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ARTS/FARA

*Office of Analysis, Research and Technical Support
Food, Agriculture and Resource Analysis*

**IMPLEMENTATION OF THE AFRICA BUREAU
NATURAL RESOURCES MANAGEMENT
ANALYTICAL AGENDA:**

WORKSHOP PROCEEDINGS

March 17 - 19, 1992

**Natural Resources Management Analytical Unit
Food, Agriculture and Resource Analysis Division
AFR/ARTS/FARA**

**U.S. Agency for International Development
Washington, D.C. 20523
June 1992**

Preface

The implementation of the NRM Analytical Agenda: Workshop Proceedings March 17 - 19, 1992 is intended to document the meeting of A.I.D. Washington, collaborators and partners in establishing the fiscal year 1992/1993 agenda for the food, Agriculture and Resource Analysis Division of the Analysis, Research and Technical Support Office of the Africa Bureau, U.S. Agency for International Development. This report includes a summary of the meeting on the following page.

The report is organized according to the Four Themes of discussion as set forth in the meeting agenda provided in Appendix A, and captures summaries of presentations of each of the collaborators with subsequent plenary session comments. For concise summaries of the ongoing projects, refer to Appendix D; additional detail on any of the presentations may be obtained by contacting the collaborators directly. Contact information can be found in Appendix E.

Throughout the document, many acronyms are used; for your convenience, they are defined on page iv if not otherwise defined within the document.

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Any questions, comments or information on obtaining additional copies may be directed to the ARTS/FARA Division of the Africa Bureau of the Agency for International Development, Washington D.C. 20523.

Table of Contents

Summary of the Workshop	ii
Acronyms	iii
Purpose, Agenda, Logistics, Introductions	1
Welcome and Opening Remarks	1
Presentations by Collaborators	
THEME ONE	8
Land Tenure Center	9
Forestry Support Program	10
World Resources Institute	12
Multi-Donor Secretariat, World Bank	13
Implementing Policy Change	14
Associates in Rural Development	15
Theme One Plenary	17
THEME TWO	22
World Resources Institute	23
Biodiversity Support Program	24
PVO/NGO NRMS	26
SARSA	28
Theme Two Plenary	29
THEME THREE	42
U.S. Forest Service	43
Economist Report	44
World Resources Institute	49
NASA, Goddard	51
U.S. Geological Service	52
BSP NASA, Goddard	54
Theme Three Plenary	59
THEME FOUR - Environmental Quality	70
Biodiversity Support Program	73
Theme Four Plenary	79
PRESENTATIONS ON RELATED ANALYSIS	
Ecotourism	85
Wildlife Management and Conservation Training	87
Integrated Pest Management	89
Famine Early Warning System	92
Followup Comments	94
Appendices:	
Workshop Agenda	A
Purpose of Workshop	B
Theme Questions	C
Summary of Collaborating Projects	D
Workshop Participants	E
Documents Displayed at the Workshop	F

Summary of the Workshop on Implementation of the FY 92/93 NRM Analytical Agenda

The Food, Agriculture and Resource Analysis Division of the Analysis, Research and Technical Support Office of the Africa Bureau, U.S. Agency for International Development, convened, on March 17 - 19, 1992, a group of partners and collaborators in natural resource management for a three-day workshop to discuss its FY 92/93 Natural Resource Management Analytical Agenda (NRMAA). This document is a summary of the first two days of the meeting, day three included discussions for collaborators only.

Each of the collaborators presented summaries of their current projects and programs related to natural resources management in Africa; detailed descriptions can be found in the Appendices. These activities result from priorities established in the evolving Analytical Agenda as set forth by the following Four Themes:

- Conditions and Policies
- Actions and Practices
- Tools and Methods
- Environmental Quality

Prior to the Workshop, a set of relevant questions pertaining to each Theme were given to collaborators for consideration. Collaborators provided comments on the questions and offered suggestions for additional and alternative inquiry. The questions were further discussed in plenary sessions for each Theme.

1. What can be said about the validity and timeliness of the questions?
2. What other questions are relevant and require investigation?
3. For each Theme, what relevant information is available, and what information still needs to be gathered?
4. What research topics might be usefully continued or initiated during FY 92/93?

The conclusions derived from the discussions of the Four Themes provide the basis for fine tuning the implementation of the NRMAA.

Acronyms

ADO	Agricultural Development Officer (USAID Missions)
AFR	Africa Bureau, A.I.D.
API	Assessment Program Impact
ARTS	Analysis Research and Technical Support
BSP	Biodiversity Support Program
CAR	Central African Republic
DFA	Development Fund for Africa
DFM	Decentralization: Finance and Management
FARA	Food Agriculture and Resources Analysis
FEWS	Famine Early Warning System
FSP	Forestry Support Program
GIS	Geographic Information System
IPM	Integrated Pest Management
IRD	Integrated Rural Development
LTC	Land Tenure Center
NASA	National Aeronautical Space Administration
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organizations
NRM	Natural Resources Management
PRA	Participatory Rural Appraisal
PVO	Private Volunteer Organization
RRD	Rapid Rural Development
R&D	Research and Development (USAID Bureau)
USAID	United States Agency for International Development
USGS	United States Geological Survey
WCI	Wildlife Conservation International
WRI	World Resources Institute
WWF	World Wildlife Fund

Natural Resources Management In Africa

The Implementation of the A.I.D. Africa Bureau NRM Analytical Agenda

Purpose, Agenda, Logistics, Introductions
Gary Cohen - ARTS/FARA/NR

Gary Cohen welcomed the group to the Africa Bureau's NRM Analytical Agenda Collaborators workshop and gave a brief explanation of the agenda. Days one and two would be open discussions of the four 1991 themes, while day three would be dedicated to more detailed discussions of the collaborators' activities for the next fiscal year.

Welcome/Opening Remarks
Jerry Wolgin - AFR/ARTS

As a result of the reorganization of the Agency and the Africa Bureau, The Office of Analysis, Research and Technical Support was created out of the former Technical Resources Office to focus on analysis and research and to move away from managing projects which implement regional activities in Africa.

The office has three functions.

1. Understanding what is going on with the development dynamics in Africa;
2. Understanding how well USAID programs are functioning; and,
3. Disseminating knowledge into USAID programs and other donor governments.

The Bureau has made a substantial commitment to this effort, 3 - 4% of the Development Fund for Africa (DFA) resources and 15% of the Washington staff. The reason is that under-development of Africa since independence has not been because resources were scarce, but rather the failure to apply resources effectively.

Fifty percent of the failure can be attributed to bad ideas, while the remainder is due to factors such as values, institutional practices, greed, and desire for political gain. The task of Africa Bureau ARTS is to improve the understanding and knowledge of development so that resources can be applied effectively and efficiently. Right now, good ideas are scarcer than resources.

There are four steps to the effort.

1. Identify the issues,
2. Implement effective research design,
3. Disseminate information to practitioners when needed, and
4. Evaluate and monitor research to influence policy makers.

- 1 -

The Bureau sees environmental and natural resources concerns as part of the development problem. Africans are not particularly interested in maintaining and sustaining a resource base that is separate from how they can grow in a sustainable way. Therefore, all activities have to be linked to improving the economic and social conditions of Africans.

The challenge is to figure out ways of developing practices and policies that allow the sustainable use of resources while providing for long-term economic growth.

Opening Remarks

Eric Chetwynd, R&D/EID

This workshop is a watershed in regional and central Bureau collaboration. It reflects the spirit and intent of the A.I.D. reorganization; cutting needless duplication. This workshop is about development through research and analysis and linkages between collaborators.

When Dick Cobb came out to the Research and Development (R&D) Bureau's retreat in Baltimore, he reported the Africa Bureau was going to count on Research and Development (R&D) projects for field support and the reallocation of technical resources while ARTS would focus on analyses of the development problems in Africa.

The ARTS vision of collaboration of the research-based approach has not been confined to A.I.D. Washington. A recent cable from USAID Mozambique similarly reported on a two-day seminar on research results and the implication of that research for the new integrated agricultural sector program in Mozambique.

At least a half dozen R&D projects were represented. The seminar was arranged by the Mission around the research themes pursued by those R&D teams. The conference led to clear conclusions about what had been learned, areas that needed further research, and the implications of both for the integrated program. In the field, this is an example of a parallel of what is going on at A.I.D. Washington, and clearly in the Africa Bureau.

Eric Chetwynd applauded Jerry Wolgin, Tom Hobgood and staff for the work that has been done within the African Bureau in sticking to the vision. Further, E. Chetwynd expressed excitement in participating in this break-through approach. It is far better to set a course, coordinate resources and agree on objectives and have this approach involve collaborators.

Opening Remarks

Tom Hobgood - ARTS/FARA

After a welcome to workshop participants, T. Hobgood explained that he and Ben Stoner manage the Food Agriculture and Resources Analysis (FARA) Division which funds analytical work in the Agriculture and Natural Resources sector including natural resources management.

The Green Card (Chart 1) sets the context for doing analysis under the Development Fund for Africa in Natural Resources Management.

There are three major targets in the Africa Bureau to be achieved and this is where most of the money is being spent.

- 1. Increasing utilization of higher yielding technologies;**
- 2. Providing efficient and lower cost marketing systems, and**
- 3. Improving natural resources management.**

The emphases is on the horizontal connections and linkages between these targets that support the success of each toward improved natural resources and environmental management activities being successful. Further, the vertical linkages indicate that all targets are not ends in themselves, but means to a higher end which are sustained increases in productivity which in turn lead to broad-based improvements in food security and increases in the entire sector's contribution to overall growth.

The FARA/NRM unit is interested in getting people linked to wise use of natural resources in a sustainable way that will have a positive impact on food security, income and productivity.

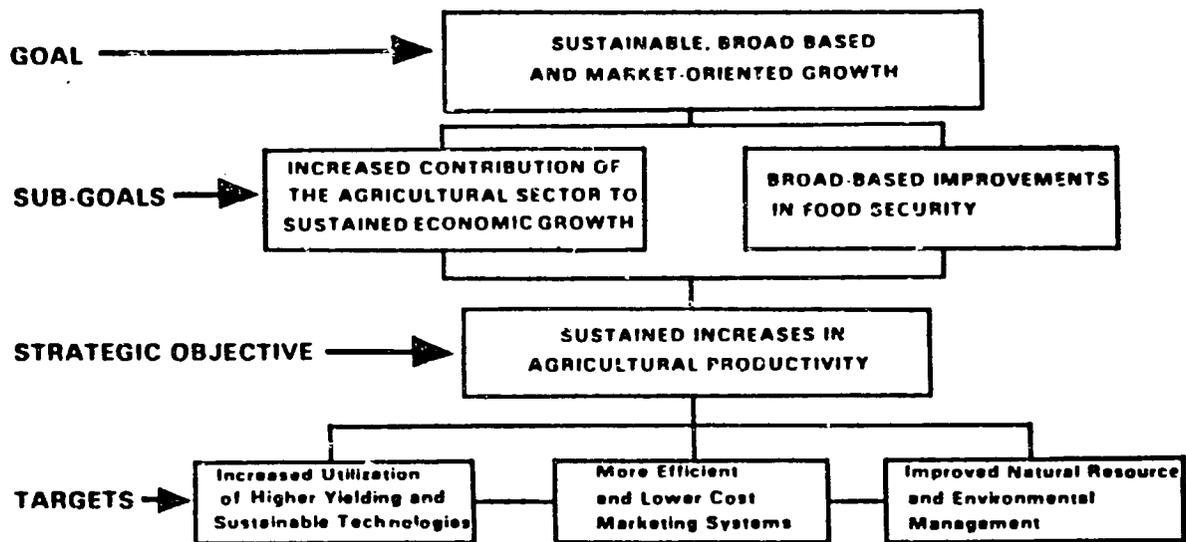
Around this tree, the targets for each level ask questions. The questions are:

- What are the trends in the sector?**
- What are the key issues that need to be addressed at each level?**
- What are the impacts of past and current interventions and how are the impacts best measured?**
- What works, what doesn't and why?**

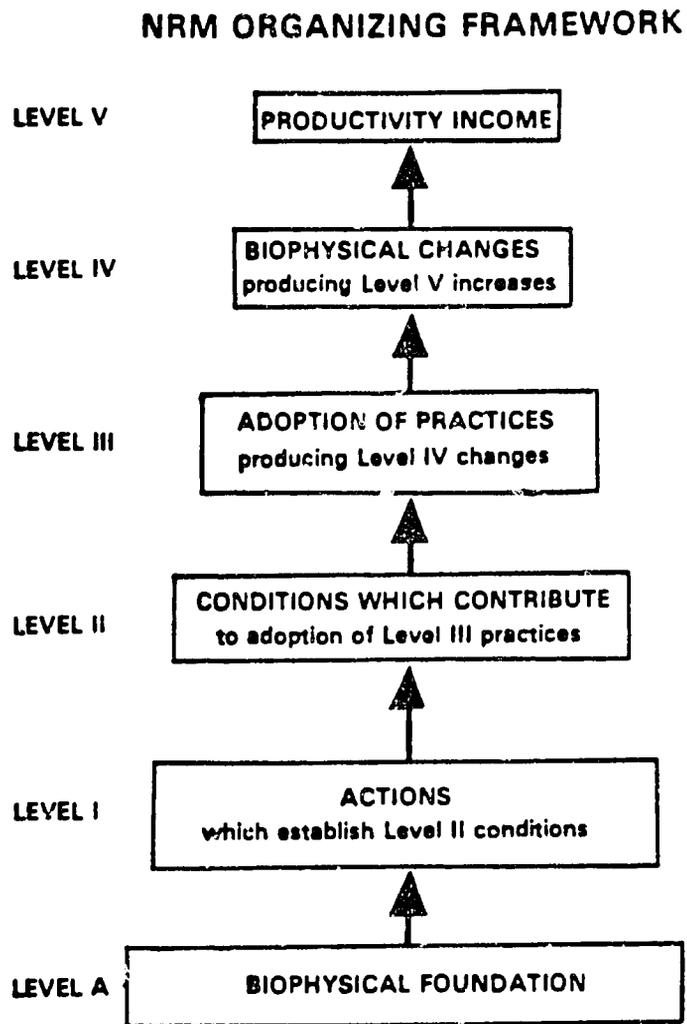
One of the objectives of this workshop in addition to looking at the questions at each Level is to see how to best collaborate. A key element is the collaboration of the Africa Bureau and the R&D Bureau under the new reorganization. Another is between R&D, Africa Bureau Washington, and the field collaborating between people in A.I.D. and outside organizations that are conducting analyses and between the collaborators here.

One of the main advantages of collaboration is achieving management efficiencies. Managing the very large Natural Resources Management Analytical Agenda will take close collaboration at every level. In the field, the Missions are funding their country-specific aspects of some of the questions being looked at here and the Africa Bureau is looking at broader questions that synthesize and analyze what is happening in the region as a whole.

OBJECTIVE TREE: Agriculture and Natural Resource Sector



4



PARTS NRM ANALYTIC AGENDA FY 1992-1993

March 18, 1992

NRM THEMES	QUESTIONS
<p>I. Policies, Institutions, and Socioeconomic Conditions for Improving Natural Resources Management.</p>	<p>A. Long term Questions</p> <ol style="list-style-type: none"> 1. What are the conditions leading to people-level innovation and improved NR management? 2. What actions are effective in leading to these conditions? <p>B. Questions to be addressed for FY 92/93</p> <ol style="list-style-type: none"> a. How useful is existing economic theory and analysis in describing economic conditions affecting adoption? b. What is the role of decentralized control and local governance of improved NRM? c. What lessons can be learned from in-country research programs on land tenure? d. What are the institutional policies and conditions which lead to improved NRM actions? e. What conditions and actions affect the success of policy reform programs?
<p>II. Natural resource management (NRM) practices and their impact on natural resource base productivity.</p>	<p>A. Long Term Questions</p> <ol style="list-style-type: none"> 1. What are the links between people level impact and adoption of practices? How do these innovations aggregate to national impacts? 2. How do these biophysical changes affect agricultural productivity and incomes? 3. How do these changes affect environmental quality? 4. What does sustainability mean in the context of natural resource management? <p>B. Questions to be addressed in FY 92/93:</p> <ol style="list-style-type: none"> a. What is the array of NRM innovations, adopted behaviors, and changes, and what are the impacts of each on short, medium and long term biophysical change? b. What are the effective factors in attitude and activity change? c. How can environmentally sound development by voluntary and volunteer organizations be facilitated?
<p>III. Environmental Quality</p>	<p>A. Long Term Questions</p> <ol style="list-style-type: none"> 1. What are the Africa-related causes and impacts associated with global climate change and effective mitigation measures? 2. What are the downstream environmental and people level impacts from pesticide use and misuse? 3. What are effective, responsive and equitable methods to coordinate local and global environmental planning, analysis and actions? 4. What are the local and global costs and benefits associated with protection of biodiversity? <p>B. Questions to be addressed in FY 92/93:</p> <ol style="list-style-type: none"> a. How does human behavior affect the sustainability of the Congo Basin, and what is the potential impact of climate change on the prospects for economic growth among the Congo Basin countries? b. How does one analyze biodiversity projects in Africa so that, over time, the impact on DFA and agency objectives can be assessed?

On the back of the Green Card (Chart 2) is a Natural Resources Management Organizing Framework. There is a similar framework for each of the key areas of concern.

One of the dangers in the Africa Bureau's efforts is breaking things down into too finite terms. One definition of analysis is breaking a system down to its component parts. A reason for collaboration is to reap the richness of work at each level. These questions tie to a larger whole of natural resources management.

On day three, which is a working level meeting, there will be specific efforts and discussions on how the group can collaborate on the analytical work. Collaboration is difficult and costly, but the benefits outweigh the costs. Hopefully, this group can make some concrete achievements by the end of the workshop.

Comments

Gary Cohen - ARTS/FARA/NR

G. Cohen re-emphasized that the workshop was a continuation of an active effort in collaboration. The timeliness of the workshop was planned to support the Analytical Agenda to be funded under PARTS.

The purpose of the workshop, (Appendix B) is to discuss the Themes and research questions of interest to FARA:

- What can be said about the timeliness and validity of the research questions?
- What other questions are relevant and require investigation?
- For each theme, what information is available and what still needs to be gathered? Some studies are desk studies and literature reviews, while others involve analyses in the field.

To put into perspective the Analytical Agenda process and what the Agenda really is, it is important to understand the PARTS project is the umbrella project to support the FARA Division which has five units: Technology Development and Transfer, Environmental Protection, Agricultural Marketing and Agribusiness, Food Security and Productivity, and Natural Resources Management. Activities under the project may be contracts, buy-ins to R&D, desk studies, initial investigations and field verification and synthesis, and other reviews of themes, questions and activities.

The definition of Natural Resources Management Analytical Agenda is a priority ordering of technical and programmatic questions against which natural resources management units resources are focused.

The Framework is used as a means for organizing efforts to support formation of linkages for the people-level impact of Africa Bureau's work. The Framework has been developed based on a number of case studies, mostly in the Sahel; however, other parts of Africa are

being reviewed for the appropriateness of this framework on other types of NRM activities including biological diversity interventions.

The driving factor in the development of this Framework is the long lag time in natural resources management. The lag time is much different from that in the health or population sectors which have developed traditional indicators and measurements. The four Themes that will be discussed differ somewhat from the FY 91 - 92 Agenda. The analytical tools, methods and approaches Theme is more of a cross-office theme (across the ARTS/FARA division). This Theme has been transferred to the Environmental Protection Unit in FARA.

The person in FARA Division with the greatest responsibility for the technical content of the Themes chaired each discussion group. Policies, Institutions, and Socioeconomic Conditions for Improving Natural Resources Management was chaired by Tony Pryor; NRM Practices and Their Impacts on Natural Resource Base Productivity was chaired by Mike McGahuey; and Environmental Quality Issues for Sub-Saharan African was chaired by Tim Resch.

Introduction of Theme One and Questions **Tony Pryor - ARTS/FARA/NR**

The Theme activities have been set up around the Levels of the Framework. Theme One focuses on conditions, policies and actions which establish conditions. These activities are important for laying the foundation for change in the field. People change their behavior because certain necessary and sufficient factors exist. These factors may include extension services, changes in tenure regimes, economics, institutional social or cultural variables. Example: there is a tendency when looking at indicators in the field that only one level is viewed; that codes may be changed without consideration for the impact.

Another significant point inherent in the Framework and how the Africa Bureau is structured is that Natural Resources has a problem when trying to evaluate impact because of lag time. Within a two to five year period of trying to evaluate people-level increases in productivity or income, there is a likelihood of measuring the wrong things or concluding that tracking can't be done and moving on to another sector. If we cannot begin to track intermediate indicators, it will be very hard to justify large future funding of natural resources.

For each Theme, there is a list of questions on which the presenters will focus.

- A. What are the necessary and sufficient sets of conditions that contribute to the adoption of NRM interventions?
- B. What are the correlations between conditions and people-level impacts?
- C. What are the actions that can be expected to establish the appropriate conditions?

- D. What are the benefits and costs of establishing the appropriate conditions compared to doing nothing.

Presentations by Collaborators

Steve Lawry, Land Tenure Center

Since 1987, the Land Tenure Center (LTC) has very much benefited from the support of the NRMs program allowing the examination of the relationship between resource tenure and natural resources management. Broadly, the center is addressing the question of "How the distribution of resource rights among the State, community and individual users affect the management of particular resources for particular purposes.

The tradition in post-independence Africa is the concentration of resource rights in the hands of the State relative to individuals and communities. LTC studies have included the effects of this policy on farmer investment in natural resources management at the farm level on grazing land and forest, and more recently on the reserve resources of biological and cultural value to the community, nation and the international community.

Three policy areas of priority concern of LTC as articulated by donor countries and resources users are:

1. The effects of Sahelian forest codes on farmer investment in forest technologies;
2. The effect of customary tenure on farmer uptake of agro-forestry technologies throughout Africa; and,
3. The potential role of tenure reform in protecting reserve resources.

Most attention has been placed on question one. The work in this area is benefited by a high level of support from the Africa Bureau. General studies of Sahelian forest codes is appropriate as most Francophone countries share a similar tradition of forestry and tree tenure management. The legal origins are a 1935 law that vested rights to trees to the State for management in the public interest.

There are high levels of Mission interest in this issue in the Sahel. In terms of forging reforms over the long run, it is important to engage with forestry policy makers in individual countries around forestry management problems. The USAID forestry management project in Mali has permitted a two-year research project on the impacts of the forestry code. In Senegal the Center looked at the likely impacts of reform on current forestry legislation. A LTC student is in Niger to study how the code affects community management of commonly used forestry resources.

These kinds of support have allowed the Center to move on to a third phase of analysis which is to disseminate country-level research findings regionally. Later this year, the Center will organize a regional conference on Sahel forest codes and forest-code reforms.

The findings of the research in Senegal and Mali identify the disincentive effects of State ownership of trees on farmer investment and agro-forestry and farmer management of natural regeneration of trees on farms. Associated with the law itself are a whole range of institutional behaviors and vested interests that work to ensure the vigorous enforcement of the code. In Mali, half of the revenues of the Forestry Department are derived from fines generated from enforcing violations of the forest code.

Generally, the forestry agents have a poor understanding of farmers rights and the code. The national policy makers and foresters do, in most cases, provide adequate protection for owners of trees on their farm. There were, however, some problems in settings where farmers borrow land from original lineages for owners to prohibit tree planting because this usually asserts land ownership.

In Senegal, a different kind of relationship is noted between farmers and forestry agents in terms of enforcement when farmers are given an assurance that investments will accrue to the farmers. Higher levels of the planting are seen in a more liberal regulatory environment.

Tenure is not the only factor in changing the climate of farmer rights and control over their natural resources. It isn't as simple as changing the codes. Revenue, training, and other factors need also to be looked at.

The Center has not explored issues of community management or collective property management. Generally, the Centers' work supports the need to expand the greater security of tenure over resources, while being mindful that communities and States have a mutual interest in resource regulations. So the Center is looking at getting a balance between tenure security and legitimate interest between the community and the State so that resources are not degraded for short-term economic gain.

Forestry Support Program Julie Morris - U.S. Forest Service

The Forest Service has an active ten year project that is funded through the R&D Bureau to provide technical assistance and information to the USAID Missions. The unique perspective that the Service offers is that it has 100 years of experience as a public-sector institution responsible for national resources management.

FSP has been working with the Africa Bureau since 1990 on policy issues in Madagascar, Uganda and The Gambia. Investigations on the impacts of institutional reform on natural

resources management included both the intended and unintended impacts of reform in the agricultural sector.

Current work began with a month-long study on institutional issues related to natural resource management. The preliminary report is a broad initial effort that draws differences between policy issues; financial, institutional and implementation. More indepth analyses are being performed in Madagascar and The Gambia.

In discussing validity, Theme One is very timely in recognizing the need to apply resources in a more impact efficient manner to focus on a potential for economic benefits to rural researchers as well as rural governments. Past projects usually focused on select regions and not on a nationwide basis. The policy Theme offers an opportunity to look at a broader context and political atmosphere; this is very timely, given the political changes in all African countries over the past 18 months. Policies and institutions are being adopted, reformed and recombined.

In terms of additional questions, a real difficulty is that policy reform rarely occurs in isolation. It is very hard to pinpoint the impact of specific activities; and, one change is often not a sufficient condition in and of itself. A second difficulty is that a lot of the monitoring, reporting and tracking sought by the Agency is at the people-level impact and establishing those correlations and quantifying values of the macro change into people-level impacts will require devoting substantial resources.

In terms of additional information on current research, there is a benefit in accessing other development assistance agencies in their activities. The Africa Bureau could capture their lessons as well as share what has been learned. The World Bank is investing in policy and institutional reform. We should investigate institutionalizing the communication among agencies.

For regional variations across the continent, historically the focus has been on agro-ecological zones. The political and social history is much more relevant in this question. Former Anglophone countries and French West Sudan, for instance, may share policy and institutional configurations that may transcend ecological zones. Political change is a constraint as well as an opportunity because negotiations may not be binding. Similarly, if the Africa Bureau is going into a country to initiate development assistance activities and the World Bank has structural adjustment loans that impact on the sector, these realities cannot be ignored.

The organizational work that has gone into the PARTS Analytical Agenda is very useful and the Division is focusing on work by collaborators to capture their unique capabilities and more communication between the collaborators should be encouraged.

