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**REPORT OF THE
INTERCRSP NRM
WEST AFRICA
STRATEGY
ASSESSMENT TEAM**

Submitted to:

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Host Country Institutions

Prime Sites

**Guatemala - Agri-lab, ALTERTEC,
CARE, ICTA**
Jamaica - CARDI, Ministry of Agriculture
Mali - IER
Philippines - NCPC/UPLB, PhilRice

Satellite Sites

Ecuador - INIAP
Honduras - EAP
Thailand - Dept of Agriculture
Uganda - Makerere University

International Centers

AVRDC - Taiwan
IRRI - Philippines

CIAT - Colombia
CIP - Peru

Private Sector

The Kroger Company

Caito Foods

PICO

NGOs/PVOs

CLADES

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REPORT OF THE INTERCRSP NRM WEST AFRICA STRATEGY ASSESSMENT TEAM

1. EXECUTIVE SUMMARY

USAID/Niger has been involved in interCRSP and natural resource management (NRM) activities in Niger since the early 1980's. The Mission has encouraged and supported both of these activities over the years. The latest support of the Mission is in the area of making a strategic assessment of NRM and interCRSP issues in the West Africa region. An interCRSP team was assigned to travel to selected countries of the region and make the assessment. In March 1995, the CRSP Council designated the IPM CRSP to be the lead CRSP for interCRSP activities in West Africa. Subsequently, the IPM CRSP received a grant from USAID/Niger Mission to implement the scope of work (SOW) covered in this report.

The SOW specifies that the team will carry out appropriate site visits to Niger, and two other West African host-countries (probably Mali and Burkina Faso) to obtain information on available and needed NRM technologies, and identify the institutional participants for the interCRSP network.

The team traveled to Niger, Mali, and Burkina Faso from July 8-22, 1995. This report contains the findings, conclusions and recommendations of the team.

1.1 NIGER

The team visited and discussed with several institutions and organizations in Niger dealing with NRM issues. The visits were made either by the entire team or representative members of the team. Comments on these visits and our discussions with these stakeholders are detailed in the full report.

INRAN is a key and lead partner of the West Africa InterCRSP initiative. Three CRSPs (INTSORMIL, Peanut, and Tropsoils) have already initiated interCRSP activities in Niger. The team held discussions with Dr. Abdoulaye Gouro, DG, INRAN and Dr. Botorou Ouendeba, scientific director, INRAN. They expressed in strong terms INRAN's commitment and support to this interCRSP NRM initiative.

As stated in its Strategy Plan document, Strategic Objective #3 of USAID/Niger aims toward the widespread adoption of natural resource management (NRM) practices to enable the people in Niger's rural areas to produce more while using less of the fragile and dwindling resources. Effective NRM research and technology transfer mechanism are essential if the anticipated results are to-be achieved. The interCRSP initiative with the NRM theme can be an important mechanism of the USAID/Niger Mission strategic plan for tackling some of the NRM related challenges of Niger.

During this visit the team established the West Africa Members of the Workshop Organizing Committee for the September 1995 NRM InterCRSP Workshop in Niamey. The team also visited the Hamdallaye Watershed Project initiated by INRAN and Tropsoils and now the site of the three CRSPs (INTSORMIL, Peanut, Soils) interCRSPing. The interCRSPing workplan of the three

CRSPs as developed last May is underway at Hamdallaye. At the Hamdallaye site, a watershed management approach is used to develop an integrated system of soil, water, nutrient, and plant management for food, fodder, and fuelwood production and provides a planning unit for considering the various environmental and socioeconomic impacts associated with technological innovation. Through this collaborative watershed management approach, a technology package suitable for the ecology represented by the watershed is to be developed. The most impressive part of the Hamdallaye work is the rapid growth and establishment of the *Acacia holosericea* trees on the eroded plateau and the effectiveness of the microcatchments dug to control water runoff. However, more time and effort are needed to transfer the integrated approach and technologies to other degraded watersheds in the region and to generate long-term ecological and socioeconomic impacts in the increasingly fragile environment of the Sahel.

Peace Corps country training and INRAN could benefit from close collaboration, especially since the INRAN/TropSoil CRSP plateau regeneration demonstration effort at Hamdallaye is so close to the Peace Corps training center. NRM is one of the high priority areas of Peace Corps Training and this includes environmental protection, biodiversity, and forestry. Examples of NRM related activities of the Peace Corps are dune stabilization, forest mapping, and giraff research.

USIS/Niger is very willing to collaborate with the interCRSPing effort, especially if it involves using its facilities for information, communication or training purposes. World Net can be used for real-time, audio-interactive sessions. It is also suitable for bringing previously taped audio/video to USIS centers. While discussing potential use of World Net in the September Workshop, the USIS/Niger urged us to bring the World Net conference session to more than one West African site so we could demonstrate the linking power of the facilities and model their use for distance learning conference and meeting. This could be a powerful communication mechanism for strengthening regional cooperation in NRM and interCRSPing.

The AGRHYMET Center is superbly equipped and well staffed to handle its regional responsibilities. AGRHYMET focuses on agro-hydrometeorological information and training of nationals of CILSS countries in food security and natural resource management. The center places high priority in and identifies itself with technology transfer in the Sahel region. AGRHYMET can be an important collaborator in this regional NRM interCRSPing effort and the management has expressed interest to be a partner.

CGRN is an inter-ministerial department under the Ministry of Agriculture with a mandate to coordinate, at the national level, activities in the area of natural resources management, to define NRM strategies, to support and guide development and implementation of the national program on natural resources management. As plans are developed for NRM interCRSPing in Niger, it is essential to keep CGRN in the loop so that there will be a nationally coordinated NRM program.

The GNRN project of Africare intervenes in the Gouré *arrondissement* of eastern Niger which is experiencing an accelerated decline in the productive potential of its natural resources. The project has a broad-based rural rehabilitation and development approach addressing such issues as water development, reforestation, and revegetation of degraded lands, leading to sustainable rural development.

The UNDP assigns high priority to NRM focused programs. UNDP confirmed that there is substantial possibility for collaboration involving UNDP in natural resource management when its new funding cycle starts in mid 1996. The UNDP especially encourages co-financing of efforts with other agencies as a way to achieve more with scarce funds.

ICRISAT is clearly committed and a close working relationship between the CRSPs, ICRISAT, and the NARSs of West Africa is advantageous to all of them. ISC's (ICRISAT Sahelien Center) active role in regional NRM technology development and transfer in this interCRSP initiative is

essential.

High priority NRM research areas for Niger are: efficient use of rain water, efficient soil nutrient management, minimizing the negative impact of the Sahel climate (wind and water erosion), identifying the most efficient farming system, and identifying the best NRM technology package for a sustainable agriculture.

1.2 MALI

Several institutions and organizations in Mali were visited by some, or all, members of the team. IER has years of experience in running a successful FSR program and the interCRSP NRM initiative links well with and complements IER's continuing activities in these areas. The DG of IER stressed the importance of involving the partner NARSSs from the very beginning at the planning stage so that they will have opportunity to influence the directions of new initiatives such as this one. Having said that the IER is very much supportive of this interCRSP NRM regional initiative. The interCRSP NRM as well as other regional programs with similar objectives have to be harmonized so that human and financial resources are utilized efficiently in the region. The overall objective of IER's strategic plan is to contribute to the rural development of Mali by ensuring a sustainable production by making use of indigenous knowledge.

INSAH is a sister institute to AGRHYMET in that it is also a specialized institute under CILSS with a mandate to coordinate and promote scientific research and techniques useful for development of the nine member countries. Currently INSAH is concentrating on assessing the state of NRM programs and gaps in the member states. INSAH envisions its collaboration and involvement with the CRSPs as an opportunity for strong and sound scientific backstopping and training by the member universities of the CRSP. On the other hand, INSAH can provide the interCRSP initiative a good regional coordination umbrella that can cover much of West Africa. INSAH suggested that it serve as the regional coordinator for the NRM interCRSP initiative and the assessment team agreed. On this basis INSAH will appoint a coordinator and the interCRSP will provide operational support. As an institute with a regional mandate, INSAH does NRM regional policy analysis, participates in formulation of regional programs, and undertakes impact assessment of policy and technological interventions. Overview of INSAH's strategic plan shows that NRM and regional food security issues, without damage to the environment, command high priority for the institute. One major outcome of the team's discussion with INSAH was that there should be a memorandum of understanding signed between INSAH and the CRSP Council. This can be the enabling instrument for initiating collaborative work between them.

NRM is recognized as a cross-cutting theme for all the three strategic objectives of USAID Mali. In principle, the Mission supports the interCRSP initiative and concurs with designating INSAH as the regional coordinating institute.

The group of country coordinators of CRSPs operating in Mali endorsed the regional approach of the NRM interCRSPing. The group emphasized that real operational and financial authorities should reside in the hands of the cooperating NARSSs.

The actions of CCA-ONG include training for NGO staff, dissemination of technical information and pilot projects. The Director commented that the NGOs in Mali frequently need technical help and he suggested that local NGOs be included in the choice of the watershed for interCRSPing. Because they are in close contact with the communities, NGO staff can contribute to the social and cultural knowledge about the site.

ICRISAT Mali confirmed that the proposed InterCRSP natural resource management effort fits well with the objectives and activities of the institution's integrated systems projects. ICRISAT

said that it would be easy for its scientists to collaborate in InterCRSP natural resource management activities or for scientists involved in the InterCRSP activities to collaborate with ICRISAT.

The project coordinator of Africare Mali said that farmers are often so preoccupied with short term problems, that they do not see long term natural resource management as a priority. He emphasized that a project must help them solve some short term problems (e.g. wells for clean water) before they can pay attention to natural resource management.

1.3 BURKINA FASO

The team held discussions with a selected range of institutions and individuals in Burkina Faso. Since NRM is the core of Burkina Faso's development, the University of Ouagadougou said that it has interest in being an active collaborative partner and, therefore, is prepared to collaborate in this regional initiative. Since the active Peanut CRSP collaborators are from the University of Ouagadougou, it was suggested that more effort should be made to attract more INERA scientists into the collaborative activities. INERA has an excellent capacity, both human and physical, to engage in NRM TDT. INERA is actively involved with the national extension program in NRM technology transfer and continuing training of extension personnel.

The watershed, Donsin, where SANREM will be conducting most of its field work has been identified. INERA and the University of Ouagadougou will be the main local collaborating institutions in many of SANREM's proposed projects. In view of the USAID/Burkina Mission closing, the possibility of initiating an interCRSP NRM regional activity in which Burkina Faso will be involved was appreciated and welcomed by the US Ambassador in the country.

Since the theme considered as the core for the regional cooperation, NRM, is one of the high priority areas for CILSS, it is very much interested in seeing the further development and implementation of the initiative. CNRST of Burkina Faso highlighted that NRM is ranked high in priority in the national strategic plan and, therefore, the center will support initiatives that will strengthen NRM in Burkina Faso, as well as in the entire CILSS region.

1.4 WEST AFRICA REGION

Among the important themes identified for InterCRSPing are Integrated NRM, Crop Production Technology, Soil and Water Management, Soil Nutrient Management, Watershed Management, Pest Management, Technology Transfer, and Strengthening Institutions. Research at INRAN and INERA indicates that West African farmers place great importance on having benefits quickly. Natural resource management technologies which have first year benefits such as rock bunds are much more likely to be adopted than those which require several years before benefits are noticeable. INERA research has also shown that, in some areas, permanent resource management efforts (i.e., planting trees, building rock bunds) are discouraged on rented or borrowed land because they give the tenant a claim to ownership.

The CRSPs can help lower information costs to farmers and extension agencies through demonstrations, field days, workshops, and publications. In this context, extension agencies would include both government extension services and NGOs. The extension agencies are a crucial link in this process because the CRSPs do not have the resources to transmit information to broad groups of farmers.

It is hoped that intimate researcher knowledge of end-user needs, preferences, and constraints will carry the day in identifying those "low hanging fruit" in the short term while the entire TDT process is adjusted to include them throughout as a longer term objective. The assessment team

was struck with the obvious pay-off of earlier investments in technical training and institutional support. There are many research institutions operating in the region that are staffed by qualified and motivated technicians, thanks to USAID's programs. The highest priority issues in human resource capacity are related to end-user (customer) involvement throughout the TDT process and creating an institutional system that encourages and allows true interdependence among research and extension staff.

Communication and information technology can play a critical role in the NRM West Africa InterCRSP Technology Development and Transfer effort. Among other things, additional input to a coherent communication and information technology workplan is expected to emerge from the planned September 1995 workshop in Niamey.

At the national level, an interCRSP committee should be formed and a lead CRSP should be designated to serve as facilitator for the national interCRSP coordination. The West Africa Regional InterCRSP Committee shall be composed of all the National InterCRSP Coordinators, the Regional Coordinator from INSAH, and a representative of the IPM CRSP, as the Lead CRSP. The Lead CRSP shall report to the CRSP Council and establish linkages with all the participating CRSPs, INSAH, and the West Africa Regional InterCRSP Committee. The Institut du Sahel (INSAH) shall be the regional focal point for the regional coordination activities. The regional coordinator shall be responsible for effective and working linkages among the national interCRSP committees, as well as maintaining effective linkage with the CRSP Council and the Lead CRSP.

REPORT OF THE INTERCRSP NRM WEST AFRICA STRATEGY ASSESSMENT TEAM

2. BACKGROUND AND INTRODUCTION

USAID/Niger has been involved in interCRSP and natural resource management (NRM) activities in Niger since early the 1980's. The Mission has encouraged and supported both of these activities over the years. The latest support of the Mission is in the area of making a strategic assessment of NRM and interCRSP issues in the West Africa region. An interCRSP team was assigned to travel to selected countries of the region and make the assessment. In March 1995, the CRSP Council designated the IPM CRSP to be the lead CRSP for interCRSP activities in West Africa. Subsequently, the IPM CRSP received a grant from USAID/Niger Mission to implement the scope of work (SOW) covered in this report.

2.1 The Specific activities of this SOW (Annex 1) were:

- a. To field a team to Niger and other West African countries, to catalogue the CRSP outputs and host-country needs, and identify common issues between the CRSPs which would benefit from an interCRSP initiative.
- b. To establish a network of scientists, government institutions, NGOs, and private sector for participation in technology transfer workshops.
- c. To host a workshop on "Advances in NRM Technology for West Africa". This workshop will serve as a groundbreaking example of the type and method of technology transfer envisioned for future interCRSP initiatives. Participants will define the process and functional organization of the interCRSP linkage with institutions in the US, Niger and throughout West Africa.

The SOW specifies that the team will carry out appropriate site visits to Niger, and two other West African host-countries (probably Mali and Burkina Faso) to obtain the information on available and needed NRM technologies, and identify the institutional participants for the interCRSP network. The SOW further states that in order to establish a network of institutions which functions as a conduit for technology transfer, an assessment must be done of the technologies, methodologies, and institutional and human capacities which are applicable and available to the interCRSP network.

2.2 The purpose and objectives of the CRSP/NARS team as specified in the SOW reads:

- a. Visit Niger and two other appropriate West African countries and discuss the concept and content of the NRM interCRSP initiative with stake holders.
- b. Facilitate the necessary contacts and involvements of appropriate networks in the NRM interCRSP West African initiative.
- c. Confirm the support of USAID missions of the participating host-countries.

- d. Identify, in each country, NRM related technologies which are regionally applicable.
- e. Develop a West African regional NRM interCRSP project proposal for further discussion and implementation through USAID Africa Bureau support. The Project Proposal for NRM interCRSP in West Africa submitted to USAID Africa Bureau by the IPM CRSP/OIRD, Virginia Tech, can be used as a working paper in developing and finalizing the project proposal.

Other specific issues the team was charged to assess covered:

- Crop production and NRM constraints and research
- Technology transfer constraints and inventory
- Institutional and human capacity building

2.3 Team Composition

Members

1. Dr. Tony Juo, Soils, Soils Management CRSP, Texas A & M University
2. Dr. Jess Lowenberg-DeBoer, Agricultural Economics, Bean/Cowpea CRSP, Purdue University
3. Dr. Brhane Gebrekidan, Plant Breeding, Team Leader, IPM CRSP, Virginia Tech
4. Mr. Ron Grosz, Communication and Information Technology, HERNS Project, Rosslyn, VA
5. Dr. Issaka Mahaman, NRM Chief, INRAN, Niger
6. Mr. Makan Fofana, NRM Chief, IER, Mali
7. Dr. Gaoussou Traore, INSAH, NRM Chief, Bamako

2.4 Visit Dates

The team traveled to Niger, Mali, and Burkina Faso from July 8-22, 1995. This report contains the findings, conclusions and recommendations of the team.

3. NIGER

The team visited and discussed with several institutions and organizations in Niger dealing with NRM issues. The visits were made either by the entire team or representative members of the team. Comments on these visits and our discussions with these stakeholders are detailed below.

