb Ohm	On-campus coordinator	07/01/90-09/30/92
J. Lowenberg-DeBoer	On-campus coordinator	10/01/92-08/31/94
Kathy Diehl	Secretary	12/09/91-05/14/93
Wendy Shorter	Secretary	10/28/93-08/31/94

Table 7. Administrative Visits.

Name	Dates of visit	Person-Weeks	Purpose of Visit
Pierre Antoine	02/12/90-02/14/90	0.3	Negotiations for ARTS Project
	09/17/90-09/19/90	0.4	On-site inspection
	04/12/91-04/14/91	0.3	On-site inspection
	02/13/92-02/20/92	0.9	On-site inspection
	04/26/93-04/29/93	0.4	On-site inspection

Table 7 Continued

Name	Dates of visit	Person-Weeks	Purpose of Visit
	03/20/94-03/24/94	0.4	On-site inspection
Larry Pherson	02/10/90-02/17/90	1.0	Negotiate cost proposal for the ARTS project
Katy Ibrahim	01/26/92-02/10/92	2.3	Administrative visit
David Sammons	10/12/93-10/16/93	0.7	Meet with ARTS staff
D. Woods Thomas	02/10/90-02/17/90	1.0	Negotiate cost proposal for the ARTS project
		Total 7.7 weeks	

V. Long- and Short-term training

A. Long-term training

The long-term training was managed by the USAID Ouagadougou mission. The role of the TAT in long-term training was informal and advisory and related mainly to the choice of graduate training program and to advising trainees who did their thesis research in Burkina Faso.

Six RSP researchers received long-term training through the project (Table 8). Three researchers studied for M.S. degrees in the U.S. The remaining three researchers studied for third cycle doctorates at the National University of Côte d'Ivoire, Abidjan. Two of the six long-term trainees are women. One woman is being trained in animal science at Colorado State University. Another woman is studying sociology in Abidjan.

It should be noted that in spite of the widely acknowledged quality of U.S. graduate training in agriculture, there was some reluctance to go to the U.S. for training. This was primarily because the CNRST promotion system is structured around the French system of advanced degrees. It requires individuals to have at least a third cycle doctorate to be considered a full-fledged researcher. Thus, an M.S. degree does not substantially advance the career of an INERA researcher. This problem was noted early in the project (see Ohm *et al.*, 1990, p. 33), but was not resolved.

Table 8. Long-Term Training Financed by the ARTS Project.

Degree and Discipline	Researcher	Period	Location	Observations
3rd Cycle Dr. Animal Science	Zoundi Sibiri	1990-1994	Côte d'Ivoire	Defense planned for late 1994
3rd Cycle Dr. Agronomy	Sohoro Adama	1990-1994	Côte d'Ivoire	Defense planned for late 1994
M.S. Agronomy	Badini Oumar	1991-1994	U.S.	Completed
3rd Cycle Dr. Sociology	Sorgho Marie-Claire	1991-1995	Côte d'Ivoire	Data analysis
M.S. Geography	Sanou Patrice	1993-1996	U.S.	In process
M.S. Animal Science	Gnoumou Brigitte	1993-1996	U.S.	In process

A U.S. Ph.D. would permit career advancement, but most RSP researchers at the beginning of the project had only undergraduate degrees and could not qualify for direct admission to U.S. Ph.D. programs. Allowing participants to study consecutively for M.S. and Ph.D. degrees in the U.S. raises equity questions because it would concentrate most long-term training resources in a few persons. In addition, the ARTS project life was not long enough to permit completion of both M.S. and Ph.D. degrees. Time required for a degree varies by discipline and program, but completion of both M.S. and Ph.D. degrees consecutively often requires at least five years.

Other disadvantages of U.S. training include the necessity of spending several months in English language training, further lengthening the training period, and the long separation from family. Third cycle doctorate training is centered on thesis research and writing. It often does not require the extensive course work associated with U.S. graduate degrees. Thus, if a thesis research project can be arranged in country, the third cycle doctoral candidate can spend most of the time close to home. Travel costs for Burkinabé trainees in Abidjan are relatively low, thus they are sometimes accompanied by family

members or they can afford more frequent trips home during their training than those who are in the U.S.

B. Short-term training

The ARTS project provided 4617 person-days of short-term training for INERA personnel from July, 1990, to July 1994 (Table 9; Annex A, Table A.1), including attendance at workshops and conferences. Additional short-term training is planned to continue through March, 1995, with funds managed by USAID/Ouagadougou. A training plan was developed by RSP with TAT help (Bertelsen, 1994). The training plan focused on reinforcing key skills needed to implement the RSP research plan.

Typically during the TA contract period, the TAT was involved in planning and implementing the training, but most expenditures were made from the ARTS Project funds managed directly by the USAID mission at Ouagadougou. When TAT or Purdue University faculty functioned as trainers, expenditures for travel, teaching supplies and other training costs were supported by the technical assistance contract, but per diem and travel costs for participants were paid through the USAID managed account.

Training was provided to researchers, technicians, librarians, administrators, clerical workers and drivers. About half of total training time was devoted to researchers (47%). The largest training category for researchers was "research methods" (31% of researcher training time) which included farming systems research techniques, community-based natural resource management, linear programming (LP) and geographical information systems (GIS). Related to research methods were statistics and research planning with 11% and 26% of researcher training time. Many researchers benefited from English training at the American Cultural Center in Ouagadougou and Bobo-Dioulassou.

Training in research planning occurred in two large workshops held at the Saria research station. One workshop was conducted under the auspices of the University of Florida by John Lichte and John Russell in March, 1992. The second workshop in January, 1993, was led by Wallace Tyner, Professor and Department Head in the Purdue University Department of Agricultural Economics.

A workshop on participatory methodology for research in regenerative, integrated natural resource management was conducted by Jonathan Landeck and Amadou Diop from the Rodale Institute in September and October, 1993.

Some 37% of the total training time was absorbed by technicians, supervisors and agents, mainly in continuing education sessions that covered a wide variety of topics. Technicians also benefited from computer training in spreadsheet data handling and from some of the research methods training designed primarily for researchers.

TAT personnel were trainers and/or resource people for all ARTS short-term training in Burkina Faso. They were trainers for 362 person-days of computer- related and statistics

Table 9. Short-Term Training[1] by Topic and Personnel Category, ARTS Project, BurkinaFaso, 1990-1994

Topic	Res.	Tech.[2]	Lib.	Admin.	Clerical	Drivers
Person-days						
Computer Skills	226	214	0	36	223	0
Research Methods[2]	701	42	0	0	0	0
Research Planning	579	0	0	0	0	0
Statistics	253	0	0	0	0	0
English	450	0	0	40	0	0
Tech. Training[4]	0	1448	0	0	0	0
Administration	0	0	0	40	0	0
Library	0	0	116	0	0	0
Driving Skills	0	0	0	0	0	252
Total Person-days	2209	1704	116	113	223	252
Percentage by Topic for Personnel Category						

Table 9 Continued

Computer Skills	10	13	0	32	100	0
Research Methods[3]	31	2	0	0	0	0
Research Planning	26	0	0	0	0	0
Statistics	11	0	0	0	0	0
Tech. Training[4]	0	85	0	0	0	0
Administration	0	0	0	33	0	0
English	20	0	0	35	0	0
Library	0	0	100	0	0	0
Driving Skills	0	0	0	0	0	100

[1]Totals include both structured training in Burkina Faso as well as conferences and workshops in Africa and the U.S. On-the-job training is not included.
[2]Technicians, supervisors and agents.
[3]Includes training in Geographic Information Systems, Linear Programming, Community Based Natural Resource Management, and Farming Systems Research Methods.
[4]"Tech. Training" is continuing education technicians and agents. A training often covers a variety of topics. Records did not permit a separate accounting of topics covered.

structured short-term training, in addition to their daily on-the-job training responsibilities. Dickey was involved in 204 person-days devoted to agronomic statistics using the GENSTAT software, in collaboration with Roger Stern, statistician with ICRISAT in Niger. Bertelsen provided a week-long workshop in use of SPSS for analysis of socio-economic data.

As part of short-term technical assistance, Purdue University Agricultural Economics faculty provided 229 person-days of training in Burkina Faso and 60 days of training in the U.S. In addition to the research planning workshop conducted by Tyner, Lowenberg-DeBoer, ARTS project campus coordinator, led a four-day workshop for RSP economists on use of linear programming for representative farm modeling in the Sahel in April 1993 and provided more advanced training for one RSP economist during a one-month individual study course at Purdue University in April 1994. William Masters, Assistant Professor of Agricultural Economics, provided a one-month individual study course at Purdue University on the development and use of a Policy Analysis Matrix PAM for an RSP economist.

Use of Purdue University faculty and TAT personnel in short-course training facilitated follow-up and development of institutional links. In implementing research programs, the TAT could reinforce skills learned in the structured short courses. Experience from projects in Brazil, Portugal and Niger indicates that links between Purdue University faculty and national researchers begun in short courses and other technical assistance can develop into long-term scientific collaboration.

Most of the travel outside of Burkina Faso by TAT members involved accompanying RSP researchers to international conferences (Annex B, Table B.1.). At the conferences TAT members were able to facilitate participation and networking by RSP researchers, including translating, making introductions and logistics.

VI. Research collaboration and on-the-job training

A. TAT role

The bulk of TAT activities were in on-the-job training and research support. This was a mix of "pulling and pushing", with TAT taking the lead in a few research activities, but more often providing technical support and collaboration for efforts led by RSP scientists. More detailed summaries of the activities of individual TAT members are available in their end-of-tour reports (Bertelsen, 1994; Deuson, 1992; Dickey, 1994; Fiebig, 1992; and Robins, 1994).

B. Specific research activities

Agronomy - The activities of the TAT agronomist included:

* Planning, execution, analysis and report writing for RSP team activities, mostly studies of the performance, economic impact or farmer reaction to technology,
* Planning, supervision, and analysis of dissertation projects which were associated with RSP activities, mostly in RSP villages, and
* Participation in research activities piloted by RSP collaborators, mostly from other INERA programs.