Comments

Tony Pryor - ARTS/FARA/NR

Our office has previously shared an overview of the evolution of analyses. Some of the groups, like Land Tenure Center are in the synthesis aspect, others are in the process of desk-top reviews and for others, like the Forest Service, work on institutions is just beginning in the field.

Natural resources almost always cuts across sectors, ministries and conflicts of turf, institutional resources and power. The Africa Bureau has not had anyone working on this area, but expects to work with the Forest Service and others in the future.

David Gow - World Resources Institute

The World Resources Institute (WRI) has been collaborating with the Africa Bureau for some time in four main areas. Two as advisory groups in natural resources management policies and environmental information systems. The other two activities include an applied research program called "From the Ground Up" and the other in the design and modeling of National Environmental Action Plans.

The Policy Consultative Group is an informal group of North American and African researchers, academicians and technicians interested in improving the process of formulation and implementation of natural resources policies in Africa.

The workshop organized just before Christmas (1991) identified a range of topics from natural resources management to macroeconomic planning, particularly agriculture, policy instruments, resource economics, and institutional issues. Also discussed were the types of linkages that exist between various types of national action plans.

WRI is interested in working with Missions and other donor organizations in African countries like Rwanda and Uganda in hopes that this policy consultative group can provide some assistance on some of the policy implications and discussions regarding implementation of the National Environmental Action Plans. This is an embryonic action.

WRI has also been involved in designing the NEAPs in sub-Saharan Africa by providing technical assistance rather than research. Two aspects that have been emphasized are the role of popular participation and the introduction of simple practical systems of evaluating and monitoring the designs. The NEAP's development process in a country takes about two years.

Last year, WRI collaborated with World Bank on a research project to examine what popular participation really means in practice. The preliminary results of the desk-top study were that popular participation left a great deal to be desired. One of the research topics is to look at what NEAPs have managed to do over the past three years.

The last speaker made a good point in saying that some of the problems in Africa were due to 50% bad ideas and 50% bad people. Some of the ideas like the NEAPs need to be

closely looked at. It is very important to look at who is actually involved in the development of these action plans, what information is used and who makes the decision about what ultimately goes into the plans. And finally, how good are the documents that come out of the plans.

Albert Greve - Multi-Donor Secretariat, World Bank

The Secretariat, in existence for the past 18 months, was created by A.I.D. and the Africa Region of the World Bank Environment Department to work specifically on the Madagascar Environmental Action Plan. Madagascar was one of the first, largest and most complex of the NEAPs. Because of the large number of NGOs, donors, and nationals involved, there was a need for coordination to ensure the rationale behind the different programs to be put in place. The Secretariat for the first 18 months, has tried to concentrate in field and operational presence in understanding NEAP design and implementation in the country. Eventually, another theme for research is how to ensure the concerted use of funding for these programs.

During the next 18 months, an analytical program can be developed while keeping one person in the field and another behind the desk. The experience in the field translated into any type of analysis should be considered a working tool for other practitioners working on NEAPs throughout Africa.

Reflecting on experiences in Madagascar in respect to the first question of conditions, the essential starting point is to create a comprehensive national framework for environmental planning in which there can be comprehensive cross sectoral planning among different ministries that come to a consensus that there really is a problem to be addressed.

Over the last three or four years, the direction taken in 20 countries has been to develop NEAPs. This has been controversial because here is another plan and what is it to do? The strategy goes beyond environmental planning because decision makers are in a climate of collaboration that is not just for the environment, but also for economic development.

On the issue of popular participation there is a lot of documentation that exists in World Bank, A.I.D. and the donor offices. The problem is how does one disseminate lessons learned? With the NEAPs the popular participation is critical if indeed there is going to be a successful product that has national ownership which is a key to success. This is a major research theme for the multi-donor secretariat.

Another aspect is donor coordination. Since there is a great deal of money available now for environment, natural resources and conservation, these countries have a lot of motivation to put in place environmental programs. The more attention put on coordination and putting resources where they are needed, the more successful these planning processes can be.

Another condition would be to establish government ownership. Frequently, donors try and take the lead too much in leading processes that are not really subscribed to by the countries.

What are some of the actions? With a valid planning process, how can the policies be implemented? How can investment programs be developed? Are new institutional structures needed? What is the policy framework needed for sustainable activities? Capacity building is also important with dissemination of practical research.

Looking at the last question of benefits and costs, if nothing is done, there will be major loss of biodiversity, major problems with erosion and economic problems as a result of environmental degradation which is estimated at \$100 million a year in Madagascar alone. If something is done, there is a wealth of benefits including changes in institutional behavior at the decision making level. Additionally, there is a lot more government recognition or acceptance of NGOs. In Madagascar, an NGO institution was created as part of the environment program; as a result there was a lot more acceptance of the fact that NGOs have a lot to contribute.

Finally, there needs to be more decentralized activities for effectiveness. Over the next 18 months, some of the other research themes that will be developed are:

1. Practical approaches to development through conservation; and
2. Studies focusing on the legal and institutional framework for NEAPs.

Derick Brinkerhoff - Implementing Policy Change

This activity has been essentially a desk-top study; a draft report is now available.

Several members of the Implementing Policy Change direct assistance consortium have been involved in looking at three sources of information. These were a set of USAID projects, programs and reports that NRM collaborators have done, published literature, and various collaborators were interviewed on implementation issues involved in natural resources management.

In drawing the boundaries around some of the policy implementation issues, there are two considerations; the legal and statutory framework and what happens on the ground. The view taken by this consortium was the broader definition of policy implementation that looks at behavioral changes that the policies are intending to establish. Boundaries are determined by what is analyzed and the ultimate determination of intervention points.

Highlights of the review are as follows. The USAID NPA reports were rated according to the management and implementation issues cited as critical to the success of the activity.

Among the top issues were:

- **management capacity,**
- **ownership and commitment of host country officials,**
- **organizational issues and systems, and**
- **sustainable and community participation.**

The consortium looked at NRM literature in regard to the way that a set of necessary and sufficient conditions for successful implementation are expressed in natural resources management in Africa. Some examples are as follows.

- **Successful policy implementation depends upon the fact that policy and statutes contain clear objectives and criteria for resolving conflicts.**
- **The framework of the policy needs to identify the linkages and factors that will lead to successful policy outcome. This is often difficult due to the many linkages inherent in NRM policies.**
- **The third condition deals with structuring implementation arrangements. In NRM, arrangements tend to be complex when bringing together government entities, quasi-government entities that cross many ministries, and NGO entities.**
- **Another factor deals with the skill level on the part of the implementers and political leaders. There is a need for political skills to manage the vast panoply of interests inside and outside governments. Government officials tend to be inside-oriented; this does not work very well when there is such a wide range of stakeholders.**
- **The fifth condition looks at the need to build and maintain stakeholder support.**
- **The last issue deals with socio-economic and political conditions.**

Louis Siegel - Associates in Rural Development

The Decentralization: Finance and Management (DFM) Project focus is to study the relationship between decentralization, local autonomy at the community level and sustainable natural resources management practices. The rationale behind this focus comes from the recognition that overly centralized institutions and governmental control over decisions on how to manage natural resources have been an impediment to the adoption of sustainable use practices by local resource users.

The principal questions looked at are:

1. **What are the institutional policies and conditions which lead to improved natural resources practices?**

2. What is the role of decentralized control and local governance in improved natural resources management?

The DFM project and Associates in Rural Development along with the organization "Workshop on Political Theory and Policy Analysis" have been working on these issues for a number of years. Through the DFM project most work has been done on options for promoting user-based governance of renewable natural resources in the Sahel. In addition, there has been a specific country study in Mali sponsored by Club de Sahel. The report covers natural resources management, policy and institutional constraints and decentralized public service in areas of health and education. A similar study will begin this spring in Cape Verde.

The first task was to do a desk study on the theme of decentralized natural resources management. There is not a lot of information available on these specific terms. The study, therefore, looked at ethno-graphic literature; case studies on specific indigenous resources management practices across Africa to show how these practices were either supported or impeded by government policy. Also, the study looked at project literature and literature on participation in natural resources management projects to determine the conditions needed to promote improved natural resources practices at the local level. A draft report is available.

In Uganda, DFM looked at issues of natural resources management around the buffer zone on the periphery of the protected areas. A team in Mali is looking at forestry issues; and, in the spring, a team will go to Namibia to examine successful local initiatives in natural resources management either through projects or where indigenous practices have survived over time to try and analyze the conditions that have led to successful initiatives.

During the course of this work, DFM has been meeting with colleagues at WRI, Land Tenure Center and World Wildlife Fund to share literature and document databases and field work. This sets the stage for future collaboration on joint research efforts.

In relation to Theme One, DFM has developed a preliminary list of conditions that sets the stage for field work.

1. The existence of viable local self-governing institutions supported by national and sub-national governments.
2. Willingness of the public-sector decision makers to negotiate terms of natural resources management with local users.
3. Accessible open and fair conflict resolution mechanisms for natural resources users.
4. Knowledge and recognition of indigenous resource management practices.
5. Resource tenure that gives users clear rights including limitations to the resources they use.
6. Physical policies that encourage sustainable exploration of natural resources.

7. Environmental policies and conservation strategies that can be developed at the community level.

Regarding agro-ecological zones, DFM work shows that since there is so much work across agro-ecological zones, there is a benefit in establishing a mix between user autonomy and the appropriate level of government intervention for enforcement purposes on the national and sub-national level.

Plenary Session for Theme One

Steve Lawry - Land Tenure Center

In the context of a situation such as the forestry agencies in the Sahel which have a long tradition of being committed to a certain kind of forestry policy where the rights of the forest are vested to the State, "How do we move institutions away from traditions of State control that stifle investment in sustainable natural resources management?"

Donors and governments alike are trying to get more trees on the ground. To do this it is necessary to give farmers clear rights and control over returns from investments in agro-forestry. If, however, tree planting is done in the context of a regulated environment where decision making of how trees are used rests with someone other than the individual farmers, then the goal will not be accomplished. To change this, it is necessary to work on reform of the larger policy environment.

Support also needs to be given to staff within forestry agencies in recognizing their professional goals and interests in agro-forestry and technology dissemination. In Mali and Senegal, the Land Tenure Center endeavors to help these people make their case within their bureaucracies.

Louis Siegel - Decentralization: Finance and Management

One concern in focusing largely on the analysis of public sector institutions in policy formulation and implementation is that there is a lack in discussion of who the object of the participation is. In talking about farmers and users, this approach creates somewhat of an imbalance for the local resource users. There needs to be a clearer recognition that if one is to broker arrangements, then there has to be a compromise as to the most effective approach to natural resources management and needs in terms of the use of the resources.

David Gow - World Resources Institute

Do we really want to continue looking at all that is necessary in order to have sustainable natural resources management, or should we be more realistic and establish priorities? (Reference, seven conditions listed in Louis Siegel's presentation.) There is no way to really address all issues.

In terms of changing behavior of policy makers as well as farmers, some of the experiences of co-management show there is quite a bit to be learned.

Albert Greve - World Bank Multi-Donor Secretariat

In meeting the need of evaluation, the approach should be more on monitoring the process of developing and implementing NEAPs. Only a few are in the implementation phase, thus, it is early to evaluate. The most critical effort is in helping countries develop adequate systems for monitoring in a way that is beneficial to participants.

Jerry Wolgin - AFR/ARTS

Aside from the tenure issues, I have no clear idea of where the policy failures are at the national level, or a clear idea about the links between macro-policy and outcomes. I am concerned that knee-jerk reactions to structural adjustments lead to increased poverty in the short run. Similarly, structural adjustments have some negative impacts on natural resources management outcomes.

What kinds of positive analysis have been made to make these links? What are the links between adjustments that lead to higher prices for foreign exchange and higher energy prices in natural resources outcomes. There is a whole range of policy issues, institutional issues and policy change.

Russell Mishloff - R&D/ENR

The focus to date has been on institutional participation and the interaction between government ministries and NGOs with the objective being to develop a strategy in which the stakeholders have a sense of ownership. This is critical. However, the presentations did not give any idea of how the participants here determine the priority and cause, the problems, what programmatic and policy options that should be looked at, and their efficacy in respect to Level III (of the Framework) and higher. That is, the impact on practices, biophysical and people-level impacts. What kinds of processes and analytical tools went into the formulation of the NEAPs?

Albert Greve - World Bank Multi-Donor Secretariat

The NEAP design process is an analytical process. In Madagascar, for instance, the process of analysis took over three years with more than 100 people working. In some countries, the process is much more rapid, but the first step is analysis.

Kjell Christophersen - International Resources Group

What is meant by the term sustainability? This may mean something different to various people.

Will Campbell - Independent Contractor

Sustainability is the maintenance of capital. It may be transforming a mineral resource into human capital. If one is not maintaining capital, then one is not sustainable. Capital does not have to be maintained in the form that it was first created.

Mike McGahuey - ARTS/FARA/NR

You talked about policy and institutional changes as being good things; but, there are costs and benefits to institutional and policy change. How do we get to the cost and benefit of these policy options.

Derick Brinkerhoff - International Development Management Center

This was one of the factors that was brought out in the literature; the notion of looking at not just the costs and benefits in terms of the ultimate outcomes on sustainability of natural resources use, but looking at the organizational and administrative costs and different approaches of implementing policy. This is behind a lot of the effort of using community co-management. The notion is that if you set up the incentives so that people are motivated to do things in their own self interest, you can cut down on the cost of managing regulatory systems.

In terms of looking at analyses, this is one of the things that people don't immediately grasp; but, in terms of land tenure, there is a series of administrative costs in the public sector that African governments under severe budgeting constraints will have a hard time doing. This issue is something that definitely needs to be factored in.

Pierre Gross - Resources for the Future

On sustainability, I agree that it is useful to put the definition in terms of capital stock; but, that it is not enough to maintain capital stock. There are a lot of people each wanting more, so, the capital stock must be enhanced. It is important to consider the various components of capital stock that need to be enhanced. It is useful to think of the most critical component as social knowledge; in this case, of how to manage natural resources in ways that will increase productivity. Maintenance is not enough; enhancement is what is needed.

Michael Brown - PVO/NGO NRMS

On brokering and brokerage, the key issue is getting around constraints at the policy and analytical level to implementation of real action. The methodology to effectively broker various stakeholders will vary in every situation. The challenge is to operationalize what is realized in terms of analytical constraints and get test and model activities operating on the ground.

Joan Atherton - AFR/DP

Do we really understand the extent to which community co-management from the State perspective may be a second best solution, but appropriate? Is it useful to distinguish between permissive and perspective policy environments?

Steve Lawry - Land Tenure Center

The tradition in the Francophone countries has been one of prescription with a strong emphasis on direct regulation. The Anglophone tradition has been much more sympathetic, giving rise to customary tenure models in the access and use of natural resources. In the context of a comparative study in The Gambia and Senegal, we are trying to compare the effectiveness of these different State approaches to regulation on natural resources management and on the vitality of local institutional approaches to natural resources management.

What we are trying to promote in the Francophone countries is how to re-orientate this culture. We are talking about allowing individuals themselves to regulate the use of natural resources. Farmers need to have the legal right to maintain their own resources.

Dick Ford - Clark University

The wind of change sweeps more than just the Soviet Union. Africa is involved as well in this dynamic move toward decentralization. The pressure for change is beyond our control, it is already sweeping; so let's have things in place that those change responses can look to and use as guidelines.

Caroline Njuki - CODEL

How sensitive are we in formulating these policies and programs? You tell the woman needing fire wood not to cut down trees. Do we have other mechanisms in place to address the situation? What alternatives are being made?

The NRM projects are making progress, but I wonder as we go into African countries are we being invited? Are we selling them a plan? We have to question how successful we can be because people work better if they have the initiative, but if we are selling them a plan that they are not comfortable with, we will waste a lot of time.

Sam Wasser - Smithsonian/National Zoo

One of the most serious problems is one of population growth. Many critics of sustainable utilization have the fear that a successful sustainable utilization program will result in future population growth. Africa is starting to lead the world in growth rate.

How do we deal with the long-range problems associated with a successful utilization program? How far into the future should our policies strive to reach?

Peter Freeman - DATEX

Are the institutions that exist now adequate and sufficient? Is cross sectoral cooperation enough to have institutional agencies do the jobs that are laid out by the NEAPs? Specifically, land degradation problems are still number one on the African environmental agenda. What are the institutions that will be fostered, reformed and supported to address land degradation.

Tony Pryor - ARTS/FARA/NR

Some collaborators have felt a bit constrained that we are trying to slow them down in reaching answers and prescriptions. The reason is that we feel knowledge is not in Washington, but rather in the field. A number of Missions have been trying to do analyses that require some prior analyses by Washington before clear judgements can be made.

Secondly, there is a process of defining what are the issues before discussing what are the final lessons. In this Theme (One) we are in varying phases of evolution of thought processes. This is not a finalization of what is known about a specific subject, but rather a snap shot of a moving picture.

Summary of Theme One Issues

Ben Stoner - AFR/ARTS

In summarizing a few points from the first session and where we are in the process of the NRM Analytical Agenda from our Office perspective, I have the following observations.

It is important to consider the reorganization of the Africa Bureau in looking at the change in function and the way we approach problems. We are now focusing on two problem areas; sustainable agriculture and tropical forestry/biodiversity. Proceeding with the program, we have developed a framework which better describes what the Africa Bureau is about and how we go about doing the job. It is useful in looking at the Theme areas, that within the framework we are trying to refine what the Africa Bureau is about and what is looked for in each of these levels.

In the adoption of practices area, we are trying to define clearly the adoption of what practices by whom and what resources users, either local-level community, public institutions or others.

Within the process of defining the NRM Analytical Agenda, we are in different phases. The work in the Land Tenure Center is much further along. Work in natural resources policy is very new. There was little expertise on this subject in the Africa Bureau staff prior to

1990. The natural resources agenda evolved out of the NRM project which is primarily an implementation support project which is now moving toward an analytical project.

There is some question about how the Africa Bureau is working with R&D. We are synthesizing information that already exists in USAID. There are some gaps. Jerry (Wolgin) pointed out some of the gaps in policy and economic analyses; the R&D Bureau is trying to address these with the EPAT project that will be in operation soon. We are also trying to work closely with the Missions to draw upon country-level experiences to synthesize and then feed this information back into the countries.

Through all of the Themes, the goals and objectives are to better define where we are in the priority research areas, and, with each, the measurements and impacts to determine what is to be done.

Introduction of Theme Two and Questions

Mike McGahuey - ARTS/FARA/NR

What is different now than five years ago? There are now in Africa Bureau very few aggies, foresters, and range managers; but quite a few economists and social scientists. This is not by accident. Historically, Peace Corps people believed that if the technology was right, everything else would follow. This is not quite right. Technologies are important, but are not the only consideration. This particular composition is not a change in philosophy; there is an empirical basis for it.

A particular case study in Niger for natural-forest management indicated that the one measure of change is the increase in revenue going from \$4,000 to \$75,000. This change is a direct result of the biophysical base in terms of density and composition of vegetation.

This change was due to farmers adopting natural forest management technologies in areas from 1,500 to 33,000 hectares. This has mostly to do with the producer and little to do with USAID. The question is how do we increase from 33,000 hectares to tens of thousands across the Sahel with broad-based impact?

What contributed to the change in farmer behavior? These technologies were developed by USAID, however, if the Niger government did not provide the technical assistance, then the impact would have been marginal. There is an active cooperative movement in Niger that spurred the increase. Additionally, there was a fiscal policy change that permitted the increase; use rights also contributed. These factors are all necessary and sufficient; but most importantly are a way to establish priorities. Natural forest management is just one case. USAID has looked at at least 100 of these case studies. This explains why there is the mix of expertise available here.

The Missions provided research, development technology, training and tenure studies. The tenure enabling language goes back to 1974, but the use rights were not formally granted to coops until 1987. There were, however, some structural policy changes that further supported this effort.

Because there are tens of thousands of hectares appropriate for natural forest management, there must be an increase in revenue. The question of today revolves around what will be required to make the increases.

In this Theme (Two) the consideration is what happens in Levels One and Two if the policies are adopted?

Presentations of Collaborators - Theme Two, Actions and Practices

David Gow - World Resources Institute

The question raised this morning by Jerry Wolgin, "What's new?", is very important. Those working in natural resources management are aware that there is no silver bullet. The issues are complex and do reflect some of the problems encountered in natural resources management, integrated rural development and agricultural development at the program and project level. Another area of increasing interest and increasing focus regarding policy implications is in the realm of brokerage and conflict.

Secondly, of interest is the area of resource control. In Africa, there is a more sophisticated approach in dealing with resource control and access to resource by placing these issues in the broader context of the political, social or technological arena.

WRI has been involved in an applied research program over the past few years. "From the Ground Up" focuses on community-based natural resources management in twelve Francophone and Anglophone countries in Africa. The communities selected were those that traditionally have received little or no outside assistance, but rather have tried to solve resources problems independently.

The methodology was to work closely with African institutions and African researchers. WRI was not doing the research. Many workshops were held with people who participated in and conducted the studies to discuss preliminary results. There will be a publication on the focal issues of natural resources management by communities and guidelines for policy makers. The project is nearing completion of Phase I that focuses on the community level. This Phase includes analyses and tentative recommendations.

The points of emphasis are as follows.

1. The definition of viable local organizations that are characterized by strong leadership, democratic decision making and sound organizational management.

2. The recognized need for results management at the level of the community that considers some technology interventions.
3. More effective than others, the importance of perceived security over the productive resources.

Regarding the policy implications of some of these findings, there is a strong argument for community-based resources management and decentralization for making this type of management more practical and feasible. Additional training is important at the government and local levels to ensure organizational skills necessary for management. Technology must be adaptable to modification at the local level.

In Phase II, WRI will trace from the national to the local level the impacts of policies on regional and local natural resources bases. The first national study in Uganda is near completion. This study looks at the effect of environmental policies on the natural resources base at the regional and local level. The study was conducted through workshops and case studies. This study will be used in the development of the NEAP in Uganda.

Phase II similarly looks at the effects of different types of policies; in Kenya, the impact of wildlife policies, in Tanzania, the impacts of tenure policies, in Rwanda, the impact of population policies.

The other aspect is indicators. The framework that WRI is working from has been used widely by USAID Missions. Another document goes into indicators for the various levels in the Framework (See Green Card). Dan Tunstall will talk about indicators for the first three Levels. The indicators for the biophysical changes and productivity increase include soil, water, vegetation cover or biodiversity, and methodologies for making measurements. Fred Weber was responsible for developing a number of these methodologies. In WRI there is an effort to interest USAID Missions in Africa in testing some of these indicators.

Kate Newman - Biodiversity Support Program

The Biodiversity Support Program is a consortium of the World Wildlife Fund, World Resources Institute and the Nature Conservancy. The cooperative agreement is to conserve biological diversity and to support sustainable development in USAID assisted countries around the world.

In 1991, BSP received support from the Africa Bureau to initiate the Biodiversity Analyses for Africa (BAA) project. This was designed as a one-year activity to promote analyses for the initiatives, strategies and approaches to the conservation of biodiversity, while promoting human prosperity. All of the components of the project will lead to the design of a biodiversity strategy for Africa that will assist the Africa Bureau. BSP will also be developing a practical base of information to disseminate to practitioners.

What are the constraints of biodiversity? The first is the conception of biodiversity as a marginal issue to development and conservation. Instead of being viewed as an integral part of development, there is a perception by some development professionals that biodiversity conservation is a separate issue, separate even from natural resources management.

This bias towards the traditional conservation view has affected how biological conservation has been implemented in Africa. The consortium is looking at a new way to bring the people of Africa into this issue. By understanding the link between humans and biodiversity, long-term approaches to development and biodiversity conservation can be obtained. Africans do not live by corn and cattle alone. Biodiversity is not just a special interest as is often treated by the development community. The challenge is how to pull development into the conservation issue to make it relevant to conservation and development in the coming years.

Increasingly, western NGOs are getting involved in buffer-zone management which is a combination of conservation and development outside protected areas. The higher issue is on maintaining capital stock within and without protected areas.

How is BSP going to implement this? BSP has the privilege of implementing from the analytical as well as the action side. There will be demonstration projects to support the field by identifying African initiatives that can be analyzed, monitored and evaluated for elements of successful conservation in Africa.

The question is "Are we really being invited in to do this kind of analysis?" This project is to establish a collaborative approach to this issue. Therefore, a panel of senior advisors, most of whom are African scientists and conservationists, has been assembled. They are the ones to set the priorities for biodiversity in the future. Conservation and biodiversity has traditionally been the agenda of northern NGOs and northern donors.

Over the next year this consortium will meet with this panel to receive intimate input into strategy development and to have the panel also conduct some conservation projects and analyses to enrich the strategy.

In biodiversity, the group has to examine eco-systems. Biodiversity cannot be analyzed by looking at perfect models. An example: the Campfire project in Zimbabwe and then moving that into the Congo or Zaire and expecting that model to be implemented over time. One of the great dividers of information in this sector is the eco-system.

In order to understand how people interact with these eco-systems, there are different production systems that humans use for using their land resources. By understanding how people interact with their environment differently in terms of different conservation techniques that are being used in Africa, this consortium can begin to aggregate and disaggregate the information from each particular activity. For example: if there was a policy and legal framework in subsistence farming, are projects being examined? It is not

necessarily true as in the Campfire example, that particular projects could be moved into Francophone forest area and have the same impact. But there are particular elements of the project that could be moved up.

The goal is to fill in the gaps of knowledge on how biodiversity conservation can be implemented in Africa, combine that with development and move the state of knowledge forward over the course of BSP. This is a part of the progressive strategy development.

Lastly, is the issue of impact. Are we hitting all of the topics? For example: as northern scientists have been involved in conservation over time, it has mostly been from a northern view point. The focus now is what is important to the Africans in biodiversity conservation. Probably, there are nutritional, economical and spiritual values to be taken into account when selecting when and how to consider biodiversity. This is important in considering how to address impact.

In impact indicators, we look for those that reflect northern standards of biological health and local standards of biological importance. We will have to rely on our African counterparts for this input.

Michael Brown - PVO/NGO NRMS

The PVO/NGO NRMS project is another collaborative project under a cooperative agreement with A.I.D. Washington and three U.S. PVOs: the Experiment in International Living; CARE; and the World Wildlife Fund.