3.1 INRAN

INRAN (Institut National des Agronomiques du Niger) has the national mandate for agricultural research in the country and was the primary contact and host national institute for the team's visit in Niger. The team's initial meeting was with Dr. Botorou Ouendeba, Scientific Director of INRAN. After an overview of the Scope of Work and the team's introduction and purpose of visit, logistic details for the week were worked out. INRAN is a key and lead partner of the West Africa InterCRSP initiative. Three CRSPs (INTSORMIL, Peanut, and Tropsoils) have already initiated interCRSP activities in Niger. In fact, implementation of the Niger interCRSP field work is well underway. On-farm trials at a Hamdallaye and Tanda (Gaya Region) watersheds and other support sites have been planted in July in collaboration with ICRISAT, IFDC and local farmers. Dr. Ouendeba pointed out that interCRSP activities will be backstopped by INRAN's soil laboratory, food technology laboratory and computer facilities.

The team held a final debriefing meeting with Dr. Abdoulaye Gouro, DG, INRAN and Dr. Botorou Ouendeba. They expressed, in strong terms, INRAN's commitment and support to this interCRSP NRM initiative. They concurred with the draft workshop agenda and assured the team that INRAN will fully be behind its implementation. It was agreed that the DG of INRAN will speak in the opening session and will also arrange either for the Prime Minister or the Minister of Agriculture and Livestock to open the workshop.

3.2 USAID/Niamey

The team met with David Miller and Moussa Saley of USAID Mission Niger for an initial briefing, introduction of team members, and collection of documents. Dr. Curt Nissly, the NRMA Chief who has been the lead person and prime proponent of USAID/Niger Mission's participation in this interCRSP NRM initiative, was out of the country during the team's visit. However, the team leader had discussion's with him in Washington, D.C. just prior to the team's departure for West Africa. He confirmed that all arrangements and contacts for the team's visit to the Mission were made. David Miller gave the team an overview of USAID supported projects in Niger as well as the Mission's Country Strategy Plan. In the context of sustainable economic development, one of the three strategic objectives (S03) of the Proposed Country Strategy Plan is to "Increase adoption of practices for conservation and productive use of natural resources".

As stated in the Strategy Plan document, Strategic Objective #3 aims toward the widespread adoption of natural resource management (NRM) practices to enable the people in Niger's rural areas to produce more while using less of the fragile and dwindling resources. To significantly improve conservation and good use of forests, fields, waters and pastures, the results indicated in the Strategic Plan are needed.

Focusing on the expected results from implementing the Country Strategy Plan, SO#3 results leading to better NRM are the following:

- Farmers practice better resource management: 5% more by 1997; 20% more by 2000
- 25 new NRM groups registered by 1997; 300 by 2002
- Greater public familiarity with conservation measures
- Farmers visit other villages to share information
- Farmers get better market and weather information
- National conservation & NRM measurement in 1996

In moving forward to achieve these results, there are significant challenges. The plan emphasizes and states that the "Poorly endowed vulnerable natural environment, low and uncertain rainfall, infertile soil, few trees, famine and pests constitute the main challenges of the natural environment rural Nigeriens confront. They and their communities, moreover, lack firm control over the resources they use. Without clear tenure, incentive is weak to invest in the land, water and trees one uses."

Effective NRM research and technology transfer mechanism are essential if the expected results are to be achieved. The interCRSP initiative with the NRM theme can be an important mechanism of the USAID/Niger Mission strategic plan for tackling some of the NRM related challenges of Niger.

The plan states that a number of improved practices are having good success: rock bunds to slow water and capture topsoil; half-moon shaped holes to trap water where crops or trees are planted; fallow management to grow more wood; small dams to check gully erosion; planted trees and fencing to help stabilize dunes.

Available NRM related technologies identified jointly by INRAN, ICRISAT, and CRSP scientists include crop residue management, use of rock phosphate, tillage, live fencing, exploitation of the Gao *Acacia albida*, and legume/cereal rotation with fertilizer application, and improved cultivars. These technologies, if properly applied, should boost production and improve the natural resource base of production.

USAID/Niger is designated as one of the Agency's re-invention laboratories and as such has focused on developing a country strategic plan. The plan gives NRM in Niger high priority. Other major donors which support NRM efforts in Niger are the World Bank and IFAD both of which promote community - based NRM activities.

The team held a debriefing meeting with the Mission Director Jim Andersen, David Miller, and Moussa Saley. The team was assured of the Mission's support and interest in Niger and West Africa as the NRM interCRSPing activity moves forward.

3.3 INITIAL TEAM MEETING

The team met in INRAN's soils lab initially and reviewed the Scope of Work and finalized the itinerary for the week, stakeholders to be visited were identified, and logistic details finalized.

During the meeting the team established the West Africa Members of the Workshop Organizing Committee for the September 1995 NRM InterCRSP Workshop in Niamey. Accordingly the following were named:

- Dr. Issaka Mahaman (Chair), INRAN, Niger
- Dr. Botorou Ouendeba, INRAN, Niger
- Dr. Curt Nissly, USAID Niamey, Niger
- Mr. Makan Fofana, IER, Mali
- Dr. Philippe Sankara, U. of Ouaga and CNRST, Burkina Faso
- Dr. Gaoussou Traore, INSAH, Bamako, Mali

The Workshop Announcement (Annex 2) developed by the US based members of the organizing committee served as the basis of the discussion. The background, objectives, and themes to be covered in the workshop are shown in the announcement. Organizational details of the workshop including tentative program and potential speakers (Annex 3), venue, hotels, interpreters, local facilitators were discussed and the necessary implementation steps taken. Dr. Abdoulaye D. Harsuna, B.P. 13158, Niamey, telephone 735498, and his partner interpreter were interviewed and accepted to serve in the workshop. Mrs. Fatuma Sani will serve as the local administrative and logistics facilitator.

3.4 HAMDALLAYE WATERSHED PROJECT

The team visited the Hamdallaye Watershed Project initiated by INRAN and Tropsoils and now the site of the three CRSPs (INTSORMIL, Peanut, Soils) interCRSPing. The interCRSPing workplan as developed last May is underway at Hamdallaye. ICRISAT and IFDC along with the three CRSPs are taking part in the collaborative research activities.

The goal of the InterCRSP collaborative effort is to integrate the diverse strengths and experience of the primary entities working on agricultural research in Niger; these include INRAN, ICRISAT, and the three CRSPs (INTSORMIL, Peanut, and Soil Management). It is recognized that this collaboration will facilitate sustainable use of the natural resources in the fragile Sahelian ecosystem upon which the fate of the farmers depend.

At the Hamdallaye site, a watershed management approach is used to develop an integrated system of soil, water, nutrient, and plant management for food, fodder, and fuelwood production and provides a planning unit for considering the various environmental and socioeconomic impacts associated with technological innovation. The integrated watershed management approach is designed to:

- Create public awareness of natural resource management and conservation (i.e., the critical linkages between common grazing lands on the plateau and the crop lands in the valleys).
- Test and demonstrate low cost technologies for rejuvenation of the degraded laterite plateau (water harvesting, fuelwood, and forage production).
- On-farm research and demonstration of soil management options to sustain millet, sorghum, and cowpea production.
- Develop a methodology for small agricultural watershed management in the Sahel.
- Generate information needed for formulation of natural resource management policies.
- Generate information needed to facilitate crop processing and marketing.
- Increase productivity of staple cereal grain and legumes.
- Reduce losses of major staple foods by increased *Striga* resistance in cultivars.

Through this collaborative watershed management approach, a technology package suitable for the ecology represented by the watershed is to be developed. The package would be developed such that an integrated approach using the research expertise of INRAN, INTSORMIL, the Peanut CRSP, TropSoils, and ICRISAT would be exploited. Impact would be sought and assessed within watersheds and additional on-farm sites. Promising sorghum and peanut varieties from their associated CRSPs would be included in the sites with better agronomic potential. TropSoils would focus on integrated management of watersheds, including reversal of land degradation. ICRISAT would focus on agronomic aspects of agricultural fields. INRAN would continue to coordinate activities using appropriate scientists to collaborate with individual CRSPs and ICRISAT activities.

The most impressive part of the Hamdallaye work is the rapid growth and establishment of the *Acacia holosericea* trees on the eroded plateau and the effectiveness of the microcatchments dug to control water runoff. The Hamdallaye watershed project, collaboratively run by INRAN and the

TropSoils CRSP, has clearly demonstrated that even under limited rainfall, vegetation on the severely degraded laterite plateau can be rejuvenated through a collaborative effort of local community, scientists, and government agencies. The team observed this physical rejuvenation when it visited the site. On-farm agronomic trials that integrate modern technologies with indigenous knowledge have also begun to show benefits. However, more time and effort are needed to transfer the integrated approach and technologies to other degraded watersheds in the region and to generate long-term ecological and socioeconomic impacts in the increasingly fragile environment of the Sahel.

The paper entitled "Rationale for using a watershed as the basis for planning and development", by T.L. Thurrow and A.S.R. Juo (in ASA Special Publication no. 60, 1995), describes well the approach and the justification for watershed based development. The Hamdallaye Model is recommended to be used as NRM operational unit elsewhere in Niger as well as in the broader West African region.

The team had an interesting dialogue with a farmer representative, Saleh Iddie, in a village within the watershed. Mr. Iddie emphasized that the project has made a significant difference already in that the interventions on top of the plateau have reduced gully formation on the slopes, reduced erosion, and increased vegetative cover throughout the watershed. When asked whether he had any suggestions or advice to researchers, he said with emphasis, "Be patient with us", highlighting the issue that restoring the productivity of the degraded lateritic plateau indeed demands patience and persistent attention.

One of the farmer managed millet trials we saw in the valley of the watershed had four treatments, namely natural rock phosphate, single super phosphate, crop residue, and rotation involving millet and cowpea. The trial was planted recently and the millet seedlings had emerged already. The cooperators in the trial are INRAN, INTSORMIL, ICRISAT, and TropSoils. The trial is replicated at seven different farms and each trial is about 3600m² large enough to serve as a demonstration.

3.5 UNITED STATES PEACE CORPS TRAINING CENTER AT HAMDALLAYE

Peace Corps/Niger has its head quarters in Niamey, a training center at Hamdallaye, and most of its volunteers situated in communities and villages in the southern part of the country. Its country program focuses on agriculture, natural resource management and maternal/child health and nutrition.

The interCRSP team met at the training center with Noelle Smith, technical director of training. They also met in Niamey with Eric Lindberg, Assistant Peace Corps Director for Agriculture and Acting APCD for Natural Resources Management.

NRM is one of the high priority areas of Peace Corps Training and this includes environmental protection, biodiversity, and forestry. Currently there are about 45 volunteers in Niger working in the NRM area out of a total of 120 and are assigned in clusters to various governmental organizations. Examples of NRM related activities of the Peace Corps are dune stabilization, forest mapping, and giraff research.

Peace Corps country training and INRAN could benefit from close collaboration, especially since the INRAN/TropSoil CRSP plateau regeneration demonstration effort at Hamdallaye is so close to the Peace Corps training center. Another point of collaboration that can be developed is in the use to which the Acacia (*Acacia holosericea*) used in the watershed project can be put for some uses such as production of a baking flour and coffee substitute from its seed. Having different uses for the rapid growing Acacia other than only as a means of rejuvenating the plateau area is worth

exploring and, possibly, exploiting.

- Peace Corps Volunteer (PCV) trainees could profit from working with INRAN technicians and scientists who in turn, could benefit from learning about grass-roots technology transfer techniques from the Peace Corps.
- PCVs can profit from having "secondary" projects or activities related to their activities in NRM. They could be used, for example, if the CRSP needs help gathering data or information from rural areas. Some PCVs may need some training on research methods but their presence in and close association with the rural population could benefit interCRSPing's focus on the end-user, on technology transfer, and on improving two way communication with the rural population.
- Peace Corps would like to know more about the September workshop and may be interested in participating in some manner. A poster presentation on the uses of the seeds of the Australian Acacia and/or a presentation/paper on involving end-users in technology development and transfer are among the potential topics PC could bring to the workshop.

3.6 USIS/Niamey

Shirley Stanton is the director of the USIS (United States Information Services) American Cultural Center in Niamey. The main objective of the Center is to support the work of the U.S. "Country team" in Niger. It has a library and reading room, a small auditorium for showing videos, movies etc. and modern multi-media equipment as well as satellite download (receiving capacity) for World Net.

USIS can and does provide various sessions including receiving live video and audio transmission from its headquarter studio in Washington, DC, two-way audio using its dedicated lines and speaker-phones. Based on our discussions with Shirley Stanton, the following points were highlighted:

- USIS is very willing to collaborate with interCRSPing, especially if it involves using its facilities for information, communication or training purposes.
- USIS/Niamey would like to see its World Net Satellite download used, for example, during one of the sessions of the regional workshops and conferences. This could involve bringing a "real time" video/audio from the USIS Studio in Washington to conference participants assembled at the Niamey video auditorium. Conference participants could communicate with Washington via dedicated phone line.
- The Niamey video auditorium can handle about 70 people comfortably. More than that puts stress on the air conditioning capacity.
- USIS/Niamey has an adequate budget for including refreshment for groups using the facilities.
- The contacts in Washington DC are Kon Sale and Don Whitman. We are encouraged to discuss both the September workshop and on going needs for World Net satellite exploitation for more effective communication.
- Director Stanton needs a concrete request from the interCRSP requesting use of her facilities, specifying the reasons for their use, type and so forth. She urged us to initiate the request before we leave Niamey or as soon there after as feasible. She needs adequate lead time since people are leaving soon for vacations. Because of time limits, even an informal request will help her get the request in process.

- World Net can be used for real-time, audio-interactive sessions. It is also suitable for bringing previously taped audio/video to USIS centers.
- Director Stanton urged us to bring the World Net conference session to more than one West African site so we can demonstrate the linking power of the facilities and model their use for distance learning conference and meeting. This could be a powerful communication mechanism for strengthening regional cooperation in NRM and interCRSPing.

3.7 AGRHYMET

The AGRHYMET Center located in Niamey is a specialized institution of CILSS (Inter - State Committee on Drought Control in the Sahel). Nine member countries in the Sahel stretching from Chad in the east to Cape Verde in the west make up the CILSS.

The objective of the AGRHYMET Center is to prepare, disseminate and manage information on food security, desertification control and renewable natural resources including soils, water, forests, etc. The AGRHYMET Center is superbly equipped and well staffed to handle its regional responsibilities. AGRHYMET focuses on agro-hydrometeorological information and training of nationals of CILSS countries in food security and natural resource management. The center places high priority in and identifies itself with technology transfer in the Sahel region. AGRHYMET can be an important collaborator in this regional NRM interCRSPing effort and the management has expressed interest to be a partner. Within the framework of the CILSS Early Warning System, it develops and distributes satellite products and geo-referenced analyses obtained through the use of a geographic information system (GIS).

The team held discussions with Mr. Gnoumou Faustin, acting DG, and Dr. R.L. da Costa dos R. Silva, head of information and communication.

In discussing the forthcoming interCRSP workshop on Technology Development and Transfer to improve Natural Resource Management, the AGRHYMET management said that they are interested in participating. The meeting rooms and conference facilities are suitable for this workshop and can be made available if INRAN requests them.

3.8 CGRN

At CGRN (Cellule de Gestion de Ressources Naturelles), the team met and discussed with Mr. Ali Moussa a zootechnicien representing Mr. Ibrahim Idi-Issa, the coordinator of the unit. Mr. Moussa gave us an overview of the responsibilities and activities of the unit.

CGRN is an inter-ministerial department under the Ministry of Agriculture with a mandate to coordinate at the national level activities in the area of natural resources management, to define NRM strategies, to support and guide development and implementation of the national program on national resources management (PNGRN).

CGRN has been operating since 1992 with a small staff composed of one high level technician in each discipline in the area of NRM (agronomist, pastoralist, forester, engineer, hydrologist, and socio-economist...). As the coordinating and policy units for national NRM issues, the CGRN is supported by a World Bank project with focus on strategy development, policy and coordination. Although the main activity of CGRN deals with coordination and implementation of NRM policies and programs, it is not conducting field activities. These are conducted by the existing government structures. For example, in the area of NRM research, INRAN has the national responsibility. As plans are developed for NRM interCRSPing in Niger, it is essential to keep CGRN in the loop so that there will be a nationally coordinated NRM program. It was agreed that the CGRN will

present an overview of the Nigerien national policy on NRM during the September NRM interCRSP workshop in Niamey.

3.9 Africare/Niger

The team visited the Africare Niamey office and held discussions with Dr. Mohamoud Osman, Project Director of the Gouré Natural Resources Management Project (GNRM), which is financed by USAID.