Thematically, the activities break down in the following categories:

Crops and Cropping Systems:

1) Varietal evaluation, including analysis of yield stability
2) Disease and pest management
3) Evaluation of agricultural machinery and its use
4) Training in methods of seed or set production and storage
5) Evaluation of crops or cropping systems
6) Improved feed production, livestock feeding and animal health

Environmental Monitoring, Conservation and Regeneration

1) Soil fertility, including use of mineral fertilizers, fabrication and use of organic soil amendments, and definition of fertility requirements of varieties.
2) Land conservation and reclamation
3) Characterization of land degradation and variability
4) Environmental monitoring

As the only natural scientist on the TAT, the agronomist provided technical support for all the natural sciences associated with RSP, including animal science, agroforestry, agronomy and soil science. This support was often requested by RSP researchers for research planning, experimental design and statistical analysis.

In the Central Zone much of the research activity in the natural sciences was thesis research. Both of the agronomists and both of the animal scientists in the Central Zone were working on theses during the ARTS project period. The nature of the research was therefore influenced by degree requirements. While the general guideline was to integrate theses into program activities, in practice some thesis topics and approaches were better suited to solving farmers' problems than others. Satisfying academic requirements often means that research design and analysis must be more complex than would otherwise be the case. The TAT agronomist devoted a substantial amount of time to support of thesis related research.

Gebisa Ejeta, professor of agronomy at Purdue University and INTSORMIL principal investigator, cooperated with the TAT agronomist and RSP researchers in on-farm trials of Striga-resistant sorghum varieties. Ejeta provided seed for newly developed sorghum varieties with Striga resistance developed in INTSORMIL collaborative research.

Economics - The activities of the TAT economist included collaboration with RSP scientists in analysis of:

1) market prices for food crops in RSP villages in the Central Zone and in the Western Zone.
2) 1991 census data for Central Zone villages

3) farm monitoring survey information for Western Zone villages to permit comparisons between farms and between villages, as well as estimation of linear programming coefficients,
4) a farmer strategy survey in the Central Zone,
5) Food Crops Fertilizer Project data,
6) economics of compost use in the Western Zone,
7) farmer-generated village classifications using discriminant analysis,
8) on-farm trial data from the Central and Western Zones, and
9) the potential returns to research on zaï.

In addition, Bertelsen worked with RSP GIS specialist Bakary Djaby on the following themes:

1) Identifying candidate villages for the Central Zone research site selected in 1993. Village population and access to an all-weather road were superimposed to identify villages to be visited during the rapid appraisal.
2) Analysis of high potential recommendation domains for upland rice. Rainfall, soil suitability, use of animal traction, access to markets and experience with purchased inputs in cotton production were superimposed to identify villages with a high potential for adoption of upland rice.
3) Refinement of RSP intervention zones using data on human and animal population densities, soil potential, precipitation, and cropping systems superimposed to develop a new agro-ecological stratification of the country.
4) Initiation of a comprehensive national agriculture and natural resource database. Because all data are relevant to a specific geographic area as well as a specific time period, GIS serves as a logical mechanism around which a comprehensive database can be organized.

Under the supervision of two U.S.-based Purdue University agricultural economists, Masters and Lowenberg-DeBoer, two agricultural policy analysis tools were developed: linear programming representative farm models of Yasso cotton producers and Fulani agro-pastoralists in the Southeast, and policy analysis matrix (PAM) spreadsheets for the major crops for both manual and animal traction in each of the three major agro-ecological zones of Burkina Faso. Additional research piloted by Lowenberg-DeBoer included research on the risk characteristics of technologies tested by the Food Crops Fertilizer Project, the opportunity cost of capital for agricultural investments, and the economics of soil conservation techniques in the northern Central Plateau.

Sociology - Sociology research contributed to the overall RSP program by:

1) determinining the role of socio-cultural factors in agricultural production and
2) increasing participation of villagers in the research process.

The TAT sociologist collaborated with RSP sociologists and other RSP scientists in research on 5 themes:

1) diagnosis of the village milieu,
2) delineation of farm types,
3) evaluation of agricultural practices (including RSP on-farm trials),
4) specification of gender roles and strategies, and
5) elucidation of producer's natural resource management strategies.

The diagnosis of the village milieu included reconnaissance surveys, preparation of village histories, a study of farmer needs and aspirations and examination of the development institutions in the region (NGOs, extension, development projects).

Activities undertaken to delineate farm types were surveys of producers' potential and constraints, and village socio-economic profiles. The profiles involved an innovative approach that asked "resource persons" in the villages to rank households in a random sample.

Farmer opinion surveys were the first and most regular tool used by RSP to obtain producer points of view. It was conducted in 1990, 1991, 1992 and 1993.

Research on gender roles and strategies included a study of women's roles in rice production, analysis of women's agricultural-economic strategies and an inventory of women's agricultural activities. Peanut variety trials with women were initiated. Previously, RSP had not worked with women farmers.

Relatively little is known about indigenous strategies for natural resource management. Such strategies were studied through the questions of the farmer opinion surveys that relate to the status of soil and forestry resources, a study of the impact of migration on land management in the Western Zone, work on tree management, particularly at Thiougou, research on indigenous soil and water conservation techniques.

Agroforestry - ARTS Project efforts in agroforestry were reinforced by the work of Jean-Marc Boffa, a Purdue University Forestry Ph.D. student. Boffa was partially funded by the ARTS project, a MUCIA grant and a Purdue University Forestry Department assistantship. He was in Burkina Faso from October 19, 1992 to December 19, 1993. His work focused on management of trees and tree-crop interactions at Thiougou.

C. Publications

The increasing scientific maturity of the RSP Program is visible in the growing body of publications. Annex C lists 122 documents produced within the ARTS Project framework. Some 74 working papers and reports were written, including 16 entries in the RSP working paper series. Papers were presented at 36 workshops and conferences.

Publication in international scientific journals is the final arbiter of research quality. Plans have been made to revise several of the working papers and conference documents for eventual submission to journals. An article by Hien *et al.* concerning the riskiness of alternative

phosphate sources has been submitted to the Journal of Farming Systems Research and Extension.

D. Material constraints

Another important role of the TAT was to identify key constraints to research productivity and quality, and to try to alleviate them. Procurement was through budget managed directly by USAID/Ouagadougou, but some purchases of key materials for collaboration and on-the-job training was made though the technical assistance contract. Specific actions were:

* Computer hardware and software purchased with ARTS Project funds have helped fuel a jump in researcher competence and productivity. Computers are now relatively cheap relative to other research equipment (e.g. four-wheel drive vehicles) and their per dollar impact on research output appears to be greater than the average project expenditure.
* GIS hardware, software and training have increased the research capacity of RSP in land use and natural resource management. This tool has demonstrated potential for organizing and using spatial information (e.g. land tenure and soil/landscape classification) at the village level.
* Aerial photographs were purchased for each RSP village. This contributed to RSP's ability to analyze the condition, management and evolution of land use. Comparisons with previous aerial photos, showed changes in cultivated land, forest and pasturage. These photos have been used to orient research and locate observations in a spatial context. Some of this data is being processed by GIS. Several satellite images were also purchased to help put the village sites into a regional context.
* Using hardware supplied by ARTS, the TAT established Email (Internet) links for the Central and Western RSP teams. This greatly reduces communication cost compared to telephone, fax or express mail.
* Soil sampling, photographic equipment, film and film developing purchased by ARTS were indispensable for data collection on technology performance and on environmental conditions.
* Purdue University supplied 457 publications to the INERA documentation center (Annex D), not counting scientific journals donated by retiring Purdue University faculty. Journals donated included Agronomy Journal, Crops and Soils, Ecology, Soil Science, Journal of Sustainable Agriculture, and Journal of Plant Nutrition. The 457 publications were either requested by the TAT or selected for their relevance to Burkina Faso at Purdue University by Jean-Marc Boffa and the campus coordinator. They include extensive documentation of agroforestry subjects and all U.S. and Canadian Ph.D theses in the last 10 years dealing with agriculture in the Sahel. An annotated bibliography was developed by Jean-Marc Boffa.

E. Linkages

TA played a role in developing and reinforcing RSP linkages in both research and extension. Networking is by nature a diffused activity and difficult to document. Linkages are developed

through telephone conversations, formal or casual encounters, written communication, and many other contacts. In addition to the contacts developed in short-term training (Annex A, Table A.1), conferences (Annex A, Table A.2), and travel by TAT (Annex B, Table B.1), other linkage development activities by TA included:

* CRPA contacts including:

- Technical Research Committee for the East-Central and East Regions, meeting with CRPA representatives on March 9, 1990, at Fada N'Gourma.
- Research-Development Seminar, March 13, 1990, Bobo-Dioulasso.
- Site visits to CRPA demonstration plots with a team of INERA, DVA and CRPA staff. Sites visited were Tankounga, Tempelga, Dapélogo, Tenkodogo, Bogandé and Koupéla, Sept. 21-24, 1992.
- Support for RSP training of CRPA senior technicians throughout the 4 year project period.
- Constraint identification workshops between Central and Western Zone teams, the CRPA's from their respective zones, and DVA, January 1994.
- Consultation regarding on-farm trials in intercropping with the Koudougou CRPA personnel, and in data analysis with the Manga CRPA.
- Field contacts with CRPA personnel in RSP villages. Attendance of CRPA field days, Dimolo, December, 1992, and CRPA attendance at RSP field days.

* NGO links including:

- contacts initiated with NGOs in the Donsin area in 1992, including Foster Parents Plan of Boulsa (PPIB), the Kaya Regional Development Association (ADRK) and the Integrated Development Project (PDI).
- collaborative research with PPIB on reclamation of degraded land using zaï and rock bunds in 1993.