The objective of the project is to increase the technical and institutional capability of NGOs, including PVOs, in Africa while focusing on four countries; Mali, Cameroon, Uganda and Madagascar.

There is a lot of agro-ecological variability in these four countries. In attempting to increase the technical and institutional capability of NGOs, the primary focus is on providing services at the level of information support, training and technical assistance.

Although the project is characterized by FARA as operational, there has been a fair amount of analytical work that has policy implications.

This work includes the following:

1. With the help of WWF/BSP, A.I.D. Washington, the Forest Service and others, the project held the first buffer-zone workshop a year and a half ago in Uganda. In buffer-zone management, attention has been placed on the process of bringing different stakeholders together to identify methods that cross cut any agro-ecological specificity.

2. In Niger, this project did an analysis of NGO work in natural resources management.
3. Similarly, another analysis was done of NGO work in Cameroon.
4. For a reserve area in the Central African Republic, the group has done work on economic options that included timber extraction, eco-tourism, and agriculture. This work contributed to the halting of an African Development Bank road project.
5. Also work in integrated conservation and development project methodologies that lead to enhanced design of projects based on lessons learned has been done.
6. Another project, natural regeneration in the Sahel, looked at the most promising opportunities in natural regeneration in farmers' fields in the Sahel.
7. Additionally, a pastoral sector assessment has been done.

What can be said about the validity and timeliness of the NRM Theme Two question?

The questions in this Theme are somewhat premature although valid. The PVO/NGO presentation could very well have fallen also under Theme One questions, because the focus is on the enabling environment in which NGOs and communities work.

The first phase of the project has been in less of an implementation mode in terms of disseminating and extending technologies that are proven. This phase is still determining what are the technologies and the methods for dissemination.

The project also includes work on policy issues and issues at the institutional and technical level of NGOs that enable NGOs to implement rather than the actual implementation of activities.

What other questions are relevant and require investigation? It is important to disaggregate between individual level interventions and group interventions. By lumping individuals together into a group, there may be a disservice to ourselves and our ability to deliver. Secondly, in the Analytical Agenda there is a gap between policy socio-economic work being carried out under Theme One and practices on the ground being carried out in Theme Two. It is assumed that people on the ground already have information on Theme One. This assumption is often incorrect. This project works on both levels.

There is a need to integrate work on the ground, work in analyses, policies and methodologies development with actions and practices. In this project, the focus is on buffer-zone management to develop these methodologies. One of the great weaknesses in development and conservation is that analyses and policy people stay to one side and action-oriented people stay to the other. The PVO/NGO NRMS project tends to render the approach in a much more whole fashion in terms of mandates.

To better understand the question related issues, those working in analysis and policy need to integrate conditions and policies agenda into the actions and practices agenda.

Dick Ford - Clark University

Dick Ford represents a collaborative project being carried out by Clark University, MA and Edgerton University.

Participation is the particular focus that this project brings to the research program. This beginning at the local and rural community level does not suggest that national policy is not important.

The joy of a meeting like this is that there are people concerned with national policy and how one does analysis and various intellectual exercises to achieve policy and at the same time suggest that there is wisdom, experience and skill at local levels that can easily be integrated into policy. Trying to systematize local participation grows out of the commitment that national policy is important.

In terms of the collaborative work with Edgerton University, the assumption is that sustainability is a factor of ownership. The degree to which individuals and institutions will go out on the line for sustainable resources management at the local level can be related to the degree that they feel ownership in the process.

Local participation is chaotic and unmanageable and without limit unless there is a conscious focus on ways in which it can be structured and organized. This process changes the approach of Rapid Rural Appraisal.

Participatory Rural Appraisal first assumes that the information and data gathering stay with the community. The most important user of information at the village and community level is at the hands of the community institutions.

Community institutions are the most effective, viable and sustainable organizations for keeping biological diversity productive, available and accessible in Africa. These local institutions manage most African resources. The key decision makers are generally women.

There are so many components, from national to local levels within different sectors, and the local sector is and can be a leverage point.

There are two differences between Rapid and Participatory Rural Appraisal.

1. In PRA, the information stays with the community, and
2. PRA focuses on the community developing its own action plans.

Participatory Rural Appraisal includes allowing:

- data gathering individuals within the community to determine their worst problems,
- the communities to determine the best solutions to problems, and
- communities to systematize and mobilize the community groups.

There are several constraints from the perspective of the village.

1. Every community has conflicts that create stratification. This project looks at case studies on gender analysis that reveal how compartmentalizing local organizations can give voice to groups that are not always heard. The groups may be ethnic, class, gender, or age. More research is needed to measure impacts.
2. PRA works island by island, however, operations and resources do not flow in this manner. If significant impact is to be made in the implementation of decentralized development, then development professionals need to look at ways in which there can be a scale up of issues from the village to districts to regions. One of the tools to use is geographic information systems to link social science, physical data and population data to develop better resources for measuring impacts.
3. Implementation is another constraint. Communities require training and experience in, for example, the process of how they can raise money internally by writing proposals. There is a handbook available on implementing PRA; this is a collection of successful plans that have been implemented.

Village appraisals create or retrieve much better baseline data than can be obtained from soil surveys, and other national data gathering techniques. For example: communities can be asked to rank trends like soil erosion, land productivity, population climbs, levels of education. Farmers know this data creates the baseline; the community is better able to measure their own progress over time.

Villages can implement a whole range of sustainable resources management enterprises based on information and experience of the communities and interaction with technical officers. The participatory effort functioning technically in rural communities requires a national policy environment to enhance success.

Plenary Session for Theme Two

David Gow - World Resources Institute

Kate Newman made some very important points concerning the fact that biodiversity is also a natural resource, and that we need to see this as part of development. This has been an up-hill battle.

In WRI, there is a program which deals precisely with biological diversity. In WRI there are debates about the relationship of biodiversity and development; these interesting viewpoints on global diversity were published last month. There are ten objectives, one of which stresses the point of support for local control and access to the resource base and the productive use of that resource base within the context of biodiversity. And, without that link, biodiversity in many parts of the world is a lost cause.

A second point Kate made was on the danger of taking models that are typical for one ecological zone and trying to apply them to another zone. BSP is trying to pick out some of the common factors that can be replicated.

A lesson learned from other experiences in Integrated Rural Development (IRD) or the activities of NGOs is that there is a tendency to jump on the band wagon of these exceptional case studies. There are several in the NGO community, IRD literature and several in the emerging literature on conservation and development. As we start looking closely at factors and constraints regarding the success of some of these models, there usually are certain neat characteristics that can be replicated.

Michael Brown emphasized the importance of adopting and testing technologies. This is very important and perhaps not getting enough attention here. Also his point about the policy makers on one hand and practitioners on the other engaging in more dialogue is a point well taken and seems to be an historical constraint of working in development. Some of the research activities talked about here today and some of the ongoing activities are trying to bridge these gaps.

Finally, the methodology of the approach that Dick Ford lays out is very important. Those of us who have been involved in participation are beginning to see increasingly, the political implications of many of the things previously advocated. I would argue strongly that when talking about participation, we should look seriously at the political implications of our actions.

Kate Newman - Biodiversity Support Program

One point discussed specifically is "Who are we working with in the field?". We seem to be stressing the policy discussion and collaboration with governments and then collaboration with NGOs and smaller local groups. It is difficult in the field to get these two entities to speak to each other, particularly in the political environment that is leading to empowerment of local people in the democratic process.

The Africans worked with often don't have a background that supports collaboration with the government. In The Gambia, one project brings the local community into dialogue with the government, but there is no direct link between the ministries and the villages. The government officials visit with the local community, hold discussions and then go away.

Perhaps one of the responsibilities is to work with the local groups to work among themselves, but also nationally. This is a linkage that enables villagers to speak out for themselves and individual partners.

Michael Brown - PVO/NGO NRMS

We all have in our vocabulary today that we must empower the local people in the course of decentralization, the course of biodiversity conservancy, managing trees on individual farmers fields. There must be local empowerment. It is important to recognize just how far we can go within the context of political feasibility and technical feasibility.

I am a great fan of PRA, but one sometimes wonders just how far we should be going with PRA in terms of a strategic approach to empowerment given the incredibly dynamic political context.

Even though the NGO community is very sympathetic to local empowerment, and is pushing as fast as possible, it is important to remember that we are working in sovereign States and the issue is how we can work collaboratively with locals, governments and NGOs to develop partnerships among the groups regardless of the issues.

The challenge is to come up with methods and techniques to bring different people together that have divergent interests. We do have to push empowerment, but also we have to recognize the context in which we are working; that is from the technical stand point and resources management responsibilities and also management.

Regarding integrated conservation and development projects that Kate mentioned, we are still in the test phase. In a way, we are trying to wed two incredibly nasty things. One is the domain of development and the other conservation. It is important to realize that we are operating on the assumption that we need to do something different from the traditional approaches to conservation and biodiversity. The assumption is that by bringing in development, the problem will be solved. Many hope that this will be the case, but we are at an early stage and we are not very confident in disseminating particular methodologies. The next five years will be very crucial in the integration of development and conservation. Methodologies of the last ten years will have to be evaluated to get some sense of what has worked.

In terms of PRA, we are starting to go into our second phase in Uganda where we have been working with a community for the past year. The Uganda NGO community is really taken by the approach of PRA. However, the danger is that the methodology has to be dealt with delicately.

We have been successful at getting communities to identify their needs within the context of flexibility and to determine how to provide the necessary training to address those needs. In our project, we are not in a position financially to address those needs. Our most

pressing objective is to give the communities tools to deal with the issues and how to go to donors for funding.

Dick Ford - SARSA

On the issue of not having the capital for projects - terrific! The best thing to realize is that the outside agents don't have pockets full of money.

We have, unfortunately, demonstrated that development is waiting for the outsider to come. Development, instead, is local institutions taking initiatives. The PRA strengthens the capability for those local institutions to organize their information, to mobilize their organizations and institutions, and to go out and find solutions.

One of the things we are working on in scaling up is to suggest that at a division level, there are particular kinds of interventions that have been identified in selected areas like water, health or agriculture, that local groups identify as priority. And we can consolidate so that every village does not have to seek donor funding, and that there can be alliances between different communities that can raise money together.

On the issue of empowerment. Empowerment has to come from the community. We can put certain analytical tools in the hands of community organizations. When we are working with a particular village with terrible problems, we make sure that the PRA initiative includes every local politician in the community. Government ministries must be fully represented, NGOs also. There must be a close collaboration. Example: In one community, the water engineer has had unprecedented success in terms of just the water ministry because he was able to mobilize women's groups. They raise money for cement because the engineer has no cement money in the budget. He provides the technical support; they raise the money.

With this approach everybody wins, even in places with a lot of stratification. And we think a fundamental research question over the next few years for the Analytical Agenda relates to the issue of stratification scaling up and implementation.

Kate Newman - Biodiversity Support Program

If these local activities are successful at the local level, the link that I am trying to understand in working with governments is how to make that connection to a policy development? Communities can be very successful at the local level, but to take that example up to the national level so that the government creates a policy that implements those changes across the board is probably a trick that A.I.D. and World Bank has to understand.

Perhaps we as international players have to help make those connections. Not necessarily speaking for them, but understanding how they can move local examples up to the policy level.

Dick Ford - SARSA

I can't describe the power or the effectiveness of bringing high-level officials to communities where things are working. And, if one wants to emphasize how to get policy change, I would suggest that decentralized development is sustainable and the ways in which local institutions can manage their own development is to bring ministers, permanent secretaries, and donor officials out to places where things are working. This can be a persuasive experience.

The policy has many elements, one of which is good, tough, hard data. The second of which is who benefits in terms of cost feasibility, and thirdly, who is using these natural resources practices.

Julie Morris - U.S. Forest Service

We talked a lot about the roles of participation by State and communities and this is a critical element in the development implementation of sustainable activities. If we look at what Missions do in their design process, there is not a great deal of requirement for participation in the development and design process of USAID projects.

How can we build this into the system? We as collaborators are generating products for dissemination to Missions that can be incorporated into the design process. There is no requirement for Missions in their design process to go out and talk to people in the field.

Michael Brown - PVO/NGO NRMS

USAID does have a mechanism to address the issue of participation, it is called Social Soundness Analysis. All too often, however, after these analyses are done; they are put aside.

Some people are extremely receptive to the importance of social issues, and within that category, participation should be addressed in all of its multi strata. The mechanism does exist but the question is probably one of implementation. The framework is there, the problem is getting people in the field to recognize the importance of Social Soundness Analyses.

David Gow - World Resources Institute

Those of you who have studied Social Soundness Analyses know that there are great differences in the quality of documents produced.

An advantage of Social Soundness Analysis, as included in the USAID project cycle, is that there is someone on the design team who acts as a broker to represent the interests of those who are not being heard in the design process. The evidence indicates that the best types of Social Soundness Analyses are done by people who have spent a long time in the country,

either nationals or expatriates who for various reasons have made some commitment to the country and understand and can articulate the realities and needs. And, the fact that it is a professional doing the brokering renders the needs more acceptable to USAID.

Albert Greve - World Bank Multi-Donor Secretariat

One of the practicalities is that if you really want effective popular participation in the whole project design process, there is a contradiction between that process and donor driven timetables for project design.

One of the components of the Niger project mentioned by Michael Brown was that it took one year to let the villagers redesign the project according to their own specifications. This is probably why it is still active and very successful. But, donor agencies will have to make some basic changes in the way that they approach the design process.

The World Bank had a seminar specifically on this subject because there is a group within the Bank that wants to see how to change project design procedures.

Russell Misheloff - R&D ENR

There is the notion that environment in developing areas is a luxury, and I think there is probably some truth to that. I think people living on the edge are more concerned about their next meal and are less concerned with next week and even less concerned about the impact of their actions on the future.

If that is the case, it is probably not an open question of what the outcome of the participatory process is likely to be. Rather, we are likely to find many instances in which the participatory approach is likely to lead to a reverse structure.

It seems to me the question we should be addressing is really what kinds of incentives we need to give to local groups in order for them to take a longer term view, and maybe this should be the focus of some of our work.

Caroly Shumway - R&D/AA

There are four levels to be considered:

1. needs and rights of individuals,
2. needs and rights of communities,
3. needs and rights of nations, and
4. needs and rights of the world.

In some cases communities might want to save the caterpillar, in other cases the nation may want to save the elephant. So, I think the issue is how can we establish dialogue between

communities and the government so that the needs and rights of all participants are addressed.

Kate Newman - Biodiversity Support Program

I would challenge that environment is a luxury. If these people need to eat everyday, what are they going to eat and as I pointed out about cattle and corn, both of these things are main staples to a particular society.

Rarely does anybody eat just corn or wheat or just keep cattle for eating. They have these products in the context of their natural environment and the natural environment is the thing that allows them to continue to harvest these products, particularly agriculture. There are a lot of projects in agriculture, starting from genetics all the way to watershed management; are these really essential and justified?

I had a nice experience in January with a Zimbabwe woman who came here for a conference. I asked her at dinner what her definition of biodiversity was. This was a new word for her, she had heard it at the conference and she immediately had an answer that she had thought of herself.

She equated biodiversity with her recent return to her homeland in northern Zimbabwe. She had lived elsewhere for most of her adult life and found the landscape where she had grown up almost neutered of any kind of natural product. She felt the whole community was on a downslide. They had given up their trees, like in Senegal, they have given up the scrubs that used to feed their children the extra nutritional set of minerals that make children grow better, they had given up almost all of every extra thing they had and had little more left than corn.

She said the children are starving and they have basically lost any hope of having a good life. Gone was the balance that they had in her childhood of both corn and trees and other natural products that made their standard of living good compared to what is making their standard of living bad now.

What we are seeking is a way to help here, even in spite of population growth. To me her definition was most feasible.

Dick Ford - SARSA

One of the most fascinating things observed in Africa is the various agriculture and forest extension services people. They attend environmental problems of soil erosion, deforestation, over stocking, etc. I can go into details of how they were a total failure because the approach was from top down in certain kinds of programs.

Three and four years later because community institutions, not individuals, have become aware that there is a problem because those institutions have banded together. Those groups know that generations upon generations into the future that the livelihood will be dependent upon soil or water or trees or other agriculturally productive resources in those communities.

We recently had a situation arise that community groups rise up and say we wish to find some short-term result, but in our experience it usually doesn't come up that way.

I agree that the inclusion of women as equal partners in these decision making issues will assure even more that there will be a long term sustainable series of missions put in place because women are concerned about their children and children's children in ways that we men sometimes don't understand.

Julie Morris - U.S. Forest Service

I want to ask a question of David Gow. David mentioned that part of the work with the WRI project was the examination of the impacts of national policy on local practices. Would this be an opportunity to or do these studies already address economics? Obviously, we do not know enough about how to make the transition from macro-level policies and track the economics and cost effects associated with the transition at the local level. Is that something that could be dovetailed onto the studies you have been doing?

David Gow - World Resources Institute

Yes, the studies are just getting underway. Obviously, the methodology is still evolving. Because tracing through the linkages from the national level to the regional level to the local level is not easy given the multiplicity of factors that are involved. Another thing we would like to include is the economic aspect.

Sam Wasser - Smithsonian/National Zoo

One of the things that I have noticed in African since 1973 is that there is a disturbing growth of a new generation of Africans looking to the West for our technology, and one of the things that is happening now more than ever is that there seems to be a loss of respect for knowledge of the older generation of Africans. That knowledge is not being transferred to the younger generation who are looking to the western way and some of that is very disturbing because local knowledge is very important and culturally relevant to the people. This knowledge has a long history of being understood and it makes a lot of sense just like traditional medicine does.

There are a lot of things that we find in traditional medicine that we can use to cure all kinds of conditions and they have been doing these things for years. This is especially

relevant to conservation because generations upon generations grew up relying upon wildlife, both plant and animal.

Many of the subsistence hunters have important rules, like it is bad to hunt a big male with big horns. These kinds of things make great conservation sense from a management standpoint. To give you one example, I worked on a large conservation area in Tanzania with a thousand square kilometers of land. One of the things noted was that new generations of rangers in this huge area could be walked into the area and if stopped and asked where they were, they could not tell you. If you asked some of the older people, they could tell you exactly where they were. There is a program going on now, in conjunction with WWF, that is trying to transfer this knowledge from the older generations to the younger.

Michael Brown - PVO/NGO NRMS

On the issue of local knowledge, one of the problems is that there is a contradiction. On the one hand, we want to validate traditional knowledge and the local people have all this wonderful knowledge; while on the other hand, is the creation of national parks in Africa, where local people have been dispossessed of their lands.

There are so many contradictions between what the park service is actually doing and what they could be doing, and what the local people and others think they are doing at the park service level. The park model is proving the validity or viability of the model is inherently being challenged in many places in Africa now. That is why I think people are looking to us. Maybe we are not going to throw the baby away with the bath water as far as parks are concerned, but how do we give incentives to conserve resources in and around protected areas? This is the challenge.

Kjell Christophersen - International Resources Group

I would like to convey a slightly different dimension here. I wonder, if our focus is not pulled together it will fall a bit short of what we really need to focus on and that there is the demographic question. We have a positive population growth and there are ecological indications of what we can do to improve the natural resources base. What we are really doing is buying time.

The real question we have to consider is what we do with that time and what we do with the proceeds that come out of improved natural resources management. I have been hearing a lot of talk about the goodness of local participation; all of these things are great, but they are a means to an end. I think we do have to focus on the fact that all we can really do is buy time. What do we do with our time? Can we solve the problems through local participatory approaches? The problems are much more complex and much bigger than that. The researchers that happen to be working on these issues of ecology, demography

and economy may need massive external inputs in terms of chemical fertilizers, to solve the problems.

These are the things we may have to consider, and these do not fall within the realm of the traditional approaches that we are talking about. I think we have to have a broader focus and not stop short of trying to improve the natural resources base.

Dick Ford - SARSA

Participation is a means to some other end. What I would still argue for is national policy. However, the local communities and individuals have to make the decision to use fertilizers. Putting decision making in the hands of those who are currently out of the loop is the reason why Africa is replete with continuous project failure. We have failed to include the land and resource users, sustainers, and maintenance people in the discussions.

The target issue is on local participation to establish a dialogue that will influence long-term policies, programs and interventions so as to allow societies to maintain and sustain their resources base.

Joan Atherton - Africa Bureau

We have spent a lot of the afternoon talking about alternative means of getting results. I don't see a commonality of objectives in the area. I still hear some people talking about conservation, some kind of more sustainable use of resources base. I don't hear people talking about how much forest cover should we have in Africa. What would be the sustainable use of that resource, what nutritional status are we looking for in Africans. We are stuck on means, and I would encourage you in terms of the research agenda to establish a basis by which you can measure increases in biomass with the participatory approach and that includes a better nutritional status.

Also, at this point, you cannot say that this works better until the outcomes are defined and we have all agreed on those objectives. If this is to be a research agenda which is going to help in programming considerably larger resources toward a result orientation, we need a rigorous means of moving the research agenda toward what will help us program the resources better.

We have lost track of this issue. There is a race against time here. I am not sure we can afford the luxury of spending time talking about how nice participation is although we might agree that it is a good means.

David Gow - World Resources Institute

I am not such a great believer in public participation as it might appear. Specifically, "From the Ground Up" is moving into a second phase which is trying to look at some of the policy

implications and the linkups at the regional and local level; at the present time, we can't have solutions to these sorts of problems.

One of the problems is that we keep talking and come out with a list of factors or necessary conditions, but we know very well that the necessary conditions as a group never arrive. It is incumbent upon us that we try to establish what some of these necessary conditions are and work towards these.

Dick Ford - SARSA

The end of the cold war may bring, in the next 10 - 15 years, massively reduced external resources into Africa. If Africa is to sustain its resources, it will increasingly have to do so from its internal energies and its internal resources.

There is a crisis, but it is also clear that the top-down plan and the externally imposed program and activities don't work. Part of the awareness is that the top down planning has been such a problem and has had negative impact. Therefore, we as a community of development professionals should be vigorously exploring alternatives.

Boyd Lowry - CODEL

CODEL is working with a consortium of 40 organizations who are working together on small scale development activities in Africa.

When this day began, it was noted that USAID Missions are silent partners here. As the day progressed, I have wondered how do you convey to Missions what the message is? The reference about the commonality of objectives is very important. One of the reasons for CODEL's representation here is not only to provide one fourth of the African presence, but rather to discover if there is any way for additional voluntary organization participation in this process.

My concern is your emphasis on Missions seems to have faded. There is a category of USAID that requires enormous attention by any private volunteer organization that becomes involved. The turnover of USAID personnel and often voluntary organizations end up with a certain amount of obligation for mutual orientation.

My suggestion is that if you would aspire to have more voluntary organization involvement and more work through country Missions, that you really need to consider a commonality of objectives that is more easily conveyed. Then, maybe you can attract partners much more easily.

In CODEL's experience, the environment and development program, started 12 years ago, is highly important to every aspect of our development activities. There are currently 105 projects.

There is not the argument between local participation, national policy or significance of the biosphere. We know it has to be encouraged and nurtured. Somehow, you need to come to a much better clarity of what are your objectives.

Mike McGahuey - ARTS/FARA/NR

How do you balance local participation with responsible management? As in the case in Senegal, we are still looking for a balance between local and government participation and, in some cases, for partnerships and incentives.

Incentives are really under more of our Analytical Agenda and if it seems confusing, it is because development is a complex issue.

Tony Pryor - ARTS/FARA/NR

We are going to talk later more about this issue of environmental quality. I hate to walk away from this meeting with people thinking that the word environment is plus or minus the issue in terms of development. In most of our work, as with CODEL's over the years, we use the words natural resources not environment. To think of environment as a luxury is sort of a personal preference.

The "brown" environmental issues are not issues the African Bureau generally deals with. No project we have in the field deals with air quality, or pollution, at least in terms of the main bilateral program. Our focus is much more directly related to people's lives in rural areas.

Wrap-up and Follow-on

Ben Stoner - AFT/ARTS/FARA

In summary, there are four points.

Looking at what we were just discussing as Theme Two, this is an attempt to really look at the impact side of the Framework, that is, the adoption of practices that impact biophysical change, increases in productivity and income. From a traditional USAID standpoint, what we are looking for is external measures as presented in the case of Niger in natural forest management. USAID is trying to see how we can measure what is happening because of our assistance which is normally Levels One and Two.

As far as providing resources and some ways in which a measure aggregates to show that these resources are having an impact, there are a variety of issues. It is clear that very few of our activities are on the external measurement issue. But most of the work is at Level Three. It is more of an internal resource user, individual, community, country government adoption of practices, and how these groups are internalizing impact information and

working through changes of policies to change conditions. This has been the focus of our natural resources work going on in Africa.

Somehow in the USAID circles in the Africa Bureau this side of the Framework has not been very well articulated. The challenge for the Natural Resources Management unit is to try and bring that out in a way that is better understood within USAID.

One area that came out was "How did this feed back into our USAID programming process?" There was some discussion on our project design procedures that we have for popular participation; how we use our various analytical approaches for social soundness for environmental analyses. How do we arrange those mechanisms and obviously this provides a basis for changing the way we operate the system.

The fourth area was really the focus of the hypothesis we are trying to test in natural resources management in Africa. While we have specified in some cases the questions we are asking about integrated conservation management, it doesn't articulate the issue of income and the propensity to conserve. It doesn't address issues of exclusive rights and responsibilities, indigenous groups knowledge and popular demographic issues. We should be specifying more clearly within this Framework our hypothesis as a basis for appropriating funds.

Conclusion

Gary Cohen - ARTS/FARA/NR

Our programming process is a question of balance and whether it will be long-term sustainability and long term growth or short term growth. This balance is what our Office in PARTS and the Natural Resources Management Unit, and a lot of our old Division has to assist the Agency in reaching. It puts long-term sustainability into a shorter-term growth strategy in Africa. We can't take either or we can't make blanket statements.

Some may say environment is a luxury, but I don't think that is correct across the board and also we can't say we always have to integrate conservation and development. We are dealing with a very complex subject.

There are things that we are doing that fall outside our objectives in the DFA. Some of this is a mandate by Congress and other special interests; although, I am not saying that should drive us, some of these special interests are just special interests.

Striking the balance is the real important issue.

Day Two of the Analytical Agenda Workshop

Gary Cohen - Welcome

After a brief welcome to the second day of the workshop and a few notes on the discussions of Themes Three and Four, the group moved quickly into the agenda.