The GNRM project intervenes in the Gouré *arrondissement* of eastern Niger which is experiencing an accelerated decline in the productive potential of its natural resources. This environmental degradation over the last 30 years has been due to the combined effects of climatic changes and inappropriate human behavior. The resulting consequences, according to the GNRM Mid-Term Evaluation Report, are said to be:

- The almost complete disappearance of relatively dense savanna woodland formations (particularly those of local acacia species), which were previously common.
- The widespread inception of shifting sand dunes which threaten to cover roads, villages, and the oasis upon which people depend for their livelihood.
- Soil degradation leading to a loss in agricultural and pastoral productivity.
- Lower water tables and the disappearance of permanent sources of surface water.

The project has a broad-based rural rehabilitation and development approach addressing such issues as water development, reforestation, and revegetation of degraded lands, leading to sustainable rural development. Active participation of end-users in problem identification and implementation of solutions is an integral part of the project. The beneficiaries are encouraged to participate by contributing money as well as labor in project implementation. A village-level management committee monitors the participation of members of the village in project related activities. In particular, women are actively involved at all levels in the participatory approach. Continuous and persistent dialogue with stakeholders in the rural communities is essential for the success of any rural development project such as this one.

Africare expressed interest in cooperating in a regional NRM activity as well as participation in the forthcoming NRM interCRSP workshop.

3.10 UNDP

The team met with Dr. Mahamadou Ouattara (former DG of INRAN), special advisor on sustainable development for the UNDP (United Nations Development Program) in Niger. Dr. Ouattara informed the team that UNDP was nearing the end of its current five year planning cycle and that they would soon begin a new three year cycle. In this new cycle, UNDP would switch from a project approach to a program approach. The project approach is characterized by financing of activities at specific institutions. The program approach, however, is to support development of selected functions across the economy. Dr. Ouattara stated that all individual projects from this funding cycle were being terminated.

The program approach of UNDP will promote and support accountable and participatory governance and democracy, empowerment of the grassroots, fight against hunger and poverty, improving incomes of the rural poor, improving the environment, and promoting overall sustainable development. In all of this approach, the proper use and improvement of NRM in the country is a prerequisite for success. Thus, the UNDP assigns high priority to NRM focused programs.

Dr. Ouattara further said that there is substantial possibility of collaboration involving UNDP in

natural resource management when the new funding cycle starts in mid 1996. The UNDP especially encourages co-financing of efforts with other agencies as a way to achieve more with scarce funds. Dr. Ouattara noted that he is part of the USAID planning effort for Strategic Objective 3 focusing on natural resource management.

3.11 DEPARTMENT OF AGRICULTURE - EXTENSION UNIT

At the agriculture service, we met with Mr. Malam Ari Kori. He gave us a brief history of extension in Niger and its linkages with research. Since 1988, the agricultural service has been reinforced. The World Bank initiated the national program of extension (PNVA) and a national program of research (PNRA). From then, the contact between extension and research has improved.

The department has a training program for specialized technicians who function at the farm level. They also have on-farm experimentations with research and monthly joint workshop for technology review during which research and extension specialists identify the technologies ready to go to the farm level. They also review the ones which are having problems at the farm level.

Mr. Ari Kori expressed that having a special NRM national unit, such as the CGRN, is not useful. However, the extension wing of the Ministry of Agriculture is looking forward to improving collaboration with INRAN and other institutions involved in NRM related technology transfer.

3.12 THE DEPARTMENT OF FORESTRY (Direction de l'Environnement)

The Department of forestry is a government unit under the Ministry of Hydrology and Environment. It is a decentralized department with functions and linkages down to the "arrondissement" level which is the lowest administrative division in the country.

One of the major objectives of the Department of Forestry is to minimize deforestation activities. Forestry agents have a wide range of activities to carry on their mission. In the earlier years, their primary role was limited to law enforcement preventing farmers from cutting trees and introducing tree seeds for plantations mainly around towns and villages. Currently, their activities go beyond the two previous ones. Sensitizing and educating farmers on the disadvantages of deforestation is now being done by forestry agents. The department has also organized farmers in cooperatives for education and reforestation efforts. In the area of the research, the department has good relations with INRAN and many joint activities such as agroforestry, introduction of new species, conservation and multiplication of local species are underway.

3.13 ORSTOM/Niger

Our discussions in this visit were with Mr. Bezançon who is a millet breeder. ORSTOM has a range of research activities through West Africa. In Niger, some of the areas they are working on include:

- Teledetection for meteorological forecast and water management
- Long-term savana monitoring and management
- Improvement program for the fallow system of production
- Millet germplasm improvement and enhancement including both cultivated and wild forms

ORSTOM expressed interest in collaborating with the interCRSP initiative in NRM.

3.14 ISC

The ICRISAT Sahelian Center (ISC) has a wide range of strong NRM related research projects relevant to the whole Sahelian region. ICRISAT and the CRSPs have had, and still have, active collaborative relationships. When the three CRSPs collaborative workplans were discussed and developed in May 1995 in Niamey, ISC played an active role and is still an active partner in the implementation of that plan. Since the ISC director and key staff in the NRM area were not available, the team did not visit the ISC.

ICRISAT's commitment to NRM research is stated well in the institutes 1994 publication, ICRISAT Now, Sowing for the Future: "The pressures on rainfed agricultural land in the SAT are increasing due to increased demands for food and feed. The natural resources (soil, water, nutrients) remain the same, but improved management is essential if we are to reverse the degradation of the natural resource base and develop production systems that sustain farming communities. Quite simply, ICRISAT's preoccupation with natural resources management in the SAT is a fundamental strength and an essential investment to achieve sustained increases in production in SAT environments."

ICRISAT is clearly committed and a close working relationship between the CRSPs, ICRISAT, and the NARSs of West Africa is advantageous to all of them. The team felt that interCRSP collaboration in Niger with ISC and other IARCs, such as IITA, ILRI and IFDC, should be coordinated through INRAN. ISC's active role in regional NRM technology development and transfer in this interCRSP initiative is essential. A pre-extension integrated technology recommended by ICRISAT for a millet-based system contains:

- Application of Phosphores and crop residues and organic manure
- rotation with legumes
- ridging
- higher crop density
- increasing cowpea component in the system
- combat erosion through crop residue
- planting Andropogon
- use of stone bunds

3.15 INTERCRSP OUTPUTS IN NIGER

Since the early 1980's, three CRSPs (INTSORMIL, TropSoils, Peanut) have been conducting collaborative agricultural research activities in Niger. According to INRAN, their contributions in technology development are significant. The following list, though not exhaustive, shows the highlights of the outputs of the CRSPs.

CRSPS Outputs in Collaboration with INRAN

TropSoils

- Soil and agroclimatic database collected and documented
- Rural economy and social database collected and documented
- Management of watershed approach, for integrated natural resource management, initiated and implemented
- Identification of chemical and physical parameters for soil variability identified and documented
- Alternative techniques of water conservation investigated and recommendations developed
- Nutrient use efficiency research conducted and results recommended
- Crop rotation investigations pursued and recommendations given

INTSORMIL

- Improved sorghum varieties and hybrids developed which are under large scale on-farm demonstrations - SRN 39, NAD 1, Sepon 82
- Millet varieties - MTDO2, MTTY2 developed
- A number of disease and *Striga* resistant experimental varieties developed
- Alternative food technology and utilization methods investigated and recommendations made

Peanut

- Peanut varieties which are resistant to diseases and pests developed

3.16 NEEDS OF NIGER IN THE AREA OF NRM

From the analysis of various published reports and documents, the major needs in the area of NRM in Niger are:

- Overall poor soils and their declining fertility
- Water and wind erosion accelerating loss of soil
- Low and irregular rainfall limiting reliable crop production
- Problems of water management in irrigated crop production systems
- High demographic pressure reducing the traditional length of fallow leading to cultivation of marginal lands
- Sand dunes invading fertile agricultural valleys
- High livestock density leading to overgrazing of the natural vegetation
- Deterioration of the vegetation cover
- Accelerated deforestation

High priority research areas for NRM are:

- Efficient use of rain water
- Efficient nutrient management
- Minimizing the negative impact of the Sahel climate (wind and water erosion)
- Identifying the most efficient farming system
- Identifying the best NRM technology package for a sustainable agriculture

4. MALI

Several institutions and organizations in Mali were visited by some, or all, members of the team. Comments and conclusions from these discussions with NRM stakeholders in Mali are summarized below.

4.1 IER

The team's first working visit in Mali was with the scientific director of IER (Institut d'Economie Rurale), Dr. Bino Teme. The team reported on the trip to Niger and the progress that has been made so far. The team expressed that it was interested in assessing the existing NRM structures and institutions and their functional and technical capacity in order to elaborate a regional strategic plan for NRM interCRSP activities in West Africa, as well as discuss the opportunity for Mali's participation in the regional workshop on NRM in September.

The scientific director welcomed the team and said that IER is pleased with this interCRSP initiative and that it is a good idea to move towards a regional cooperation. He said that he is concerned about developing a working coordinating mechanism that is acceptable to all stakeholders. This needs to be worked out carefully for the benefit of the CRSPs and the collaborating countries. IER, as the national institution collaborating with several CRSPs, supports strongly the effort of the interCRSP and will do all that is needed to make the interCRSP work. The IER's mission is to conduct and coordinate all agricultural research activities in Mali. It has a growing number of young and qualified researchers. Through its SP/GRN (Systeme de Production/Gestion des Ressources Naturelles) program, IER conducts sound research activities in the area of NRM at national and regional levels. Therefore, the IER feels that interCRSP activities will benefit the national NRM program.

The team also had a debriefing meeting with Dr. Oumar Niangado, DG, IER, and Dr. Bino Teme, Scientific Director. IER has years of experience in running a successful FSR program and the interCRSP NRM initiative links well with and complements IER's continuing activities in these areas. Dr. Niangado stressed the importance of involving the partner NARSs from the very beginning at the planning stage so that they will have opportunity to influence the directions of new initiatives such as this one. Having said that, the IER is very much supportive of this interCRSP NRM regional initiative. He pointed out that there are other similar programs being planned for the West Africa region such as the Desert Margins Initiative (DMI) under ICRISAT. The interCRSP NRM and the DMI as well as other regional programs with similar objectives have to be harmonized so that human and financial resources are utilized efficiently in the region. In this debriefing, the role of INSAH as a regional coordinator was brought up and all agreed that INSAH should serve as the regional coordinating cell but real functional leadership and authority should be at the participating NARS level. Another point Dr. Niangado stressed was that these initiative should be as inclusive as possible in involving additional NARSs of West Africa. He advised that the door should be left open so that new NARSs can come into the interCRSP NRM initiative. With reference to the forthcoming Niamey workshop it was agreed that IER will finance and send a member of a Mali Farmers Union to serve as a resource person and present farmers' views in the workshop. It was also suggested and agreed that farmers' representatives from diverse ecological zones in Niger should also be invited to participate in the workshop. Issaka Mahaman is to follow-up on this.

4.2 Mali Natural Resource Management Strategic Plan

The Institut d'Economie Rurale (IER) has developed a strategic plan in Natural Resource Management (NRM) for 10 years starting from 1994. The overall objective of this strategic plan is to contribute to rural development of Mali by ensuring a sustainable production by making use of indigenous knowledge. The specific objectives are:

- Improve basic knowledge on natural resource and traditional farming systems in the main agro-ecological zones.
- Evaluate the development impacts and production practices on resources in view of sustainable management.
- Identify, develop, and transfer technologies in natural resources conservation and rejuvenation in a participatory way.
- Develop organizational measures and rules for better management of natural resources.
- Promote technical and socio-economic options for decision-making at national, regional, local, and individual level for resource use.

4.3 INSAH

The team visited INSAH (Institut du Sahel) and held discussions with the DG, Dr. M.S. Sompo-Ceesay. Initial discussion concentrated on clarifying the scope of work of the team and getting overall information on the mandate and function of and institutional capacities of INSAH. INSAH is a sister institute to AGRHYMET in that it is also a specialized institute under CILSS with a mandate to coordinate and promote scientific research and technique useful for development of the nine member countries. INSAH is heavily supported by USAID in particular through PADRES funds. Currently INSAH is concentrating on assessing the state of NRM programs and gaps in the member states. INSAH envisions its collaboration and involvement with the CRSPs as an opportunity for strong and sound scientific backstopping and training by the member universities of the CRSPs. On the other hand, INSAH can provide the interCRSP initiative a good regional coordination umbrella that can cover much of West Africa.

INSAH is currently preparing to review and assess the NRM status in the member countries in a workshop to be organized the last week of next November. Questionnaires on NRM issues have already been distributed and analysis and report on the results will be discussed in the workshop. INSAH suggested that the planned interCRSP NRM September workshop be postponed to be combined with their workshop. However, because of the commitments already made and the expiration of the available funds it was made clear in the discussion that the Niamey September workshop could not be delayed.

In the discussion with Dr. Sompo-Ceesay the desirability of including non-CILSS West African countries in the interCRSP initiative was brought up. It was agreed that it would be desirable for the regional interCRSP program to cover non-CILSS countries also.

In the West Africa region in general there are a wide range of programs and initiatives under the overall NRM umbrella and it is critical to have an effective regional coordination mechanism to minimize duplications and strengthen regional cooperation. INSAH suggested that it serve as the regional coordinator for the NRM interCRSP initiative and the assessment team agreed. On this basis, INSAH will appoint a coordinator and the interCRSP will provide operational support.

As an institute with a regional mandate, INSAH does NRM regional policy analysis, participates in formulation of regional programs, and undertakes impact assessment of policy and technological interventions. Overview of INSAH's strategic plan shows that NRM and regional food security issues without damage to the environment command high priority for the institute. Among some of the strong programs of INSAH are IPM (funded mostly by USAID) and drought resistance

research (funded by EEC). Dr. Sompo-Cessay informed the team that INSAH and its member countries have designated Burkina Faso as the lead country or center of excellence for regional NRM TDT activities. The overall regional acceptance and operational modalities of such a designation have yet to be seen.

One major outcome of the team's discussion with INSAH was that there should be a memorandum of understanding signed between INSAH and the CRSP Council. This can be the enabling instrument for initiating collaborative work between them. Based on the MOU, INSAH can be designated and start functioning as the regional interCRSP NRM coordinating unit.

4.4 CPS

CPS (Cellule de Plan Statistics) is a newly established unit under the Ministry of Rural Development and the Environment following the restructuring of Malian Government agencies some three years ago. The team visited with the Unit's Director, Dr. Mamadou Goita (former DG of IER), and the economist Mr. Diallo. The Unit's main responsibilities are to collect, monitor and evaluate statistical data of rural development and natural resource management in Mali. The unit consists of three divisions, namely statistics, monitoring and evaluation, and planning. One of the Unit's current activities is to make a critical assessment of land tenure at selected sites. The findings will be used to design new land tenure systems in the country. Statistics used in the CPS are collected by several other units of the Ministry and the unit's main responsibility is to analyze and summarize the results for use in national and regional planning efforts.

4.5 USAID/Mali

Our initial meeting in the Mali USAID Mission was with Mr. David Atteberry, Project Development Officer. We were informed that the Mission's Strategic Plan was not yet available for us to see. However, from the discussion we learned that NRM is not recognized as a specific strategic objective as is the case in Niger. Mr. Atteberry agreed that a regional approach and outlook on NRM is the desired way to go.

The team had a debriefing session with Mr. Augustin Dembele, the Mission's NRM lead person and the INSAH project officer for the Mission. Mr. Dembele pointed out that the Mission's Strategic Plan has three strategic objectives which are governance, sustainable economic development, and youth affairs. NRM is recognized as a cross-cutting theme for all the three strategic objectives of USAID Mali. In principle, the Mission supports the interCRSP initiative and concurs with designating INSAH as the regional coordinating institute.

4.6 PNVA

The team met with Mr. Adama Sidibe, Research-Extension liaison specialist in the Ministry of Agriculture, on July 18 at the extension services offices in Bamako. Mr. Sidibe stated that with the help of the World Bank financed National Agricultural Extension Project (PNVA), the extension service is promoting use of crop, livestock and environmental technologies in an integrated program. The Training and Visit system is used. They have specific programs in:

- Soil conservation and erosion
- Range and pasture management
- Tree planting, and
- Use of crop residues in livestock rations.

Malian extension services have a staff of 1441 persons, 725 of which are local extension agents in direct contact with farmers. Some 195,000 farmers are organized in 17,189 extension contact groups.

Technologies to be extended are identified by a team made up of researchers, extension personnel and farmers. A diagnosis is performed to identify the problem and if research has a potential solution that is tried. If there is no "on-the-shelf" solution, the problem is turned over to researchers.