* University of Ouagadougou

- TAT offered technical support for students doing thesis research with INERA.
- TAT taught classes at the University in collaboration with RSP staff.
- Consultation and guidance with the Institute of Rural Development trainees on their thesis research.

* CRSP links:

- participating in and facilitating the launching of SANREM activities in Burkina Faso in 1993. Donsin has become one of 3 SANREM research sites worldwide.
- facilitating activities of TROPSOILS/TSMM, in particular collaborative research with RSP on the sustainability of production systems at Yasso. RSP staff visiting the U.S.

participated in the Tropsoils meeting at the American Society of Agronomy meetings in Cincinnati in November, 1993.

- a proposal for a McKnight Collaborative Research grant was prepared in Burkina Faso for joint research with the Peanut CRSP, the University of Ouagadougou and INERA.
- Brhane Gebrekidan visited Burkina Faso in October 13-17, 1993, as part of preparation for INTSORMIL's 10-year plan. He visited sorghum-growing areas including the RSP village site of Yasso and met INERA sorghum scientists. Burkina Faso is one of the priority countries in which INTSORMIL would launch activities if funds become available.
- RSP staff visiting Purdue University met with Bean-Cowpea CRSP representatives in November 1993 and April, 1994.

* Links with International Centers and other national programs

- Training at CG International Centers included a course for the Western Zone Agronomist in maize production research at IITA, and for the GIS specialist in GIS applications to African Environmental Challenges at IITA.

- Field trip to WARDA and the Ivoirian national program and cotton parastatal, especially to identify farmer-ready technology in rice weed management and yam agronomy, March 1993.

- Field trip to ICRISAT Sahelian Center to prepare a joint course with their Statistics Department in the use of Genstat for intermediate data analysis, March 1994.

- Joint course in the use of Genstat for intermediate data analysis, given to all RSP natural scientists with the ICRISAT Sahelian Center Principal Statistician. Participation of an INRAN (Nigerien national program) statistician, Ouahigouya, April 1994.

- Joint presentation of a course in using GIS to INERA personnel, given at Ouagadougou, July 1994.

VII. Conclusions and perspectives for the future

RSP is a young research program, with a relatively inexperienced staff. In their short history they have demonstrated their abilities to:

* work hard,
* learn and incorporate lessons into daily research work,
* seek and reach consensus on difficult matters,
* rigorously develop and communicate their own vision of production systems and production systems research, and
* understand and operate within a complex and dynamic institutional environment.

The evolution of RSP shows the following positive trends which should be reinforced from within RSP and by Burkina collaborators, by donors and foreign collaborators:

* Research increasingly corresponds to constraints as described by farmers and is therefore more specific to each village and region,
* RSP efforts increasingly address natural resource management issues, such as woody plant production and consumption, land conservation and regeneration, and pasture improvement or feeding alternatives to overgrazing,
* The social/cultural/economic dimensions are more often considered the bottom line, and input from social sciences is sought and valued to enrich the entire research program,
* Collaboration with other INERA program in research activities is now standard practice. Informal and formal encounters with researchers from other programs (especially ESFIMA) are more frequent and fruitful for all.
* RSP researchers and supervisors are able to do more of their data management and analysis.
* The quality of the technicians has increased through experience and training in field techniques.
* RSP has increased research productivity. Research projects are increasingly well-planned, executed, analyzed, interpreted and finished in written or oral communications. RSP is providing research leadership within INERA.
* Links with donor and technical assistance resources are diversifying. During the ARTS Project technical assistance contract functional links were reinforced with the CRSPs (especially SANREM), the CG centers (especially WARDA and ICRISAT), and U.S. universities, including Purdue University, Washington State University, U.C. Davis. Email has helped in establishing and maintaining these links.

Challenges and problems remain in several areas:

* Mechanisms are needed to continue scientific links between U.S. researchers and INERA. The decision not to implement the planned second phase of the ARTS Project threatens to repeat the mistake made at the end of the SAFGRAD/FSU effort. Just as some momentum is being built, funds are terminated and budding scientific potential is cut off before it can bloom. Alternatives to maintain these links include the CRSPs and/or regional projects.
* Rules of promotion reward academic degrees (in particular those from francophone institutions) and contribution to scientific literature, but do not fully recognize other contributions to development such as technical bulletins and extension meetings with farmers and development personnel.
* Functional links to extension need further development. RSP needs effective collaboration with the Ministry of Agriculture and NGO extension personnel to develop better ways to communicate research results to farmers.
* Joint planning and execution of research, especially among researchers of different disciplines, must become more flexible and fruitful. One of the simplest strategies to

accomplish this is for researchers to take a greater interest in the work of their colleagues in other disciplines.

* Researchers need to continue to develop in areas of data management, analysis, interpretation and presentation. Scientists need to find time to finish and publish their work. Mentoring is needed to encourage and facilitate analysis and publication.
* RSP needs to broaden its scientific contacts. Many RSP researchers are relatively isolated from their disciplines. Sometimes they are the only representative of their discipline at a given research station. At best they have two or three colleagues. There is rarely a critical mass for the discussion and exchange that are essential for scientific progress. Continued international links are essential. U.S. scientists can play an important mentoring role through the CRSPs and other mechanisms.
* RSP has a shortage of experienced scientists. INERA tends to assign administrative duties to relatively young researchers, thereby extinguishing research careers too early.
* INERA's commodity programs tend to have their own vision of RSP's role that focuses on the farm testing of technologies developed on research stations. In this perspective, the flow of technology and knowledge is unidirectional from the research station to the farm with RSP as the messenger. RSP researchers have a broader vision of their mandate that centers around technology development in a systems context. The RSP vision involves both farmers and commodity researchers as partners in the development process. Constructive collaboration between RSP and INERA commodity programs has been hindered by this difference of perspective.
* Administrative responsibilities are heavy and time-consuming. Because of poorly organized and inadequately trained staff, administrators find it too risky to delegate responsibilities and are thus buried in detail. As a result, researchers waste time and effort in securing resources needed for their work.

REFERENCES

Bertelsen, Michael, "End-of-Tour Report", ARTS Project, Ouagadougou, Burkina Faso, August, 1994.

Deuson, Robert, "End-of-Tour Report," ARTS Project, Purdue University, West Lafayette, Indiana, 1992.

Dickey, John, "End-of-Tour Report," ARTS Project, Ouagadougou, Burkina Faso, August, 1994.

Fiebig, William, "End-of-Tour Report," ARTS Project, Ouagadougou, Burkina Faso, 1992.

Ohm, H., Deuson, R. and E. Robins, "Report of the ARTS Project Implementation Team, March 2-April 2, 1990," April, 1990.

Robins, Edward, "Annex 4, RSP Data Collection and Analysis" in H. Ohm, R. Deuson, and E. Robins, "Report of the ARTS Project Implementation Team," Purdue University and WINROCK International, 1990.

Robins, Edward, "End-of-Tour Report," ARTS Project, Ouagadougou, Burkina Faso, July, 1994.

USAID, "Burkina Faso, Agricultural Research/Training Support," 1989.

World Bank, World Development Report 1994, Oxford University Press, New York, 1994.

ANNEX A

Table 9. Short-Term Training Financed by the ARTS Project, July 1990 to August 1994.

Topic and Trainers	Participants	Date	Location	Number of Participants	Observations
- DOS - WP * M. Nana	Researchers (3) Technicians (3) Agent (1)	Nov.-Dec. 1990	Ouagadougou	13	Evaluated by participants 12 days/person
- DOS - WP - LISA *Ms Tailly CIRAD/ DSA	Researchers (10) Technicians (5) Agent (3)	Dec. 1-24, 1990	Ouagadougou Bobo-Dioulasso	22	Report Evaluated by participants 6 days/person
- GAMS Linear Programming, Modeling. "The Rural Economy" *Daniel Debey	Researchers A. Sidibe D. Kaboré S. Ouédragao	Sept. 10-24, 1991	Ouagadougou	3	12 days
- Continuing Education for Technicians Part I Methodology, *CAP, Matourkou	Supervisors Technicians	Jan 12-Feb. 14, 1992	Bobo-Dioulasso	28	29 days

Topic and Trainers	Participants	Date	Location	Number of Participants	Observations
- Documentation Techniques *IPD/AOS	Documentalists	Feb.3 and March 6, 1992	Ouagadougou	2	Training reported by participants 29 days
- Planning Research on Farming Systems * John Lichte * John Russel	Researcher	March 9 and 20, 1992	Saria	34	- Final report - Participation by other programs 11 days
- Role of Women in farming systems *CESAO	Supervisors and Technicians	April 20 to May 2 1992	Bobo-Dioulasso	21	12 days
- Quatro Pro Data Management and Analysis * John Dickey * Ouédraogo Sita	Researchers	Nov. and Dec. 1992	Bobo-Dioulasso Ouagadougou	20	6 days
- Word Perfect * IBC and MDI	- Secretaries Farako-Ba - Secretaries Kamboinse	Nov. 92 Nov. 92	Bobo-Dioulasso Ouagadougou	3 4	25 days
- English: American Cultural Center	Researchers	3 semesters	Ouagadougou Bobo-Dioulasso	29	120 hours/person

Topic and Trainers	Participants	Date	Location	Number of Participants	Observations
- Computer Basics * Dickey	All	Jan. 1994	Kamboinsé	6	1 day
- English American Cultural Center Son Gouyahali	ESFIMA Researchers	Jan. 94	Ouagadougou	1	120 hours
- DOS and Quatro Pro Data Analysis * Bertelsen	Researchers and Technicians	Jan. 93	Kamboinsé	8	1 day
- Research Planning Workshop * Wallace Tyner	Researchers	Feb. 1-5, 1993	Saria	41	Evaluation Form Completed by Participants 5 days
- Continuing Education "Research on Annual Production Systems" Matourkou II * CAP Matourkou	Technicians and Supervisors	Jan. 18 to 31, 1993	Matourkou	25	12 days
- Linear Programming * Jess Lowenberg-DeBoer	Economists	April 5-8, 1993	Bobo-Dioulasso	6	4 days