Presentations of Collaborators - Theme Three, Tools and Methods

Dan Dworkin - AFR/ARTS/FARA

Chairman Brown of the House Science and Space Technology committee quotes in today's paper that "GIS is the most powerful information management tool of our times ... enabling the synthesis of information toward a higher level of knowledge".

This is right in line with the Theme (Three) of today.

The question of tools and methods for analysis encompasses four things:

1. monitoring,
2. analyses,
3. evaluation, and
4. dissemination.

In Senegal, the Mission had used GIS for very simple agricultural statistical presentations and it was widely hailed within the Senegal Department of Agriculture. The minister said it was the first time he understood the agricultural system in Senegal.

There is nothing magic about tools. It is possible to use simple spread sheets and pen and pencil and, in most cases, get the same results as obtainable from the sophisticated GIS. Databases, spread sheets or GIS systems can provide analysis and dissemination of information. The questions are, "Why pick a tool? What does it cost in terms of a small country that wants it?"

Implementing a GIS in Rwanda could take five years and \$1-2 million to put into place. The Mission lost interest because of the cost and decided against GIS.

The other element is the ability to implement. It doesn't take much to train people to use a pencil and pen. It does, however, take substantial training in order to implement GIS. Is the data to put into a GIS going to be useful in other work or used repeatedly? Or is this a one-time practice? Data entry is not a trivial matter for a GIS.

Another question is that of dissemination. Visual products from GIS are very powerful. More important than the information conveyed is the fact that people get turned on by looking at the beautiful pictures that come out of the GIS.

Finally, is the question of whether GIS is the tool for assisting in the types of analysis needed. If one is involved in the project in which the critical element is rainfall, can there be small area rainforest statistics that will support the claim that the project is successful even though the yields are lower because of the lower rainfalls. And, of course, with the GIS and use of remote sensing techniques, the result of small area rainfall statistics can be normalized.

In some cases, GIS is necessary. GIS is one of the tools that is most sophisticated and one to be selected with a great deal of caution. When the collaborators talk about the differences between GIS systems, they should also talk about intended use.

Julia Morris - U.S. Forest Service

Two different activities worked on with the Africa Bureau during the past couple of years have been under the Theme: Tools and Methods.

The first is the Analytical Framework which the Bureau has been working on and that Missions are adopting to develop their impact indicators. This goes back to almost two years when Mike McGahuey was trying to develop the precursor to the Framework and we hired a person to sit down with the "Opportunities" study and determine the elements of success.

The interesting point of this is that the Framework came out of those case studies from the Sahel; primarily semi-arid agricultural issues, places where introduction of one kind of technology began to have a significant impact on the former agricultural production system.

The question that has come back over the last year or so, as the Missions worked with the Framework, is "How relevant and appropriate is this and how applicable is the Framework in eastern southern Africa where there are complex indigenous agricultural production systems, wildlife utilization, eco-tourism, conservation of biological diversity types of activities?" The Framework was applied to four particular case studies in Madagascar, Rwanda, Zimbabwe, and Uganda, to try and highlight what the shortcomings or difficulties were with the Framework as the Missions try to use it.

In summary, the points that came up were that the Framework, as it is now, does not allow for errors or feedback loops. As the programs develop, there is often no hierarchy. There are negotiations, there are iterative incremental steps. The cause and effect relationships are always consistent. The Framework can be used as a monitoring tool and has planning potential. Additionally, the data generated for USAID documents does not always identify who benefits within local communities from economic issues. Perhaps in our own project tracking and documentation, there needs to be more attention paid to this issue.

In continuation, some consultants will go out to the field later this spring and summer to determine the kinds of adaptations or evolutions of the Framework that can be suggested in order for better response to these program activities that are not necessarily for the semi-arid Sahel agricultural systems upon which it was originally based. Bonni Blarcom was just in The Gambia helping to develop their impact indicators.

The Forest Service has done substantial work with GIS and is considering different possibilities for additional work with USAID. A caution on using GIS: in the last 12 - 24 months there has been a lot of emphasis on the potential of GIS for USAID in Africa. A lot of information has been shared with the field Missions, but sometimes its role as a tool is misused.

Dan Dworkin mentioned that GIS could add the rigor to our analysis that Jerry Wolgin was speaking on yesterday. This can be disputed because the GIS as a tool is only as good as the information put into it. If the information input is not improved, then the output will not lead to more valuable or rigorous analysis.

ADOs in the field are being asked to educate themselves as to what GIS is, what its potential is in their country, what their information needs assessments might identify, how to design an inventory, how to analyze the data, and how to develop the total package. They are being asked to do a lot and they are already overworked.

GIS is a rapidly evolving technology. Technology has a tendency to drive the interest in its use instead of the interest in information management. The focus should be on the application of the information. Focus now is on training people in land use management and planning once there is an output from the GIS. It is important to feed people in the field sufficient information for making valid and useful decisions.

Bonni van Blarcom - Economist

Bonni van Blarcom was recently in The Gambia, 1) to design survey instruments to collect information on practices of natural resource (NR) managers: farmers, herders, forest managers; 2) to review NRM indicators (for an agriculture and NR management project and for the Mission's Assessment of Program Impact); and 3) to contribute to the economic analysis of the new program.

The three topics of discussion are:

1. design of survey instruments to collect baseline data on Natural Resource Management (NRM) practices,
2. responding to A.I.D. Mission needs of the integration of the natural resource management Framework, indicators and the Mission's API, and
3. approaches to economic analysis for NRM projects.

Topic One: Survey Instruments for Baseline Data Collection on Agriculture and Natural Resource Management Projects.

- 1. It is better to have a project design before designing a survey instrument to collect baseline data, against which an agriculture and natural resource management (NRM) project's success is measured. This may seem like common sense, but is not always possible. In The Gambia, the program is still being designed, but the questionnaire has already been developed.**
- 2. It should be clear if the project's goals are largely oriented towards conservation of agriculture and natural resources, or conservation and increased productivity of the resources. Conservation focuses on the prevention of loss, while activities designed to increase productivity are aimed at deriving more benefit from existing resources, as well as increased sustainable use of what resources are available.**
- 3. Level 3 indicators of the NRM Framework are insufficient for baseline data collection efforts for projects which results are expected to take 10 - 20 years for implementation. Level 3 indicators measure progress at the "practice" level of NR managers. Information at Level 2, "conditions which contribute to the adoption of Level 3 practices" including the change of attitudes by NR managers, is also necessary if change of practices is not expected to be immediate.**
- 4. In measuring "people-level impact" consideration should be given to measuring the change in quality of life, and not just income changes.**
- 5. Data and indicators for monitoring the implementation of program activities as well as achievement, or progress towards achievement of project objectives are needed.**
- 6. It should be understood that different methodologies will better contribute to some objectives than others. For example, a nation-wide, enumerator administered questionnaire will provide little diagnostic information for understanding the problem, but will provide an indication of national prevalence of a practice. A combination of data-collection techniques may be appropriate, dependent on the state of information about management practices and the priority for data uses.**
- 7. Instrument design for baseline data collection efforts should follow the usual procedures of questionnaire development:**
 - a. clarity of the objective of the questionnaire, and the use of the data,**
 - b. consideration of the sequencing of questions,**
 - c. careful expression of concepts in other languages,**
 - d. consideration of the information processing: easily "codeable" answers for low-level skill requirements in translating respondent answers,**
 - e. enumerator training,**

- f. pilot testing, and
 - g. data processing requirements.
8. The use of the data for A.I.D. objectives should try and be combined with information requirements of the host government.

Topic Two: Responding to USAID Mission needs: The integration of the natural resource management Framework, indicators and the Mission's API.

In other words, this is "field testing" the NRM Framework for the Mission's needs. In applying the Framework, and working with the Mission's needs of their program requirements, indicators for monitoring project progress, and indicators for the Assessment of Program Impact (API) a number of questions were raised about the Framework, and as a consequence, a number of criteria were used in applying the Framework and identifying appropriate indicators.

1. What order of magnitude of benefits, if any, at the "people level" is expected within the first five years of a NRM project? This is a question that the Mission has to answer implicitly when reporting to Washington in their Assessment of Program Impact (API). The Africa Bureau's API has a five year time frame for which data is reported. The order of magnitude in the change at the people level, NR managers implementation of difference techniques etc., will depend on the mix of component types of the project design; resource management and use rights, reduction of financial risks, identification and development of technology, and technology transfer activities.

In my opinion, the types of activities involved will provide an indication of when project benefits will be expected. Of course, this is dependent on host country conditions. Activities which directly work with farmers in the adoption of technology are more likely to show people-level benefits, than resource management and use rights which change the conditions by which NR managers make their decisions. The type of technology promoted will also determine when people-level benefits should be expected. For example, benefits from reclaiming land that is under salt water can be expected within the first harvest year. In constructing check dams to protect water catchment fill-up down stream, benefits may be seen in small increments starting in a few years after construction. In summary, I do not expect that a high percentage of total project benefits will be at the people level during the first five years of a NRM project if the project activities are predominantly national level planning in contrast to direct technology promotion activities at the farmer level.

2. How can benefits be measured from policy reform programs? First, the reasoning between the policy, conditions and practices must be identified. Clear reasoning between what is expected from policy reforms, how the reforms will change conditions (training, inputs, etc.) to enable the reforms to change NR managers'

practices should be clearly identified. Identification of the other necessary conditions and inputs, does to imply that the project will provide the inputs, but if the project expects changes at the NR management level to occur, then it should be explicit that an assumption is that the necessary identified inputs will be provided by some other donor, or the host country. Identification of these inputs will facilitate collaboration with other entities working on the same problem. In summary, benefits from policy reform may be difficult to measure with any great certainty, but an attempt should be made to clearly identify how the policy changes will impact on NRM practices with a clear reasoning between policy, conditions and change in practices identified.

3. What is the relationship between indicators for the project and indicators for the Mission's API? The time frame within which results were expected, and intended use of the data are factors differentiating these two types of indicators. Indicators for a monitoring and evaluation system are ideally, for immediate feedback into project management and a "flexible redesign" response. Indicators for the API are for monitoring the success of the program, or progress towards that success within a five-year time frame. For the API, it is wise to report on those significant changes: e.g. change of attitudes, and change of practices within a specific project area. Reporting impact at the people level of a nation for a policy change project, should be done after a realistic assessment, as noted above, has been completed.

Guidance for API indicators states that a few well chosen indicators should be reported. Effective project monitoring will generally require a large number of indicators. Experience has shown that the better API reporting is from those Missions that realistically assess their programs expected accomplishments and use indicators first as a self-monitoring tool, and secondly as a reporting tool for Washington review. Generally, a hierarchy of indicators can be developed from the project activity to the program goal.

4. Is a sustainable constant yield (instead of an increase in yields) an acceptable target for a project and thus a Mission's API? If benefits are positive and make the project economically viable, then a constant (static) target is acceptable. The value of benefits may be large given the assumption that decreasing yields are partially or fully prevented. A sustainable constant yield (instead of an increase in yields) is an acceptable target given a country's history of decreasing yields.
5. Must benefits on a national scale be attributable to A.I.D.'s programs when other programs and donors are at work? It may be difficult to distinguish between national trends apart from A.I.D.'s contribution. A comparison between the trend and a theoretical counter-factual situation: estimation of what the trend would have been without A.I.D.'s program, provides a basis to estimate benefits. An important aspect is to make a plausible argument for the attribution of benefits (measured in quantitative terms) for the assistance in qualitative reasoning. Benefits on a national scale can be attributable in a quantitative economic analysis to A.I.D.'s program if a

plausible line of reasoning exists between activities and changes, even when other programs and donors are at work.

6. What is an acceptable cost of monitoring, evaluation and data collection efforts? Factors to consider in determining the size of evaluation funding is the size of the project, how the resources are to be used, and the technology. Estimates in the range of 1 to 10 percent, depending on the size of the project have been used.
7. Is there inappropriate technology for monitoring a program aimed at subsistence agriculture which uses the most basic cultivation techniques? Some may question the use of remote sensing, aero-photography and other relatively high technology, by developing world standards, to collect data for API indicators when many of the farmers are still using basic cultivation technologies, such as manure for fertilizer. The cost of using the higher level technology may be the most cost effective method of obtaining the data for a specific indicator. Costs to obtain the data, and to train host country individuals to interpret the data (if considered to be an appropriate technology for continued monitoring by the host country), should be compared with the benefits from having the data, and the usefulness of the indicator to measure project progress. An additional concern in using a high level technology is that it may promote the justification of its use for inappropriate purposes. There is no inappropriate level of technology for monitoring a program aimed at subsistence agriculture, as long as the cost is reasonable in comparison to the benefits expected and the externalities controlled.

Topic Three: Approaches to Economic Analysis of NRM Progress.

Insufficient time remains to discuss economic analysis, the topics which would have been covered are the following.

The objective of the analysis should be clear. Is the economic analysis to justify investment in the project, or is the analysis to identify issues or constraints during the economic analysis? The identification of such could contribute to improving project design. Many of the same issues are reviewed in meeting either objective.

Unfortunately, neither objective is met in the design of many A.I.D. projects. Frequently, justifying investment is done in a pro forma manner, in which the conclusion is that funding is justified and it is the economist's responsibility to provide "some numbers" for the "justification", without rigorous analysis.

Analysis may take many approaches. Examination of the benefits from project activities may be done on many levels and answer a number of questions.

1. Is the value of changes on a national level (order of magnitude of changes) feasible for providing productivity increases leading to at least the cost of inputs of the project?
2. Is there clear reasoning between how the project/program activities will contribute to the anticipated changes in NR management practices? Is the reasoning clear and have the necessary inputs been identified which are necessary for the change of NR management practices?
3. Are the technologies proposed economically viable options from the perspective of the NR managers?
4. Is it reasonable that project funded activities (or other activities) will convince (either directly or indirectly) the number of NR managers necessary to provide the size of benefits for the project to be economically viable, and are there enough inputs, including change agents which will provide the information and guidance to the NR managers?

Dan Tunstall - World Resources Institute

This program has two phases. The first phase involved work with Fred Weber and Mike McGahuey and a number of other people last year to further develop the Framework and to develop a catalogue of natural resources management indicators.

The second phase started this past year when WRI was asked by the Africa Bureau to modify the program and provide advisory services in the whole area of natural resources information. The first meeting, of the Natural Resources Information Consultative Group was held last Monday, March 16.

The basic objectives of this program are as follows:

1. Strengthen capacity of institutions and individuals in Africa in natural resources information management.
2. Focus on the application of information, not just data gathering or technologies involved, but also their use and dissemination.
3. Focus on selected countries. Obviously, the projects are aimed at all USAID work in Africa. However, this work concentrated on Rwanda and Uganda.

The scope of the project basically has five parts, but sometimes three or four, depending upon the audience of the day. The natural resources information consultative group will provide advice, guidance and support to carry out specific studies. These studies will be

mostly on information strategies, information policy and ways to get information used efficiently to provide support to Headquarters and the Missions.

The group has compiled, with the support of Environment Natural Resources Information Center (ENRIC), a small database of USAID projects operating in Africa and is making a substantial effort at collecting data on resource inventories for supporting remote sensing activities, GIS and other kinds of spatial analysis activities. The group has identified about 34 USAID-supported projects that have done these types of activities over the past ten years. Of these projects, about 16 are still operational.

In cooperation with ENRIC, the group is ensuring that coding and designing data is compatible with other USAID data. Contact is then made with each of the collaborators to obtain details on what is the support to natural resources information technologies. This data will be available within the next month.

The group has also developed an experts list and a bibliography of about 120 documents and studies that have been supported by USAID and World Bank and others in Africa.

Coordination activities are a major part of the work being done. We are keeping in contact with a number of organizations that are also involved in natural resources information management and technologies.

Additionally, work is being done on indicators; in some cases, databases are being built and, in other cases, efforts include working with collaborators to learn how to improve the data at the five Levels of the Framework.

In the past, WRI has, with the Africa Bureau, compiled national-level indicators mostly at Level 4 that deal with biophysical measures. This information is at the country level and is not screened necessarily in detail by USAID, but some USAID projects that have worked in the field have supported development data that is included. The three major areas of focus are soil fertility, vegetation cover and biodiversity, and more recently, some material has been added on water resources, energy and coastal resources.

At this point, a set of 29 tables is available on the network at USAID that has been compiled from the World Resources database. These tables are being updated with the latest information from each of the international organizations. There are approximately 29 tables, 8 variables per table, roughly 240 variables for all 46 sub-Saharan African countries. The data is in a format that hopefully is useful to USAID. The next edition will be available next month.

Roles and functions of this information group over the next couple of years follows:

- Provide advice to USAID on problems and opportunities in natural resources information management.

- Provide expertise to Missions as needed, both as individuals and possibly as part of the team.
- Provide peer review of research proposals.
- Assist in designing environmental monitoring and assessment research agenda.
- Perform specific studies and projects.
- Assist in conducting workshops on methods and identify analytical tools.

The main purpose of the group is not to supplant other activities that are going on in the field or in Washington. It is to provide guidance and advice.

Julia Morris gave the perfect rationale for the group. The busy ADOs cannot be expected to be familiar with certain kinds of information management technologies. However, they can be encouraged to move along a path of improving environmental information in support of policy making. This group can help to do this in a fairly low-key manner by working with the collaborators.

The group plans to do the following:

- Prepare a natural resources information paper on the issues and develop a strategy for USAID.
- Support efforts of inventory and archiving of natural resources data in Africa.
- Develop case studies on the use of natural resources information in development.

Jim Tucker - NASA, Goddard

The U.S. Geological Service and NASA have adapted some of the federally funded research in the area of remote sensing to meet some of the problems in natural resource management.

There is a substantial amount of research underway which involves looking at various aspects of the terrestrial surface. Largely in the area of local change and inventory of natural resources, NASA is trying to adapt some of the simpler more practical applications that will be of specific interest to some of the NRMS objectives.

There are a wide range of different satellite tools for looking at various features of the land surface on a daily basis with a coarse resolution on an area of one to five kilometers. Every 16 days there is the potential to look at a much higher scale of 20 to 30 meters.

If information is needed for a special domain in terms of special detail, then the data from the LANDSAT satellite and the SPOT satellite should be valuable. The satellite data is in

the process of being transferred back to NASA. Within a year or two this means that the cost will plummet to 10%. The cost of data will be purely reproduction cost. The extremely predatory pricing of ESAT Corporation will hopefully decrease very soon. These costs have been a tremendous embarrassment to many of the people at NASA interested in using satellite data.

The overall objective is to adapt some of the selected techniques which can be of interest and can provide some of the information from remote sensing for linking to various geographical information systems to answer natural resources questions. This can be done in practical, timely and inexpensive ways. It is important to work at the local level and certainly to involve local women's group as has been mentioned earlier.

Don Moore - U.S. Geological Service

This meeting is an opportunity for technicians to fully capture and put into very specific goals the needs of policy makers. At USGS the focus is on collecting data and information and putting this information in a form that will be sufficient for decision makers. There is an opportunity to lend support to a variety of projects in USAID.

FEWS is a project that looks at the whole Sahel. In FEWS, a lot of the technology has been put into desk-top type data management systems for analyses and archiving. One of these systems, Regional Center for Training and Application of Agrometeorology and Hydrology for the Sahel (AGRHYMET) is centralized and has the ability to distribute and operate in nine different countries.

African Emergency Locust/Grasshopper Assistance project (AELGA), another activity worked on cooperatively, was a project that we introduced into an operating environment of remote sensing. This project looked at rainfall and growth of grass. The areas viewed for this type of project are sometimes two to three times the size of the United States. The U.S. now expends hundreds of millions of dollars for monitoring. USAID has not been able to come up with that kind of budget.

As mentioned earlier, there are major activities in the federal communities. The efforts of USGS is to glean the techniques and determine which ones are the most appropriate for Africa and which are most appropriate for USAID in the NRMS programs. The fortunate experience of the last two days has been in hearing the different ways in which the Service can participate in the objectives and goals presented.

Monitoring changes over a long period of time is required for natural resources management. An objective view of Africa over the last twenty years has captured baseline data that looks at Senegal to Sudan. There have been drastic vegetation changes within the last twenty years.

Another advantage of remote sensing data is something called "synoptic". This looks at village-level changes. The question is whether information from these surrogate indicators can be transferred from the village level to other regions.

To get a large field investigation on some of the technologies used can take three months to define. The remote sensing data is already archived systematically and is readily accessible. The data may not provide all of the information needed to help in the decision making process.

To monitor change, baselines are needed. There is, however, a need to quantify the parameters on the ground. In analyzing the parameters, the questions are how big is the area, and how does it relate to the ethnic population and their practices? There is a need to quantify from different aspects that includes a description on the ground, and the area and population impact. This information needs to be communicated to technicians and policy makers alike. Technicians and policy makers speak different languages.

There is a notion that policy makers don't like to go to the field or the field people don't like to go to the policy makers. Sometimes the field people have to be brought to the policy makers. There are many things that can be done.

Lastly, successes and failures must be measured and sufficient monitoring systems must be in place. One of the advantages of information systems is in systematizing and cataloging data. If the proper units of measure are not put on data and the data is not properly understood, then it is useless.

Usually when there exists massive amounts of data, information systems are relied upon for research. Our focus is to extract some of these techniques, that are being developed through a variety of programs, for input to natural resources management.

At the grossest level, everyday satellite data is available that looks at square kilometers at a time. If the task is to monitor how many trees are in a hectare, it is necessary to define which techniques are appropriate for monitoring what types of variables. The concentration is first on those satellites that are most cheaply available.

One of the things is to evaluate the utility of the satellite estimation techniques of rainfall and then take those data and monitor other resource information systems. For soils that are deep and hold a lot of moisture and support more vegetation, the resource information that has the input of rainfall must be reviewed. The question is how are large area monitoring techniques able to look at the vegetation response to rainfall and relate that to growing, ecological conditions of vegetation? Maybe agro-ecological zones are not the best for monitoring.

How can socioeconomic data be put into a monitoring system where there is satellite data? NASA and USGS are not socio-economic organizations. Some of these responsibilities can

be distributed to organizations that have the capabilities of analyzing such data. When looking at monitoring natural resources information, there must be statistical validity, and confidence limits must be established. If images are coming in every ten days from sensors alone, then some kind of computerized information system is absolutely needed.

At the end of every year, the Service intends to conduct an evaluation and awareness workshop at USAID Washington.

Nadine Laporte - BSP NASA Goddard

Remote sensing is a useful tool to give basic information concerning climate data like temperature, gases and particulate matter estimates and also vegetation data, land distribution, and land cover dynamics. These are natural resources management issues.

The first problem of the Central Africa Global Climate Change project is availability of data for central Africa. LANDSAT data shows there is a big hole in south Cameroon, Gabon and Zaire for 1973; the 1990 picture is worse. National remote sensing agencies in these countries are a future activity with not much being done presently. These activities will mainly be supported by the French and the Canadians. The remote sensing activities are generally very close to the NEAP in all of these countries. This is a big effort to coordinate toward a long-term commitment.

For mapping of the vegetation, low resolution data at one kilometer is used. The objective is to obtain the recent distribution of the tropical vegetation. The data shows a 20% underestimation in the savannah and 10% inside the forest proper.

Low resolution data in Cameroon shows dense forest, cross canopy and degraded areas. The same exercise was done for Zaire and, hopefully, will be done for all of central Africa in the near future. The rate of deforestation can be measured by using LANDSAT images. This data includes visual interpretation, digital analyses and continuing GIS methods.

In dealing with satellite images, very often it is difficult to go on the ground to verify the data; one often has to depend on people in-country to do these surveys.

The satellite derived climate data should be improved and made available to people in the countries. Most of these African countries are thinking of using remote sensing in the development of NEAPs, and help is available within a collaborative framework.

Vegetation inventories and monitoring requires a lot of research on modeling successful states of vegetation especially between secondary forest, young regrowth, old fallow terrain, and natural forest.

For biomass burning, satellite imagery is used for modeling at the continental scale. Satellite data is also good for improving cattle grazing.

DENSE HUMID FOREST MAPPING USING NOAA-AVHRR

OBJECTIVE:

Obtain recent distribution map of tropical vegetation at small scale.
(1/1,000,000)

- Land cover classes:
- Dense closed humid forest
 - Degraded forest (agriculture, fallows, liry forest)
 - Mixed Forest/Savanna
 - Savanna

METHOD

Vegetation classes are delineated on 1 km AVHRR data using different thresholds in near infrared and middle infrared images.

VALIDATION

MSS data are used to estimate 1km classification errors.

Depending on forest patch size distribution the 1 km mapping:

- underestimates forest in mixed formation (Forest/ savanna transition) (20%)
- overestimates forest in density forested areas (10%)

SS

LAND CHANGE ASSESSMENT USING LANDSAT

OBJECTIVE:

measure rate of deforestation

METHODS

**Test different methodologies to assess rate of deforestation
(visual interpretation, digital analysis, ...)**

RESULTS AND VALIDATION

**Highlight problems inherent with the Central African Region
Need to foster collaborative "ground truthing" framework**

IMPROVING GASES EMISSION ESTIMATES USING NOAA-AVHRR

OBJECTIVE

Mapping burns scars and actives fires at a regional scale

METHOD

Fires are detected using a thresholding method combining thermal and middle infra-red information

Burn scars are detected using a thresholding method combining thermal and near infra-red information

15

REMOTE SENSING DATA AVAILABILITY / USE

- **LANDSAT coverage**
- **Status of the National Remote sensing agencies**
- **Coordination/Long-term commitment -Institutional support**

REMOTE SENSING CASE STUDIES

- **DENSE HUMID FOREST MAPPING USING NOAA-AVHRR**
- **LAND CHANGE ASSESSMENT USING LANDSAT**
- **IMPROVING GASES EMISSION ESTIMATES USING NOAA-AVHRR**

Plenary Session for Theme Three

Don Moore - U.S. Geological Service

The first questions asked by the Missions is, "What hardware and software systems should we buy?" This is absolutely the wrong question to ask. We need to help the Missions understand what information systems are. They feel these systems are magical and that data put into the systems is true.

There is a term in our system call meta data. Meta data is data about data. We are finding that meta data is the most important in describing what the data is and its limitations.

Soils maps come in varieties and scales. But, to people who are not soil scientists, its all soils data.

The second aspect is timing. The computer does things very fast, but it takes a long time to get the computer ready. Once the computer is ready, there are many things that can be done. That is our advantage. It can respond to questions on an emergency basis.