Sidibe outlined the following extension service problems, in order of priority:

- Lack of credit
- Socio-economic aspects not well understood, including profitability, resource constraints, and cultural problems
- Continuing education for agents

4.7 Meeting with CRSP Coordinators in Mali

Five CRSPs (INTSORMIL, IPM, Tropsoil, Peanut, and Bean/Cowpea) have current programs in Mali. The team met with the country coordinators of these CRSPs as a group. They were:

Dr. Aboubacar Toure	INTSORMIL
Dr. Amadou Diarra	IPM
Mr. Zoumana Kouyate	Tropsoil
Mr. Moussa Sanogo	Peanut
Mr. Mamadou Toure	Bean/Cowpea

Overview on the assessment team's assignment and on-going activities of the various CRSPs were exchanged and discussed. The group endorsed the regional approach of the NRM interCRSPing. The group and the team discussed the regional coordination alternatives and concluded that INSAH would be the choice institute to carry the coordination administrative umbrella. The group emphasized that real operational and financial authorities should reside in the hands of the cooperating NARSs. The concept of assigning to a lead country a given program through the so-called "pole" approach came up and the conclusion was that there is yet no regional agreement on the implementation of the concept.

4.8 PGRN

Projet de Gestion des Ressources Naturelles (PGRN) is a nationwide project in charge of the execution of a program intended to help villages:

- To identify their land limits, potentials and constraints for improving the environment (social, economic, physical, biological...),
- To identify and comment on current practices in NRM,
- To design a scheme of village land area improvement,
- To help villages and assist them in planning actions for their land area improvement, and to implement planned actions.

All these actions should be carried out in a participatory and partnership manner. This is to say that the populations are being held responsible for the development of their community.

PGRN will assist in information, training, organizing and implementing planned actions. PGRN is an important partner of research institutions mainly IER in terms of technology transfer. IER has a process to come up with a collaboration framework with PGRN.

4.9 CCA-ONG

Three members of the team visited the offices of the Coordination Committee for Action of Non-governmental Organizations in Mali (CCA-ONG) on July 19. They met with Dr. Edmund Dembele, who is the coordinator for the PVO-PIVOT-GRN project implemented by CCA-ONG and CARE International with USAID funding. There are currently 300 NGOs registered with CCA-ONG, 94 of which work with some aspect of natural resource management (Annex 4). They are most active in the 5th region of Mali around Mopti. He stated that the objective of CCA-ONG is to help NGOs coordinate and collaborate with:

- Government agencies
- Each other
- With the local populations

The actions of CCA-ONG include training for NGO staff, dissemination of technical information and pilot projects. Dembele commented that the NGOs in Mali frequently need technical help.

"They are well motivated, but frequently lack technical expertise," he said.

Dembele indicated that a watershed approach could be useful as a testing and demonstration site for both NGOs and local populations to learn about new technologies. He suggested that local NGOs be included in the choice of the watershed. Because they are in close contact with the communities, NGO staff can contribute to the social and cultural knowledge about the site.

4.10 ORSTOM Mali

ORSTOM, Institut Français de Recherche Scientifique pour le Développement en Coopération, was begun in 1947 and has over 1,500 researchers working in a wide range of areas throughout the region. There are 24 expatriates in the Mali installation who do work in fisheries, vermin damage to crops, hydrology of the Niger River basin (soil erosion, water quality, etc.), and land fallowing. ORSTOM has a very large training function. It works collaboratively with local governmental organizations and ministries (IER, CNRST, ISFRA, Hydrology, Forestry, etc.).

ORSTOM has a regional (francophone) West African electronic network that is gatewayed to the Internet. There have been discussions in the past with representatives from ORSTOM and RIO, the computer network, about collaboration in expanding connectivity in West Africa. USAID has debated whether the network was appropriate to USAID's needs in the region, whether the French would be in the region for the "long haul", and whether a collaborative agreement could be negotiated that was appropriate for both institutions and those using the network. The InterCRSP team met with a representative from the Bamako installation as part of the strategic assessment trip.

ORSTOM is in West Africa for the long haul since scientific research in the region is linked to France's foreign policy. ORSTOM is interested in collaborative arrangements with other organizations working in the region on development-related issues. At this time, there are some 15 organizations who have collaborative agreements with ORSTOM/RIO and who make use of the research network and Internet access for transmitting data/information and messaging throughout the region.

4.11 ICRISAT Mali

On 18 July, the team met with Dr. Kofi Debrah, ICRISAT representative in Mali, and Dr. Ranajit Bandyopadhyay, an ICRISAT plant pathologist visiting from India, at the ICRISAT Mali center outside of Bamako. Debrah explained the reorganization of ICRISAT and its consequences for natural resource management research. Worldwide ICRISAT is now organized in 23 projects, most of which are represented in Mali. There are four integrated systems projects, sixteen projects focusing on improvement of a single commodity, two projects on economic issues and a genetic resources project.

ICRISAT Mali scientists participate in two integrated system projects:

- ISP2 - Strategies for enhanced and sustainable productivity in short or intermediate season (100-125 days, Northern Sudanian Zone) rainfed millet/sorghum/legume based production systems.
- ISP3 - Strategies for enhanced and sustainable productivity in short or intermediate season (90-150 days, mainly the Southern Sudanian Zone) rainfed production systems.

Both projects focus on characterization of the environment, development of improved management strategies and improved land use systems which are more productive and sustainable than existing systems. The ISP2 project is specially concerned with sorghum and peanut based systems on sandy soils. Project design is intended to promote collaborative research between IARCs, NGOs, and NARSs. Debrah is team leader for ISP3.

Debrah stated that the proposed InterCRSP natural resource management effort fits well with the objectives and activities of ICRISAT's integrated systems projects. He said that it would be easy for ICRISAT scientists to collaborate in InterCRSP natural resource management activities or for scientists involved in the InterCRSP activities to collaborate with ICRISAT.

One concern was raised regarding the date of the proposed workshop in Niamey. The week of Sept. 18-22 is planned for the Sorghum Network meeting in Bobo-Dioulasso.

4.12 Africare Mali

Three members of the team visited the U.S. NGO Africare on July 19. They spoke with Mr. Yerefolo Male, projects coordinator for Africare Mali. He said that their primary involvement with natural resource management has been a flood plain project which initially was to focus on reforestation, but has shifted to other activities because of institutional problems in moving forest management from the Forestry and Water (Eaux et Forêts) officials to the local population. This project is implemented with the Dutch development agency, SNV, and two Malian NGOs. The other activities include:

- Promotion of artisanal and other small scale activities which do not depend on forest raw materials
- Diking and improvement of water control for rice paddies
- Creation of village tree nurseries including fruit trees
- Dune stabilization with trees
- Well digging to provide potable water

Male said that farmers are often so preoccupied with short term problems, that they do not see long term natural resource management as a priority. He said that a project must help them solve some short term problems (e.g. wells for clean water) before they can pay attention to natural resource management.

The first phase of this project has ended. A second phase is planned. The second phase will continue many of the activities of the first phase, but will include an enlarged dryland cropping component. Dryland cropping, especially introduction of nitrogen fixing legumes, was planned in the first phase, but not implemented because of lack of technical expertise in the area. Male expressed the general need for technical help in agriculture.

5. BURKINA FASO

The team held discussions with a selected range of institutions and individuals in Burkina Faso. The major findings and conclusions of our meetings with NRM stakeholders in Burkina Faso are as given below.

5.1 University of Ouagadougou

The team met Dr. Ambroise Zagre, Vice Recteur, and exchanged views on NRM and regional cooperation. The university's mission addresses teaching, research, and development. In this context, the university is interested in promoting regional cooperation and actively participating in such an effort. The university accepts and has a number of students from other West African countries, such as Niger and Chad. Since NRM is the core of Burkina Faso's development, the university has interest in being an active partner and, therefore, is prepared to collaborate in this regional initiative.

5.2 Peanut CRSP

We met with Dr. Philippe Sankara, plant pathologist, and Dr. Patoine Ouadrigo, entomologist, who are active collaborators in the Peanut CRSP activities in Burkina. The Peanut CRSP has a comprehensive country program in Burkina Faso and covers crop improvement, entomology, and food technology. Since the active Peanut CRSP collaborators are from the university, it was suggested that more effort should be made to attract more INERA scientists into the collaborative activities.

5.3 INERA

Our meeting in INERA (Institut d'Etudes et de Recherches Agricoles) was attended by five administrators and researchers of the institute. They were Victor Hien (representing DG, Dr. Paco Sereme who was traveling abroad), François Lompo, Sebastien Boro, Souliyman Ouadrigo, and Clementine Dabire. A major USAID financed FSR program has just been completed and the findings published under the title Integrated Research in Agricultural Production and Natural Resource Management: ARTS Project Technical Report (1994). The report is thorough and comprehensive and covers a wide range of topics and results in NRM - Soil and Water Conservation, Cropping Systems, Integration of Livestock and Crop Production, Agroforestry, Research Extension Issues, Agricultural Policy and Land Tenure, and Baseline Socio-economic Studies with several papers under each sub-theme. This NRM initiative serves as a logical follow-up and continuation of the accumulated work on INERA's past FSR work. In this continuing activity, the active participation of INERA is crucial. INERA has an excellent capacity, both human and physical, to engage in NRM TDT. INERA is actively involved with the national extension program in NRM technology transfer and continuing training of extension personnel. The FSR program has been designated as the liaison for research and extension.

The INERA staff brought up the issue of the regional coordination mechanism and how Burkina Faso, INERA in particular, fits into the mechanism. It has been mentioned elsewhere in this report that Burkina Faso has been designated as the "pole" for NRM research, and this apparently is how INERA perceives the issue. However, as mentioned earlier, the "pole" concept has not been fully accepted and has yet to be implemented. We also were informed that INERA has been chosen to coordinate the Desert Margin Initiative. A good regional discussion in the September Niamey workshop is essential to develop a regionally acceptable coordinating mechanism. As emphasized by INERA, duplication in coordination could hamper the progress of the regional NRM program.

5.4 SANREM

Dr. Laurent Millogo, SANREM's Burkina Faso coordinator, gave us an overview of the CRSP in the country. According to him, so far SANREM has been active in identifying stakeholders and collaborators and has not yet started actual field work. The watershed, Donsin, where SANREM will be conducting most of its field work has also been identified and decided. Some NRM related project titles, which reportedly are likely to be funded by SANREM, deal with small ruminant management and NRM, cultural practices for sustainable soil fertility, and impact of sustainable agriculture and NRM on human nutrition. INERA and the University of Ouagadougou will be the main local collaborating institutions in many of SANREM's proposed projects.

5.5 American Embassy/Burkina Faso

The team met Ms. J. Cheema, USAID Burkina Faso Mission Director, who is being transferred and who just finalized the details of closing down the USAID Mission in Burkina Faso within a month. We also met Ambassador Donald McConnell and some of his staff and exchanged views on the interCRSP initiative. In view of the USAID Burkina Mission closing, the possibility of initiating an interCRSP NRM regional activity in which Burkina Faso will be involved was appreciated and welcomed by the Ambassador.

5.6 CILSS

The team held a meeting with two officials of CILSS (Comité Inter-Etats de Lutte contre la Sécheresse dans le Sahel), Mr. Bana Ide and Mr. Sanoussi Fofana, in the headquarter offices in Ouagadougou. CILSS has now been in existence for over two decades and has a wealth of accumulated experience and knowledge on the Sudano-Sahelien zone of West Africa. The nine member countries of the CILSS are Burkina Faso, Cape Verde, Chad, Gambia, Guinea Bissau, Mali, Mauritania, Niger, and Senegal. CILSS expressed strong support for the participation of its specialized institute, INSAH, in the interCRSP regional initiative. Since the theme considered as the core for the regional cooperation, NRM, is one of the high priority areas for CILSS, it is very much interested in seeing its further development and implementation. The CILSS officials emphasized that special attention should be given to NRM technology transfer. They also stressed that, as the initiative develops further, more countries than the three visited by the assessment team should be included as full partners.

5.7 CNRST

Our meeting at CNRST (Centre National de Recherche Scientifique et Technologique) was with Dr. Adolph Kere (Secretary General), representing the DG Dr. Michele Sidogo who was traveling, Dr. Roger Zangré, Director of Cooperation, Dr. Sie Palm, Director of International Cooperation, and Dr. Philippe Sankara, Scientific Director of CNRST. François Lompo, Victor Hien, and Souliman Ouadrigo participated representing INERA. Several national institutes come under the coordination of CNRST, one of which is INERA, which deal with agriculture, forestry, and the environment. Dr. Kere highlighted that NRM is ranked high in priority in the national strategic plan and, therefore, the center will support initiatives that will strengthen NRM in Burkina Faso, as well as in the entire CILSS region.

5.8 SAFGRAD

We visited the SAFGRAD Ouagadougou office and met with Dr. Taye Pezuneh, Director, Dr. N. Muleba, and Dr. J. Ouadrigo. SAFGRAD, as a unit of OAU/STRC, has over 15 years of service covering some 25 countries in sub-Saharan Africa. It has been covering research and development in food grains including NRM related activities. Over the years, SAFGRAD has received multi-donor support with USAID providing the bulk of the funds. With no USAID funds now,

SAFGRAD continues to operate primarily with OAU and ADB funding. Capitalizing on its past work, SAFGRAD continues to function regionally focusing on NRM, accelerating food grains production, and promoting technology transfer. SAFGRAD may transform into a research coordination agency and serve as an advocate for regional cooperation in food production research under the OAU umbrella. It would be important and advisable for this regional interCRSP NRM initiative to coordinate well with SAFGRAD and its future directions.

6. REGIONAL ISSUES

The following sections cover themes and issues which are cross-cutting and have regional relevance. There are sub-themes which are presented and discussed below.

6.1 Themes for InterCRSPing

For over a decade, several CRSPs have been working effectively with their collaborating NARSS in the West Africa region in their specific mandate areas. Those specific activities of the individual CRSPs are the building blocks for an effective interCRSPing initiative. Hence, those specialized activities of the participating CRSPs must continue. At the same time, opportunities for complementarity and synergies among the CRSPs, as well as other stakeholders, must be created and exploited. The interCRSPing initiative provides such opportunity and illustrative themes for interCRSPing, though not exhaustive, are given below:

Integrated NRM: Effectively integrated NRM requires the participation of a range of complementary disciplines and activities including crop genetic resources, agroforestry, land rejuvenation, water harvesting and conservation, erosion control, etc.

Improved Integrated Crop Production Technology: This theme is a critical prerequisite to a successful and effective NRM implementation on a national or regional basis. With an improved and integrated crop production technology, it is possible to produce more food with less land, which should lead to reduced use of marginal lands which, in fact, are often subjected to misuse and rapid degradation.

Soil and Water Management: The participation of several disciplines and CRSPs, in an integrated program, should improve soil and water management technologies across the region.

Integrated Nutrient Management: The soils of the region are fragile and low in major nutrient elements, such as N and P. These could be improved through integrated crop, soil, water, land management, and related practices through interCRSPing.

Integrated Watershed Management: The rationale and desirability of using an agricultural watershed, as a unit for improving NRM, is discussed elsewhere in this report. The watershed management approach mobilizes the expertise of multiple CRSPs and disciplines to improve the productivity and sustainability of the watershed. Lessons learned there could be extended to similar watersheds in similar ecologies.

Integrated Pest Management: In the various ecological zones, pests (insects, diseases, and weeds) account for a significant amount of losses of crop harvests. IPM approaches, which would involve several CRSPs and disciplines, would minimize such losses and contribute to improved NRM practices.

Post Harvest Processing and Utilization: Improved processing and utilization of the important crops of the region, sorghum, millet, maize, cowpea, etc., can improve consumer acceptance of the crops and lead to value-added products. Collaborative activities under this theme should encourage the different CRSPs to work together.

Joint Workshops and Training Sessions: Over the years, the different CRSPs have been running their individual workshops and training sessions in the region, some of which may have to continue. Multi-CRSP workshops and training sessions would be an important mechanism for promoting and cementing the interCRSP model.

Technology Transfer: Technologies generated through the CRSPs, as well as technologies from other sources, are most useful to end-users if they are promoted as components of an appropriate package. Each CRSP can contribute to the package and be involved through the partner NARSSs in promoting the transfer of the package. Involvement in monitoring the adoption of the package should assist the CRSPs to continuously assess whether the technologies they are generating are appropriate to end-users or not.

Promotion of Multi-Institutional Linkages: Close collaboration and strong linkages among the CRSPs, IARCs, NARSSs, and the national extension systems are necessary for a good NRM program, as well as the overall national and regional research and extension systems. An effective and functional interCRSPing program could be a powerful mechanism for promoting the multi-institutional and organizational linkages.

Strengthening Institutions: Over the years, the CRSPs, individually, have contributed significantly in strengthening the NARSSs of the region, particularly in human capital building, and this should continue. The CRSPs can collaborate more in joint training and putting more effort into strengthening regional institutions and networks.

The themes listed above, for interCRSPing, are only illustrative and should be expanded or modified based on the collective judgements of the partner CRSPs. Based on the discussions with a wide range of stakeholders, the strategy assessment team is convinced that the time for initiating interCRSPing across a range of themes in West Africa is now.