Topic and Trainers	Participants	Date	Location	Number of Participants	Observations
- LOTUS 1-2-3 - QUATTRO PRO * IBC	Technicians Accountants Assistants	June and July 1993	Ouagadougou Bobo-Dioulasso	19	Certificate of Completion 6 days/person
- Natural Resources * Jonathon Landeck * Amadou Diop	Researchers (14) and Supervisors (3)	Sept. 30 to Oct. 2, 1993	Poura	17	Participants ESFIMA et P.A. 10 days
- Introduction to Micro Computers * IPD/AOS	Documentalists	May 31 to July 2, 1993	Ouagadougou	2	Certificate of completion 29 days
- GENSTAT * Dickey	Researchers and supervisors	Aug. 17-21 and Aug. 31-Sept. 4, 1993	Farako-Bâ	5	12 days
- SPSS - Data Analysis * Bertelsen	Technicians and Researchers	Nov. 8-13, 1993	Kamboinsé	6	6 days
- Socio-Economiss * CAP Matourkou	Supervisors and Technicians	March 8-12, 1994	Ouagadougou	21	12 Days
- Driving Skills Improvement * CFTRA Ouaga	Drivers	March and April 1994	Ouagadougou	7	Certificate of completion 12 days
- D Base IV * IBC Ouagadougou	CNRST personnel	April 1994	Ouagadougou	2	6 days

Topic and Trainers	Participants	Date	Location	Number of Participants	Observations
- GENSTAT * Stern * Dickey * E. Egou	Researchers and Supervisors	April 11-23, 1994	Ouagadougou	13	1 participant from ICRISAT Niamey - 1 from INRAN - 1 ESFIMA - 12 days
- Workshop "GIS" * IITA/Diaby	Researchers and Technicians INERA	July 20 and 21	Kamboinsé	6	2 days

Table 10. Conferences, Seminars and Short-Term Training in Africa and in the United States Financed by the ARTS Project, July 1990-August 1994.

Topic	Participants	Dates	Location	Number of participants	Observations
- Climatic Influence on vegetative production - FIS	Sanou Patrice	Sept.23-28, 1991	Ouagadougou	1	Daniel Kaboré presented the paper written by P. Sanou 6 days
- Regional meeting on promotion of regional exchange of DRSPR products Sikasso, Mali	Researchers Supervisors	July 8, 1991	Sikasso, Mali	7	+ 1 CIRAD staff and 2 drivers
-SAFGRAD International conference	Researchers	March 7-14, 1991	Niamey, Niger	4	+ 2 TAT
- Scientific writing	Researchers	17 to 30 Nov. 91	Lomé, Togo	5	13 days
- Land tenure and Natural Resource Management	Researchers	July 13-31, 1992	Dakar, Sénégal	2	17 days
- Finance and Developpement	Researchers	21 to 25 Oct. 91	Ouagadougou	3	4 days

Topic	Participants	Dates	Location	Number of participants	Observations
1. SAS Workshop 2. Ag Statistics	Daniel Kaboré	June 10-July 5, 1991	Nebraska	1	25 days
1. Visit to Purdue University 2. AFSR/E Symposium	Bélem Célestin	July 5 to Aug. 5, 1991	USA	1	40 days
- Personnel Management	Guiébré Robert	May 29 to July 27, 1991	Connecticut USA	1	29 days
- Maize research and technology transfer * IITA	Sankara Estanislass	June 20 to August 16, 1992	Ibadan, Nigéria	1	30 days
AFSR/E Symposium	Ouattara Marc Taonda J.B.	Oct. 5-10, 1991	Michigan State, USA	2	5 days
- Seminar on the Economics of Development	Gnoumou Brigitte	June 26-Aug. 14, 1992	Ann Arbor, Michigan, USA	1	20 days
AFSR/E Symposium	Daniel Kaboré Ouédraogo Souleymane	Sept. 92	Michigan State	2	21 days

Topic	Participants	Dates	Location	Number of participants	Observations
- Forestry seeds	Yaméogo Georges	Nov. 23-Dec. 8, 1992	Ouagadougou	1	14 days
- Society of Applied Anthropology	Ilboudo, D.	March 1-14, 1993	San Antonio Texas, USA	1	+ 1 TAT 14 days
Study Trip to WARDA	Researchers	March 93	Bouaké, RCI	3	1USAID + 1 TAT 6 days
- Maintenance and reclamation of soils in the Sudanian Zone "GREFMASS"	Researchers	October 18-21, 1993	Bobo-Dioulasso	4	3 days
- Parklands Conference	Researchers	October 25-27, 1993	Ouagadougou	2	+ 2 TAT 3 days
- Time in Agricultural Production Economics	Economists	June 7-11, 1993	Niamey, Niger	2	5 days
- Continuing Education on USAID procedures	Accountants	May 3-4, 1993	Ouagadougou	4	2 days
- Agronomy Society annual meeting	Agronomists	Nov. 8-12, 1993	Cincinnati Ohio; USA	2	+ 1 TAT 5 days
- Sustainable Soil Management	Researchers Sohoro/Sankara	Dec. 6-10, 1993	Ouagadougou	4	5 days

Topic	Participants	Dates	Location	Number of participants	Observations
- Geographic Information Systems (GIS)	Djaby Bakary	Jan. 17-28, 1994	Ibadan, Nigeria	1	22 days
- Natural Resource Management	Sorgho Marie-Claire	Feb. 14-March 4, 1994	Dakar, Sénégal	1	22 days
- Farming Systems	Researchers Taonda S. Ouédraogo	Feb. 28-March 4, 1994	Nairobi, Kenya	2	+ 2 TAT 5 days
- Workshop on Indigenous Knowledge	F.Traoré E. Sankara S. Ouédraogo	June 20-24, 1994	Cotonou, Benin	3	4 days
- Modeling Representative Farms	Sidibé Amadou	April 94	Purdue University	1	30 days
- Policy Analysis Matrix	Daniel Kaboré	April 1994	Purdue Universtiy	1	30 days

ANNEX B

Table 11. Travel by Long-Term Staff.

Name	Destination	Inclusive Dates of Visit	Person-Weeks	Purpose of Visit
Robert Deuson	Lincoln, Nebraska	05/28/90-06/02/90	0.9	SAS training for ARTS project
	Spokane, Washington	06/05/90-06/08/90	0.6	Annual meeting of the TSMM project (USDA/ERS).
				Preparation of a work and a budget for FY 1991 collaborative research
	Ouagadougou, Burkina Faso	03/03/90-04/03/90	4.0	Project implementation team
William Fiebig	Lansing, Michigan	10/02/91-10/13/91	1.7	Attend and present paper at the 1991 AFSR/E symposium
	Lincoln, NE	05/28/90-06/01/90	0.7	SAS training for ARTS project
Edward Robins	Nairobi, Kenya	02/26/94-03/06/94	1.3	Participate in the Symposium on Farm Systems Research in Africa and present paper

Name	Destination	Inclusive Dates of Visit	Person-Weeks	Purpose of Visit
Edward Robins (Continued)	Washington, DC	03/01/93-03/09/93	1.3	Meat with World Bank, Chemonics & Winrock personnel
	San Antonio, Texas	03/10/93-03/15/93	0.9	Present paper at the Sociandy for Applied Anthropology meandings
	Ouagadougou, Burkina Faso	03/03/90-04/03/90		Project Implementation Team
	East Lansing, Michigan	10/06/91-10/13/91	1.1	Attend Farming Systems Workshop
John Dickey	Niamey, Niger	03/07/94-03/13/94	1.0	Plan a statistical workshop with Roger Sterns at ICRISAT Sahelian Center
	Cincinnati, Ohio	11/03/93-11/22/93	2.9	Attend the American Sociandy of Agronomy, Crop Science Sociandy of America, and Soil Science Sociandy of America 1993 annual meandings
	Griffin, Georgia	05/04/93-05/06/93	0.4	Meeting with SANREM staff to discuss collaboration with project

Name	Destination	Inclusive Dates of Visit	Person-Weeks	Purpose of Visit
John Dickey (Continued)	Bouaké, Côte d'Ivoire	03/03/93-03/05/93	0.4	Promote regional research collaboration and professional exchanges among Côte d'Ivoire and international researchers from the RSP program
	East Lansing, Michigan, West Lafayandte, Indiana	09/11/92-09/27/92	2.4	Participate in the AFSRE/E meandings: Lafayandte to me and with Purdue staff relative to ARTS project
Michael Bertelsen	Nairobi, Kenya	02/26/94-03/06/94	1.3	Attend Farming Systems symposium
	Abidjan, Côte d'Ivoire	03/07/93-03/12/93	0.9	Attend workshop on "Gender Dimensions of Program Effectiveness"
			Total Weeks 25.8	

ANNEX C

RSP (CENTRAL AND WESTERN ZONES) AND ARTS PROJECT PUBLICATIONS

WORKING PAPERS AND REPORTS

Bertelsen, M. K. and D. Kaboré. *Marginal Productivity Estimates for Factors Affecting Cereal Production in Burkina Faso: A Production Function Approach.* October 1994 [Report]

Bertelsen, M. K. *Normative and Positive Evaluations of Impact of SANREM Activities in Donsin, Burkina Faso.* April 1994. [Research Proposal Concept Outline]

Brux, J. *Women in Development: Guidelines for Farming Systems Research in Burkina Faso.* August 1991. [Report]

Gnoumou, B. *Systèmes d'élevage et espaces pâturés dans les villages de Thiougou et Donsin : Identification et caractérisation.* March 1992. [RSP Working Paper 2.0]

Hien, V., D. Kaboré, Y. Sansan, and J. Lowenberg-DeBoer. *Les caractéristiques de risques des technologies testées en milieu réel par le Projet Engrais Vivriers de 1989 à 1991.* October 1992. [RSP Working Paper 3.0]