On the project cost of implementing an information system, 80% of the costs are in building the database. When we define information systems, we like to define the user within the circle of the system. An information system is no more than a tool to satisfy information needs. If the user is not defined within the system, there is not a good understanding of what his information needs are, when data is needed, nor the competence level.

There are five components of the information system; each one interacts with the others. The user, knowledge base, database, technicians, computer and software. Individuals will say I have this kind of software, how do I use it for this problem? I say you don't need my advice, I'll come back in a couple of years and see how you have adapted it.

Don't go in and select a system just because that technology is there. Go in and select the system after you have talked to the user and after you know exactly what they need and in what form. Design the system to fit the specifications.

It is important to design a useful information system that might stand the test of time.

Tim Resch - ARTS/FARA/NR

The purpose of this session is to improve techniques for decision making. Decisions are being cut right now. I'd like to hear what the panel has to say about the quality of the decisions that are being made based on the data in hand and what the incremental benefits are going to be. How bad is decision making today, and how much are you going to improve it?

Julia Morris - U.S. Forest Service

If we can take the data and information and apply it in a more accurate manner, it will hopefully lead to a better product. I have no idea how to quantify that.

Bonni van Blarcom - Economist

In The Gambia case, there is a component of the ag-natural resource management project that deals with range management. There are technologies that exist, there are approaches and interventions. This is not the information regarding what grasses are there, what percentage coverage is there.

The program is being designed, but without that information. The technologies or approaches to use can't be decided upon now. The decisions are made on a general basis to be refined later.

Russell Misheloff - R&D/ENR

We had heard this morning a lot of useful information about tools and methods. This information was largely for the gathering and arraying and displaying of information needed to determine the physical changes such as in Level 4. I have heard little this morning about tools and methods for relating observed bio-physical changes to programs and policy changes and also for planning, for identifying problems, prioritizing problems, for determining the causation of problems, for identifying and assessing remedial programs and policy options. It seems to me there is a huge gap here.

Is this gap intentional, or is this a large area which has not yet been addressed?

Julia Morris - U.S. Forest Service

I wonder how much we are using information management for reporting requirements for Congress and how much are we using it for land management planning. I don't have enough grasp of all the different program activities in Africa to know or have experience with applying it for planning purposes.

Mike McGahuey - ARTS/FARA/NR

We spent the last couple of weeks working on API report reviews. This is the one instrument that the Bureau is judging their programs on. We have talked with a number of people about how to make those linkages.

In natural resources we are not going to have impacts so quickly. We have some plausible association between the policy and institutional changes of the lower Levels and the eventual impact.

We need to measure our progress. In the case of Niger, I suggested that we should give them credit for making progress in perceived use rights, access to markets, increases in access to technical assistance, and increase in access to information. The only thing that we have done is tried to find the mode of common elements and that is the basis by which we convince Congress that we should be getting credit for these elements.

I have heard that local participation is good; we need conflict resolution, it is necessary. In our analyses, we have not been able to show that those elements are necessary. I think they are, but in the next year the challenge is going to be for us to decide how to use analyses that make a link between those lower level indicators and eventual impact. The answer is "we are working on it."

Kjell Chistophersen - International Resources Group

In Latin America, I faced a situation where I had to create certain economic spreadsheets to come up with the various NRM interventions. I was stumped on the fact I could not come up with hard information on the extent to which crop yield and wood yields increase or change in response to different levels of management propensities. I was wondering if there is not something else that I could add to change the focus a little bit instead of focusing just on the elements of the system and come up with some real elements the people can use for their research.

Bonni van Blarcom - Economist

A very important question for economists is "What were the biophysical changes expected from the different practices?"

What Kate Newman has presented is that the categorization of data is very useful. The biophysical changes can be generalized with clarification and that is helpful for applying that information to specific conditions.

Dick Ford - SARSA

Could you talk a bit more about specific examples where you have been able to integrate from local level into a national-level or some type of a large regional data base? I think this is another large area of opportunity for research.

Don Moore - U.S. Geological Survey

Take the example of FEWS. We have to prioritize when examining volatility analysis. We like to think that health information is very important. How do you possibly use that data to look at the whole country? There are some techniques.

Let's say that you are assessing individual volatility based upon his access to food distribution centers which might be the villages. In the traditional geographic process, you can ask what is the closest village and he is ten kilometers away from it. But, we know there are going to be problems; maybe that village didn't get food to distribute. So maybe, he has to go four or five villages around. We must look around at all four or five of these locations and say he has this level of accessibility, therefore, he is in better shape or worst shape than the person next door.

This means taking someone in a clear space and looking at the geographics around him and trying to relate that person to those geographics. If you have one data point that reflects health, the health people talk about catchment areas for their health center. How do you say something about the whole country? Maybe it is health-related problems that relate to the distribution of the service.

In Burkina, you look at famine as a lack of access to food. The basic model is the household income model. What do you do with the people that work in the gold mines? We know that the income doesn't stay at the site. You know that it is dispersed as you move through the country. How might it be dispersed? It might be dispersed by some distance factor. The farther you get away from the gold mine, probably the less probability the income from the gold mine actually gets there. That is the knowledge base; that's the kind of model that we need to be able to work.

A lot of times we can establish a very good strata using some type of technique like remote sensing. Some of these spacial techniques need to be tried and tested.

Dick Ford - SARSA

We are finding high correlation between land use and population density. Land use is conceivably identified through satellite. We can get those types of surveys at local levels. In some cases, you come out with some better population density information than from the national census.

Peter Freeman - DATEX

How do you distinguish the methodology between the effect of a USAID program and that work in the environment that affects the long-term trends in the way resources are used?

Bonni van Blarcom - Economist

That is a difficult question. You don't know. If you have to, you guess and then try and find a plausible explanation between USAID activities and the changes that are occurring.

Don Moore - U.S. Geological Survey

Certainly if you are going to do geographic analysis, the first requirement is that you have to register to a map. In fact, the one common theme of data is that they come from somewhere. So, what we have to do is determine where that somewhere is.

If you are out in the middle of a dense tropical forest, it is hard to tell where you are. A lot of people need globalization systems.

Now everywhere in Africa there are sufficient satellites to be able to give an accurate reading within 25 - 50 meters in terms of where you are in relation to the land surface. These systems cost \$1,000 to \$3,000 each. They are very simple to use and about the size of a hand held calculator. You can read latitude and longitude; and these systems are being used quite frequently.

If we get serious about data, the first issue is that you have a problem. I want a solution to my problem and I don't want to be dependent upon GIS. GIS doesn't make data. GIS provides the ability to organize data; merge different types of data.

When there is a project that has a data collection component, should we have a minimum set of standards that bind this boiler plate under the contract that says data should at least have a certain description? Then, you know what the data is, you can pick that data up and hand it to someone else for their use. Should we have that as a minimum? Should that data go to some location where it is archived, merged into the database and distributed so it all can be merged together? That is an issue.

Kate Newman - Biodiversity Support Program

To reinforce what has been said about collecting cross-disciplinary data, we need to collect cross-disciplinary data for natural resources management projects to know whether or not we are having any human level impact. Nutrition and population types of data are being collected by USAID for their other projects and compartmentalized. However, there seems not to be a way to use data from other sectors.

A health project rarely interacts with a NRMS project. Is there a way to capture that data and make it assessable in a design process for our types of projects? I feel like a preacher preaching to the choir in this room and don't have collaboration or access to cross-disciplinary information.

Bonni van Blarcom - Economist

Not having factual information makes it difficult to make evaluations. If information is available, it can be condensed into a monitoring report at the beginning of the project. Information may not be available. What is available can be identified and used later.

With regards to having an economic rate of return for projects, most projects are required to have these calculations. I would like to question the process used in obtaining the magic number. In many projects, whatever the number is, it is very difficult for an analyst to not forget that number. What can be done to get that number is to explain what other conditions need to be present.

This approach to identifying the inputs and necessary and sufficient conditions will be helpful in designing topics to be addressed in the further development of programs. If you assume something is going to be available, it doesn't mean that the program has to supply it, but it should be recognized as a component that needs to be present in the environment.

Don Moore - U. S. Geological Survey

One FEWS model includes supplying information on nutrition data, price data, crop conditions, crop yields, geographic data, etc. The approach that was used there was to have a person stationed in the country whose primary task was to gather all the cross-sectional data and be able to put it together to make an analysis. This is not our standard routine; most people realize they must be available, but on a programmatic basis. I'm an agriculturalist and I can't concentrate on agriculture without help from health. I don't know if I want to use my time to help do this.

I don't know how else to look at this issue of a country-wide information system and start thinking of encouraging countries to share their data between ministries. I am sure there are some instances where it is happening. It is difficult to find incentives where data are a commodity for sale and are shared in some centralized information system.

Jim Tucker - NASA - Goddard

There are international organizations that compile information for a standard location in countries that look at global information on health, socio-economic variables and biophysical variables. In some ways we have to know more about these global systems and how they relate to the local ecosystems where things naturally occur. We can look at these global variables. We may not know how all of them interact, but we can look at them and add them up and test them. During our meeting last week, there was expressed a need for integrated socio-economic and biophysical information and other kinds of information in a spacial dimension. I think this is definitely an area that the group is advising itself and USAID to work on.

Caroly Shumway - R&D/AA

How can USAID help to provide the most recent satellite data to country decision makers? Too often decision makers use old satellite data. I am not sure that old satellite data is better than no data at all. I know that in one case, decision makers were using satellite data of mangroves for a management plan. The mangroves no longer existed and they were

basing the management plan on data that was completely useless. How can we provide, cheaply, satellite data to decision makers that are absolutely the most recent?

Don Moore - U.S. Geological Survey

I don't think anyone would suggest doing a project of this nature and let the information go to decision makers without going into the field to see if the mangroves were there. It is not only how do you provide satellite data, but how do you provide a situation where the people might use it appropriately in mapping.

Jim Tucker at NASA produces a global indication index for the world. He produces it every day and aggregates it every ten days with availability one to two days thereafter. This is low resolution data. We use the data in the Famine Early Warning System to look at the condition and health of the vegetation. So, there are certain levels of information that can be obtained from this data, and the information is very inexpensive.

When there was a locust problem in northern Africa, we looked at the same satellite, but the sensor was for one kilometer instead of eight kilometers. The data were formatted into maps that could be sent out to the field to help determine where the priority locations are. Those data were produced on a ten-day basis, but they were produced in the United States and then Federal Expressed back to Africa. This meant that they were ten days later than the last dated cycle. For locust and grasshoppers, that happens to be OK because it is within the period that you need the information.

Through development of some regional capabilities in Africa, those same data are collected on the continent, processed and then distributed. For distribution, they have the same problems that we have, so we are putting in telecommunication systems for quicker distribution. But, that is a development project. To do this, we probably would have to invest \$1.5 - 2 million. To get the collection capability in Africa so that data can be collected, received and distributed requires a capital input. To buy one of these scenes, process it and make multiple copies costs about \$3. The cost of the data at NASA is billions of dollars to develop these programs and satellite systems; so, it depends on what cost you put in to equal the cost of the data.

Regarding the purchase of our own civilian resource satellite, five years ago, the United States did experiment in privatization and sold the satellite for minus \$175 million, with the hope that we could market the data and therefore the volume would go up and the cost would go down. That neat American experiment failed. And now, it is going back into the public sector to try and keep the price low. There is a continual subsistency on the price.

The data are probably more valuable to the developing country's land management than to the U.S. land management. Those data can be made available in a variety of forms at a variety of costs. For Africa, probably 25% of Africa, there are some data available. But if you want to get new data every year, there is a very specific procedure of going through a

facility like Nairobi's Remote Sensing Center. This Center has spent its efforts on being a data archive and a go-between for countries, and so it is like the U.S. Right now, the data would cover 180 kilometers by 180 kilometers.

To get those data would cost about \$1,000 a scene at commercial market prices. The price of the data is probably outside the bounds of getting it every year. By putting the data back into the public domain, the price will go down to about \$200 per scene.

On the subject of value added: one way to place yourself in space is to have a photograph and you recognize things in the photograph. You stand at that spot and that spot is then registered in space to a map. For a lot of mapping in countries, these maps are used to determine latitude and longitude.

In response to some of the issues being raised here, the remote sensing community does not define the kind of information that the policy makers use. The policy maker defines the type of information. On the technical basis, the remote sensing community, as disciplined communities, can try to define the least expensive most reliable way of getting that information. So what commonly happens is that GIS is there to make a definition of what GIS should be. This is the wrong approach. The policy maker has to make that definition and the technical community can respond and construct the system in the proper manner.

Michael Brown - PVO/NGO NRMS

Two years ago in Lome, there was a NRMS meeting that the Mission Level of Effort contractors put on. We discussed a variety of NRMS issues.

One of the resolutions that came out of the meeting was that in natural resources management in Africa, process is product. There were a number of sets of eyeballs that were rolling around the room when that resolution was raised, but the resolution and recommendations reached Washington and the various USAID Missions in the field. Since that time, process-level indicators are being developed.

How are we getting at the different Level indicators? Is there a way to assess the impact of the different USAID programs and projects in terms of moving from Level 1 to 2, 3, 4. My own hypothesis is that we are probably dealing with process-level indicators rather than with quantifiable types of indicators. So has there been any work done on the process level indicators?

Secondly, if there is a lot of talk about Participatory Rural Appraisal, I am surprised that we have not heard anything from the collaborators on Rapid Rural Appraisal (RRA). Some people still have a fondness for Rapid Rural Appraisal. RRA offers a set of techniques that could be very useful in the ground truthing aspects of different types of high level reconnaissance type work. I suggest that we look into Rapid Rural Appraisal as a source

that a variety of organizations in different countries at the grass-roots level would be able to collaborate on.

Russ Webster - Management Systems International

We are in charge of micro-enterprise monitoring that puts together USAID agency-wide information on micro-enterprise program interventions. I come as an outsider because natural resources management is not my field. Although I share with my other colleagues that don't work in the field a commitment to try and understand more about how our project/program activities contribute or detract from the goals and objectives of your programs in natural resources management.

Peter raised a question and I was not satisfied with the response, that had to do with looking at the relationship between USAID programs and interventions and the impacts on the environment. We have heard about twenty years of GIS information; has there ever been an attempt to take either country-specific, region-specific or sector-specific program information over time where USAID has been working in a place for say twenty years and look at these interventions and try to draw any kind of relationship between those interventions and either contribution to environmental degradation or improvement?

I am surprised there has been no discussion around that point and I am curious to know whether there has ever been an effort to do this. When you talk about cross-sectoral interventions such as micro-enterprise development, I think we do need to know more about how our activities affect the environmental concerns.

Remko Vonk - CARE

In the PVO/NGO community we don't use satellite imagery. The average project would cost \$350,000 a year.

I think we have to keep in mind the reality. We worried about, in this context, getting USAID to impose on the PVO community certain data collection requirements that can be fed into the GIS.

That means you will have hundreds of PVO projects collecting data that they will never have the money to use or analyze. Building money to go to libraries to look up old literature would be more useful.

Mike McGahuey - ARTS/FARA/NR

A lot of the impacts have come from PVO small level projects. I don't think these could really be detected from remote sensing data. So, I think there is a limitation with remotely sensed data. We probably have to get those changes in some other way.

Bonni van Blarcom - Economist

A point regarding establishing systems for impacts is as follows. In The Gambia, they were collecting information on a national basis for practices and attitudes and trying to collect other biophysical indicators for designing and monitoring evaluation systems. This depended on the NGOs in the country.

Don Moore - U.S. Geological Survey

My statement was, if data are collected during the project to organize or facilitate the opportunity to bring those data back to archives and have sufficient descriptions. It was not that every project should request data.

If data are collected on a project and paid for by the U.S. government, then a responsibility of the project participants would be to organize that data with guidelines and provide data in addition to summary analysis results of the data.

Gary Cohen - ARTS/FARA/NR

The PVOs don't have the staff to collect all this type of data to support a GIS or remote sensing. However, if the U.S. government, especially the Africa Bureau, is going to give PVOs millions of dollars in grants, it is under our Development Fund for Africa to collect data for impact.

You are right as far as over doing it, but there still is a lot of room for improvement as far as data collection, but in the format that a PVO can use. But, as far as getting away with no improvements in data collection, I don't think that would occur under the new DFA guidelines. We have to show Congress impact. We have to find a balance between the two -- feeding more sophisticated systems that may or may not come online in the future, and also having PVOs and NGOs do a better job of collecting data which they have to do or they will not get funding under the DFA.

The data can be collected in basic project design exercises where a little bit more money is put in initially when the project is being designed.

Remko Vonk - CARE

The amount of money USAID has spent on all PVO type projects for natural resource management has been reduced by 30% over the last four to five years. You are asking us to do more, but that trend has to be reversed in one way or another. It doesn't look very good, so I don't see how we can expand with the reducing budgets.

Tony Pryor - ARTS/FARA/NR

There is a tendency for this subject to become a technology subject. In fact, that wasn't how the work has been perceived and over the long-term it is not where the best gain is. Everybody is to benefit from understanding what impact what one does has, whether one is a large multi-national corporation or a small PVO dealing with the grass-roots level of community development.

There is a lot of activity going on which is counted as output. We very seldom ask ourselves, 10, 20, 30 years later, "What was the impact? Did we actually meet the final objective?" What the Bureau is doing, and what many of you are trying to do is not at all perfect, but rather an attempt to try to improve the ability to look at impact, and that includes both what we talked about yesterday, some of the intellectual aspects of things, as well as techniques used to evaluate impact.

It should be in everybody's interest to know what you did from the point of view of impact.

Ben Stoner - AFR/ARTS/FARA

There are three points I wish to make.

This session was very important for us at the ARTS Office. We are really focusing on analysis of information, trying to better collect and improve the use of information in USAID, primarily in our field work in Africa.

We are getting to the heart of how we are reorganizing: what this Office is going to do. We are in the process of establishing a project called PARTS. It is a core project, which is the first one that we have had that really focuses on analysis. Different questions look at putting value on the information and utilization of that information in Africa. A lot of this discussion gets at the heart of what this Office is all about with the mandate that we have for reorganization.

The three areas that I would like to bring out from this discussion are as follows:

1. The Framework provides a common point of departure for us in Washington, for Missions, for many of you that we work with.

We don't want to take it beyond what it is really intended to be used for. It is a generic framework for organizing information. We had a lot of case studies presented on use and application of that framework. Our Missions take this Framework and apply it in different ways.

2. The second area is how can USAID as an institution work better to use knowledge. We have tried to set up some mechanisms at the central level. How in our

decentralized organization do we relate to Missions and link these mechanisms at the central level into their program planning and implementation?

If we are really going to be effective, it has to be implemented into the way USAID works at all levels. This is one of the challenges that we are looking at in natural resources.

- 3. The third area gets into the systems or levels of information. It was clear in discussions that there are four levels; household, community, national and global. It is very difficult for USAID to define what we are about. We are a public institution dealing with a lot of interests and essentially we have to respond to those interests. Even though we would like to focus, in many ways we cannot the way we want to.**

In information systems, we have to deal with information at all levels. We have to find better ways to deal with cross-sectoral information because natural resources information is cross sectoral. We have to find ways to better integrate biophysical, and socio-economic information, spatially as well as temporally.

The heart of our discussion is some very interesting ideas, tools, methods, and on how we can get information utilized across the Levels and across geographic boundaries and more effectively in our programming.

We are hoping that we can synthesize your ideas and use them in our Analytical Agenda which we will try and define more tightly tomorrow.

Presentation of Collaborators - Theme Four, Environmental Quality

Tim Resch - ARTS/FARA/NR

Environmental quality is now a separate part of the Analytical Agenda. Last July at the Analytical Agenda Workshop, we discussed how a number of activities looked at biophysical change, particularly, global climate change. In biodiversity issues, activities were distributed among levels, policy, practices and strategy for USAID.

After a couple of months of trying to fit a square peg into a round hole, the Natural Resources Management Unit realized efforts in global climate change and biodiversity do not only contribute to the SO₃. There are certain aspects of global climate change and biodiversity activities that do lead to sustainable increases in agricultural productivity: the strategic objective on which the FARA unit has been focused. For example, biodiversity preservation at the genetic level and buffer-zone management clearly relate to sustained increases in agricultural productivity. Some biodiversity and global climate change activities also contribute to the larger goals of the Development Fund for Africa which are listed in the following Chart.

The United States government's Global Climate Change objective was to mitigate the effects of global climate change by helping nations to reduce emissions of greenhouse gases and increase sinks for storage capacity. This led to a CO₂ fixation focus for research. The lesson learned was that the question is broader than this alone.

The questions for the next period of time are:

1. How does human behavior affect the sustainability of the Congo Basin? What is the potential impact of global climate change on the prospective for economic growth in the Basin?

The difference is a northern view versus a southern view. What is going to happen in the Congo Basin and the rest of Africa because of global climate change?

2. How is biodiversity analyzed over time, so that the impact of the DFA and other agency objectives can be assessed?

The point is that within the theme of biodiversity and environmental quality, some things increase agricultural productivity. Other actions contribute to the DFA objective; other actions address Agency and northern/southern interests.

There is a sense that all participants in this workshop come from different biases and understandings about what is biodiversity. Biodiversity involves three levels:

1. eco-systems diversity,
2. species diversity, and
3. genetic diversity.

The one reason for FARA concern for biodiversity is that the Bureau's annual obligations are increasing as governments recognize that some non-productive lands have value and can be given value.

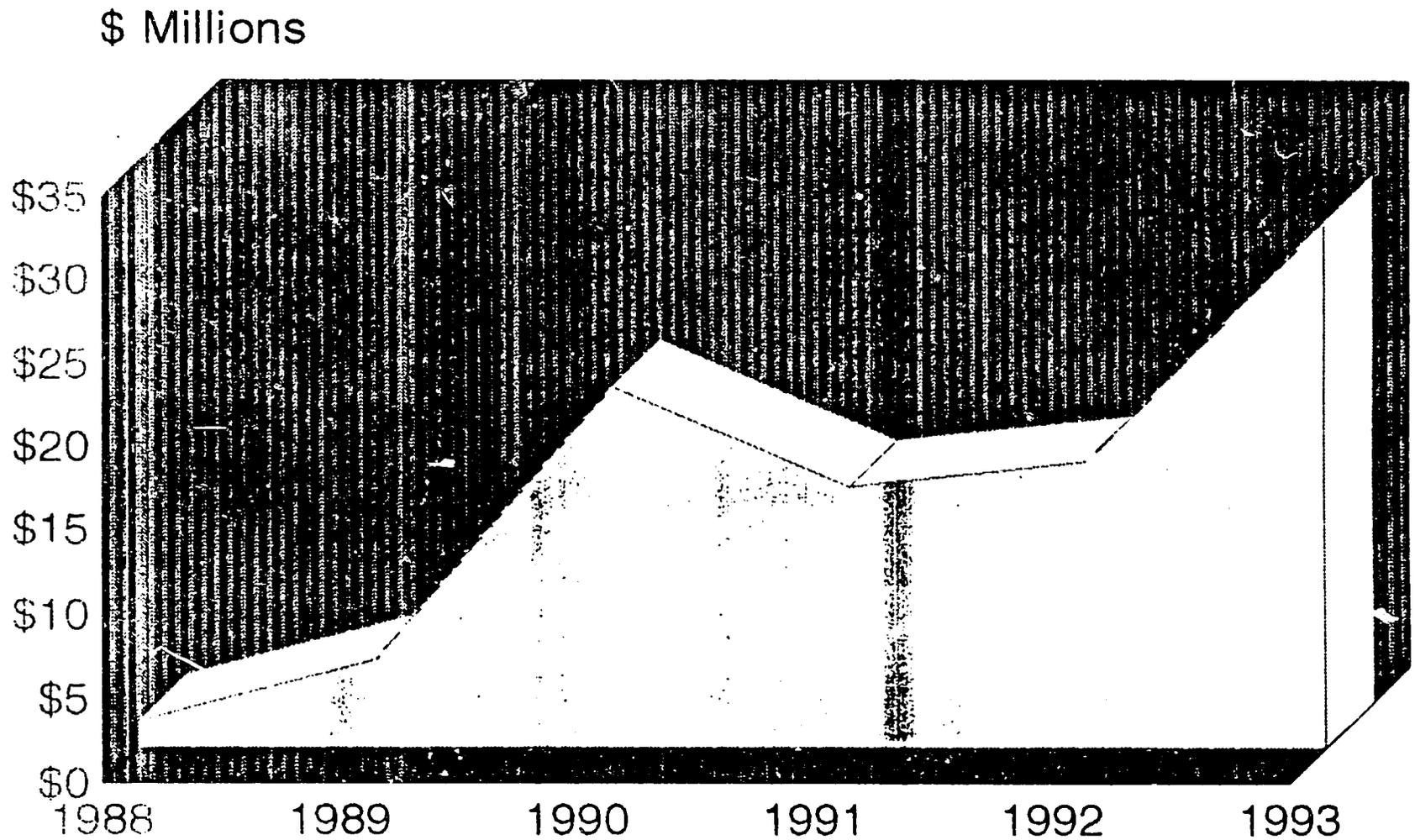
The following graph shows Bureau biodiversity funding over time and shows about \$190 million now dedicated to biodiversity activities.

On global climate change, there was some concern about public administration, documenting CO₂ increase, apparent temperature increases and concerns, and about what kinds of contributions are coming out of Africa. The Agency has programs in Africa, Latin America, the Philippines, Poland, and Indonesia.

Within the environmental quality parameter, global climate change is still in the theme and questions definition understanding level. Biodiversity efforts are proceeding in the initial investigation, desk studies, field verification, synthesis and feedback of the evolving portfolio.

AID-Funded Biodiversity Programs

Annual Obligations



Kate Newman - Biodiversity Support Program

The major question is how effective are approaches designed to serve biodiversity in Africa? The first issue concerns the validity and continued relevance of this question.

The first activity has been to assess some of the early USAID biodiversity projects that the Africa Bureau funded between 1988 and 1990. These projects are beginning to mature and, therefore, this is an excellent opportunity to go back and look at lessons learned. Some of these projects are still active.

One of the issues is "did the small biodiversity grant leverage an interest on the part of the Missions to get more involved in biodiversity?" These were precursors to the enormous projects going on now; \$65 million in Madagascar, \$40 million in Rwanda, \$40 million in Uganda. To be understood is the role of biodiversity in the Agency portfolio.