6.2 Criteria for Watershed Selection

The strategy assessment team recommends that the watershed management model underway as the three CRSPs interCRSP NRM activity in Niger, at the Hamdallaye site, be extended to other participating West African countries. In choosing the site for watershed-based NRM project, the following criteria should be considered:

- a. The study site, preferably, should be located within a relatively small agricultural watershed with definable boundaries. It is desirable to have the presence of toposequence which will help to define the watershed as a level of resolution that makes both ecological and economic sense.
- b. Soils on arable lands should be representative of the region.
- c. Crops and cropping systems should be representative of the region so that the results could be extended to other similar areas in the ecology.
- d. Natural vegetation on the common grazing lands in the watershed may be in varied degree of degradation (depending upon grazing pressure and fire wood collection).
- e. The site has an active farming community to which new technologies and innovations can be introduced and, in turn, the community can participate in the formulation, generation, and implementation of technologies.
- f. The site has potential to develop village-level processing and utilization industries so that value-added end products could contribute to the economic and nutritional well-being of the community.
- g. The site should be reasonably accessible to major roads and be convenient as a site for demonstration and diffusion of improved technologies and innovations.
- h. The site should be within a reasonable distance to national research and extension centers so that researchers and extension workers can be involved in the watershed management activities regularly and continuously.
- i. Availability of agronomic and socio-economic information from previous studies is preferable, but not essential.
- j. The site should be one where all the participating CRSPs would be able to carry out meaningful work.

6.3 Socio-Economic Constraints to Adoption

Farmers adopt new technology only if it makes them better off. A new technology may conserve natural resources and it may even improve physical productivity without improving the well-being of farmers. Socio-economic research has identified several inter-related factors which may prevent or delay adoption:

Profitability: Do benefits from the new technology cover all costs, including the costs of family resources like land and labor? Family resources have opportunity costs because they can usually be employed in several activities. The opportunity cost is the gain sacrificed by using a given resource in the new technology instead of the best alternative. Profitability is essential for voluntary adoption.

Timing of Benefits: Research at INRAN and INERA indicates that West African farmers place great importance on having benefits quickly. These farmers often live at a subsistence level and cannot afford to invest in technologies that require 5 or 10 years to bear the first fruit. They must survive in the short-term. Natural resource management technologies which have first year benefits such as rock bunds are much more likely to be adopted than those which require several years before benefits are noticeable.

Farmers' Participation in TDT: Constraint to adoption can be alleviated when farmers (customers, end-users) are involved in the technology development process from the very beginning of TDT. Farmers would be more familiar with the technology that is finally made ready for dissemination and can/do become advocates to fellow farmers.

Resource Availability: Can the farmer implement the new technology with available land, labor, capital and other resources? Resource availability is closely linked to profitability because scarce resources usually have high prices or high opportunity costs.

Land Tenure and Other Resource Institutions: Local institutions and customs often govern how resources may be used and by whom. For example, INERA research has shown, that in some areas, permanent resource management efforts (i.e., planting trees, building rock bunds) are discouraged on rented or borrowed land because they give the tenant a claim to ownership. Similarly, there are often customs limiting involvement of women in certain farm activities (i.e., weeding in Western Niger).

Risk: Research indicates that most West African farmers are risk averse. That is, they would prefer to avoid low value outcomes even if that means giving up some potential for large gains. Risk bearing capacity is closely related to resource availability. Low resource farmers have little to cushion the blow of a crop failure or animal death loss.

Marketing: Can production beyond the needs of the farm family be sold at a profitable price? Biological scientists sometimes measure the health of a system in terms of biomass production, but, for the farmers, biomass has value only if it can be turned into usable or marketable products (i.e., herbaceous biomass consumed by animals and converted to meat and milk, or ligneous biomass used as firewood). Price levels often depend on market institutions and infrastructure. If transactions and transportation cost are high, farmgate prices will be low.

Adoption Cost: The most important adoption cost, for most West African farmers, is the cost of information about performance of the new technology. How can they know that the new technology will be reliably more productive than their time tested traditional techniques? For natural resource management technology, adoption cost is related to the timing of benefits. For technologies that have mainly long-term benefits, it may be necessary for the farmer to have several years of experience with the technology before it is possible to determine if benefits exceed cost.

6.4 CRSPs Role in Accelerating Technology Transfer

Technology adoption can be accelerated by reducing those factors which would prevent or delay adoption. The CRSPs are most likely to affect adoption through:

- a. Development of technologies which fit farm conditions.
- b. Reducing information cost to extension agencies and farmers.

The CRSPs are not development agencies. They do not have the human or financial resources to tackle major resource or infrastructure issues. They cannot create credit programs to overcome capital constraints or build roads to reduce transportation cost.

The CRSPs can incorporate knowledge of farming-level constraints in the technology development process. They can propose only technologies which:

- Cover all costs
- Provide early (preferably first year) benefits
- Are feasible with available land, labor, and capital
- Do not increase risk and potentially stabilize returns
- Yield marketable products

The CRSPs can help lower information costs to farmers and extension agencies through demonstrations, field days, workshops, and publications. In this context, extension agencies would include both government extension services and NGOs. The extension agencies are a crucial link in this process because the CRSPs do not have the resources to transmit information to broad groups of farmers. Lowering the cost of information to extension agencies effectively lowers the cost of this information to the farmer.

6.5 Human Resource Capacity And The NRM West Africa InterCRSP Activity

The Natural Resource Management InterCRSP activity in West Africa presents development practitioners with a unique opportunity to leverage past investments in the region. It can also be the forum for planning, implementing, monitoring and assessing the impact of USAID's "re-engineered" approach to sustainable development. After the July strategic assessment trip to Niger, Mali and Burkina Faso, it was clear that there exists a tremendous amount of latent potential that can be leveraged to support sustainable development in NRM. The potential that exists is a result of many years of investment in institutions, people, and processes. However, like so much previous work in development, the investments were often made without full regard for the whole "system" of Technology Development and Transfer (TDT). The result has been a less-than-optimal TDT situation. While some aspects of the existing scenario seems to function well, other parts operate suboptimally, sometimes severely so.

The driving objective of the InterCRSP activity is to unleash that pent-up or latent potential, leverage past investments, and carefully move in a "re-engineered" manner toward a measurably more optimal system of NRM Technology Development and Transfer. An enabling environment must be established for this to occur, one which focuses on the TDT end user (customer) as part of the team of stakeholders seeking to empower people and institutions to achieve demonstrably sustainable results. It was clear from the country visits that an erstwhile "independent" set of investments can be encouraged to function "interdependently" in a coordinated, collaborative and participatory manner and that this will result in releasing a tremendous amount of latent sustainable development energy in the West African region.

Human and institutional capacity development go hand in hand. Their effect on sustainable development is, in turn, closely linked to the whole "system" environment which is either an enabling one, a constraining one, or, more likely, a set of sub-systems, some of which promote while others restrain the entire system. Unless and until a holistic or systems approach is used, the InterCRSP effort risks being planned, achieved and judged in a sub-optimal way. The existing "disconnects" in this systems overview are serious. They can be overcome.

A key element in the InterCRSP activity is identifying those "disconnects" and fixing them. A great deal of time, effort and resources have already been invested in human and institutional capacity development in West African NRM and agriculture. Many of these people and institutions represent the latent or potential development energy referred to above. The investments made to date can be greatly leveraged through a well planned and coordinated training, information and communication effort. This effort must be closely married to a widespread change in the TDT

process, one which places the end-user or customer solidly and continuously as a necessary team-mate along with the other stakeholders in the TDT process.

If one were to prioritize key constraints to achieving an optimally operating TDT system in the region, lack of technical capacity would not be at the very top of the list. Neither would the absence of developed technologies rank highest on such a list. Here the issue is whether the technologies already developed, those "low hanging fruit" referred to in the InterCRSP proposal, will prove to be appropriate for transfer if they were developed with little or no end-user involvement. It is questionable whether technologies on the shelf can be assessed as "transferable" without customer involvement in the TDT process. It is hoped that intimate researcher knowledge of end-user needs, preferences and constraints will carry the day in identifying those "low hanging fruit" in the short term while the entire TDT process is adjusted to include them throughout as a longer term objective. The assessment team was struck with the obvious pay-off of earlier investments in technical training and institutional support. There are many research institutions operating in the region that are staffed by qualified and motivated technicians thanks to USAID's pest programs.

Based on the team's observations and conversations, high on the priority list of constraints to a more optimal TDT system are the following:

- a. *Technology end-users/customers are not included in the entire TDT process* (development through transfer, needs assessment through research and into testing, transfer and redesign) on a more wide-spread basis in the region.

There was striking contrast within countries and between countries concerning this constraint. There are lessons learned in the region that must be gathered, assessed and adapted/employed on a wider basis. Elsewhere in this report see reference to how Mali has begun including farmers as team mates in the TDT process. Also see reference to Africare/Niger's recent total re-engineering to decentralize and incorporate farmers as team mates throughout the TDT system. It is observed that the up front investment needed to include end-users in technology development reaps benefits during (so-called) technology transfer. A systems approach, as is used in Mali and by Africare/NIGER is actually an iterative and ongoing process of technology development and transfer in which development and transfer are integral to each other. End-users simply can't just be thought of at some end-point in technology development when it is "time to transfer". The TDT process proves to be more organic than linear.

- b. *Less than effective collaboration and coordination* among researchers, extension technicians and end-users at a national and regional level.

This is a serious institutional constraint since the research community is, by and large, separated from the extension community. Researchers are also often separated from end-users as noted above. The result is that the large investment in technical training and education, especially in the research community, is often latent rather than kinetic energy for sustainable development. As is noted in one background report, both researchers and extension agents recognize that the information prepared by research for use by extension is too complex or difficult for the extension people. It was also noted during several interviews that extension staff receive technical training in NRM and/or agriculture but no (or little) training in communication, use of information, technology transfer, human psychology/sociology, and the like.

- c. *Lack of regular, timely communication* among researchers within a country, across the region and between the region and other parts of the world (e.g., the US, Canada, Europe).

Several background documents on the region note the technical isolation of the scientific community once they return home from their training/education. They are constrained from keeping pace with their field and with their colleagues. They are basically cut off from information and communication resources they became used to, especially if they did their training in an industrialized country like the US.

- d. *Lack of access to information* when needed, whether of a "hard science" nature or about the social dimensions of TDT and sustainable development.

There is often information extant about technical matters and/or lessons learned from attempts made to enable more optimal TDT in sustainable development. But most people in West Africa don't have access to it. This is not a "training" issue but an access issue (see next point).

- e. *Inability to get training* about a topic or issue when needed and in the format required (Just-in-Time or Just-Enough Training).

This constraint is exacerbated by the lack of information and communication issues raised in the two points directly above. This type of training is often referred to as "sharpening the saw" and is important as a way to leverage investments in previous training and education. Included in this category of constraint is the need for "field skills" training of technical researchers and extension staff in areas such as: customer focus and participatory processes; teams and teaming; systems thinking and operations; leadership, empowerment/accountability and management; group process; needs assessment; and results monitoring and evaluation. Training in these areas is also critical in the first point mentioned above.

- f. *NGOs have said they lack the technical expertise* needed in some areas to be effective players in the TDT process.

In most respects, this constraint is linked to point #5 above but is directly related to the NGO community. Often the solution is seen as sending experts to provide technical backstopping. While this may be needed in the short term, the sustainable development solution involves skill and capacity building in the in-country NGO community. Since this community plays such an important role among stakeholders in the TDT process, this constraint is listed as a separate one and lends itself to training and education.

Summary: The highest priority issues in human resource capacity are related to: end-user (customer) involvement throughout the TDT process, creating an institutional system that encourages and allows true interdependence among research and extension staff, access to effective and timely communications and information among the various key stakeholders in the TDT process, and technical support through "Just in Time/Just Enough" training for various members of the TDT team.

6.6 Communication and Information Technology and the NRM West Africa InterCRSP Activity

"Efficient communications is the foundation of the Africa Bureau's efforts to promote the use of information for policy development and decision-making in Africa. Support for low cost electronic networking is one way to share information and expertise more widely than is possible using conventional telephone and fax communications. The relative cost-effectiveness of electronic networking is well documented. In Africa, for example, a one page E-mail costs about \$1 to transmit, a one page fax about \$10, and a five minute phone call up to \$25. Electronic networking can help African Countries respond to, and participate more effectively in a rapidly changing global economy that is increasingly driven by the free flow of information and ideas. Without the expertise and communications infrastructure to circulate information rapidly, Africa will be further disadvantaged."(1)

Development and use of technology is a complex issue in societies. International development practitioners spend a great deal of time, money and energy developing technology and talking about developing it. Technology is a tool that serves users in response to a problem, issue or opportunity. The technology, then, is not the driving force for an effort or activity but rather the facilitator. In looking at technologies to solve problems or take advantage of opportunities, one must consider whether a technology is affordable, maintainable and appropriate from perspectives such as culture, politics, and society. Determining whether there's a good match between the problem, the technology and the people or institutions who are the intended "end users" is as critical as the technology itself.

A "systems approach" that looks holistically at a situation is important to the sustainable success of any communication or information activity.

Care must be taken in rushing headlong or too rapidly in declaring computer-based information technology as "the" solution. There are many computers gathering dust in many offices in many countries. We realize that it's not technology alone that ever solves a problem or gives someone a chance to take advantage of an opportunity--but a carefully matched balance of people, process and technology that "works" most effectively and is ultimately sustainable.

With this caveat, there is definitely a place in West Africa for well-planned, implemented and supported efforts to bring the information highway to the continent. The lack of modern communications situated in a system of human and institutional capacity and an "enabling" policy and regulatory environment is a critical constraining factor that risks putting already impoverished areas of the world even more deeply into poverty. Information is the "new currency". Much of the African continent is dreadfully poor in it. Countries risk not being able to purchase a hold on the global economy without it. Information and communication technology nested in a private sector environment, supported by policies, regulations, skilled men and women and capable institutions is a winning combination for Africa.

The InterCRSP proposal has two overlapping and interdependent objectives. First is to strengthen the institutional and human capacity to develop and transfer natural resource management technology and information. Second is to increase the availability of and access to profitable and sustainable NRM technology in West Africa. An indicator that improved information transfer and communication play a critical role in achieving these objectives is easily seen in the actions needed to do so: coordinate, integrate, exchange, transfer, link, strengthen (2). Information and communication technology can assist the InterCRSP effort turn these verbs into indicators of results when they are stated, in some future time, in the past tense.

Intended actions can become phrases in a results framework such as:

- Technologies transferred and exchanged
- West African Scientists linked with each other and with the international scientific community
- Information exchanged among scientists and other development agents
- Agriculture and natural resource management TDT efforts integrated in National and Regional strategies
- NRM TDT coordinated in West Africa

The contribution of a well coordinated effort to help West African stakeholders and customers move deliberately onto the information highway is tied closely to building the human and institutional infrastructure necessary to support regionally sustainable NRM technology development and transfer.

Lower-end Technologies: Existing technologies are often still appropriate to supporting the human and institutional infrastructure. They should not be forgotten as efforts are undertaken to improve communications and information flow in the region. Phones and faxes are important and don't consistently work well in the region. They are often constraints to rather than supporters of effective communication. Motor-scooters or bicycles are still critical to getting around to communicate with a group of farmers or business women. They are often in short supply. The need for these and other communication and information tools doesn't disappear just because there is suddenly an Internet node operating in Niamey!

E-mail: Rapid and measurable results in solving identified problems can be achieved through reliable applications such as computer-mediated communication (E-mail, electronic conferencing) and training (Just-in-Time and Just-Enough). Five of the six constraints identified by the team and noted in the section of this report, "Human Resource Capacity", could be greatly mitigated through adequate yet simple "higher-end" technology such as E-mail. Reliable E-mail can help end isolation, obtain information, coordinate, collaborate and learn what's needed when it's needed. As the February 10, 1995 "AFRICALINK" report points out, the benefits will substantially exceed the costs of establishing E-mail service in Africa.

WorldNet: The USIS's satellite-based WorldNet system already operates in many of the region's countries. It can and should be used immediately since it doesn't rely on E-mail. If the InterCRSP activity identifies training needs among various stakeholders that lend themselves to video and audio training situations, WorldNet could play an important role. Whether the system becomes a permanent technology for distance learning will depend on the fate of USIS as an agency. One can only hope that the existence of this valuable technology will be recognized and used in any future configuration of foreign assistance.