Hien, V., D. Kaboré, Y. Sansan, and J. Lowenberg-DeBoer. *Stochastic Dominance Analysis of On-Farm-Trial Data: The Case of the Food Crops Fertilizer Project, Burkina Faso, 1989-1991.* Purdue University, Department of Agricultural Economics. 1994. [Staff Paper 93-19]

Ilboudo, D., E. Sankara, A. Sidibé, and J. Bayala. *Compte rendu de la recherche participative sur les pratiques et les conditions de réalisation liées au problème de dégradation des sols à Yasso.* October 1993. [Report]

Ilboudo, D., E. Sankara, and E. Robins. *Une enquête d'opinion auprès des paysans dans la Zone Ouest.* September 1992. [Report]

Ilboudo, D., E. Sankara, and S. Ouédraogo. *Rapport de mission de la visite de l'équipe RSP à la DRSPR de Sikasso* (Mali). November 1991. [Report]

Ilboudo, D. and D. Kaboré. *Quelques questions sur la démarche participative dans la recherche sur les systèmes de production agricole du Burkina Faso.* December 1993. [Report]

Ilboudo, D. and E. Robins. *Etude des aspirations et besoins des chefs d'exploitations Agricoles des Quatre villages sites de la Zone Ouest.* January 1992. [Report]

Ilboudo, D. and E. Robins. *L'immigration agricole et son impact sur les pratiques de gestion des terres dans la Zone Ouest du Burkina.* February 1992. [Thesis proposal]

Ilboudo, D. and E. Robins. *Potentialités et contraintes humaines des quatre villages de la Zone Ouest.* September 1992. [Report]

Ilboudo, D. and E. Robins. *Proposition de programme de recherches sociologiques sur les systèmes de production agricole dans la Zone Ouest.* September 1990. [Report]

Ilboudo, D. and E. Sankara. *Enquête d'opinion des producteurs des quatres villages-sites sur les tests agronomiques de la campagne agricole 1991-1992.* 1992. [Report]

Ilboudo, D. *Etude de l'agriculture intra et péri-urbaine de la ville de Bobo-Dioulasso.* November 1992. [Report]

Ilboudo, D. *L'enquête diagnostique: Cours à l'adresse des techniciens spécialisés des CRPA.* September 1993. [Report]

Ilboudo, D. *La formation des techniciens spécialisés (TS) des quatre CRPA de la Zone Ouest.* December 1992. [Report]

Ilboudo, D. *La typologie comme outil de vulgarisation agricole.* October 1993. [Report]

Ilboudo, D., P. Lingani and E. Robins. *Synthèse des activités sociologiques 1990-1993 Zone Ouest.* February 1994. [Report]

Ilboudo, D. *Peuplement de l'Ouest Burkina : Quel projet de sociétés villageoises?* October 1993. [Report]

Ilboudo, D. *Potentialités et contraintes humaines des quatre villages (sites de recherche du Programme RSP/Zone Ouest) du Burkina.* [Report]

Ilboudo, D. *Rapport de mission de la conférence de l'Association Américaine d'Anthropologie Appliquée à San Antonio, USA.* April 1993. [Report]

Kaboré, D. and S. Ouédraogo. *Recherche socio-économique en riziculture au Burkina Faso: Résultats et perspectives.* [RSP Working Paper 16.0.]

Kaboré, D., R. Deuson, P. Sanou and J. Lowenberg-DeBoer. *Intégration des analyses de politique agricole dans les recherches sur les systèmes de production: l'expérience du Burkina Faso.* 1992. [RSP Working Paper 12.0]

Kaboré, D., S. J. B. Taonda, E. Robins, J. Dickey, and A. Sohoro. *Synthèse des activités de recherche de l'equipe Centre 1990-1992.* September 1992. [Report]

Kaboré, D., F. Kanibon, J. B. Dickey and J. Lowenberg-DeBoer. *Economics of Rock Bunds, Mulching and Zaï in the Northern Central Plateau of Burkina Faso, A Preliminary Perspective.* 1994. [Report]

Kaboré, D. *Réflexions sur l'irrigation au Burkina Faso.* March 1991. [RSP Working Paper 1.0]

Lalba, A. and B. Gnoumou. *Diagnostic sur les troupeaux bovins: Identification et caractérisation globale des systèmes d'élevage dans les villages de Yasso et Kawara, 1992.* [Report]

Lingani, P., D. Ilboudo and E. Robins. *Activités dominantes et spécifiques des femmes dans les villages sites de la Zone Ouest.* January 1994. [Report on internship research]

Lowenberg-DeBoer, J. *Life After the Agricultural Research and Training Support Project: A Concept Paper.* August 1993. [Report]

Nébié, M., D. Ilboudo, and E. Robins. *Action et niveau de décision des femmes de Kawara dans la production de riz.* February 1992. [Report on internship research]

Ouédraogo, A. and D. Ilboudo. *Le travail temporaire à la station de recherche agricole de Farako-Bâ.* December 1993. [Report on internship research]

Ouédraogo, S., D. Ilboudo, E. Sankara, E. Robins, and J. B. Dickey. *Aperçu des activités de recherche de l'équipe Ouest 1990-1992.* September 1992. [Report]

Robins, E. and M. C. Sorgho. *L'enquête d'opinion paysanne: Evaluation de la campagne agricole 1993 Zone Centre.* June 1994. [Report]

Robins, E. and M. C. Sorgho. *L'enquête d'opinion paysanne: Evaluation du zaï à Donsin.* February 1994. [Report]

Robins, E. and M. C. Sorgho. *Perceptions des paysans sur la campagne agricole 1990.* January 1991. [Report]

Robins, E. and M. C. Sorgho. *Synthèse des activités sociologiques 1990-1993 Zone Centre.* January 1994. [Report]

Robins, E. and M. C. Sorgho. *Un diagnostic des femmes à Donsin.* March 1992. [Report]

Robins, E. and M. C. Sorgho. *Une évaluation auprès des paysans des tests en milieu réel.* February 1992. [Report]

Robins, E. *Les évaluations des paysans sur la campagne agricole 1992.* June 1993. [Report]

Robins, E. *Lignes directrices pour la recherche collaborative.* July 1991. [Report]

Robins, E. *Profils des unités de production sur les données du recensement de la Zone Centre.* March 1991. [Report]

Robins, E. *Proposition du projet d'optimisation de l'élevage: Dimensions sociales.* May 1992. [Report]

Robins, E. *Measuring household food security in a village in the Central Plateau of Burkina Faso.* July 1991. [Collaborative Research Proposal, RSP-ESSEC]

RSP Central Zone Team. *Enquête de reconnaissance : recentrage des sites RSP/Zone Centre.* 1990. [Report]

RSP Central Zone Team. *Programme d'activités RSP, équipe Zone Centre 1992 - 1993.* April 1992. [Report]

RSP Central Zone Team. *Programme d'activités RSP, Zone Centre 1993 - 1995.* April 1993. [Report]

RSP Central Zone Team. *Rapport analytique de travaux de recherche. campagne agricole 1990 - 1991.* April 1991. [Report]

RSP Central Zone Team. *Rapport d'activités - Projet CES/AGF Campagne 1992 - 1993.* September 1993. [Report]

RSP Central Zone Team. *Rapport de synthèse des activités RSP Zone Centre 1990 - 1991.* March 1991. [Report]

RSP Central Zone Team. *Synthèse des activités de recherche conduites par l'équipe RSP Centre à Donsin.* April 1993. [Report]

RSP Central Zone Team. *Synthèse des activités de recherche de l'équipe RSP Centre de 1990 à 1992.* October 1992. [Report]

RSP Central Zone Team. *Synthèse du rapport d'activités RSP équipe Zone Centre.1992 - 1993.* June 1993. [Report]

RSP Central Zone Team. *Synthèse du rapport d'activités RSP/Zone Centre 1991 - 1992.* April 1992. [Report]

RSP Central Zone Team. *Compte rendu de la recherche participative sur les pratiques et les conditions de réalisation liées au problème de dégradation des sols à Yasso par l'équipe RSP/Zone Ouest.* 1993. [Report]

RSP Central Zone Team. *Rapport de synthèse des résultats des activités de la campagne 1992 - 1993.* [Report]

RSP Central Zone Team. *Résultats de synthèse des contraintes de la campagne 1991 - 1992.* March 1992. [Report]

RSP Central Zone Team. *Synthèse des résultats des activités de la campagne 1990 - 1991. Propositions d'interventions pour la campagne 1991 - 1992.* [Report]

Sankara, E. *Productions végétales et pratiques agricoles dans les villages-sites RSP/Zone Ouest.* 1992. [Report]

Sanon, A., D. Ilboudo, and E. Robins. *Initiation à la recherche sur les systèmes de production.* September 1991. [Report on internship research]

Sanou, P., D. Kaboré and J. B Taonda. *Problématique de la gestion de terroirs : l'approche gestion de terroirs de l'INERA à travers le programme RSP.* July - August 1991. [RSP Working Paper 6.0]

Sanou P. *Analyse des potentialités foncières de Donsin.* April 1992. [RSP Working Paper 11.0]

Sanou, P. *Analyse méthodologique sur l'approche globale du milieu.* January 1992. [RSP Working Paper 9.0]

Sanou, P. *Approche du milieu physique et géographique.* November 1991. [RSP Working Paper 8.0]

Sanou, P. *Esquisse méthodologique de l'approche gestion des terroirs.* January 1992. [RSP Working Paper 10.0]

Sanou, P. *Insertion des productions agro-pastorales à Donsin et Thiougou.* March 1991. [RSP Working Paper 5.0]

Sanou, P. *Projection spatiale de la dualité climatique dans les zones Centre et Ouest du Burkina Faso : Approche cartographique des systèmes de production végétale.* September 1991. [RSP Working Paper 7.0]

Sanou, P. *Rapport d'activités en géo-photo-cartographie. Thème : L'insertion spatiale des producteurs dans la Zone Ouest du Burkina, cas de Dimolo, Kawara, Kayao, Yasso.* [Report]