One of the earlier projects was to support Wildlife Conservation International (WCI) in their past research work with gorillas in Rwanda. This resource was not considered valuable locally, but was an internationally valuable biological resource. It was not considered valuable locally until WCI conducted an attitude assessment and information activity. Now this is a model for ecotourism. It is never too late to go back and define what was the impact of a project. It will probably reveal that USAID was a precursor and one of the best innovators of ecotourism in the world since people go back to this gorilla example repeatedly in all other countries.

Some of the gains would not just be national revenue or ecotourism. It is the most critical watershed management area of that small and over-populated country which relies entirely on agriculture. It was being damaged by encroachment and now that there is the attitude monitoring and education effort, the encroachment has decreased. The tourism has continued and gorillas have been protected in spite of the threats of wars and agriculture encroachment.

This type of post-facto impact assessment is really to guide that huge influx of money in the biodiversity sector. If all this money is to be well spent, the process for USAID must be informed. This will take looking at active projects, including projects that are not necessarily in the conservation sector, for example, development projects that are successful in participation, to see how some of these techniques can be used in conservation.

USAID has made an investment in biodiversity conservation. BSP would like to build up a system where the Mission can learn and apply this practical knowledge so that they can adapt to this changing field of conservation. This broadened base of knowledge can be used for design and implementation.

Most of the experience has been captured in the eastern and southern African regions partly because the English tradition of naturalism has been a better conservation ethic in those countries. The Francophone countries lag behind a bit. There has to be a different and more intense focus on training in the Francophone countries in the near term.

What are the questions that are relevant and require investigation? What needs to be done to generate understanding? One issue that arose during the course of this project was how to set priorities and design projects in the context of multiple value systems.

Previously, the local benefits of biodiversity conservation to the people living on the land were discussed. In Rwanda, the national economic benefits were discussed. The Rwanda people also have some non-economic national heritage benefits that they want to conserve.

The international global community concerns that are not necessarily of local concern for these countries are very important. USAID and Congress have taken on the responsibility of being concerned about the global commons and helping Africa to likewise be concerned.

All of the levels of biodiversity are important, but have not necessarily been taken into account when studying priorities for biodiversity conservation in Africa. The challenge this year is to study these levels in depth to understand the local values and to help the countries develop their own strategies, as well as to help USAID develop long-term strategies.

The project looks for ways to link these different levels and have multi-value priorities set. The way is the collaborative approach with senior level Africans for developing this strategy. This is a participatory approach, but not at the village level.

The next big question is, "how does attitude change and what causes the change?" There are several levels of attitude to be examined next year. Particularly, the difference between local-level attitude change and policy-level attitude change. The policy makers have their own attitudes; they are individuals. How is it that in some places policy changes can take place that would seem impossible in other areas?

The southern African concept of return of benefits to local communities is a good example. There are legal changes that have been made that takes money out of the treasury for return to the local community. In Zaire, this concept is completely alien. How is it that this has occurred in the southern African countries? It was someone at a very high level that signed this effort into law.

One of the other goals for this project is to look at the impact of conservation education. The books and slide shows that exist in America have been going on for a long time in Africa; particularly in Zambia, Zimbabwe, Kenya and Tanzania. These people have the same reasons as Americans for conservation. Millions of dollars have been spent in conservation education, most of it oriented towards local attitude change at the village level and at the policy level.

The last topic to be addressed is, "what new research needs to be done and what needs to be done better?" In biodiversity, the focus is in the biophysical realm. There are a lot of data on the status of the biophysical realm. There are, however, gaps in some areas and this project will do a scientific assessment with the local knowledge contacts. This information is to be used for monitoring purposes and for making better decisions in development.

A great example of a very bad decision in development was the Lake Victoria perch story in which perch introduced for game fishing started eating up the fish that supported the livelihood of the people around the lake. The perch now sells well, but they take up a lot more wood because they have to be smoked rather than laid in the sun. The perch also ate up every other fish in the lake and are now starting to eat their young. Obviously, this is not sustainable. This Lake, which is a huge resource for several countries is now dying biologically because of poor planning. So, the effort is to get biophysical information into the planning sector.

The main focus is to determine how people are linked to the land. People use natural resources in many ways other than agriculture to fulfill their lives. Understanding these issues takes a lot more research in the biodiversity sector to link to development for increased productivity.

Barbara Braatz - Biodiversity Support Program

The Central Africa Global Climate Change project is a study implemented through a one year buy-in to BSP. This project is still in the theme/definition stage, so not only is the project trying to answer the first question here, but also trying to determine if this is the correct question.

The project grew out of an Oak Ridge National Laboratories study which assessed current and potential future greenhouse gas emissions from sub-Saharan Africa. That project concluded that the major source of carbon dioxide was deforestation and that the largest potential source of carbon dioxide resides in the carbon in the vegetation and soils of central Africa. The study also concluded that the data upon which the conclusions were based are extremely limited and recommended that this deficiency be addressed in order to make more accurate estimates for appropriate policy decisions.

The focus was on six countries: CAR, Cameroon, Congo, Gabon, Equatorial Guinea, and Zaire. One of the most innovative aspects of the project was the collaborative process used. This included using remote sensing with input from other socio-economic analysis for the better assessment of factors contributing to land use change. The need for validation of remote sensing analysis by people on the ground is also important.

The team set up for this project also addressed those needs. BSP has the connection with the NGO community to effectively work with them in the field. WRI brought in the socio-economic expertise and helped to determine the factors which contributed to land use

change in the region. The NASA Goddard Space Flight Center provided remote sensing and GIS.

Initially, two U.S.-based desk studies were undertaken. One study was on the biophysical setting of vegetation, soils, climate and hydrology of the region, and the second on socio-economic factors for requiring land use change in the region.

During the project, one of the deficiencies was that it was not addressing potential effects of global climate change on the people and environment in the region. Peter Alpert from USAID helped to write another desk study on this subject for the project.

There was also a U.S.-based limitation of this project. There was a lot of information in the world relative to global climate change that was not being accessed. So, some Belgium researchers were brought in to collect and put together databases on videographic and photographic information that resides in Belgium on Zaire.

The remote sensing part of the project involved both desk study and demonstration exercises. The desk study was an assessment of remote sensing in the region and how it can contribute to understanding climate change. The demonstration exercise included the production of a wall-to-wall map of the closed forest of the region using higher resolution imagery for validation. This component of the project was enhanced by a pilot project with Wildlife Conservation International that was already doing research in the field.

LANDSAT imagery was also used to examine methods of change detection in the forest. And ortho-photo image maps were produced with high resolution images containing graphic overlays.

Another limitation of the study was that it was not addressing savannah burning. Savannah burning is not a source of carbon dioxide because the burned vegetation regrows the next year; this has a net zero effect for emissions of carbon dioxide. It is, however, a source of methane, carbon monoxide and oxides of nitrogen. This is not so important in central Africa because there is not that much savannah area; but, is important for the continent and the world.

The question of current and potential emissions is valid for a variety of reasons:

1. Greenhouse gas emissions in central Africa are due to land use practices. So, understanding and mitigating emissions is a natural resources issue.
2. Understanding the sources and magnitude of emissions from central Africa is an important first step if these countries want to become more active participants in the global climate change arena.

CENTRAL AFRICA GLOBAL CLIMATE CHANGE PROJECT

**'90-'91: WHAT IS THE CURRENT AND POTENTIAL
FUTURE CONTRIBUTION TO GCC FROM CENTRAL
AFRICA, AND HOW CAN THIS CONTRIBUTION BE
MITIGATED?**

**'92-'96: HOW DOES HUMAN BEHAVIOR AFFECT THE
SUSTAINABILITY OF CENTRAL AFRICA, AND WHAT
ARE THE POTENTIAL IMPACTS OF GCC ON
ECONOMIC GROWTH?**

17

3. A better understanding of greenhouse emissions from the region is important for the global scientific and policy community.

The people who are clearing the forest could care less about greenhouse emissions, so what makes it relevant to them? The relevance comes in on the effect side, because people are not in a position to adapt to climate changes the way people in this country can.

The effects of climate change are highly uncertain, but over the long term are likely to have vegetative impacts on the people and the environment. Also, without the forest, the resilience of the region to climate change would be reduced.

One of the issues that came out of this project stems from the fact that 90% of the precipitation in the region is recycled in the basin. If the forest is cut down, it is likely that the hydrological cycle will suffer.

What information is available and which still needs to be gathered? Remote sensing can help in gathering better information on land use change and forest area in the region. The GIS component was a case study to demonstrate the usefulness of this tool and recommends a pilot demonstration of GIS.

One of the prior constraints is politics in the region. Hopefully soon, field work on mitigation activities will begin and hopefully, ground work can continue so that when other countries open up, similar activities can be started in these countries.

A final report should be available in the spring of this year.

Plenary Session for Theme Four

Carolyn Shumway - R&D/AA

How can biodiversity be more fully incorporated with agricultural projects?

Kate Newman - Biodiversity Support Program

Many of the areas on the continent are feeling the cost of allowing diversity on a landscape to be depleted, particularly that leading to erosion, and not even able to retain water for their agricultural projects. A lot of the research on genetic diversity unfortunately takes place out of Africa. It is a question of intellectual property rights. There are a few laboratories on the continent that do the analysis that we do in the U.S. on genetic diversity.

There is a push to have genetic research brought back so that this sharing of genetic knowledge and information can be done more equitably; so that it can benefit all people directly rather than coming back in high yield varieties that came from Africa, went somewhere else, got processed and are now being sold at a high cost to the African

population. That is one aspect of the issue. I am not sure exactly how to do that without a lot of costly inputs in terms of technology.

There are other factors involving diversity in the landscape that are traditional and important to keep. An example is the Zimbabwe community that formerly took advantage of every single plant and tree that was on their property, and now only grow corn. Trying to do that intensively to the greatest extent possible does not allow them to keep that diversity on their own landscape. Consequently, their standard of living has gone down. Understanding all the property and what it gives to that farmer encouraging that kind of diversity is important.

This kind of work is being done in Kenya in an indigenous plant program where farmers are encouraged to reintroduce indigenous plants into their landscape.

Tim Resch - ARTS/FARA/NRM

We have in USAID, centrally managed, a project called Project NOAH that focuses on ex-situ (off-site) conservation of biodiversity. Some of the activities deal with agricultural commodities. The Africa Bureau focuses on in-situ (on-site) conservation.

USAID is also working with the National Institutes of Health on drugs and biodiversity where the important focus is looking at Madagascar and the unique mix of species there.

There are two other examples of linkages and increasing emphases on productivity.

Kathy Saterson - Biodiversity Support Program

In addition to these two examples, another international foreign-funded effort is the International Centers for Agricultural Research. They are beginning to add biodiversity to programs that operate out of Africa.

S.H. Sohmer - R&D/ENR

In the NOAH project, which is a strong step in the right direction, the work may be concentrated on a few basic crops, varieties of corn and rice, etc. What is really missing in ex-situ conservation is the ability to deal with thousands, if not tens of thousands, of species of plants and animals that may not necessarily have high economic value now, but which may be very important for the future. This is a very important gap in the entire biodiversity effort which will somehow have to be filled if we want to hang onto some of this genetic diversity.

Remko Vonk - CARE

We talked about attitudes and changing attitudes at different levels. Three to four years ago, part of our CARE projects always talked about changing farmers' attitudes about agriculture, forestry, tree planting and soil conservation.

We have moved away from that because we are saying that the people have the wrong attitudes. That is an arrogant statement. We have a better attitude in mind for them and if we keep on plugging away at it we will change their attitudes. Looking at that, we have concluded that people are making decisions with the information that they have available and we are making more and better information available to them.

In our dialogue about this issue, it would behoove us to look at it more from that perspective. It is better to assume that people do make rational decisions, but that the decision is based on a certain set of information and we try to expand on that information base.

Kate Newman - Biodiversity Support Program

It is arrogant to say we have to change everybody's attitude when the people have been living on this land all this time, getting along OK, but, in some cases, maybe their lives are worsening. This year, we are trying to emphasize a better understanding on our part of their knowledge. Their knowledge system is different. It is very useful information and some of it is being lost very quickly. A whole generation has not used this information because they have moved to the city.

We are trying to address that by understanding that the information you want to give out can be a combination of western scientific information blended with African knowledge systems. Policy makers who have been educated in the West are trying to battle the way they grew up and what they have learned and how they have to manage Africa in a changing state.

We are trying to get into that same position where we have the same basis in mind, but that we understand it better and help them make good decisions. Help them understand that they have lost some of their valuable knowledge and that a lot of our valuable knowledge has been developed in that context.

There are some field projects in conservation that are using GIS for maps and giving people information that has enabled them to say we have a map of our area. This is where we live, this is where the boundary is and this is the wrong place. The local people have the information. They use the modern information, but they are looking at it from their own perspective. There is a lot of give and take on both of our parts that is not necessarily a part of the development background.

Asif Shaikh - International Resources Group

We are looking at natural resources on one side and then we have something called quality of environment. We are looking at global warming and biodiversity. Do you not have a credibility problem when you look twenty years down the line and there are a great many environmental issues that are not necessarily within the mandate of the Africa Bureau but are direct concerns for the health and welfare of populations?

To get the message institutionalized and to get communities of people who have always been the strength of the communities committed to environment, don't you have to open a window to integrate these other concerns into the picture?

If we don't have people in these countries relate to environment as an issue in their lives, we are not going to have any input beyond the funding cycles which in four years may be on to something different.

It does not mean that the Africa Bureau has to open such a window, but should these programs be integrated with the programs that can address environment?

Kate Newman - Biodiversity Support Program

Africans are very concerned about environmental quality. We have been coming across groups, NGOs, and individuals who are very concerned about these issues. Climate change issue is one of them. We have mentioned training people in the governments to participate in the international climate change arena where the decisions are being made on global issues, but the Africans have not had a great voice. It is not fair that they haven't.

Part of it is their training background and resource background. They have not been able to participate in emissions analysis that the Indians have and about which they are very vocal. The Brazilians also have been very vocal, but the Africans have been very quiet. That is someplace to go over the next few years to allow them to participate in the general issues of quality of the environment.

Biodiversity tends to be considered a rural issue. USAID certainly has considered that a rural issue, but the people do move mainly in one direction and out of the rural areas where the quality of life goes down immediately. It has a lot to do with their available resources, pure water and adequate food.

Tim Resch - ARTS/FARA/NRM

It is a question of "brown" issues versus "green" issues and how do we strategically maximize our resources and at what level "brown" issues are pervasive in African cities.

It is because we don't have unlimited resources that we strategically focus on the "green" issues in Africa. Other Bureaus in USAID focus on the "brown" issues and my hope is that they will test technology approaches and processes in other regions of the world that have applications in African cities.

Gary Cohen - ARTS/FARA/NR

On the Green Card, we separated environmental and natural resources management. We do recognize that these are separate issues. We only have so many resources and so much money and staff, so we are now focusing on the sustainable agricultural productivity side. Part of the environmental quality activities in the environmental unit also addresses these issues. We are just not handling that type right now because it is a matter of focus and making impact when we can make a difference.

In the future with urban migration, we are looking at some incredible problems. We may get more funds or we may focus in other areas, but at this point, this is the story. I will not refute the issue of urban problems.

Cynthia Jensen - African Wildlife Foundation

Since USAID started funding diversity conservation projects, there has been a lot of assistance provided; institutional strengthening, training, research, management, policy change. I wonder whether your diversity analysis is evaluating the relative effectiveness of these different modes and what are the most appropriate modes for USAID systems?

Kate Newman - Biodiversity Support Program

No, we don't have preliminary results. One of the things we are looking at is the different aspects of conservation. Even though one project may have several of these different modes within it we would like to separate them out and understand the effectiveness of working in these particular sectors and the importance of having that included in a development program. No, we haven't started that yet. We are looking at USAID's own projects as well as projects implemented by other organizations and hope to sum up with some consensus on what are the best methods for USAID.

Russell Misheloff - R&D/ENR

Regarding attitudes at local levels and whether or not they are appropriate, I would have to agree that it would be presumptuous on our part to pass on the appropriateness of local attitudes. The issue is not exclusively inadequate information. There are two real problems involved.

1. Local perceptions of self interest take a short term perspective. It is natural and not related to inadequate information nor inappropriate attitudes. It is life.

2. The benefits of conservation are fairly broad where the cost of conservation may be disproportionate in the areas where the conservation is to take place.

In these circumstances, the attitudes about whether or not conservation is appropriate from the local level. They may see the cost very clearly where as the benefits may accrue much more broadly. They may not take this under consideration or in the same light that we would.

Tim Resch - ARTS/FARA/NR

On the question of attitudes, our research agenda is not how we give people the right attitude, but a better understanding of how attitudes are formed. Presidents Carter and Reagan had the same kinds of documents, but came up with different policies. I would like to understand how these attitudes influenced our national environmental policies. It is not just a question of doing the right study and then making the right decisions.

Gary Cohen - ARTS/FARA/NR

It is not necessarily changing attitudes, but also providing people with options instead of prescriptions for changes in attitudes.

Ben Stoner - AFR/ARTS/FARA

It is not whether these issues fit into the DFA, but what priority should they have. Most of our programs and leaders in the Africa Bureau look at this area and the magnitude of things to be done in Africa. This traditionally has not been given high priority. One of the things we have to address is why this area is important for broad-based stable economic growth in Africa and why it cuts across all four of the strategic objectives.

From our Africa perspective, we look at this as part of the agriculture and natural resources sector. We look at land use and land productivity across both the agricultural and natural resources sector. So, we take this broad integrated approach of looking at the agricultural side of it as it varies the natural-resource base where there was less human interaction traditionally, but now there is more human interaction because of demographic changes and economic stagnation.

The level of knowledge and use of the level of knowledge is an underlying factor. When we look at the Africa Organizing Framework, it is that biophysical foundation that we are trying to address to improve our level of knowledge of that foundation and how that foundation is being used and how it can be better used.

Certainly in the objective here, one thing that bothers us is, "so what?" Our objective three was, "How is this going to be used?" We have a situation in which we are addressing some geographic areas in Africa near the Congo Basin. We, as an Agency, are poised to help use

this information that is coming out of this region by working with others in the PVO/NGO community. But, if we don't have Missions in these areas, it really poses a problem of creating an information base and not being able to take that to the next step of putting it into practice. One of the questions we have is "where do we go from here?"

Presentations on Related Analysis

Ecotourism

Kjell Christophersen - International Resources Group

This is a collaboration through the mechanism of the IQC to carry out a study on ecotourism in Africa. The task was to answer the question, "Whether ecotourism is a potentially viable alternative for achieving USAID strategic objectives."

The group was also asked to offer policy and strategic recommendations for USAID programming in ecotourism and to provide planning guidance to ecotourism development if warranted.

In a sense, we work with a natural resource base that is intact. The major hurdle is a perception or stigma that environmental quality is a luxury. That perception is real.

Ecotourism is judged as being a good thing on the basis of macro-economics. There is a lot of literature on the macro-economic aspects of ecotourism and, also, the environmental economics of ecotourism. In this respect, lions are worth \$26,000, a herd of elephants is worth \$600,000 on the basis of the tourist revenues that are generated. These are the kinds of economics that are going around in the literature.

There is, however, not enough hard core micro-economics associated with ecotourism. Few have really assessed the bankability of ecotourism development. What is in it for the different actors? For people living in the area to be developed, this has to be an undertaking that means something to them. The private sector will make investments in the ecotourism development as will the public sector.

Local people have to be factored into the equation of ecotourism. There could be great concern over the fact that biodiversity is something that is degrading. There is an opportunity to stop that trend. Ecotourism is a tool by which we can stop degradation or we can preserve natural resources. There is a big "if" here. It has to do with the conditions that have to be met in order for ecotourism to work.

There are economic and financial conditions. There has to be something in it for all the actors involved. Policy initiatives have to be addressed on the part of the host country government. One of the conditions to be put in place is carrying capacity. Ecotourism has to do with the ecological integrity of the site, which must be maintained.

Ecological integrity becomes a policy issue whereby the public and private sector will have to get together and decide what should be the number of visitors for this potential site in order for there not to be a negative impact on the site. An example would be the following: a site can be determined to have 100,000 visitor days per year. If visitors are allowed beyond this number, then the effect will impact the behavior of the animals and an ecological disturbance of the site.

Suppose there is an economic study carried out. The rate of return was 30%, which is attractive. Suppose someone did a study that said if the carrying capacity were increased to 150,000 then a rate of return of 50% would be realized. This is where policy decisions have to be made. Which option does the host country take? Problems of this sort are found in Kenya. There is more money to be made in the short term, but ground is lost as far as ecological carrying capacity.

To establish and improve national tourism boards to promote local tourism means more than having a board, it also means a commitment that cross-links a lot of different kinds of activities. There must be commitment on the part of different ministries to improve infrastructure.

If there is not sufficient infrastructure to accommodate an influx of tourists, en route to the site, tourists will not come. Ecotourism cannot be an item of efficiency in itself; it has to be accommodated and publicly supervised. There has to be a partnership between the public and private sector. The literature did not reflect this.

It is not the business of development to wine and dine tourists in natural parks or other ecotourism sites. This is the business of the private sector. The private sector will, however, not make investments in the ecotourism facilities unless the government also admits to the fact that it is going to provide/develop trails going to the site, provide additional rangers, give the rangers vehicles in which to do their jobs, etc. These things have to go hand in hand.

There is a State tax attached to ecotourism in a lot of these countries. However, these proceeds have to be equitably channeled from ecotourism back to the local people who now use and depend on the resources.

What makes tourists do what they do? If one goes to the travel agent and writes a check for a \$4,000 package, that entitles them to go to the site, come back and be wined and dined in between. The tour operator is the one that handles everything. There has to be an understanding between public sector, conservation groups and the government about the traveling public.

It seems that if ecotourism can be promoted successfully, it is economically and financially feasible, and if all of the conditions are met, then this produces more tourism. This is supported by appropriate policy.

John Michael Kramer - DATEX

There is a lot of history in ecotourism. Someone might want to take a look at that history and see what USAID has been doing and what others have been doing to see what the strengths and weaknesses are.

If we had more time and personpower, we would like to have developed a step by step set of guidelines, for Missions, NGOs and governments to use in preparing ecotourism plans. These guidelines would be field tested and improved.

Wildlife Management and Conservation Training Sam Wasser - Smithsonian Institution: National Zoo

Developing countries are often very rich in natural resources, but very poor in economic resources necessary to protect them. A partial solution to this problem is special training of people who are in charge of protecting those resources. This is the primary focus of the training.

The training program is for Africans as a whole, although it is based in Tanzania. There are very few conservation organizations that have paid much attention to Tanzania as compared to Kenya. This is very surprising because in this region there is more wildlife than in all of Kenya. Tanzania devoted an unprecedented 25% of its land mass to protected areas; this totals about 55,000 square kilometers. This is the largest protected area in Africa and second largest in the world.

Wildlife managers are shooting from the hip and they are doing this because of a need to manage on a day-to-day basis for lack of resources. They rely very heavily on subjective impressions. This training program hoped to achieve a change in this type of behavior by giving an appreciation to the importance of analytical thinking. This analytical thinking is necessary to do effective management and make the people understand why they need systematic methods for effective conservation.

The course helps in understanding why techniques are needed and the danger in making subjective judgements. The people learn to ask effective and meaningful questions. We want to teach how to develop ecological monitoring programs so that when they get into a conservation problem in this area, they have the documentation to validate the problem. They have the hard data to show something is going on here and be fully justified in why they are not building roads.

Another aspect of the training is developing communication skills. This is necessary for convincing superiors that the problems that exist are worth spending time on and to convince local people toward being solutions to the problems. Finally, external funding agencies need to be convinced that these are problems worth spending money on.

By achieving these goals, the foreign assistance cycle can be broken. The African people will have the ability to solve their own problems.

The hidden agendas here are the following:

- create a sense of independence and self confidence among the participants so that they can solve their problems.
- convince the higher ups of the importance of these kinds of tools.

The training program is designed as a six week course that is taught once per year. The course was attended by half Tanzanians and half from other countries.

The first two weeks were spent trying to flush out the most important conservation problems. There were a series of workshops in which the participants were asked to give the five most important conservation questions that related to their conservation area. Debates and forums were also held to stimulate thought on the subject.

Then, methods for addressing the problems were introduced. They were taught word processing, spreadsheets, graphics, and the necessary tools for generating reports. A lot of other courses lack coherence. Techniques are taught without the ideas being put under one roof; the ideas often get lost. Part of the course was build around a problem facing the African, such as loss of woodlands.

Also developed in this course was an ecological monitoring program. One of the factors addressed for woodlands was fires. When asked, the managers could not really appreciate the impact or complexity of this problem. This type of monitoring is important also because of the ivory ban. Different kinds of methods like remote sensing are being presented in the monitoring program. Different methods are selected from a list and each participant has to justify its use. The elephant population will start increasing and impacts will have to be measured.

The final project for the course was to prepare a research proposal. There was \$5,000 in the budget to allow funding of one of these proposals. This was a tremendous incentive. The people were allowed to submit as many drafts as possible during the course. The excitement of the proposals was shared by senior management. The director, who thought the course was a waste of time, began to appreciate the importance of the course and assured that if their research was supported, they would have time to carry out the research.

Of the twenty proposals submitted, ten were so well prepared that money is being sought to fund as many as possible. By looking at the quality of the proposals, it was evident that the concepts were effectively presented.

As other Tanzanians see the products that the participants have and the support the projects have, the program will build on itself. The participants are now trained to be apprentices. People in the country are taking a much greater role and interest in the whole course. Funding these proposals is a good risk to take because it will create incentives for the people to keep going.

In terms of continued relevance, the national park is the closest park to the University of Dar es Salaam and the University of Agriculture. An ecological program is being built and data will be collected for a course at the University. The course is going beyond simply training senior officials, but they are turning to education groups that are also coming in.

There is a major highway that passes through the center of the Park and 75% of people living in Tanzania have never seen wildlife. This is one of the ways they are able to see wildlife. Buses are rented and driven through the park and the people are flabbergasted when they see giraffes and other animals. At the gate, an educational park interpretation facility is being built for informing people about conservation issues.

The most valuable part of this course was the exchange of information between participants from other countries. It was amazing how common the view points were. One disappointment was that there was no showing from the southern African nations. This will change in the future.