Periodic, regular training sessions for the region can easily be designed using WorldNet. For example, technicians at the various research or extension institutions can gather at the USIS facility in their capital cities. Expert trainers/teachers from collaborating Universities or Government Agencies in the US can be inexpensively brought to the USIS studio in Washington, DC rather than flying them to countries in West Africa. They would present the training module which is sent by satellite and immediately viewed by those gathered at the facilities in West Africa. While these

sessions are one-way video to the countries, there is two-way audio connection established using dedicated telephone lines so question and answer sessions and/or discussions can be carried on among all the connected sites in real time. Real time interaction among connected locations is sometimes called "synchronous" communications. When communication or interaction happens at different times, such as when an E-mail is sent on one day and read by the receiver at some later time, this is called "asynchronous" communication. The concepts are relevant here because training that depends on asynchronous communication is designed differently than learning situations that happen in real time. Both can be highly and effectively "interactive". When pre-recorded video or audio is involved, the learning situation must be designed to include on-site facilitators/trainers, an E-mail or phone hook up, or some "correspondence" teaching in order to be interactive.

WorldNet could also be used with video taped training for those situations where the trainer can't come to the Washington studio.

Such sessions would be less "interactive" unless local resource people were "trained up" to provide on site discussion and answer trainee questions or refer them on to other experts. E-mail would greatly improve and facilitate such distance interaction. Meanwhile, a training program that included training of local facilitators could be designed and implemented to take advantage of the WorldNet facilities in the region.

It appears such facilities are most appropriate for NRM technical cadre. However, there is every reason to design programs that are appropriate for others such as farmers, input suppliers, and others ultimately responsible for sustaining any NRM and agricultural efforts. Farmers can be brought as easily to USIS in Niamey as can research technicians or extension agents.

Kiosks:

There are successful examples in the US of computer mail stations called "kiosks" that are accessed in public places by individuals and groups who do not own the hardware and software. The concept could be piloted at key points in rural areas in West Africa. These kiosks could become centers for farmers and extension agents to pose questions to experts in national or international fora or to facilitators who could find answers. Input suppliers and others who play marketing functions would be able to get critical information. Key sites for such installations might be in regional extension or farmer organization offices, NGO field locations and so on, depending on existing supporting infrastructure like electricity and phone lines.

National Television:

In at least one country visited by the team, Niger, there is reason to investigate whether national television facilities have what appears to be excess capacity that could be put to use for learning and information transfer. Television could be used effectively in distance learning as well as in information dissemination efforts in Niger. As with all technologies, there would have to be an appropriate "match" between the medium, the message and the audience or client. Perhaps video taped regular programs could be designed for extension agents and/or researchers who could be brought to a TV access point more cheaply than they could be brought to, say, Niamey. Combining TV with capable on-site trainers can make this an effective learning technology.

Summary:

Communication and information technology can play a critical role in the NRM West Africa InterCRSP Technology Development and Transfer effort. Using an information systems approach, learning, communication and information needs in the region are determined. Intended audiences, existence of and access to the various communication and information technologies and any constraints to establishing a process for people to use both the info/com and the NRM technologies are assessed. The InterCRSP team investigated this issue during their recent trip. Additional input to a coherent communication and information technology workplan is expected to emerge from the planned September 1995 workshop in Niamey.

ENDNOTES

- (1) AFRICALINK, Final Report & Recommendations, Draft. Jake Brunner, World Resources Institute, Washington, DC. February 10, 1995.
- (2) Project Proposal for NRM InterCRSP in West Africa, Draft. Submitted by IPM CRSP/OIRD, Virginia Tech. Section 5, "Objectives and Conditions". April 28, 1995.

7. ORGANIZATIONAL STRUCTURE FOR INTERCRSPING

7.1 Needs and Objectives of InterCRSP Coordination

The proper coordination of the different CRSP activities in West Africa is essential for the success of the interCRSP initiative. Currently, no formal coordination mechanisms of these activities exist. In the past, the CRSPs have been operating fairly independently in West Africa without adequate coordination among them.

For the interCRSP activities to be efficient, it will be of prime importance to devise a simple and suitable mechanism for their coordination, with the following objectives:

- Establish and/or improve interCRSPs joint activities.
- Strengthen collaborative inter-institutional research in partnership between the CRSPs and the NARSSs, as well as regional and international programs which focus on natural resources management.
- Ensure coherence between interCRSP NRM activities and other natural resources management research activities and initiatives by avoiding duplications and presenting complementarities and synergies.

Two basic principles should underline the interCRSP coordination mechanism. They should be:

- Kept light and simple.
- Built on existing national and regional coordination mechanisms for research in natural resources management. These mechanisms should be strengthened and improved when needed.

7.2 Coordination Mechanism

Based on the above objectives and principles, a coordination mechanism, which is shown in Figure 1, is proposed.

7.3 National InterCRSP Committee

At the national level, an interCRSP committee should be formed and a lead CRSP should be designated to serve as facilitator for the national interCRSP coordination. The lead CRSP shall be designated by the host country scientists of the CRSPs functioning in the country.

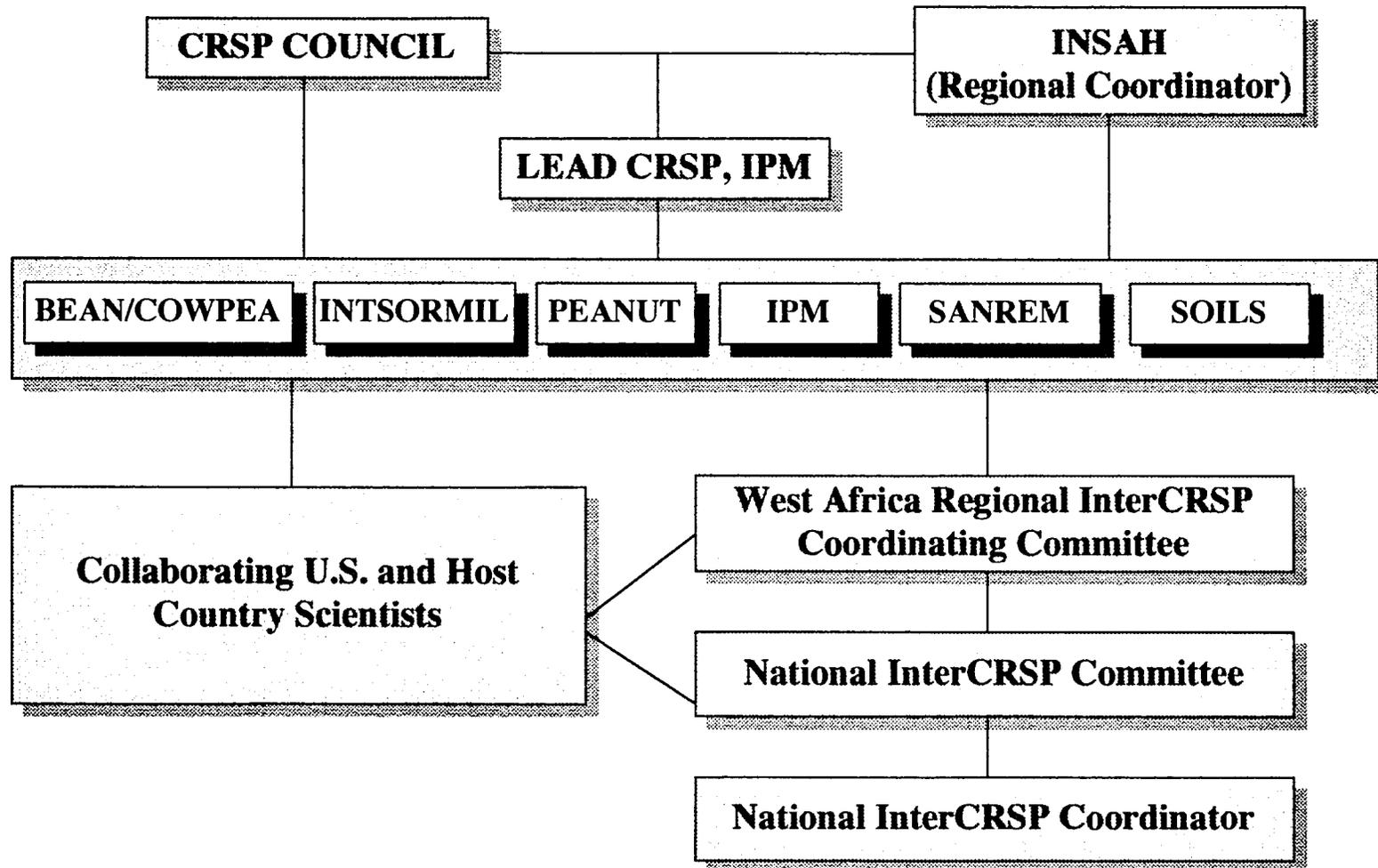
The members of the national interCRSP committee shall be all host country CRSP coordinators and the US coordinators of the various CRSPs present in the country.

The members of the committee shall meet at least twice a year for planning/programming of activities and discussion of results.

7.4 The National InterCRSP Coordinator

The National InterCRSP Coordinator shall be selected by the members of the National InterCRSP Committee. The Coordinator shall be responsible for promoting and facilitating collaborative TDT activities by the CRSPs operating in the country, as well as strengthening linkages with other organizations which are stakeholders in NRM.

Fig.1. Organizational Structure for InterCRSPing in West Africa



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7.5 Regional InterCRSP Committee

The West Africa Regional InterCRSP Committee shall be composed of all the National InterCRSP Coordinators, the Regional Coordinator from INSAH, and a representative of the IPM CRSP, as the Lead CRSP. The Committee shall be Chaired by the Regional InterCRSP Coordinator. There shall be two annual meetings of the committee, for planning and for discussing results, with the venue rotating among the member countries.

7.6 CRSP Council

The CRSP Council shall be overall responsible for the overall participation of the CRSPs in the interCRSP initiative. The CRSP Council shall be the body responsible for making all agreements with other organizations to initiate interCRSP activities.

7.7 Lead CRSP

The CRSP Council has designated the IPM CRSP, OIRD/Virginia Tech, as the Lead CRSP for coordinating interCRSP activities. The Lead CRSP shall report to the CRSP Council and establish linkages with all the participating CRSPs, INSAH, and the West Africa Regional InterCRSP Committee.

7.8 INSAH (West Africa)

The Institut du Sahel (INSAH) shall be the regional focal point for the regional coordination activities. INSAH shall provide the regional coordinator who shall be the Chair of the Regional InterCRSP Committee. The regional coordinator shall be responsible for effective and working linkages among the national interCRSP committees, as well as maintaining effective linkage with the CRSP Council and the Lead CRSP.

8. CONCLUSIONS AND RECOMMENDATIONS

- 8.1. There is a broad regional and institutional support for the InterCRSP NRM Initiative.
- 8.2. Institutional and human resource capacity in NRM and related areas available in West Africa is substantial.
- 8.3. Strong financial support from donors is essential to coordinate and implement the InterCRSP NRM Initiative in West Africa.
- 8.4. It is recommended that the watershed management model underway as an InterCRSP NRM activity in Niger be extended to the other participating West African countries.
- 8.5. In addition to the watershed approach, the InterCRSP should employ supplementary Technology Development and Transfer methods to reach a wider range of farmers.
- 8.6. As the InterCRSP NRM regional activity continues, it is recommended that Niger be taken as the lead and model country.
- 8.7. Of the three countries visited by the team, only the USAID/Niger Mission had a prepared and well articulated strategic plan in which NRM was identified as a high priority strategic objective.
- 8.8. Both Technology Development and Technology Transfer are important in the regional InterCRSP initiative.
- 8.9. The CRSPs should begin to give high priority to Technology Transfer.
- 8.10. The CRSPs can help lower information costs to farmers and extension agencies through demonstrations, field days, workshops, and publications. In this context, extension agencies would include both government extension services and NGOs.
- 8.11. The stakeholders in NRM TDT are many and diverse - GOs, NGOs, PVOs, ROs, IARCs, CRSPs, etc. - highlighting the importance of having a strong national and regional coordination mechanism.
- 8.12. The highest priority issues in human resource capacity are related to: end-user (customer) involvement throughout the TDT process and creating an institutional system that encourages and allows true interdependence among research and extension staff.
- 8.13. A typical NGO involved in NRM work, Africare Niger, has a broad-based rural rehabilitation and development approach addressing such issues as water development, reforestation, and revegetation of degraded lands, leading to sustainable rural development.
- 8.14. NRM TDT means different things to different stakeholders, emphasizing that the InterCRSP NRM Initiative should identify and concentrate on NRM aspects where the CRSPs and their collaborating NARSSs have comparative advantage.
- 8.15. It is recommended that INSAH serve as the regional coordinating institute and designate the coordinator.

- 8.16. A MOU should be signed between INSAH and the CRSP Council to formalize the InterCRSP coordination.
- 8.17. AGRHYMET can be an important collaborator in this regional NRM interCRSPing effort and the management has expressed interest to be a partner. Within the framework of the CILSS Early Warning System, it develops and distributes satellite products and geo-referenced analyses obtained through the use of a geographic information system (GIS).
- 8.18. Where multiple CRSPs are present in a country, these CRSPs should designate a lead CRSP and its host country coordinator as the interCRSP country coordinator.
- 8.19. The group of CRSP host country coordinators, especially those operating in Mali, emphasized that real operational and financial authorities in interCRSPing should reside in the hands of the cooperating NARSs.
- 8.20. A lead CRSP, the IPM CRSP, should be responsible for the overall coordination of this InterCRSP NRM initiative.
- 8.21. ICRISAT has expressed that the proposed InterCRSP natural resource management effort fits well with the objectives and activities of the integrated systems projects of the institute.
- 8.22. Among the major themes suggested for interCRSPing are integrated NRM, Integrated Crop Production Technology, Nutrient Management, Watershed Management, Pest Management, Technology Transfer, and Institutional Strengthening, etc.
- 8.23. Access to effective and timely communications and information among the various key stakeholders in the TDT process is important. Communication and information technology can play a critical role in the InterCRSP NRM West Africa effort.
- 8.24. The InterCRSP Workshop next September in Niamey, "Technology Development and Transfer to Improve Natural Resource Management", be the forum for:
 - Presenting, reviewing, and assessing the applicability to West Africa of technologies developed by the CRSPs.
 - Evaluating NRM related Technology Transfer issues.
 - Developing coherent communication and information technology workplan.
 - Discussing the Watershed Management Approach as an InterCRSP NRM model to be replicated elsewhere in West Africa.
 - Planning and discussing details of the InterCRSP Regional NRM TDT initiative in West Africa.
- 8.25. If we initiate distance learning using World Net, USIS/Niger urged us to bring the World Net sessions to more than one West African site so we can demonstrate the linking power of the facilities and model their use for distance learning conference and meeting. This could be a powerful communication mechanism for strengthening regional cooperation in NRM and interCRSPing.
- 8.26. Follow-up Assessment
 - This assessment, covering only three West African countries, was only a first step. It is recommended that similar assessments be done in the future in additional West African countries.

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11. LIST OF ACRONYMS

ADB	African Development Bank
AGRHYMET	AGRicoles, HYdrologiques et METéorologiques
APCD	Assistant Peace Corps Director
ARTS	Agricultural Research and Training Support
ASA	American Society of Agronomy
CCA-ONG	Coordinating Committee for Actions of Non-Governmental Organization
CGRN	Cellule de Gestion de Ressources Naturelles
CILSS	Comité Inter-Etats de Lutte contre la Sécheresse dans le Sahel
CNRST	Centre National de Recherche Scientifique et Technologique
CPS	Cellule de Plan Statistics
CRSP	Collaborative Research Support Program
DC	District of Columbia
DG	Director General
DMI	Desert Margins Initiative
EEC	European Economic Commission
FSR	Farming Systems Research
GIS	Geographic Information System
GNRM	Gouré Natural Resources Management
GO	Government Organizations
GRN	Gestion Ressources Naturelles
HERNS	Human and Educational Resources Network Support
IARC	International Agricultural Research Centers
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IER	Institut d'Economie Rurale
IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
INERA	Institut d'Etudes et de Recherches Agricoles
INRAN	Institut National de Agronomiques du Niger
INSAH	Institut du Sahel
INTSORMIL	International Sorghum and Millet CRSP
IPM	Integrated Pest Management
ISC	ICRISAT Sahelien Center
MOU	Memorandum of Understanding
NARS	National Agricultural Research System
NGO	Non-Governmental Organization
NRM	Natural Resources Management
OAU	Organization of African Unity
OAU/STRC	Organization of African Unity/Scientific, Technical, and Research Commission
OIRD	Office of International Research and Development
ORSTOM	Institut français de recherche scientifique pour le développement en coopération
PADRES	Programs for Applied Development Research in the Sahel
PC	Peace Corps
PCV	Peace Corps Volunteer
PDO	Project Development Officer
PGRN	Projet de Gestion des Ressources Naturelles
PNRA	Program National Recherche Agricoles
PNVA	Program National Vulgarization Agricoles
PVO	Private Voluntary Organization

RO	Regional Organization
SAFGRAD	Semi-Arid Food Grains Research and Development
SANREM	Sustainable Agriculture Natural Resource Management
SAT	Semi-Arid Tropics
SOW	Scope of Work
SP/GRN	Systeme de Production/Gestion des Ressources Naturelles
TDT	Technology Development and Transfer
TT	Technology Transfer
UNDP	United Nations Development Program
US	United States
USAID	United States Agency for International Development
USIS	United States Information Services

12. ANNEXES

12.1 PIO/T 683-0261-3-40013, Amendment 1 SCOPE OF WORK (SOW)

Design Activity 2 and 3 for the Inter-CRSP activity in Niger and West Africa

INTRODUCTION

USAID has been involved in natural resource management (NRM) in the agricultural sector through several Collaborative Research Support Programs (CRSPs). Six CRSPs (Bean/Cowpea, IPM, INTSORMIL, Peanut, SANREM, Soil Management) have been active in a number of countries in the West African Region, for over 10 years, addressing the natural resource constraints to crop production and natural resource management. The CRSPs have helped host-country agricultural research programs to increase yields, develop disease and pest resistant varieties, implement sustainable agricultural practices, develop appropriate marketing policies, and increase human and institutional capacities.