Sorgho, M. C., and E. Robins. *Enquête d'opinion auprès des producteurs RSP Zone Centre.* December 1991. [RSP Working Paper 14.0]

Sorgho, M. C., and E. Robins. *Enquête sur les activités des femmes à Donsin.* 1991. [RSP Working Paper 15.0]

Sorgho, M. C., and E. Robins. *Enquête d'opinion auprès des paysans dans le Plateau Central du Burkina Faso.* June 1991. [RSP Working Paper 13.0]

Taonda S. J. B. , A. Sohoro and J. B. Dickey. *Rapport analytique d'agronomie RSP Zone Centre, campagne 1992-1993* 1993. [Report]

Taonda S. J. B. , A. Sohoro and J. B. Dickey. *Rapport synthèse d'agronomie RSP Zone Centre, campagne 1992-1993.* 1993. [Report]

THESES AND RELATED DOCUMENTS

Badini, O. *Identification et caractérisation des systèmes d'élevage et étude des écosystèmes pâturés dans les villages sites RSP.* 1994. [Thesis]

Bambara, D. *Dynamique de la matière organique selon les systèmes de cultures dans les sols agricoles du finage de Thiougou: approche quantitative.* June 1993. [Mémoire de fin d'études. CNRST/INERA, IDR]

Ilboudo, D. *Immigration rurale et changement social: La gestion des terres dans la Zone Ouest du Burkina. Le Cas de Kayao et Yasso.* February 1994. [Thesis report]

Sanou, K. *Relation entre la durée de mise en valeur d'un sol et bilan hydrique. cas du village de Thiougou (Burkina Faso).* December 1993. [Mémoire de DIAT. CNRST/INERA CNEARC ESAT]

Sohoro, A. *Contribution à l'identification des contraintes agro-pédologiques dans le Plateau Central au Burkina Faso.* March 1992. [Mémoire de DEA d'Ecologie Tropicale. Option Végétale CNRST/INER, FA.S.T.]

Sorgho, M. C. *Dimensions socio-économiques de la femme en milieu rural dans le Plateau Central du Burkina Faso.* December 1992. [Mémoire de DEA]

TECHNICAL BULLETINS

Bertelsen, M. K. *Utilisation du courrier electronique et de l'INTERNET.* August, 1993.

Bertelsen, M. K. *Analyse économique des éssais en utilisant une macro de Quattro Pro.* June, 1993.

Bertelsen, M. K. and A. Sidibé. *Guide d'utilisation de SPSS.* October, 1993.

Dickey, J. B. *Calculs des superficies des champs à l'aide d'une calculatrice programmable et de Quattropro.* RSP Researcher's Technical Bulletin, 1993.

Dickey, J. and P. Séremé. *Fiche sur l'utilisation d'Apron Plus en traitement des semences du mil.* 1994. INERA/RSP.

CONFERENCE PAPERS AND POSTERS

Bertelsen, M. K. and D. Kaboré. *Effets de la densité des arbres sur les rendements du sorgho et du mil : cas de deux villages du Plateau Central du Burkina Faso.* Paper presented at the Symposium on Agroforestry Parklands in the Semi-Arid Lands of West Africa, Ouagadougou, Burkina Faso, October 25-27.

Bertelsen, M. K., S. Ouédraogo, J. B. Dickey, S. B. Taonda, E. Robins, D. Kaboré and B. Djaby. *Dynamic Recommendation Domains in Burkina Faso: A Geographic Information System as a tool for Facilitating the FSR-Extension Connection.* Paper presented at the African Association of Farming Systems Research, Extension and Training Meetings. Nairobi, Kenya. 28 Feb. - 4 March, 1994. Also presented at The National Research Forum, 28 March - 1 April, Ouagadougou, Burkina Faso.

Boffa, J. M., S. B. Taonda and J. B. Dickey. 1993. *Analyse chronoséquentielle de la gestion de l'arbre dans le parc à karité du terroir de Thiougou, province de Zoundwéogo au Burkina Faso.* Paper presented at the Symposium on Agroforestry Parklands in the Semi-Arid Lands of West Africa, ICRAF/IRBET/CILSS/LTC, Ouagadougou, Burkina Faso. 25 - 27 October, 1993.

Dickey, J. B. , A. Sohoro, S. Ouédraogo, J.B. Taonda and E. Robins. *Performance of forage/grain varieties of sorghum and cowpea in farmers' fields.* Paper presented at the meetings of the American Society of Agronomy, November 1993.

Dickey, J. B., F. Kambou, S. B. Taonda, and A. Sohoro. *Reclamation of Highly Eroded Land in Namentenga province, Burkina Faso – preliminary results.* First International Colloquium on Sustainable Soil Management and Environmental Protection in Tropical

Africa. West and Central African Soil Science Association. 6 - 10 December, 1993 at Ouagadougou, Burkina Faso.

Dickey, J. B., F. Kambou, S. B. Taonda, A. Sohoro, E. Robins, M. K. Bertelsen, and S. Ouédraogo. *Potentialités des mesures de conservation des eaux et des sols dans le Namentenga, Burkina Faso.* National Research Forum, 1994. 28 March to 1 April, 1994 at Ouagadougou, Burkina Faso.

Djabi, B., M. K. Bertelsen and S. Ouédraogo. *Redéfinition de nouvelles zones d'intervention du Programme RSP à l'aide du Système d'Information Géographique (SIG).* Poster presented at the Commission des Programmes, Ouagadougou, Burkina Faso. February 1994.

Fiebig, W., J. B. Taonda and E. Robins. *Farmer Participation in a New FSR Program in Burkina Faso.* Paper presented at the FSR/E Association Meetings. USA. October 1991.

Ilboudo, D., S. Sanou, S. Ouédraogo and E. Robins. *La collaboration dans les systèmes de recherches agricoles au Burkina Faso.* Paper presented at the symposium of FSR/E Association Meetings. East Lansing, Michigan. September 1992.

Kaboré, D., M. K. Bertelsen and J. Lowenberg-DeBoer. *L'économie de construction de cordons pierreux sur le sorgho et le mil au Burkina Faso.* First International Colloquium on Sustainable Soil Management and Environmental Protection in Tropical Africa. West and Central African Soil Science Association. Ouagadougou - Burkina Faso, December 6 - 10, 1993.

Kaboré, D., R. Deuson, J. B. Dickey, P. Sanou, and J. Lowenberg-DeBoer. *Integration of Agricultural Policy Analyses into Production Systems Research: The Burkina Faso Experience.* Meetings of the Association of Farming Systems Research and Extension, East Lansing, Michigan. 18 - 22 September 1992.

Kambou, N. F., S. B. Taonda, R. Zougmoré, B. Kaboré, and J. B. Dickey. *Evolution of Sedimentation, Surface Micromorphology, and Millet Production in Response to Soil Conservation Practices on an Eroded Site at Yilou, Burkina Faso.* American Society of Agronomy Meetings Poster A6-66P. 1993

Ouédraogo, S. *Méthodologie de recherche sur les systèmes de production rurale : l'expérience du Burkina Faso.* Paper presented at the Seminar on the Current Situation and Future Perspectives in Farming Systems Research. Sikasso (Mali) November 17 - 21, 1992.

Robins, E. and M. C. Sorgho. *Une enquête d'opinion auprès des paysans dans le Plateau Central du Burkina Faso.* Bulletin of the West African Farming Systems Network, No. 10. October 1991.

Robins, E., M. K. Bertelsen, and D. Kaboré. *Farmer Participation in Generating Village Socio-Economic Profiles.* Paper presented at the African Association of Farming Systems Research, Extension and Training Meetings. Nairobi, Kenya. 28 February - 4 March, 1994.

Robins, E., W. Fiebig, and S. B. Taonda. *Farmer Participation in a New FSR Program in Burkina Faso.* Paper presented at the Symposium on Farming Systems Research and Extension, E. Lansing. October 1991.

Robins, E. *Researching Tree Management Strategies in Thiougou village, Central Plateau, Burkina Faso.* Paper presented at the Symposium on Agroforestry Parklands in the Semi-Arid Lands of West Africa, Ouagadougou, Burkina Faso October 25 - 27, 1993.

Sankara, E., A. Sidibé, and J. B. Dickey. *Upland Rice: An Alternative for Cash Crop Diversification to Stabilize Farm Incomes in Western Burkina Faso.* The American Society of Agronomy Meetings Poster A6-67P, 1993. Also presented at The National Research Forum, 1994. 28 March to 1 April, 1994 at Ouagadougou, Burkina Faso.

Sankara, P., B. Ouédraogo, D. Balima, and J. B. Dickey. *Producer/Consumer-Centered Research on Peanut Production in Sustainable Farming Systems.* Grant proposal to the McKnight Foundation, Collaborative Plant Biology Research Program. With the National Center for Scientific Research and Technology and the Institute for Rural Development, Burkina Faso. 1994.

Sidibé, A., M. K. Bertelsen and S. Ouédraogo. *Analyse économique de la préparation du compost dans la Zone Ouest du Burkina.* First International Colloquium on Sustainable Soil Management and Environmental Protection in Tropical Africa, West and Central African Soil Science Association, Ouagadougou, Burkina Faso. December, 1993.

Sidibé, A. *Analyse du système de production rizicole des femmes dans la Comöé: le cas des femmes de Kawara.* 1993.

Sidibé, A. *Analyse économique de quelques activités féminines liées à l'utilisation des essences forestières non ligneuses dans le Sud-Ouest du Burkina Faso.* Paper presented at the Symposium on Agroforestry Parklands in the Semi-Arid Lands of West Africa, October 25 - 27, 1993, Ouagadougou, Burkina Faso.

Sohoro, A., S. Ouédraogo, S. B. Taonda, J. B. Dickey, and E. Robins. *Performance of Forage/Grain Varieties of Sorghum and Cowpea in Farmers' Fields: Agronomic and Economic Evaluation by Researchers and Farmers.* American Society of Agronomy Meetings Poster A6-68P, 1993.