The most important constraint is to ensure follow-up of the program. Africans are encouraged to setup monitoring programs in other areas. Our group will periodically visit these areas.

There is an effort to bring students in for higher education so that they can be trained and sent back into the system. Then there can be a pool of individuals with some expertise in this area.

Another major constraint is convincing ministry-level people of the importance of conservation programs. Therefore, the ministers are invited in to talk to the participants and this provides an atmosphere of exchange.

It is important in these programs not to just teach techniques, but also to give the techniques with the knowledge of their limitations. It is important to open the participants to appreciate their own ingenuity which was found to be quite formidable.

Walter Knausenberger - Integrated Pest Management

This particular area of environmentally sound pest control concerns a major effort made by USAID over the last five years. In particular, African Emergency Locust/Grasshopper Assistance Project.

A specific set of tools were designed to assist efficiently locating, areas of survival and breeding by locusts, so that crop protection survey and control teams could target areas for management efforts. USAID alone invested nearly \$60 million on African locust control over the past five years. There is no clear idea of impact of this kind of investment, due to both the emergency nature of the project, and the lack of institutional monitoring.

In the AELGA project, there has been an effort to merge issues related to pest management, crop production, food security and general natural resources management as a whole. The focus now is on developing an agenda that will work with other projects in regard to research activities.

A few years ago, after the locust went into recession, the Agency's efforts were redirected to include alternative tools for control of locusts and grasshoppers that did not depend on pesticides. The minimization of pesticide use is really the objective as this has direct implications for the environment.

Chemical pesticides were used for three to four years during the locust campaign with no real focus on the environment. There have been ecotoxicological studies done which monitor the impact of that campaign and there are plans to move forward with this information to focus on future interventions. Because of the probable upsurge of this sort of migration of epidemic pest again, it is essential to maintain a continuity in the search for alternative tools for dealing with, and making decisions about interventions in the future. This will be happening to some extent in ARTS, but functions will also be placed in another office.

While broadening the perspective toward the concept of Integrated Pest Management, that does not mean that the previous investigations will be left behind. Of importance is continued research on biological control agents for grasshoppers and locusts. Several have a great deal of promise in showing the effectiveness of pesticides in their ability to control, without the secondary impacts on other organisms. Specifically in the category are the microbial pesticides and fungi.

Integrated pest management is a strategy, a philosophy, not a set of specific practices that can be implemented in any particular way. It is non-prescriptive as opposed to the concept of chemical pest control which is a prescriptive intervention directed with little concern for negative environmental impacts. IPM is a management principle which involves decision making on the part of the farmer. Therefore, the IPM concept is closely attuned to the environmental context of the local environment, the particular crop, as well as the pest itself.

There is a great stigma attached to integrated pesticide management in some circles, partly because of its lack of success in sub-Saharan Africa. The lack of attention to the socio-economic context of getting farmers involved in problems, conditions and executions seems to be a key element in the lack of success. The intent of future IPM projects will be to identify those elements that are critical to success and show patterns similar to the experience found in the early design of the NRMS projects.

To identify the empirical practices that are not in use presently, some traditional farming systems may be supplemented by adding modern IPM technologies. Pesticides should not be used as the only tool, but rather should be kept available for need as a last resort in a range of approaches and strategies. It is necessary to deal within the policy environment as well as with technical constraints themselves. This requires a focused effort on the initial status of a baseline assessment of these practices and the context within which they are implemented; that would be the first phase. Participatory Rural Appraisal may have a lot to offer in this respect.

There is benefit to having a multi-disciplinary team with ecological, socio-economic and technical perspectives to make assessments. For example, when the NRMS team went out in the mid and late 1980s, there was no pest management person on the team.

In dealing with the overall potential for productivity, pest management has been understood as a major constraint with 25 - 35% potential crop production in the field before harvest losses. Access to that food is therefore drastically affected. Potential for being dependent on pesticides is great, as is the likelihood for increased use of pesticides.

The Africa Bureau is currently focusing on traditional export crops. This may imply greater pesticide use. What better time than now to identify technologies which can be introduced that are not pesticide oriented and take advantage of the strengths of these systems that do exist or identify them more carefully as to the implications of various practices for pest management.

Making the linkages between natural resource management and pesticide management has potential. For example, in the area of buffer zone management, there will be crop production concerns in this area where pesticides are used increasingly on certain crops. One area is in habitat management and natural enemy enhancement that increases the natural regulatory mechanism that exists in those systems. This is already available to farmers, rather than impinging on the farmers by depending on technology like chemical pesticides which will promote secondary problems.

In considering this process over the next year or two, it is important to distinguish between the attitude of the lower-input single agricultural system and those with intensified crops for cash economy, which may be able to buy inputs and make a decision on those inputs.

Most countries in sub-Saharan Africa depend on a centralized service for control of pests. There is also the problem of subsidization of pesticides; 80% of pesticides in sub-Saharan Africa are subsidized. This is a disincentive to using practices other than pesticides in addressing the pest mitigation problems that exist.

The various collaborators will more fully identify, within their projects, the residual problems of past interventions. There are a number of good possibilities. The issue of residual

pesticides present in Africa is not to be ignored. Twenty to sixty million liters of pesticides are considered to be obsolete or unusable. Most of these have been contributed by donors.

The overall concept of dealing with the pesticide sector is a tricky issue, a very sensitive one, because there are conflicting results from interventions and policies. If subsidies are to be removed, there is an increase in risk that the farmer may not be able to provide for his crops' protection. This may increase the chance of utilization of other non-chemical practices. An increased interest in this domain is expected. By the year 2000, a billion dollars worth of pesticides will be sold in sub-Saharan Africa alone, and this is important when considering macro-economic policy adjustments. These things need to be properly assessed.

The general issue of pesticide use and other technologies bear some examination. Hopefully the potential is great for building linkages between natural management considerations and the best management and crop protection in connection with minimizing pesticide use.

Don Moore - Famine Early Warning System

After the 1985 famine, the Administrator of USAID said "We shall not be embarrassed again by our late action because we did not have reliable and credible information that we could communicate to decision makers to get the decisions to establish mitigation on time."

During this period the U.S. had to rely on BBC broadcasts from Ethiopia before the population and the U.S. Congress would respond. There were stories that airlifts of food into Sudan would cost \$1.00 per pound. With early warning, communication systems set up and credible reliable information, these conditions would not have existed.

So, FEWS was designed. The realization is that it takes an average of six months between the time the decision is made to ship food and the time when food is delivered to places in Africa. If the decisions are not made by November or December, the rains have come again and then the food cannot be distributed. Early warning is the key. The second key is that famine is considered a creeping disaster rather than something that just happens abruptly. There are early warning signs.

The task from a research perspective is to look locally for the appropriate indicators. What kind of data are needed to support these indicators and are being used to predict a volatile situation? Often times data are too dispersed to provide clues as to how much food is needed and where.

With the advent of the FEWS project, the process was institutionalized such that the seven famine sensitive countries from Mauritania to Sudan and Ethiopia would have support for food security offices.

Famine Early Warning operates on the premise that famine is caused by lack of access to food. Within our own lives this is based on household income and the cost of food. So now, the consideration is, what factors affect that household income and the cost of food? What types of data are needed to look at what are the nutritional status and the nutritional trends and decisions of the population. Where is the population, where is the agriculture, is it subsistence agriculture, or is it for cash? What is the condition of that agriculture this year? How can the conditions of the agriculture be monitored this year? Weather data must be used to look at the condition of the agriculture?

The approach to answering these questions lies in the convergence of evidence of indicators and the indicators have some influence on household incomes. This is also a geographic problem. The methods designed into the program had to be data intensive, as quantifiable as possible and reliable. The accumulation of this data was very difficult and the approach was to put a young, aggressive, very high level interpersonal skilled type person in a useful position in the field. This person's primary purpose was data gathering and knowing techniques for management and to use the analytical process on data to support the USAID Missions in developing food security cables.

On the issue of developing famine relief strategies, there needs to be a communication mechanism. The Missions have a communication mechanism in the cable, but the cable is long and very involved. A document must be published that can catch the Administrator's eye. The approach is to use a daily bulletin.

Further, there must be determinations on the progress of the season. In May, economic and nutritional evaluations must be made. For a lot of people, large portions of their incomes are from traditional agriculture. So, in May, a volatility assessment must be made to determine where the population is and the likelihood of an abnormal growing season. In September, a preharvest assessment should be done. Was the planting normal? Did it appear that the crop progressed normally? Then, in December, a post harvest assessment is needed.

To do these assessments, a variety of disciplines and types of data are needed. FEWS has pioneered defining the problem and getting someone to test it and put it into the software system. Other government agencies like the Joint Agricultural Weather Facility as well as U.S. Geological Survey are used for archiving.

FEWS has learned techniques on the process of linking these data types. It can study problems for a long time, but every ten days a bulletin has to come out. FEWS is desk-top data management. There is a rainfall data manager, population data manager and agricultural data manager that guide a person, who does not have to be very literate in computers, toward standard analyses.

FEWS was not designed for linkage to development. It was designed for warning U.S. decision makers of impending famine.

Ben Stoner - Followup comments

As a point of clarification, when we talked about the Framework and the FARA Division, we were looking at boxes for dealing with natural resources and environmental management. There are in our Division six general themes. We have considered in depth four of them here.

In the last year we have established two management units that deal with natural resources and the environment. We focused this workshop on the natural resources unit activities that are directed by Gary Cohen, Tony Pryor, Mike McGahuey, and Tim Resch. We have had some participation of environmental aspects directed by John Gaudet, Dan Dworkin, Walter Knausenberger and Bill Thomas. All of these, in our thinking, are linked.

It is unfortunate that John Gaudet is traveling to Abidjan for a training workshop; we have not been able to integrate natural resources and the environment into this workshop as we would have liked.

In our thinking and the way we approach the problem in Africa, natural resources and the environment, are linked and are dealt with simultaneously. We didn't mean to downplay one over the other in this proceeding.

APPENDIX A

**NATURAL RESOURCES MANAGEMENT IN AFRICA:
The Implementation of the AID Africa Bureau NRM Analytical Agenda**

March 17-18, 1992
General Workshop

Washington Vista Hotel, 1400 M Street NW, Washington, DC
Phone: (202)429-1700. Fax: (202)785-0786.

WORKSHOP AGENDA

Tuesday, MARCH 17, 1992

- 8:00 Registration
Complimentary Continental Breakfast
- 9:00 Introduction - Gary Cohen
Purpose, Agenda, Logistics, Introductions - Gary Cohen
Welcome/Opening Remarks - Jerry Wolgin
Opening Remarks - Eric Chetwynd
Opening Remarks - Tom Hobgood

THEME ONE - CONDITIONS AND POLICIES

- 9:30 Introduction to theme and questions - Tony Pryor
- 9:40 Presentations by Collaborators
Steve Lawry, Land Tenure Center
Julia Morris, Forestry Support Program
David Gow, World Resources Institute
Albert Greve, NEAP Mutli-donor Secretariat
Derick Brinkerhoff, Implementing Policy Change
Louis Siegle, Decentralization: Finance and Management
- 11:00 Coffee
- 11:15 Panel Discussion by Collaborators (Chair - Tony Pryor)
- 11:45 Plenary Discussion
- 12:15 Lunch (on your own)
- 13:30 Summary of Theme One Issues - Ben Stoner

THEME TWO - ACTIONS AND PRACTICES

- 13:45 Introduction to theme and questions - Mike McGahuey
- 14:00 Presentations by Collaborators
David Gow, World Resources Institute
Kate Newman, Biodiversity Support Program (BAA)
Micheal Brown, PVO/NGC NRMS
Richard Ford, SARSA
- 15:15 Panel Discussion by Collaborators
- 15:45 Break
- 16:00 Plenary Discussion
- 16:30 Summary of Theme Two Issues - Ben Stoner
- 17:00 Cash Bar reception for participants

95

Wednesday, MARCH 18, 1992

THEME THREE - TOOLS AND METHODS

- 8:00 Complimentary Continental Breakfast
9:00 Introduction to theme and questions - Dan Dworkin
9:10 Presentations by Collaborators
Julia Morris, Forestry Support Program
Bonni van Blarcom, Gambia Economist
Dan Tunstall, World Resources Institute
Jim Tucker, NASA - Goddard
Don Moore, USGS
Nadine LaPorte, BSP NASA Goddard
10:30 Coffee
11:00 Panel Discussion by Collaborators
11:30 Plenary Discussion
12:00 Summary of Theme Three Issues - John Gaudet
12:30 Lunch (on your own)

THEME FOUR - ENVIRONMENTAL QUALITY

- 13:30 Introduction to theme and questions - Tim Resch
13:40 Presentations by Collaborators
Kate Newman, BAA/Biodiversity Support Program
Barbara Bramble, GCC/Biodiversity Support Program
14:15 Plenary Discussion
14:30 Summary of Theme Four Issues - Ben Stoner
14:45 Break
15:15 Related Analysis
Kjell Christopherson, Ecotourism
Sam Wasser, Wildlife Management and Conservation Training
Walter Knausenberger, Integrated Pest Management
Jonathan Olsson, Famine Early Warning System
17:00 Workshop Wrap-up - Cohen
17:30 Closure

96

**NATURAL RESOURCE MANAGEMENT IN AFRICA:
The Implementation of the AID Africa Bureau NRM Analytical Agenda**

March 19, 1992
Synthesis Workshop

Washington Vista Hotel, 1400 M Street NW, Washington, DC
Phone: (202)429-1700. Fax: (202)785-0786.

WORKSHOP AGENDA

Thursday, MARCH 19, 1992

- 8:00 Complimentary Continental Breakfast
- 8:45 Introduction - Gary Cohen
- 9:00 Summary of the PARTS Project and the NRM Analytic Agenda
- 9:15 Introduction to the Revised Themes, Discussion
- 9:45 R&D role in supporting the NRMAA - Eric Chetwynd
- 10:30 Theme One - Conditions and Policies - Proposed Activities: description, status and comments
- 11:45 Working Lunch
- 13:00 Theme Two - Practices and Impact - Proposed Activities: description, status and comments
- 14:30 Break
- 14:45 Theme Three - Environmental Quality - Proposed Activities: description, status and comments
- 16:00 Linkages to Environment unit - John Gaudet/Dan Dworkin
- 16:45 Summary and Options for Collaboration - Gary Cohen
- 17:00 Closure

Participants:

Tom Hobgood, ARTS/FARA
Ben Stoner, ARTS/FARA
Gary Cohen, ARTS/FARA/NR
Tony Pryor, ARTS/FARA/NR
Mike McGahuey, ARTS/FARA/NR
Tim Resch, ARTS/FARA/NR
Peter Alpert, ARTS/FARA/NR
Dwight Walker, ARTS/FARA/NR
John Gaudet, ARTS/FARA/ENVT
Dan Dworkin, ARTS/FARA/ENVT
Caroly Shumway, R&D/AA
Kate Newman, Biodiversity Support Program
Julia Morris, Forestry Support Program
Stan Peabody, EPAT

David Gow, World Resources Institute
Jim Gage, Implementing Policy Change
Steve Lawry, Land Tenure Center
Larry Siegle, DFM
Albert Greve, World Bank/NEAP
Sy Sohmer, R&D/ENV
Bob Mowbray, R&D/ENV
Russ Mishelhoff, R&D/ENV
Micheal Philly, R&D/ENV
Jeane North, R&D/EID
Pamela Stanbury, R&D/EID
Tom Mehan, R&D/EID
Eric Chetwyn, R&D/EID
Twig Johnson, R&D/ENV

APPENDIX B

95

PURPOSE OF WORKSHOP

The purpose of the workshop is to review the questions identified in the NRMAA, and to discuss the following:

1. What can we say at this time concerning the validity and timeliness of these questions?
2. What other questions are relevant and require investigation?
3. For each theme, what relevant information is available, and what information still needs to be gathered?
4. What research topics might be usefully continued or initiated during FY 92/3?
5. This is a workshop, not a conference. Work by our collaborators is for most part ongoing; this is part of our evolving Agenda, and not a final reporting session.

APPENDIX C

FY 92/93

THEME ONE

**Policies, Institutions, and Socioeconomic
Conditions for Improving Natural Resources Management.**

QUESTIONS:

1. How useful is existing economic theory and analysis in describing economic conditions affecting adoption?
2. What is the role of decentralized control and local governance of improved NRM?
3. What lessons can be learned from in-country research programs on land tenure?
4. What are the institutional policies and conditions which lead to improved NRM actions?
5. What conditions and actions affect the success of policy reform programs?

FY 92/93

THEME TWO

**NRM practices and their impacts on natural
resource base productivity**

QUESTIONS:

- a. What is the array of NRM innovations, adopted behaviors, and changes, and what are the impacts of each on short, medium and long term biophysical change?

- b. What are the effective factors in attitude and activity change?

- c. How can environmentally sound development by voluntary and volunteer organizations be facilitated?

FY 92/93

THEME THREE

Environmental Quality Issues in Sub-Saharan Africa.

QUESTIONS:

- a. How does human behavior affect the sustainability of the Congo Basin and what is the potential impact of climate change on the prospects for economic growth.

- b. How does one analyze biodiversity projects in Africa so that, over time, the impact on DFA and other Agency objectives can be assessed?

APPENDIX D

**INFORMAL SUMMARY OF COLLABORATING PROJECTS'
PARTICIPATION IN USAID MISSION NRM PROGRAMS**

Niger	ACCESS II D:FM [RSSA staff]
Gambia	ACCESS II FSP [RSSA staff] BSP
Guinea	ACCESS II [RSSA staff]
Senegal	ACCESS II IPC (proposed) MDS (proposed) [RSSA staff]
Mali	ACCESS II [RSSA staff]
Uganda	EPM ACCESS II FSP D:FM MDS BSP [RSSA Staff]
Madagascar	EPM ACCESS II FSP D:FM BSP MDS [RSSA staff]
Kenya	ACCESS II (with ICRAF) SARSA BSP [RSSA staff]
Rwanda	ACCESS II (including with ICRAF) EPM MDS FSP [RSSA STAFF]
Burundi	ACCESS II (ICRAF)
Botswana	EPM (Proposed)

105

PVO-NGO/NRMS Project
1250 24th Street NW
Suite 500
Washington, DC 20037
Tel: (202)293-4800

Fax: (202)293-9211

CONTACT: Michael Brown

PROPOSED OUTPUTS, STATUS OF EACH, AND EXPECTED COMPLETION DATE

1. The establishment of PVO-NGO/NRMS country consortium (or "Country Working Groups") in Mali, Cameroon, Uganda and Madagascar. The groups focus on channeling technical assistance, training and information support to NGOs, local communities, government bodies (in select cases) and donors (regarding information support). Completion date: completed.
2. The on-going consolidation of these working groups; increased institutional and technical capability of member NGOs to design and implement feasible NRM activities corresponding to original priority themes identified at the project outset by each group. Completion date: March 1993.
3. Implementation of innovative NRM activities with analytical or policy implications for NGOs, government, and local resource user communities in Africa (and to an extent in Asia). Examples:
 - (a) Buffer Zone Management Workshop, publications and video, distributed in Africa, Europe, USA, and Asia. Status: Completed. Implemented by: PVO-NGO/NRMS/WASHINGTON.
 - (b) NGOs in NRM in Niger: for USAID/Niger, attached as annex to ASDG II PP. Status: Completed. Implemented by: PVO-NGO/NRMS/WASHINGTON and CCA/ONG/MALI.
 - (c) NGOs in NRM in Cameroon: for USAID/Cameroon, as part of Natural Resources Sector Assessment. Status: Completed. Implemented by: PVO-NGO/NRMS/WASHINGTON and PVO-NGO/CAMEROON.
 - (d) Evaluation of economic options in Dzangha-Sangha Forest Reserve. Status: Completed. Implemented by: Telesis, Inc.
 - (e) Integration and Conservation and Development Projects: Lessons learned and design Issues: for AID/ADRE conference, presented in Sri Lanka. Status: Completed. Implemented by PVONGO/NRMS/WASHINGTON and WWF's Wildlands and Human Needs Program. Forthcoming joint publication of PVO-NGO/NRMS, WHNP, and the Biodiversity Support Program (BSP).

- (f) Natural Regeneration in the Sahel: A methodology for identifying Promising Sites in Farmer's Fields. Status: Completed. Implemented by: CARE/International.
- (g) Pastoral Sector Assessment in East and West Africa: Rethinking the for NGOS. Status: May 1992 completion. Implemented by IIED/London, PVO-NGO/NRMS/WASHINGTON, CCA/ONG/MALI.
- (h) "Approches Amenagement du Terror": Developing methodologies for appropriately maximizing NGOs contribution in land use management in the Sahel. Status: Proposal submitted by CARE/MALI with support from CCA/ONG/MALI and PVO-NGO/NRMS/WASHINGTON to USAID/MALI: To begin upon final approval.
- (i) "Approches Amenagement du Terroir dans le Sahel": A review of aménagement du terroir to date, its potential, and potential pitfalls. Status: Completed. Implemented by CARE/International.
- (j) "NGOs in the Agricultural Research Process": A Workshop linking NGOS with national and international agricultural research centers. Status: Completed. Implemented by: Winrock International, ELCS, ILEAI.
- (k) Conservation Needs Assessment in Papua New Guinea: Developing an innovative approach to link NGOS, landowners (local resource users), government, donors, and timber industry. Status: April 1992. Implemented by: PVONGO/NRMS/WASHINGTON in collaboration with BSP.
- (l) PVO-NGO/MALI/CAMEROON/UGANDA/MADAGASCAR/WASHINGTON presentations on NGO work in NRM, and North-South partnership in NRM, at the Global Forum meeting in Rio de Janeiro. Status: June 1992.
- (m) Buffer Zone Management in Uganda: A follow on Workshop in Kibale forest. Status: March 1992. Implemented by: Makerere University Biological Field Station, Makerere Institute for Ecology, PVO-NGO/NRMS/UGANDA. Status: March 1992.
- (n) Conseil pour le Redressement Economique et Social (CRES). The council for economic and social reconstruction. Status: ongoing. Implemented by: COMODE/MADAGASCAR in collaboration with the government of Madagascar.
- (o) "Women in Natural Resource Management in Mali". Two workshops held in consecutive years. Status: Completed. Implemented by: CCA/ONG in collaboration with FSP and PVONGO/NRMS/WASHINGTON.
- (p) NGO Roles in the East and West African: Pastoral Sector Technical

Institutional Issues and Methods. Status: A workshop to be tentatively held in January 1993. Implemented by: PVO-NGO/NRMS/WASHINGTON and IIED/London.

- (q) Participatory Rapid Appraisal Workshops and Field Exercises: Kenya, Uganda, Cameroon. Status: Workshop completed, field exercises ongoing. Implemented by: World Resources Institute, PVO-NGO/NRMS/UGANDA and CAMEROON.**
- (r) Legal status of NGOs in Madagascar. From criteria COMODE's membership, analysis of the optimal legal status of NGOs in Madagascar is being made to serve as a basis for a policy proposal to government. Status: December 1992 completion.**

COOPERATION AND INTERCHANGE WITH OTHER COLLABORATORS

As indicated above of particular note:

- Collaboration between PVO-NGO/NRMS/WASHINGTON, CCA/ONG, CARE/MALI, the World Bank funded Plan National Pour la Lutte Contre la Desertification (PNLCD), and USAID/MALI;**
- PVO-NGO/NRMS/UGANDA on the Uganda National Environment Action Plan (NEAP) steering Committee, chaired by the Ministry of Environment;**
- COMODE/MADAGASCAR on the Conseil Pour le Redressement Economique et Social (CRES) in collaboration with the interim government prior to forthcoming elections in Madagascar.**

1/5

Associates in Rural Development, Inc.
110 Main Street, Fourth Floor
P.O. Box 1397
Burlington, VT 05402
Tel: (802)658-3890

Fax: (802)658-4247

CONTACT: Louis Siegel

PROPOSED OUTPUTS, STATUS OF EACH, AND EXPECTED COMPLETION DATE

A. DECENTRALIZATION: FINANCE AND MANAGEMENT (DFM) PROJECT NATURAL RESOURCES MANAGEMENT STUDY (AFR/ARTS)

I. OUTPUTS

1. Synthesis Report: Literature Review on Local Autonomy and Natural Resources Management in Sub-Saharan Africa

First draft version completed and submitted December 1991. 2. 2.

2. Uganda Field Work Findings

Research is on-going in February; draft findings to be completed by March 6.

3. Mali Field Work Findings

Research will begin approximately March 11; draft findings will be completed by approximately April 2.

4. Southern Africa (Namibia?) Field Work Findings

Research will begin approximately April 20; draft findings will be completed on or about May 15.

5. Workshop

After completion of all field work, a workshop will be convened to consider the literature review, the findings of the field work, and additional issues and research questions regarding decentralization and improved natural resources governance and management that might be investigated through a long-term research program. No date for the workshop has been set, but it will likely be held within four weeks of completion of the field work.

6. Final Report

A multi-faceted final report will be prepared within eight weeks of completion of the workshop. The final report will include: a final literature review synthesis; final reports on field work (including both findings regarding decentralization and natural resources governance and management at the sites, and potential issues to be addressed through future research at the sites); findings based on the literature review, the field work, and the discussions at the workshop; recommendations regarding what issues require further research; a proposal and methodology for conducting the additional research.

B. OTHER ACTIVITIES RELEVANT TO THE AFRICA BUREAU'S NRMAA

Other activities conducted by DFM or DFM associates that are relevant to the NRMAA include:

Contributions by a DFM team to the design of the USAID/Madagascar Knowledge and Effective Application of Policies for Environmental Management (KEAPEM) project.

Preparation of a three-volume study, based on field work, for the OECD/Club du Sahel on decentralization, governance and management of natural resources, and public services, in Mali.

Preparation of a four-volume study for USAID/AFR/DP on decentralization, structural adjustment and public service delivery in Ghana, Ivory Coast and Nigeria.

FAO financed workshop at Indiana University/Workshop in Political Theory and Policy Analysis to refine the common pool resources data base questionnaire for use with forestry resources.

Publication (April 1992) by FAO of a volume on analyzing social forestry institutional problems, based on four Nigerian case studies.

SUMMARY OF RESULTS SO FAR

To date, because all of the research including the literature review is on-going, all results are purely preliminary. Based on research in progress, DFM/NRM has articulated nine cross-cutting themes that require exploration, and has developed a working version of a field protocol to conduct field research on these themes.