Technologies and methodologies developed through CRSP initiatives in Niger and throughout West Africa remain localized in their use and implementation. There is a need for the CRSPs to plan work together within countries and between countries in the region, in order to achieve greater efficiency of operation and transfer of information to meet USAID mission and host country strategic objectives in NRM. This activity is directed at gathering necessary background information and data, establishing a network between US, Nigerien and other West African scientists and institutions, and supporting a groundbreaking workshop on NRM state-of-the-art in West Africa and technology transfer.

Collaboration Background

The six CRSPs have worked and continue to work actively on a wide range of issues related to the sustainability of food production systems and natural resource management in the region with an emphasis on enhancing the quality of life for small scale farmers and their families. In their efforts to collaboratively tackle this broad issue, the six CRSPs have mobilized the technical and institutional expertise available from a large pool of land-grant US universities.

The application of science and technology is essential to mitigate the deteriorating per capita food production realities of the region and improve the natural resource base in a sustainable manner. While there are various technical and economic constraints involved, the six CRSPs collectively are by far the best equipped and experienced consortium to strengthen natural resource management in the region through collaborative research with national and regional African scientists.

Through the involvement of the CRSPs in the region, some of them for over 15 years, both the US universities and the collaborating host countries have accumulated valuable collaborative experiences. The CRSPs are committed to strengthening and promoting interCRSP collaborations. They will continue to cooperate with each other and complement the activities of each other in areas of mutual interest.

Natural Resources Management InterCRSP

An InterCRSP is understood here to be an agreement among the CRSPs that provides access to the collective strengths of the CRSPs and member Universities through a single administrative entity. The NRM InterCRSP program will support natural resource management technology development and transfer in West Africa. The NRM InterCRSP provides a mechanism to coordinate A.I.D. supported relationships with National Agricultural Research Systems (NARSs) and CRSPs working on natural resource management issues in West Africa. It will also facilitate coordination among CRSPs and International Agricultural Research Centers (IARCs).

The rationale for the InterCRSP is that natural resource management constraints cut across individual commodities. Bringing the joint skills and capacity of the CRSPs to bear on natural resources management will help create a critical mass from among existing but separate groups, and improve efficiency. It will also contribute to a more rapid integration of NRM findings and lessons into commodity programs. The InterCRSP agreement will enable Field Missions, NARSs and AFR to coordinate NRM related activities implemented by CRSPs through a single management entity.

Lead CRSP

Consistent with the Memorandum of Understanding and the bylaws, the CRSP Council unanimously designated, on March 22, 1995, the IPM CRSP/OIRD, Virginia Tech to be lead CRSP to implement this initiative. Accordingly, the IPM CRSP will serve as the Management Entity for this program and coordinate the activities of the participating CRSPs. The overall workplan will be collaboratively developed by the partner CRSPs and the collaborating national and regional institutions.

The Specific activities of this SOW are:

1. To field a team to Niger and other West African countries, to catalogue the CRSP outputs and host-country needs, and identify common issues between the CRSPs which would benefit from an interCRSP initiative.
2. To establish a network of scientists, government institutions, NGOs, and private sector for participation in technology transfer workshops.
3. To host a workshop on "Advances in NRM Technology for West Africa". This workshop will serve as a groundbreaking example of the type and method of technology transfer envisioned for future interCRSP initiatives. Participants will define the process and functional organization of the interCRSP linkage with institutions in the US, Niger and throughout West Africa.

The Africa Bureau of USAID intends to provide funding under the PARTS project, for a network among the CRSPs and host-countries to carry out technology transfer of innovations in agriculture relating to natural resource management. The project will be structured to mobilize the U.S. CRSP research establishment to work with agricultural research institutions in Niger and other West African USAID-supported countries, and to coordinate activities with international agricultural research centers. The activities defined by this SOW set the groundwork for establishing a network which is described in this SOW. This initiative will focus on assessment and evaluation of existing structures/institutions and their functional and technical capacities for participation in an integrated technology transfer project. This activity will result in a new design of the organizational structure between the

CRSPs and host-country institutions, to facilitate information flow and use of NRM practices by greater numbers of people.

STATEMENT OF WORK

Purpose of SOW

This Scope of Work defines the responsibilities of the interCRSP design team and the objectives of the workshop. The team will carry out appropriate site visits to Niger, and two other West African host-countries (probably Mali and Burkina Faso) to obtain the information on available and needed NRM-technologies, and identify the institutional participants for the interCRSP network. This interCRSP network will facilitate technology transfer in Niger as well as the Sahelian region of West Africa, beginning with a workshop on NRM technology development and transfer. The workshop will be organized in Niamey, Niger.

Tasks to be accomplished under this SOW

Three CRSPs (Peanuts, Soils and INTSORMIL) have embarked in an integrated effort to address NRM issues within Niger. Although this activity is currently planned for one year, the nature of the problems they address require long-term approaches and solutions. As different CRSPs have been active in different West African countries, there are outputs, technologies and lessons learned within the region which are applicable to Niger. Involvement in regional NRM activities, as envisioned in this SOW, will provide access to needed information and technologies, and facilitate a long-term approach to NRM. In order to establish a network of institutions which functions as a conduit for technology transfer, an assessment must be done of the technologies, methodologies, and institutional and human capacities which are applicable and available to the interCRSP network. The Project Design Team proposed in this SOW is expected to make this assessment. It is anticipated that the activities of this SOW will generate further USAID and host-countries in supporting regional NRM activities.

The Project Design Team

Team Composition

The team is composed of 3 core members including two representing the CRSPs, and a team leader. The IPM CRSP ME will identify the members of the Design Team in consultation with the CRSP Council. A representative from INRAN and from a second host-country (probably Mali) will be full participants during the West African trip.

The purpose and objectives of the CRSP/NARS design team will be to:

1. Visit Niger and two other appropriate West African countries and discuss the concept and content of the NRM interCRSP initiative with stake holders.
2. Facilitate the necessary contacts and involvements of appropriate networks in the NRM interCRSP West African initiative.
3. Confirm the support of USAID missions of the participating host-countries.
4. Identify, in each country, NRM related technologies which are regionally applicable.

5. Develop a West African regional NRM interCRSP project proposal for further discussion and implementation through USAID Africa Bureau support. The Project Proposal for NRM interCRSP in West Africa submitted to USAID Africa Bureau by the IPM CRSP/OIRD, Virginia Tech, can be used as a working paper in developing and finalizing the project proposal.

Objectives of the Workshop

The main objectives of the Fall 1995 workshop will be to:

1. Assess the state of the art of NRM related technologies in West Africa with special focus on application to Niger.
2. Identify appropriate technologies ready for transfer to farmers and other target groups.
3. Lay the groundwork for coordination among the participating CRSPs, NARSs, NGOs and IARCs.
4. Serve as a model and launching pad for interCRSP NRM related activities in West Africa.
5. Establish the functions, organization, subject areas, and future activities of the ongoing interCRSP network in West Africa (considering/modifying proposal of the design team).

Schedule of Events

- | | |
|---------------|--|
| May-June 1995 | <u>Groundwork:</u> Team leader and CRSP representatives will organize information on previous and current CRSP activities within Niger and the West African region. This will include cataloging information on technologies and studies, human and institutional capacities and potential partnerships and participants, and natural resources and NRM issues. |
| June 1995 | <u>Team visit:</u> The core team will visit Niger and two other potential host-countries. The participating CRSPs will be responsible for contacting their host-country collaborators and arranging a schedule of meetings with the team. |
| July 1995 | <u>Final program design:</u> The final design of an interCRSP network (to be supported by USAID Africa/Bureau PSGE), including organization and budget, will be prepared by the team leader and the IPM CRSP and submitted to G/EG/AFS, AFR, and USAID/Niamey for joint approval. |
| Fall 1995 | <u>Workshop in Niger:</u> A follow-up workshop will be supported under this SOW and will be held on the general theme "Advances in NRM Technologies for West Africa". The design team may suggest more specific themes for the workshop. The workshop should serve as a forum for launching the "NRM interCRSP in West Africa" regional initiative to be supported under the AFR/PSGE project. The organizers of the workshop will be the interested CRSPs and INRAN |

with the IPM CRSP and the team leader of the project design team assuming the lead role.

Estimated Budget

The core team will travel to three host-countries and be primarily responsible for scheduling appointments, organizing meetings and workshops, and data/information collection and analysis. The core team consists of the team leader and two CRSP representatives. Other specific responsibilities include:

Team leader: Responsible for writing final document and coordinating entire activity as well as taking a lead role with the IPM CRSP in organizing the Fall 1995 workshop.

CRSP representatives: Responsible for organizing CRSP positions and input both in US and in host countries. They will liaise with all interested CRSPs in the NRM interCRSP West Africa initiative and articulate their concerns and positions in future workplans.

Host country representatives: Responsible for clarifying and articulating host country perspectives on NRM, technology transfer, linkages, and related issues. They should liaise with the other West African NARSs which are to participate in this initiative.

The following are the specific assessments which will be carried out under this scope of work.

1. Crop Production and Natural Resource Management

- 1.1 Constraints: Identify principal constraints to crop and natural resource management in the West African region applicable to this initiative. The identified constraints should be prioritized with regard to importance in terms of the ecological, economic, policy and sociological elements expected. This should be done in consultation with community based groups working on NRM programs.
- 1.2 Research: Perform an inventory of NRM research priorities, technologies and capabilities within the host countries and the CRSPs, particularly in INRAN and other NARSs participating in this initiative.
- 1.3 Strategic Objectives: Identify complementarity between goals and strategic objectives of countries, missions and CRSPs, and define how these can be mutually met through a coordinated program.

2. Technology Transfer

A principal focus of this activity is to increase the availability of known techniques among national research systems; and to increase access to profitable and sustainable NRM innovations among technology users.

The technical activities designed and implemented by this initiative will include, from the outset, both the development and transfer of innovations. To the fullest extent possible they should encourage multi-disciplinary teams that collaboratively address on and off farm constraints. Core funding of CRSPs are designed to give priority attention to technology

development. AFR/SD and Field Mission funding will concentrate on validation and transfer of technology. This activity will improve the complementarity of these two efforts.

Technology transfer will be a major thrust of this activity, especially initially. The CRSPs in general have not given high priority to technology transfer; however, there is increasing interest by the USAID Missions in the region to have the CRSPs participate in technology transfer. Some feel that lack of technology transfer is more limiting than technology generation. The CRSPs are well situated to strengthen Research-Extension-Farmer linkages. High priority should be given to create opportunities for an aggressive technology transfer programs, perhaps in the fashion of the Global 2000 program effective elsewhere in sub-Saharan Africa. The active and lead participation of the NARSs in this effort is essential. Identification of components and packages of technology suitable for a given ecological zone could be done collaboratively by the CRSPs and the NARSs. It is important to identify a few strategic locations and move on with the job of transferring technology aggressively and demonstrate what is possible.

- 2.1 Technologies: Inventory technologies and technical backstopping available from the CRSPs and within the host-countries, and identify areas where linkage between the two could be strengthened.
- 2.2 National constraints: Identify the focus of activities in Niger and other participating countries, through identification of constraints to technology development, use and transfer.
- 2.3 Regional constraints: Identify the regional focus of the project, through identifying existing constraints and opportunities for regional cooperation. This should include defining existing networks, trade barriers, sociological and political issues, and identifying overlap of commodity focus and environmental conditions. The recommended regional activities should be identified and ranked. Recommendations should be made regarding mechanisms for technology transfer and coordination of other regional activities (i.e. workshops, scientist exchange, networking modalities, etc.)
- 2.4 Communications: Identify networking and communication abilities including electronic communications, computer systems, and phone systems; and define areas of priorities and deficiencies for resource allocations.
- 2.5 Institutions: Inventory existing NRM technology transfer organizations and the type of support services they can provide.

3. Institutional and Human Capacity Building

- 3.1 Institutions and Organizations: Identify existing and potentially effective host-country institutional partnerships, and identify participants for the Fall 1995 NRM workshop. In order to accomplish this, the team must identify, visit, and assess the capabilities of potential participants and organizations including producers, private sector, universities, governmental, NGO, and international organizations. The team should identify areas of overlap in crop focus or complementarity of disciplines that have the potential to increase technology transfer and enhance

research outputs through inclusion in the interCRSP. Constraints to partnership development should also be identified.

- 3.2 Targets: Identify target groups and define recipients and beneficiaries; define targets for human capacity building. Specific attention should be given to evaluating the role and needs of producers, researchers, processors, gender issues, and consumers.
- 3.3 Other USAID Projects: Prepare a brief summary of existing USAID agricultural and environmental related projects which have a potential role in interCRSP initiative. The summary should include projects from G/EG/AFS, AFR, G/ENR, OFDA and all participating missions.
- 3.4 Institutional coordination: Identify mechanisms and management options for joint planning and coordination of CRSPs, NARSs and IARCs supported activities at the national and regional levels.
- 3.5 Donor coordination: Evaluate existing and potential sources and mechanisms for donor coordination and for leveraging of other donor assistance.
- 3.6 Contracting: Examine the funding and contracting mechanisms and restrictions existing in the national systems and determine the best mode of support.

DRAFT

InterCRSP activity in Niger and West Africa

TERMS OF REFERENCE

Team Leader:

Should have broad knowledge of, and experience in, the overall CRSP operations, should know well the CRSPs and the West African partner NARSs, and should have disciplinary expertise in the broad NRM or related areas.

- Assume leadership in coordinating the overall activities of the team.
- Be responsible for coordinating and preparing the draft workplan under this assignment.
- Provide technical input to the team in his area of expertise.
- Contribute to articulating CRSP positions and concerns in this initiative.
- Assume leadership in organizing the September 1995 interCRSP workshop in Niger.
- Work closely with the IPM CRSP in moving forward the various components of this interCRSP NRM West Africa initiative and eventually implementing them.

CRSP Representative 1 (Socio-Economics):

Should complement and strengthen the team in the socio-economic discipline, should know West Africa and the NARSs of the region well, should be familiar with the key US universities involved in this NRM initiative, and should have experience with technology transfer in West Africa.

- Provide leadership to the team in the broad socio-economics discipline.
- Articulate CRSP positions and concerns in developing the plan of work.
- Take leadership in identifying relevant technologies ready for transfer to users.
- Provide leadership in writing the socio-economic aspect of the draft NRM West Africa interCRSP plan.

CRSP Representative 2 (Soils):

Should complement and strengthen the team with solid knowledge of and background in soils, should know West Africa and some of the partner NARSs, and should be familiar with the key US universities providing leadership in the soils discipline.

- Provide leadership to the team in soils and overall NRM issues.
- Contribute to articulating CRSP positions and concerns in developing the plan of work.
- Assist in identifying transferable NRM and soils related technologies for the West Africa region.
- Provide leadership in writing the soils aspect of the draft NRM West Africa interCRSP plan.

West Africa Region Host Country Representatives (2) (Agricultural Scientists):

Should have solid academic training and experience in the agriculture of West Africa, should be natives and be thoroughly familiar with the cultures and customs of the region, and should be senior scientists commanding professional respect nationally and regionally.

- Provide regional inputs in their professional areas of expertise.
- Articulate and clarify host country and West Africa regional positions, perspectives, and concerns in developing the plan of work.
- Make contributions in identifying regionally appropriate technologies ready for transfer to users.
- Identify appropriate national and regional linkages and institutional partnerships for this interCRSP initiative.
- Assist in identifying regional participants, as well as taking active part in the organization and implementation of the September 1995 interCRSP NRM workshop in Niamey.
- Contribute actively to the write-up and preparation of the draft plan for this interCRSP regional initiative.