Sohoro A., S. Ouédraogo and J. B. Dickey. *Intersection variété/fertilisation dans le terroir de Kamsi.* Paper presented at the Workshop GREFMASS October 18 - 21, 1993 Bobo-Dioulasso, Burkina Faso.

Sorgho, M. C. and E. Robins. *Women's Agricultural Production Strategies in the Central Plateau, Burkina Faso.* Paper presented at the African Association of Farming Systems Research, Extension and Training. Nairobi, Kenya. February 28 - March 4, 1994.

Taonda S. B. *Maintien et restauration des sols du Sud du Plateau Central burkinabè à partir du cas du terroir de Thiougou/Manga, Burkina Faso.* Paper presented at the 1st Workshop of the Collaborative Research Group on Maintenance and Restriction of Soil Fertility in the Sudano-Sahelian Zone (GREFMASS) October 18-21, 1993 Bobo-Dioulasso, Burkina Faso.

ARTICLES

Bertelsen, M. K. and D. Kaboré. *The Economics of West African Parklands Agroforestry System: Preliminary Evidence from Two Central Plateau Villages in Burkina Faso.* July 1994.

Bertelsen , M. K. and S. Ouédraogo. *The Value of Research on Indigenous Knowledge: Preliminary Evidence from the Case of Zaï in Burkina Faso.* 1994.

Lalba, A., and J. B. Dickey. *L'impact de complémentation d'alimentation des vaches laitières sur la production de viande et laitière dans le système traditionnel d'élevage burkinabé.* 1994.

Lalba, A., P. Kleene and O. Badini. *Livestock Diagnostic Methodology as Applied in FSR in Western Burkina Faso* in Diagnostic Research On Livestock Systems, by Roeleveld L, and Van den Broek, A, Amsterdam: KIT. 1994

Ouédraogo, S. and A. Sidibé. *Implementing a Sustainable Agriculture: A Challenge to Burkina Faso.* July, 1994.

Ouédraogo, S.. *Land Tenure and Farm Productivity in Western Burkina Faso.* 1993.

Sankara, E. and A. Lalba. *Les fosses fumières à travers l'intégration agriculture-élevage: une alternative au maintien et à la restauration de la fertilité des sols en zone cotonnière du Burkina Faso.* 1993.

Sidibé, A., B. Kama and Y. Congo. *Effets de la mesure de suppression des subventions aux intrants sur les revenus des producteurs et la demande des intrants dans la zone cotonnière du Burkina Faso.*

Sidibé, A., and Ouattara. *Impact de la crise cotonnière sur le système d'assolement des producteurs de coton dans le Sud-Ouest du Burkina Faso,* 1993.

ANNEX D

Publications Purchased for Burkina Faso ARTS Project

Title	Author(s)	Copies
Adaptability Analysis of Farmer-Managed Trials in Farm Systems Research	M. Lang H. Ohm R. Cantrell	2
Adaptation of Plants to Soil Stresses Publications #94-2		4
Adaptation of Sorghum/Maize & Sorghum/Pearl Millet Intercrop Systems to the Toposequence Land Types in the North Sudanian Zone of the West African Savanna	W.A. Stoop	1
Adoption of Soil Conservation Practices in Burkina Faso: The Role of Indigenous Knowledge, Soil Structure and Institutional Support	B. Dialla	1
Advanced Management Accounting	R. Kaplan	1
Agricultural Economics	B. Greenshields	1
Agricultural & Economic Development	P. Jha	1
Agricultural Household Model for Burkina Faso, West Africa	C. May	1
Agricultural Policy Analysis Project, Phase II Vol. 1		1
Agricultural Price Policy - 1990	I. Tsakok	2
Agricultural Policies in Developing Countries	F. Ellis	2
Agricultural Production and Marketing Activities of Women in Burkina Faso	M.G. Lang	2
Agricultural Research & Cereal Technology Introduction in Burkina Faso & Niger	J. Sanders	1
Agricultural Research for Resources-Poor Farmers Part II: A Parsimonious Paradigm	R. Chambers J. Jiggins	1
Agricultural Technology Development in Burkina Faso	J. H. Sanders B. Shapiro	1
Agriculture and Food Policy	R.D. Knutson	1
Agriculture and National Resources Technical Report Series - No. 3, Approaches to Improving Natural Resource Use for Agriculture in Sahelian West Africa	T. M. Painter	2

Agronomy Journal Vol. 53-81		
Agronomy Abstracts 1955-1988		
Agronomy Journal Vol. 69 - 79		
Agronomy Abstracts 1951-1990		
Agronomy Journal Index		
Agroforestry in Africa - A Survey of Project Experience	P. Kerkhof	1
Agroforestry in Dryland Africa	D. Rocheleau F. Weber A. Field-Juma	1
Agroforestry Research in Farming Systems Perspective: The ICRAF Approach - 1/86 Working Paper #39	J. B. Raintree F. Torres	1
Agro-pastoralism in Chad as a Strategy for Survival	A. Bonfiglioli	1
Agronomic Management of Cereal/Cowpea Cropping Systems for Major Toposequence Land Types in West African Savanna		1
Airtight Storage of Cowpea in Triple Plastic Bags - CRSP Technical Bulletin 3	L. Kitch G. Ntoukam	1
Aménagement Intégré Des Bassins Versants Agricoles - Caracterisation d'un Site du Recherche pres de Hamdallaye, Niger	Bulletin de Tropsoils No. 91-03, Nov. 1991	1
Aménagement Intégré des Bassins Versants Agricoles - Régime Foncier et Savoir-Faire Paysan en Matière d'Aménagement des sols et des cultures	Bulletin de Tropsoils No. 91-04, Nov. 1991	1
American Association for Advancement of Science (AAAS) Vol. 187 - Vol. 236		
American Meteorological Society Journal (Vol. 36-73)		
American Scientist - Sigmi Xi - Vol. 58 - 72 American Society of Agronomy & Methods of Soil Analysis 2 Volume Set		1
Analysis of IITA/SAFGRAD Mechanical Ridge Tier	J.G. Nagy H.W. Ohm L.L. Ames L.D. Schaber	2
Analysis of Messy Data	G. Miliken D. Johnson	1
Analysis of Messy Data, Vol. 1 & 2	V. Nostrand-Reinhold	2

Animal-Driven Shaft Power	Tillers	1
Animal Traction and Resource from Upper Volta	W. Jaeger	2
Annual Report of the Malawi Agroforestry Commodity Team for 1990/91: Research Activities and Results, Vol. 1 and the 1991-92 Workplan and Budget	A. Saka W. Bunderson O. Itimu Y. Mbekeani	1
Annual Report, English, 1992	Farming Systems Unit SAFGRAD -Purdue	2
Annual Report 1991 - International Fertilizer Development Center	Farming Systems Unit SAFGRAD - Purdue	1
Annual Report, (English), 1979	Farming Systems Unit SAFGRAD - Purdue	2
Annual Report, (English), 1980	Farming Systems Unit SAFGRAD - Purdue	2
Annual Report, (English & French), 1983	Farming Systems Unit SAFGRAD - Purdue	2
Annual Report, (English & French), 1984	Farming Systems Unit SAFGRAD - Purdue	2
Annual Report, (English), 1985	Farming Systems Unit SAFGRAD - Purdue	2
Anthropological Research Process and Application	J. Poggie, Jr. B. Dewalt W. Pressler	1
An Application of Whole-Farm Modelling to New Technology Evaluation, Central Mossi Plateau, Burkina Faso	M. Roth P. Abbott J. Sanders L. McKinzie	2
Applied Categorical Data Analysis	Wiley	2
Applied Regression Analysis	N. Draper H. Smith	1
Applied Statistics and the SAS Programming Language 2nd Ed.	R. Cody J. Smith	2
Approches Alternatives pour L'unité De Recherche Sur Les Systèmes De Production		
Appropriate Technologies for Farmers in Semi-Arid West Africa	H. Ohm J. Nagy	5
Arbres et Arbustes Du Sahel		1
Assessment of the Integrated Rural Development Program in Eastern Upper Volta: 1974-1981	K. Negash	1

Atlas of Landforms	H. A. Curran	1
Baler Construction Plans	Tillers	1
Behavior of Livestock Owners in Senegal: A Microeconomic	C. Ly	
Basics of Qualitative Research	Strauss	1
Bibliograhphy of Women in Agricultural Development Form Britchen, Brakes, and Head Yokes	Tillers	1
Burkina Faso: Access and Control of Resources in the Farming Systems: Recent Legal, Political and Socio-Economic Changes	N. Diallo J. Nagy	2
Burkina Faso: A Case Study of the Purdue University/SAFGRAD Farming Systems Project	J. Nagy H. Ohm S. Sawadogo	2
Caise Centrale de Coopération Economique - No. 21, January 1989	G. Guyon	1
Cereal Sales Behavior Among Households in Four Villages in Burkina Faso	C. Pardy	2
Cereal Technology Interventions for the West African Semi-Arid Tropics	J. Nagy J. Sanders H. Ohm	1
Characteristics and Determinants of Food Consumption of Poor Households in Urban Mali	M. Lowdenmilk	1
Coarse Grain Production and Transactions in Mali: Farm Household Strategies and Government Policy	V. D'Agostino	1
Common Property Resource Management Panel on Common Property Resourse Management Board on Science & Tech. for Int'l Development Office of Int'l Affairs National Research Council - Wash. D.C., 1986		1
Communications in Soil Science & Plant Analysis, Vol. 1 - 24		1
Community Forestry - Rapid Appraisal of Tree and Land Tenure	J. Bruce	1
Community Woodlot Study - Land Tenure Project, Mopti, Mali - Report 5 - 9/91	R. McLain B. Ba M. Koloma	1

Comparative Analysis of Grain Marketing and Price Policies in Three Sub-Saharen African Countries: Implications for Food Policy	T. Jayne	1
A Consortium for International Development Study-Farming Systems Research and Development Guidelines for Developing Countries	Westview Press	1
Continuous Economic Analysis of Data on Crop Response to Fertilizer in On-Farm Research - No. 3		2
Contribution to the Management of the Central Delta of Niger River in Mali	G. Traore	1
Corn Diseases		2
Costs and Returns of Household Crop Production, Nedogo, Upper Volta	S. Cohen	2
Crop and Livestock Marketing Patterns in Burkina Faso	M. Lang	2
Cropping Systems Budgets for South-Central Niger 1984 and 1985	S. Swinton	1
Cultural Interpretation of Development: Developers Values and Agricultural Change in the Somali Context "Isku Kalsoonaan Baa Horumar Lagu Gaaraa"	D. Putman	1
Décentralisation en Matière de Fourniture des Services Publics, Gouvernance et Gestion des Ressources Naturelles Renouvelables, au Mali Contemporain - Vol. 1, Oct. 1991 Rapport Final	J. Thomas M. Tall	1 1
Décentralisation, Gouvernance et Gestion des Ressources Naturel- Cheibane Coubibaly less Renouvelables: Options Paul Marko Locales dans la Republique Mali-Volume III, Octobre 1991 Rapport Final-Redigé	K. Djibo C. Coulibaly P. Marko J. Thomas	2
Determinants of Private Investment in Rural Burkina Faso - May 1989	G. Christensen	1
Developing New Agricultural Technologies for the Sahelian Countries: The Burkina Faso Case	J. Sanders J. Nagy S. Ramaswani	1
Developing and Evaluating New Agricultural Technology for the Sahel: A Case Study in Burkina Faso	J. Sanders J. Nagy B. Shapiro	1

Dictionary - English/French French/English - Hard	C. Robert	1
Dictionary - French/French Vol. 1	P. Robert	3
Dictionary - English/French Hardback	Harraps	3
Difficulties in African Agricultural Systems Enhancement? Ten Hypotheses	J. Anderson	1
The Disarticulation of Farming Systems Research With National Agricultural Systems: Bringing FSR Back In	P. Marcotte L. Swanson	1
Discrete Multivariate Analysis	T. Bishop S. Feinberg Holland	1
Does Farming Systems Research Have a Future?	A. Davidson	1
Dryland Farming, A Systems Approach	V. Squires P. Tow	2
Ecological Deterioration: Local-Level Rule-Making and Enforcement Problems in Niger	J. Thomson	1
Ecological Society of America The Ecology of Intercropping	Vandermeer	1 1
Economic Analysis of Cotton Production in the Northern Cote D'Ivoire	K. Berte	1
Economic Analysis of Factors Factors Affecting Millet Production and Transactions in the Peanut Basin of Senegal	O. Ndoye	1
Economic Analysis of Farm Level Livestock Marketing In Eastern Upper Volta	F. Sands	1
Economic Analysis of the Socio Market and Market Economies: A Study of Burkina Faso	E. Szarleta	1
Economic Analysis of Resource Allocation in Tradition Agriculture: Case of the Boromo Farm in Burkina Faso	A. Bonkian	1
Economic Analysis of Tied Ridges and Fertilization in Farmer-Managed Sorghum Trials in Burkina Faso	J. Nagy H. Ohm	2
Economic and Institutional Analysis of Formal and Informal Credit in Eastern City Upper Volta: Empirical Evidence and Policy Implications	E. Tapsoba	1

An Economic Evaluation of Agricultural Policy in Burkina Faso, West Africa A Sectoral Modeling Approach	M. Roth	2
An Economic Evaluation of Agricultural Technologies and Implications for Development Strategies in Burkina Faso	M. Roth J. Sanders	2
Economics of Bas-Fond Rice Production in the Eastern Region of the Upper Volta: A Whole Farm Approach	P. Fotzo	1
The Economics of Project Analysis - 1991	W. Ward B. Deren	1
The Economics of Production	R. Taylor	1
Economics of the Family and Farming Systems in Sub-Saharan Africa	1	
Economics of Weed Control in the Savanna Regions of Cote D'Ivoire: Choosing Evaluating Input Characteristics and Determinants of Choice	J. Baidu-Forson	1
Economic Viability of Phosphorus Fertilization in Southwestern Niger: A Dynamic Approach Incorporating Agronomic Principles	P. Jomini	1
Effects of Interactions Between Technology, Institutions and Policy on the Potential Returns to Farming Systems Research in Semi-Arid Northeastern Mali	H. De Frahan B. Andre	1
Empirical Model Building & Response Surfaces	G. Box N. Draper	1
End of Project Report, 1986, FSU/SAFGRAD/Purdue		2
Evaluation of T&V-Based Extension in Burkina Faso	V. Bindlish	1
Environmental Entomolgy	W. P. Kemp	1
Etudes Rurales, Vol. 4 1962 PP24-86 - A Propos de Quelques Terroirs d'Afrique Occidentale	G. Sautter	1
Evaluation of the Causes of Soil Infertility in Niger	J. Scott-Wendt	2
Evaluation of New Technologies in Burkina Faso Using Whole Farm Modelling	J. Nagy L. Ames	2

Evaluation of the Performance of the Marketing Systems for Fed Cattle, Range Cattle and Beef in Mali	C. Boccoum	1
Evaluation of the Phosphorous Status of Selected Soils of W. Africa - M.S. Thesis	D. Birmingham	1
The Evolution of Farming Systems Research: Towards Where?	J. Sanders	2
Experimental Design for Biotechnology	Haaland	1
Experimental Designs	W. Cochran G. Cox	1
Factors Affecting Adoption of Agricultural Technologies by Small Farmers in Subsaharen Varieties of Cowpeas Around the Agricultural Research Station of Cinzani, Mali	O. Coulibaly	1
Factors Affectin Adoption of Agroforestry in Region De Tambacounda, Senegal	F. Caveness	1
Factors Affecting the Demand for Ferilizer in Senegal's Peanut Basin	V. Kelly	1
Family Social Structure, Farm Operation Characteristics and the Adoption of New Technologies for Sustainable Farming Systems in Mali	M. Tangara	1
Farm Level Study of the Rice Production System at the Office Du Niger in Mali: An Economic Analysis	M. Kamuanga	1
Farmer First-Farmer Innovations and Agricultural Research		1
Farmer Researcher Collaboration in Developing Cropping Practices that involve the Complementary Use of Mechanical Tied Ridges & Fertilizer Technology for Sorghum in Burkina Faso	J. Nagy H. Ohm Sawadogo	5
Farming Systems Research: Issues in Research Strategy and Technology Design	D. Byerlee L. Harrington D. Winkelmann	1
Farming Systems Research for Limited Resource Farms - Proceedings of Workshop August 10-12, 1987		1

Farming Systems Research Unit Working Papers: (1) Agriculure in Upper Volta: The Institutional Framework; (2) Local Ecology, Population, and Ethnic Groups in Upper Volta, and (3) The Mossi Farming Systems in Upper Volta	IPIA	2
Fertilizer Research - 34 Volumes		
Field Glossary of Ag Terms in French & English		3
A Financial Analysis of Two Agroforestry Techniques: Alley Cropping Maize with Leucaena Leucocephala and Intercropping Maize with Acacia Albida	I.M. Hayes	1
Food From Dryland Gardens	D. A. Cleveland	2
Food Security in Niger Republic: An Economic Analysis of Millet and Sorghum Yield and Acreage Responses	S. Maina	1
Food Security Study in Mali: Toward Harmonized Food Policy for Rural Farm Households	J. Xiao	1
Foreign Language Tutoring Program - Moré	Bergmark	1
A Forest Beyond the Trees: Tree Cutting in Rural Ghana	G. Dei	1
Forest Islands and Kayapo Resource Management in Amazonia: A Reappraisal of Apete	E. Parker	1
Framework of Analysis of Agricultural Research Organizations and Extension Linkages in West Africa	M. Snyder	1
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Genstat 5 Release 3 Reference Manual		3
GIS Applications in Natural Resources Selected Papers	M. Heit	1
Glossary of Soil Science Terms - Soil Science Society of America		3
GLS: A Management Perspective	Akouof	1

Gourmantche Agriculture Part II Cultivated Plant Resources &Field Management	R.A. Swanson	2
Grain Markets and the Marketing Behavior of Farmers: A Case Study of Manga, Upper Volta	J. Sherman	1
Grazing Intensity and Ecological Change in Eastern Senegal: Implications for the Monitoring of Sahelian Rangelands	M. Niamir	1
Ground & Air Survey for Field Scientists, 1982	J. Wright	1
Groundworks 1 - Managing Soil Acidity		1
Herbaceous Biomass Assessment in the Central Pastoral Zone of the Sahelian Country of Niger, 1986-88	B. Wylie	1
Household Food Demand in Burkina Faso with Food Supply Demand Balance Projections for 1995	K. Savadogo J. Brandt	1
Identification Des Constraintes Au Niveau Fermier et Evaluation de Nouvelles Technologies En Haute Volta	M. Lang R. Cantrell J. Sanders	2
Identifying Constraints and Evaluating New Techology in Purdue Farming Systems Project in Upper Volta	M. Lang R. Cantrell J. Sanders	2
ILEIA - Subscription		1
Impact of Collaborative Research Support Programs A. Alternatives for Coco Growers B. Expertise on a Disk C. Integrated Soil &n Water Management D. Lime - A Resource for Agribusiness E. Environmental Policy		1
Impact of Animal Traction on Farming Systems in Eastern Upper Volta	G. Lassiter	1
Impact of Direct Taxation and Government Price Policies on Agricultural Production in a Developing African Country: An Empirical Study of Mali	B. Kone	1
Indigenous Land Use Systems and Investments in Soil Fertility in Burkina Faso - Jan. 1991	P. Matlon	1
The Influence of Karité and Néré Trees on Sorghum Production in Burkina Faso	J. Kessler	1

Informing Food Security Policy in Mali: Interactions Between Technology, Institutions and Market Reforms. Vol. I & II	J. Dione	1
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