12.2 WORKSHOP ANNOUNCEMENT

TECHNOLOGY DEVELOPMENT and TRANSFER to IMPROVE NATURAL RESOURCE MANAGEMENT

A Regional Workshop to Plan Collaborative Activities for West Africa

18-22 September 1995, Niamey, Niger

Background

Through several Collaborative Research Support Programs (CRSPs), USAID has promoted agricultural research and development for West Africa since the early 1980s. There are currently six CRSPs with independent activities in West Africa -- Bean-Cowpea; Integrated Pest Management; Peanut; Soil Management; Sorghum-Millet; and Sustainable Agriculture & Natural Resource Management. These CRSPs have contributed significantly to technology development and human capital for West African agricultural research.

In July 1995, three CRSPs began an InterCRSP project on natural resource management with support from the USAID Mission in Niger. In addition to this project, USAID has identified a need for a regional approach to natural resource management that would draw on available technologies developed by all CRSPs active in Africa. The USAID Mission in Niger is partially supporting this workshop. As a supplementary activity the Mission is also supporting a strategic assessment of natural resource management and interCRSP issues in West Africa.

Objectives

The primary objective of this workshop is to develop a workplan to improve natural resource management in West Africa within a coordinated InterCRSP project. This workshop will provide the first opportunity for participants of the different CRSPs to plan integrated efforts across CRSPs and countries in West Africa.

Specific objectives are:

1. Create a common base of understanding across CRSPs, including technologies that have been developed and the current and potential impacts of those technologies in the region.
2. Identify priority constraints to natural resource management.
3. Plan technology transfer to apply available technologies and research activities to develop new or to adapt existing technologies for priority constraints.
4. Establish linkages among research, extension, and NGO/PVO organizations active in West Africa.

Participation

The workshop is open to interested researchers and extension specialists from West African countries. We particularly encourage participants from countries with active CRSP projects: Burkina Faso, Ghana, Mali, Niger, and Senegal. Researchers and technology transfer specialists from US CRSP institutions, NGO/PVOs, and IARCs with projects in Africa are also welcome.

Tentative Program

- I. Opening Session
- II. Technology Development -- Invited Oral and Volunteered Poster Paper Sessions
 - i) *Genetic Resources, including crop plants and small ruminants*
 - ii) *Crop Protection*
 - iii) *Post-harvest Processing and Crop Utilization*
 - iv) *Natural Resource Management, including agroforestry, land rejuvenation, water conservation and harvesting*
- III. Technology Transfer -- Invited Oral and Volunteered Poster Paper Sessions
 - i) *Models to Link Research with Extension, NGO/PVOs, and Industry, including networks and participatory research methods*
 - ii) *Seed Production*
 - iii) *Integrated Pest Management*
- IV. Field Trip to Hamdallaye -- InterCRSP natural resource management watershed
- V. Workshops to plan collaborative, integrated research and technology transfer activities
- VI. Closing Session

Languages

Official conference languages are English and French, with simultaneous translation available for both languages. Invited papers will be published in the language the paper is presented (English or French), with the abstract translated to the other language.

Costs and Registration Fees

Participants are expected to provide their own funds for travel and living expenses in Niamey. Conference organizers are negotiating a group rate with the Grand Hotel in Niamey. A registration fee will be charged to cover costs of local transportation, an evening banquet, publication of workshop proceedings, and coffee breaks. Specific costs will be available by 1 August 1995.

For More Information

Those people interested in participating in the workshop should send a statement of intent, including full name, contact information, and poster title (optional): David Cummins, Chairman of Workshop Organizing Committee, Georgia Station, 1109 Experiment Street, Griffin, GA 30223-1797 U.S.A.; Internet: crspgrf@gaes.griffin.peachnet.edu; Tel: 404 228 7312; Fax: 404 229 3337.

12.3 TENTATIVE WORKSHOP PROGRAM

(As Revised by the Strategy Assessment Team in West Africa)

1. Opening Session

- 1.1 Welcome address (DG of INRAN)
- 1.2 Background and purpose of the workshop (CRSP Council)
- 1.3 Perspective of USAID on regional and institutional collaboration (USAID Niamey Mission Director)
- 1.4 Opening Address (Prime Minister or Minister of Agriculture and Livestock of Niger)

2. Technology Development - Invited oral and volunteered poster paper sessions

- 2.1 Genetic resources improvement and conservation, including crops and small ruminants.
 - 2.1.1 Sorghum and Millet (INSORMIL CRSP)
 - 2.1.2 Bean/Cowpea (Bean/Cowpea CRSP)
 - 2.1.3 Peanut (Peanut CRSP)
 - 2.1.4 Small Ruminant (Small Ruminant CRSP)
- 2.2 IPM (IPM CRSP with collaboration of other appropriate CRSPs)
- 2.3 Cereals (INTSORMIL)
- 2.4 Legumes (Bean/Cowpea and Peanut CRSPs)
- 2.5 Agroforestry and land rejuvenation (Soil Mgt CRSP - Tom Thurow to coordinate)
- 2.6 Soil fertility and water harvesting (Soil Mgt CRSP - Tony Juo to coordinate)
- 2.7 Socio-economic issues in NRM technology development (INSORMIL & Bean/Cowpea - Jess Lowenberg-DeBoer to coordinate)

3 . Technology Transfer - Invited oral and volunteered poster paper sessions

- 3.1 Models to link research with extension and end-users (farmers, national extension agencies, industry, NGOs/PVOs)
 - 3.1.1 Overview of models of technology transfer (international expert to be identified)
 - 3.1.2 West African region and national experiences and perspectives on technology transfer (Malam Kori, Ministry of Agriculture, Extension, Niger)
 - 3.1.3 Farmers and PVOs perspectives on technology development and transfer (Mali Farmers' Union, Africare, Peace Corp)
 - 3.1.4 Information and communication technology Worldnet Interaction Session (CRSP Council, Ron Grosz, Shirley Stanton)
- 3.2 Seed industry
 - 3.2.1 Perspectives on successful seed industries in developing countries (Lee House)
 - 3.2.2 Potentials and constraints of the seed industry in the West Africa region (IER Mali to coordinate - Makan Fofana)
- 3.3 Overview of Integrated Pest Management Technology Transfer (IPM CRSP to coordinate)
- 3.4 West African experiences on Integrated Nutrient Management (INRAN/Soil Management CRSP to coordinate - Issaka Mahaman)
- 3.5 Nigerien lessons on Integrated Watershed Management (INRAN to coordinate - Zanguina)
- 3.6 Socio-economic issues in NRM Technology Transfer (IER - Makan Fofana and Bean/Cowpea CRSP - Ann Ferguson, Michigan State University)

4 . Field Trip to Hamdallaye - InterCRSP Natural Resource Management Watershed (INRAN/Soil Management CRSP to coordinate - Issaka Mahaman / Tony Juo)

- Visit to watershed
- Dialogue with farmers
- Video recording of visit

5. Planning of Collaborative and Integrated NRM Research and Technology Transfer Activities in West Africa

- 5.1 Presentation of the InterCRSP West Africa NRM plan (Strategic Assessment Team)
- 5.2 Strategic planning and participatory appraisal methodologies (Organizing Committee to coordinate) (SANREM and Michigan State University Sub-Saharan Africa Strategic Agricultural Research Planning Group)
- 5.3 Gender issues and NRM planning (SANREM to coordinate - Revathi Balakrishnan and Ron Grosz)
- 5.4 Technology impact assessment (INTSORMIL/Purdue to coordinate - John Sanders and Jess Lowenberg-DeBoer)
- 5.5 Working Groups discussions on interCRSP West Africa Planning on NRM
 - Promising Technologies
 - Methods of Technology Transfer
 - Mechanisms of InterCRSPing
 - Communication/Information Needs
- 5.6 Plenary session and workshop recommendations

6. Closing Session

- 6.1 Workshop evaluation by participants
- 6.2 Closing remarks by the Minister of Agriculture and Livestock of Niger

NOTE: *Additional potential presenters (Regional Organizing Committee to follow-up)*

- AGRHYMET
- Peace Corp
- INSAH

12.4

LISTE DES ONG MEMBRES DU GROUPE PIVOT/GRN

A La date du 09 Mars 1995

N°	SIGLES	ORGANISMES	SIEGE
01	AADEC	Assoc. d'Appui à l'auto-Dévelop. Communautaire	Bamako
02	ADAC	Assoc. Dévelop. de l'Arrdt de Cadiana	BP: 2783 Tél:22 88 73 Bamako
03	ADEV	Assoc. de Dévelop. des Villages non Encadrés de l'Office du Niger	Bamako
04	AED	Assoc. d'Entraide et de Dévelop.	Bamako
05	AETA	Assoc. d'Etude des Technologies Appliquées	Bamako
06	AFOB	Assoc. des Femmes de Ouolofobougou et Bolibana	Bamako
07	AFOTEC	Appui à la Formation et aux Technologies	Tél:22 99 88 94 21
08	DJANDIO AU SAHEL	Assoc. Djandio au Sahel	Bamako
09	AMAC	Assoc. Malienne d'Aide aux Communautés	Bamako
10	AMADE	Assoc. Malienne pour le Dévelop.	BP: 2646 Tél:22 59 09 Bamako
11	AMAPROS	Assoc. Malienne pour la Promotion du Sahel	BP: 6026 Tél:22 53 98 Bamako
12	AMRAD	Assoc. Malienne de Recherche-Action pour le Développement	BP: 1641 Tél:22-85-21 Bamako
13	CADEF	Comité d'Action pour le Droit de l'Enfant et de la Femme	Bamako
14	GRAPES	Groupe de Recherche Action pour la Promotion	BP: 6026 Bko Tél:22-53-95
15	GRAT	Groupe de Recherche et d'Application Technique	BP: 2502 Bko Tél:22-43-44
16	AMPAS	Assoc. Malienne pour la Promotion Agro-Sanitaire	Bamako

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34	AMEF	Assoc. Malienne pour l'Etude et la Formation	BP:1721 Bamako
35	AES	Agir Ensemble au Sahel	
36	ASM	Aide au Sahel Mali	BP: 581 Tél:22 88 73 Bamako
37	JIGUI	JIGUI	Bamako
38	CADB		BP: 5071 Bko
39	KILABO	KILABO	BP :2246 Bko Tél:22 36 52
40	AMOFÉ	Assoc. Malienne pour l'Observation de la Faune et son Environnement	BP: 2921 Bamako
41	PDR	Partenaire pour le Dévelop. Rural	BP: 9025 Bamako
42	AMAJEPROF	Assoc. Malienne d'Assurance à la Jeunesse, à l'Enfance et à la Promotion Femme	BP: 5089 Bamako
43	Fondation YEREDON	Fondation Yèrèdon	S/C Souleymane TRAORE BP: 18, Rue Samba NIANG, Hamdalaye.
44	IADS	Initiative-Action pour le Développement au Sahel	BP: 1206 Bko Tél:22 98 75
45	FDS	Fondation pour le Dévelop. au Sahel	BP: 415 Rue Sdiata x 107 A/S SUCO
46	SUCO		BP: 415 Tél:22 27 77
47	SIX "S"	Se Servir de la Saison Sèche en Savane et au Sahel	BP: 221 Tél:43 04 28 Mopti
48	SOS SAHEL G.B.	SOS Sahel Grande Bretagne	BP: 2119 Bko Tél:22 02 85
49	AMCFE	Assoc. Malienne pour la Conservation de la Faune et son Environnement	BP : 2921 Rue 942x653 Torokoro-boigou
50	BAARA NYUMAN	Baara - Nyuman	BP:7099 Bko

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51	CARREFOUR SAHEL	Carrefour Sahel	BP : 1206 Bamako
52	M.A.	Mali-Assainissement	BP: 3146 Tél:22 96 51 Bamako
53	SADEB	Solidarité-action pour le Développement à la Base	BP: 2348 Tél:22 58 31 Bamako
54	As.S.A.F.E	Assoc. du Sahel d'Aide à la Femme et à l'Enfant	BP: 5017 Djikorini- Para, Rue 20 mètre Bamako
55	AMAPEF	Assoc. Malienne pour la promotion des Entreprises Féminines	Missira Rue 14 x 35 BP:3179 Bamako
56	ACD	Action Couverture et Développement	BP: 1122 Tél:22 30 76
57	88	Serviteur du Sahel	BP: 1561 Bamako
58	GRID	Groupe de Recherche et d'Intervention pour le Développement	BP: 1781 Bamako
59	AID-MALI	Assoc. Malienne d'Initiatives et d'Action pour le Dévelop. Mali	BP: 3179 Bamako
60	AJDDA	Assoc. des Jeunes Diplômés pour le Dévelop. Agro-pastoral	BP: 91 Tél:22 43 11 Bamako.
61	AMPJ	Assoc. Malienne pour la Promotion de Jeunes	BP: 09 Tél:22 43 41 Fax:22 23 59
62	VADR	Volontaires de l'Animation pour le Développement Rural	BP: 3264 Tél:22 30 41 Bamako
63	O.MA.DE.Z.A.	Oeuvre Malienne pour le Développement des Zones Arides	BP: 236 Quartier du Fleuve Bamako
62	AJR	Action Jeunesse Rurale	BP: 217 Ségou
63	A.MA.D.I.	Action Malienne pour le Développement Intégré	BP: 8017 Tél:22 02 85

64	A.D.I.D.A.R.	Assoc. pour le Dévelop. Intégré du Darouma	Tél:22 04 30 Rue, 62 X 53 Dar Salam
65	USAID	United States Agency for International Development	Tél.22 36 02 Bamako
66	ADIS	Action pour le Développement Intégré du Sahel	Tél.22 01 41 Bamako-Coura
67	ADRAE	Assoc. pour un Dévelop. Rural en Accord avec l'Environnement	BP: 2932 Bamako
68	MISSION-SAHÉL	Mission-Sahel	BP: 1122 Tél:22 30 76
69	CEAD	Centre d'Etudes et d'Actions pour l'Auto- Développement	BP: 5020 Rue, 214x193 Hamdallaye Bamako
70	TBPPD	Tam-Tam pour la Sécurisation des Populations du Plateau Dogon	Immeuble Banam Bais BP: 836 Bko
71	LILUDE	Ligue de Lutte contre le sous Développement	BP: 5091 Bamako
72	ADAF/Gallé	Assoc. pour le Dévelop. des Activités de Production et de Formation	BP: 3267 Tél:22 00 33 Rue 8 x 37 Missira - Bamako
73	GADB	Groupe d'Appui au Dévelop. à la Base	BP: 25 Tél:26 20 66 Koulikoro
74	So.D.A.C.	Solidarité Développement Action Communautaires	BP: 165 Tél:22 39 28 Bamako
75	ADZOR	Action pour le Dévelop. des Zones Rurales	BP: 2271 Bamako
76	FYMA	Yedde Yirwere Mali	BP:8031 Tél:22 51 50 Fax:22 62 74
77	JEKABAARA/ADRI	Assoc. pour le Dévelop. Rural Intégré	Rue 16 x 37 Missira-Bko

78	G.R.E.	Groupe de Recherche pour la Réhabilitation de l'Environnement	BP: 1756 Face TOYOTA DIAMANT, Quinzam- bougou
79	AGE	Assoc. Générale Ecologie	BP.2548 Tel: 23 0447 Bamako
80	AMPES	Assoc. Malienne pour la Promotion Economique et Sociale	S/C de GUAMINA BP:2744 Bko
81	AMASEN	Assoc. Malienne pour la Sauvegarde de l'Environnement	BP:E246 Rue Sikasso Bozola - Bamako
82	Voisins Mondiaux	Voisins Mondiaux	BP 210 Segou
83	SOLISA	Solidarité pour le Sahel	Avenue Cheick Al Zayed x 121 Bolibana BP. 5091 Bamako
84	GAUTIER FREDERIC	USAID	Bureau des Projets Divers BP:34 Bamako
85	DJENEBA DIARRA	Ingénieur des Eaux et Forêts	Tel:22 68 78 Bamako
86	Béridogo Bréhima	D'Anthropologue	ENSup BP:241 Tél:22 21 89 Bamako
87	ADESA	Assoc. pour le Dévelop. du Sahel	Hamdalaye Rue 210 x 199 Bamako
88	PIDEB	Projet Intégré de Développement et Education du Cercle de Bafoulabé	
89	AMEN	Alliance Malienne Environnement	BP:1258 Rue 588 x 431 Hippodrome Tél:23 12 20
90	AMPD	Assoc. Malienne pour le Progrès et le Développement	S/C SECO-ONG Bamako

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91	GRAD	Groupe de Recherche-Action pour le Développement	BP : 5075 Tél:22 88 73
92	Moustapha SOUMARE	Assoc. Maliennne d'Aide au Développement	AMADE - Bamako
93	Ibrahim Balla CAMARA		S/C Mme CAMARA Animata DIALLO Bamako-Coura Rue 134x135 Tél:23 06 82
94	AMF-D 14è Parallèle	Assoc. de la Zone Méma Farimaké pour le Développement 14è Parallèle	BP 45 Médina-Coura Bamako