The cross-cutting themes relate to the hypothesis that natural resources governance and management problems are posed at many levels. Failure to take account of those different levels, and the different parties involved at each level, will predictably lead to inappropriate institutional solutions. This hypothesis is illustrated by the too typical approach to forestry in many countries: central control at a single national level which led to unnecessary and inefficient destruction of woodstocks in Asia, Africa, and Latin America, and a host of avoidable downstream problems. Conversely, attempting to resolve natural resources governance and management problems by an overly simplistic devolution of management

authority to the smallest level will also likely lead to inappropriate outcomes. The specific resource and the specific problems associated with its management should determine the most appropriate institutional arrangements, not a single policy promoting decentralization, uncentralization, or re-centralization.

The cross-cutting themes are:

1. Local control of natural resources by viable local selfgoverning institutions is a desirable, effective, and efficient governance and management option.
2. Governments, both local and national, should govern and manage natural resources in conjunction with local selfgoverning institutions by promoting and providing support to those institutions. The exact nature and degree of that support should vary depending on the resource and a host of other variables.
3. National and local government could improve conditions for natural resources management by establishing policies that create an enabling environment.
4. Sustainable natural resources governance and management systems may well have to be complex in many situations, rather than simple, to take account of the diverse interests of the various interested parties.
5. The combination of local and overlapping supra-local or central controls probably has to be negotiated on a case by case basis. However, recognition that various parties can have a legitimate interest in a given natural resource is an important starting point for conducting negotiations.
6. Community level conflict resolution mechanisms are critical for effective sustainable resource governance and management. Appeals procedures that guarantee equitable and open treatment for all parties in conflict are also essential to build trust and cooperation.
7. Communities as well as individuals have to have incentives to govern and manage natural resources sustainably.
8. The technologies available for management and use of natural resources affect both the feasibility of exclusion and the character of consumption (either separable or joint) of the resource. Viable governance and management institutions will reflect both the attributes of the resource, and the technologies available for its management.
9. Natural resources management must capitalize on existing local knowledge regarding resources.

To test the above assumptions, guidelines for field research that include specific questions within a number of broad categories have been prepared. The broad categories of questions

are:

1. Attributes (characteristics) of the resource and associated technologies;
2. Attributes (characteristics) of the community;
3. Attributes (characteristics) of local and other working rules;
4. Interactions among people and/or groups seeking to achieve their natural resources preferences, given the incentives for various classes of individuals created by the attributes of the resources, communities and working rules or institutional arrangements; and,
5. Outcomes of the interactions in terms of the productivity and sustainability of target resources.

TIMING OF TRAVEL

Uganda - February 15 through March 6

Mali - March 10 through April 3

Namibia (?) - April 20 through May 10 (tentative)

COOPERATION AND INTERCHANGE WITH OTHER COLLABORATORS

Information exchanges, sharing of literature, and meetings have taken place with the Land Tenure Center of the University of Wisconsin, the Center for International Development and Environment, World Resources Institute, and the Wildlands and

Human Needs Program of the World Wildlife Fund. These exchanges have included accessing data bases for information, and discussions regarding potential field sites for research that would build upon the work done at those sites by other NRM collaborators. Future collaboration could involve integrated research efforts at existing sites and combined workshops to address issues associated with the NRMAA framework.

**Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)293-4800 Fax: (202)293-9211**

CONTACT: Kate Newman

The Biodiversity Support Program (BSP) is a joint venture of three U.S. environmental NGOs - World Wildlife Fund (WWF), The Nature Conservancy (TNC), and World Resources Institute's Center for International Development and Environment (WRI/CIDE). BSP was established through a cooperative agreement between the Research and Development Bureau of A.I.D. and WWF, and has a dual mission to conserve biological diversity and promote sustainable economic development in developing countries through better conservation and use of biological resources. BSP received support from the Africa Bureau in FY 1991 for the Biodiversity Analysis for Africa Project and the Central Africa Global Climate Change Project.

PROPOSED OUTPUTS, STATUS OF EACH, AND EXPECTED COMPLETION DATE

A. BIODIVERSITY ANALYSIS FOR AFRICA (BAA) PROJECT

The goal of the BAA project is to advance the conservation of biodiversity in Africa while promoting human prosperity through the analysis of biodiversity conservation initiatives, strategies and approaches. The following activities or outputs will be undertaken simultaneously and will provide the basis for an overall analysis and a series of recommendations to be included in the final strategy report due in late September 1992.

Proposed outputs, status and expected completion dates:

1. Advisory Committee:

BSP is establishing a Senior Advisory Committee made up primarily of African scientists and conservationists to contribute to the BAA project analyses. The principle objectives of the Committee are to identify and prioritize the critical issues for biodiversity conservation in Africa and recommend actions and guidelines for future biodiversity conservation efforts. The committee will also contribute to the final strategy report.

Status:

Four of eight members have accepted nominations; the first meeting will take place in Nairobi May 2-4, 1992; and the second in the U.S. in September 1992.

Expected Completion Date:
September 25, 1992

2. Demonstration Activities:

The project will support a series of demonstration projects, studies and small grants that explore key issues and innovative techniques in biodiversity conservation. Projects will be evaluated and monitored closely by BSP and will thus contribute to the on-going analyses of biodiversity conservation initiatives. Principle outputs will include progress and final reports for individual activities and a final summary report on all activities. Support to each project will begin in FY 92 but project activities can continue until September 30, 1993. BSP will continue to monitor projects throughout next year.

Status:

Selection process has been established; several small grants have been approved; one major project is under negotiation; and team is actively seeking new proposals.

Expected Completion Dates:

Obligation of all demonstration activity funds: September 30, 1992.
Preliminary report on project impact to be included in final strategy report: September 1, 1992.
Final report on lessons learned and impacts: September 30, 1993.

3. AID Project Review:

BSP is conducting a technical review of biodiversity conservation projects supported by the Africa Bureau. Outputs will include a report on the status, impact and lessons learned from these projects and a data base of project information.

Status:

Review of project documentation in progress; site visits scheduled for April, 1992.

Expected Completion Dates:

Draft report: July 17, 1992.
Final report: sept. 1, 1992.
Data base: on-going through FY 93.

4. Monitoring and Evaluation Study:

1/10

The project will produce a report on the present status of monitoring and evaluation of biodiversity conservation projects in Africa, concentrating on the use of biological indicators to measure project impact and the participation of local communities in the evaluation process. The report will include recommendations on the use of new techniques in A.I.D. and NGO projects.

Status:

To begin in April 1992.

Expected Completion Date:

Draft report: August 1, 1992.

Final report: September 1, 1992.

5. Final Strategy Report:

The final report will compile and assess the findings to date of all BAA activities and will produce a well-rounded analysis of biodiversity conservation in Africa today. The report will also provide to the Africa Bureau a series of recommendations to strengthen their biodiversity strategy.

Status:

Preparation for report began in November 1991; activities on-going.

Expected Completion Dates:

Draft Report: August 1, 1992.

Final Report: September 25, 1992.

B. CENTRAL AFRICA GLOBAL CLIMATE CHANGE (CAGCC) PROJECT

The major goals of this project are to determine the potential for future CO₂ emissions from deforestation in central Africa and to provide a readily accessible source of information to policy makers concerned with mitigating future deforestation-related CO₂ emissions from the central Africa region. Central Africa, as defined by this project, includes the Central African Republic, the Congo, Cameroon, Gabon, Equatorial Guinea, and Zaire. The project is a collaborative effort of WRI, NASA's Goddard Space Flight Center (Goddard) and BSP. The objectives of the project are to evaluate the extent of closed forest cover in the region; investigate methodologies to estimate rates of forest depletion; develop systemized approaches for data collection, retrieval, and analysis; and identify modes and dynamics of forest modification due to human land use.

Proposed outputs, status and expected completion dates:

1. Remote Sensing and Information Management Analyses:

115

Goddard is analyzing satellite data to estimate the current extent of closed forest cover in the region. This analysis was enhanced by limited ground truthing activities undertaken by U.S. conservation NGOs to verify satellite data interpretation. Goddard is also investigating change detection techniques using satellite imagery and will evaluate existing geographic information and criteria for the future development of a Geographic Information System (GIS) for climate change studies in the region.

Status:

Ground truthing activity completed in September 1991. All other activities on-going.

Expected Completion Date:

- Initial estimation of forest extent to be completed mid-April 1992.
- Change detection analyses to be completed March 10, 1992.
- Report on development of GIS to be completed March 10, 1992.
- Report on all activities published: late May 1992.

2. Biogeophysical Setting and Human Interaction with the Forest:

World Resources Institute is undertaking a series of U.S.-based desk studies that will provide an initial analysis of the biogeophysical setting and the human factors that affect the carbon reserves contained in this forest system. The biogeophysical report will describe the climate, soils and vegetation of the region, and the human impacts report will discuss the existing policy and macroeconomic framework that drives human activity in the forest as well as key sectors that affect the forest such as agriculture, energy and timber exploitation and how they interrelate.

Status:

First draft of all studies completed in December 1991.
Presently under review.

Expected Completion Date:

Final draft: mid April, 1992.
Report to be published: late May, 1992.

3. Final Report:

The final report will combine the results of the remote sensing, information management and forest dynamics studies into a comprehensive analysis of climate change in the central Africa region. An advisory panel of scientists and development specialists has had a key role in critiquing the report as it has progressed. The report will be produced in a shorter summary form for distribution and the complete version will be made available to those that request it.

Status:

All studies to be completed by March 10, 1992 for inclusion in first

draft of report to be reviewed by Advisory Panel. The final report will be produced after the panel has met in late March, 1992.

Expected Completion Dates:

First draft: March 10, 1992.

Third Advisory Panel Meeting: March 26-27, 1992.

Final Draft: late April 1992.

Publication: late May 1992.

SUMMARY OF RESULTS SO FAR

A. Biodiversity Analysis for Africa Project

Activity during the first half of the project has been focused on (a) researching and clarifying key issues affecting the conservation of biodiversity in preparation for a report to the Advisory Committee in May, (b) identifying members of the Advisory Committee, (c) initiating analysis of USAID-supported projects (d) evaluating the first round of demonstration project proposals, and (e) initiating overall analysis of biodiversity conservation for final report.

B. Central Africa Global Climate Change Project

Activities in this project are nearly completed. The Advisory Committee has met with the team twice and has had a significant impact on the analyses, specifically with the recommendation that our analyses include the effects of global climate change on the region. These forests represent a globally-significant store of carbon that could be released to the atmosphere. However, the potential effects of global climate change on these countries as well as the environmental impacts of landuse change are likely to be more significant to the region at present. These forests represent a huge economic resource that if well-managed could enhance economic development without contributing to global climate change and regional environmental degradation. Continued research and institutional development will be required to improve climate change information data bases and their management, but enough preliminary information is available to begin, at the same time, field activities to assist these countries in improved management of their resources.

PROPOSED TIMING OF TRAVEL

A. BAA Project:

- BSP staff, consultants and advisors will travel to Nairobi in April-May 1992 and to Washington in September 1992 for the Advisory Committee Meetings.
- BSP staff and consultants will travel to various countries for proposal development, monitoring and report preparation in April, May and July, 1992.

B. CAGCC Project:

- Goddard staff completed a trip to central Africa to assess national-level remote sensing analysis capacity in December 1991.
- No other travel is anticipated.

COOPERATION AND INTERCHANGE WITH OTHER COLLABORATORS

A. BAA Project:

- BSP has been collaborating with WRI, specifically on their work in establishing priorities for biodiversity conservation.
- BSP also plans to work with the U.S. Forest Service's Forestry Support Program (FSP) on monitoring and evaluation techniques.

B. CAGCC Project:

This is a collaborative project between BSP, WRI and Goddard. The ground-truthing component also involved collaboration with World Wildlife Fund and Wildlife Conservation International.

AMEX International, Inc.
1725 K Street NW, Suite 402
Washington, DC 20006
Tel: (202)429-0222 Fax: (202)429-1867

CONTACT: Steve Kelleher

In 1991, AMEX International, Inc. increased its involvement with the AFR/ARTS/FARA Office and undertook specific NRM activities as well. Although AMEX and AMEX staff had previously participated in a number of short term assignments through USAID and other international donors and collaborators, the past year has augmented this involvement through both long term and short term assignments.

PROPOSED OUTPUTS, STATUS OF EACH, AND EXPECTED COMPLETION DATE

In August 1991, AMEX was awarded and began to implement a Natural Resources Management Support (NRMS) contract from the AID/AFR/ARTS/FARA Bureau (formerly AID/AFR/TR/ANR). Although funded under the NRMS mechanism, the support provided under this contract is within the FARA Division of AFR/ARTS.

The principal objective of this 2 year contract is to assist USAID/FARA technical staff to manage a growing volume of research, analytical and information management activities. Support is provided by a staff of seven that provides operational, administrative and information management support to technicians.

Due to the nature of the NRMS Contract, many services provided by AMEX are on-going, and will remain so for the duration of the contract. An illustrative list of the services provided under this contract include:

GENERAL ADMINISTRATIVE SUPPORT SERVICES:

The following is an illustrative list of general administrative support services that are offered on a continual basis:

- Word processing and typing
- Photocopying and off-site document reproduction
- Typing, formatting, dispatching and tracking fax and cable communications
- Creating mailing labels, organizing mailings
- Scanning documents onto disks and transferring electronic files
- Sorting and distributing incoming mail; dispatching outgoing mail
- Inputting of spreadsheet data into Lotus
- Creating charts and drawings in Freelance and Harvard Graphics -Arranging for overnight delivery of documents
- Ordering and tracking orders and inventories of office supplies and requested publications

- On-site translations (French into English, and English into French)
- Arranging translations off-site for large documents
- Assisting with new ADO Directory

- Maintaining a PIOT, file (in a three-ring binder) for NRM Unit
- Answering main telephone line and greeting visitors in the reception area
- Initiated a recycling program for white paper (at no cost)
- Other administrative support services as requested
- Implemented new hard-copy filing system
- Developed electronic filing system (implementation pending)

INFORMATION MANAGEMENT:

Completed tasks:

- Designed, developed and implemented of an Environmental Database tracking system
- Procured and installed office equipment (computers, scanner, printers, fax machine, etc.)
- Designed a preliminary ARTS/FARA project management system
- Developed a template (database table design) for use with the API's (Phase I complete)
- Developed spreadsheets for use in DFA reporting
- Established an electronic hookup which connects the RSSA's with "This week in Congress" and "The LEG Report" (both from AID's Bureau for Legislative Affairs)

Ongoing tasks

- Management of API report materials
- Inputting of data and verification of data for the API's
- Development and production of graphical presentation materials of API data and for analytical units
- Inputting and verification of data for DFA/NRM Report
- Software and hardware technical support
- Design of an ARTS/FARA Database Tracking System
- Graphical analysis and presentations
- Retrieval and printing database files
- Data entry and verification
- Edit, print and bind frequently used software documentation

PUBLICATIONS:

- FARA NOTES Issues I (November 1991), II (January 3.992), III (in progress for March 1992)
- Special Report I- a DFA/NRMS Report (in draft, awaiting changes)

- Special Report II-- The FARA Briefing Document (in draft, awaiting changes)
- Special Report III-- The Plan for Supporting Natural Resources Management in Sub-Saharan Africa (in draft, awaiting changes)
- Special Report IV-- FARA Operations Manual. (planned, compiling information);
- Special Report V-- Report on the NRM Collaborators Workshop, For Internal Use (planned, workshop to be held March 17-19, 1992)
- Special Report VI-- Report on the NRM Collaborators Workshop, For External Distribution (planned, workshop to be held March 17-19, 1992).

NON-FARA

Although not directly financed through ARTS/FARA (NRM), AMEX has recently undertaken the following NRM activities through various funding sources:

In January-February 1992, AMEX Staff co-facilitated a workshop in Segou, Mali on the theme "Women, Tenure and Natural Resources Management." With the Malian NGO consortium CCA-ONG (Comite de Coordination des Activites des ONG). Funding for this activity came from USAID's Women in Development (WID) office, USAID/Bamako and the PVO/NGO/NRMS Project. USDA's Forestry Support Project organized the workshop.

From 15 March to 30 April 1992, AMEX is providing a forester to participate in USAID/Gambia's NRM PAAD (Program Assistance Approval Document) design. The objective of this effort is to work with a comprehensive inter-disciplinary team to: 1) reform the policy environment to facilitate NRM by local communities; 2) improve understanding of the natural resources base and local institutional and socio-cultural issues as they relate to resource use; 3) improve the capacity to extend technologies by strengthening links between the GOTG and NGOs, and; 4) improve, through public sector planning and budgeting, the ability of the GOTG to employ effectively the limited financial, human and material resources that are available.

The final report is due upon departure from Banjul, 10 April 1992.

COOPERATION AND INTERCHANGE WITH OTHER COLLABORATORS

At present, AMEX works to maintain formal and informal collaborative links, such as information sharing and attendance at various meetings and forums, with both NGOs and donor organizations. Examples include The World Resources Institute (WRI), Private Agencies Collaborating Together (PACT), The World Wildlife Fund (WWF), The World Bank and the United Nations Agencies. AMEX plans on maintaining these links and strengthening them with more formal collaborative arrangements over the next year.

121

**Land Tenure Center
University of Wisconsin-Madison
1300 University Avenue
Madison, WI 53706
Tel: (608)262-3657**

Fax: (603)262-2141

CONTACT: Dr. Stephen Lawry

PROPOSED OUTPUTS, STATUS OF EACH, AND EXPECTED COMPLETION DATE

I. Outputs for the Africa Bureau's Natural Resources Management Unit

The Land Tenure Center activities for the Africa Bureau's Natural Resources Management Unit center on the following major themes: Sahelian forest codes, the role of tenure polices in the management of buffer zones and tenure factors affecting the adoption of agroforestry practices. LTC is also conducting research on the management of communal grazing resources in Uganda. In 1992, LTC will begin field research on tenure and natural resource management issues in Guinea, Madagascar and Rwanda.

A. SAHELIAN FOREST CODE STUDIES

1. Implications of the proposed Senegalese forest code:

LTC staff have advised the Government of Senegal concerning regulatory and administrative reforms needed to support implementation of Senegal's proposed forest code, which extends to farmers private rights to trees on their farms. Short-term consultancies were carried out by Steve Lawry and Kent Elbow in 1989 and 1990. Field research on tenure and tree management on farms was carried out by Doug Stienbarger in 1991, in collaboration with Senegalese researchers from the Institute of Environmental Studies at the University of Dakar.

2. Tenure factors affecting the capacity of local institutions to manage resources (Senegal):

LTC researcher Mark Freudenberger is collaborating with Senegalese researchers from the Institute of Environmental Studies at the University Cheikh Anta Diop of Dakar, the University of Saint Louis and the Ecole Nationale d'Economie Appliqué in Senegal in the design and implementation of a study examining the statutory and tenure framework within which local institutions, such as the Communautés Rurales, manage natural resources. Information gathered during the study will be used to design appropriate interventions for a new natural resources management project being funded by USAID/Dakar. Research activities began in February 1992.

126

3. Forest and tree tenure policy issues in Mali:

In October 1991, LTC researcher Rebecca McLain completed a two-year study of the effects of the Malian forest code on the willingness of farmers to invest in agroforestry practices. USAID/Bamako has expressed an interest in having LTC participate in the drafting of new forest legislation, and in the development of an extension program that would inform farmers of their rights to trees. The research was funded by USAID/Bamako as an add-on to LTC's Access II Cooperative Agreement with the Bureau of Research and Development.

4. Sahelian forest code conference:

LTC is organizing a conference on Sahelian forest codes and forest policy with seed money from the Africa Bureau's buy-in to the LTC's ACCESS II Cooperative Agreement. Additional funds for the conference are being sought from the Forestry Support Project's Tropical Forest Program and from the Club du Sahel. The conference will bring together policy makers and researchers from Mali, Niger, Chad, Senegal and Burkina Faso to discuss LTC research findings on the effects of current forest policy on individual and community management of forest resources. The conference will be held in November or December 1992, at a venue in the Sahel.

5. Sahelian forest code workshop (Washington):

LTC will hold a one-day workshop for the Africa Bureau to present LTC findings on the effects of forest codes and forest regulatory policies on resource management in the Sahel. Workshop discussion will focus on AID and mission strategies for promoting appropriate legal and other reforms in the Sahelian forestry sector. The workshop will take place in early 1993 so that the conclusions of the Sahelian forest code conference can be incorporated into the workshop.

B. BUFFER ZONES

1. Buffer zone study in Uganda:

As an aspect of LTC's collaborative research program with the Makerere Institute of Social Research (MISR), LTC researcher Mark Marquardt is undertaking a study on buffer zones in Uganda. The buffer zone research will identify issues related to access to land adjacent to protected areas and sustainable use of protected resources. The initial work will describe the history of settlement in buffer zones, the economic activities of resource users and land use patterns in the reserves and surrounding buffer zone. In addition, the research will examine the costs and benefits of establishing and

103

administering buffer zones.

The first phase of the buffer zone study in Uganda is underway. Rapid rural appraisals have been completed in two research sites. The administration of detailed questionnaires has begun in one site, and is scheduled to continue in the remaining sites in April. The buffer zone study is to be completed in December 1992.

C. AGROFORESTRY AND TENURE STUDIES IN COLLABORATION WITH THE INTERNATIONAL COUNCIL FOR RESEARCH ON AGROFORESTRY

In January 1992, LTC and the International Council for Research on Agroforestry (ICRAF) began a two-year collaborative research program on tenure and agroforestry. LTC economist Frank Place is based at ICRAF's headquarters in Nairobi, and is responsible for overseeing collaborative research with national research affiliates in three East African countries.

The agroforestry and tenure studies in East and Central Africa will build upon LTC's recent research funded by the International Livestock Center for Africa on tenure and alley-farming in the humid zone of West Africa. Working through ICRAF's Agroforestry Network for Africa (AFRENA), LTC will likely carry out collaborative research in Kenya, Uganda and Burundi.

D. OTHER ACTIVITIES

1. Common property study in Uganda:

LTC and the Makerere Institute for Social Research are carrying out research on the management of communal grazing resources in Uganda. The LTC/MISR research team is examining how changes in land tenure rules, pastoral management practices, and land use have affected access of livestock producers to grazing resources. The project is supervised by MISR Senior Researcher Wilberforce Kisamba-Mugerwa. The first phase of the study has been completed and a seminar to present research findings to the Ugandan government will be held in mid-March. The remaining field work will be completed in September. The final report is scheduled for completion in January 1993.

2. Papers:

In addition to the above studies, LTC will be publishing a state-of-the-art paper on natural resources and tenure, and a strategies paper, which will synthesize key findings from completed research and work in progress. The state-of-the art paper will be

124

completed in April 1992, and the strategies paper will be completed in the third quarter of 1992.

3. Training:

The Land Tenure Center, in collaboration with the Institute of Environmental Studies at the University Cheikh Anta Diop of Dakar, will sponsor a short course on tenure and natural resource management for French-speaking Africans. The three week course will be held in Senegal from July 13-31, 1992.

E. NEW RESEARCH PROJECTS

1. Watershed management in the Fouta Diallon (Guinea): The LTC will begin a study of community management of forest resources in the Fouta Diallon highlands of Guinea in 1992.

2. Buffer zone research in Madagascar: The LTC's proposal to examine land tenure and natural resource management issues in Madagascar is under discussion with USAID/Madagascar.

3. Wetlands development in Rwanda: In June 1992, the LTC will begin a research project in Rwanda on tenure issues and resource management concerns in wetlands development.

II. Supporting Activities Relevant to the Africa Bureau's NRMAA

1. Local Resource Management in the Gambia:

In February 1992, LTC researcher Mark Freudenberger, working in collaboration with the Gambian Ministry of Local Government and Land and the Agricultural Research Department within the Ministry of Agriculture, completed four weeks of field research on the institutional dimensions of natural resource management in the Gambia. The case study in the Foni Jarrol District will provide information on the institutional opportunities and constraints for local level natural resource management.

2. Dispute Resolution in Uganda:

LTC is conducting a study on the resolution of disputes over grazing resources, land and buffer zones in collaboration with John Kigula of Makerere Institute for Social Research.

125

3. Community forest management in Niger:

In November 1991, UW graduate student Kent Elbow completed a one-year field research program examining community management of the Baban'rafi forest reserve near Maradi, Niger. The research, funded by a Fulbright grant, evaluated models being developed in Baban'rafi and elsewhere in Niger for greater community control of natural forests. The information gathered by Elbow will be useful in helping formulate appropriate co-management models for natural resources in the Sahel. Before leaving Niger, Elbow reported his research findings to the government of Niger and the USAID/Niamey mission.

4. Agricultural master plan for Mali:

In November 1992, LTC consultant, Gerti Hesselting, working in collaboration with CILSS representative, Cheibane Coulibali, completed a study of tenure issues for the Malian Ministry of Environment, Agriculture and Animal Husbandry. The research points out the disincentives for agricultural investment that are inherent in existing land and forest legislation.

5. Tenure and alley-farming in the West African humid zone:

In August 1991, LTC staff members Steve Lawry and Doug Stienbarger completed a two-year research project examining relationships between tenure and adoption of alley-farming in Cameroon, Nigeria and Togo. The work, which was funded by ILCA, was done in collaboration with research groups in each country. The research provides a framework for understanding the variety of rules affecting tree planting on land held under various tenures.

6. Niger rural code project:

In January 1992, the LTC began a four-year cooperative agreement with USAID/Niger to carry out research that supports further development and implementation of a Rural Code. Among the issues being addressed by the Rural Code project are herder/farmer interactions, on farm tree tenure issues, and community natural resource management.

SUMMARY OF RESULTS SO FAR

A. Sahelian Forest Code Studies

LTC's research indicates that forest codes in the Sahelian countries give states broad rights over trees on farms and in natural forests, and grant forestry agencies sweeping powers to regulate the use of trees. The data suggest that because of their limited rights to trees, farmers lack sufficient incentives to invest in tree planting and intensive tree management practices on their farms.

Communities also lack the incentives and the authority needed to develop and implement sustainable harvest plans for nearby natural forests. There is thus a need for forest code reforms that would transfer rights over trees and forests to farmers and communities.

Preliminary results from community forest management experiments suggest that many communities lack the financial, administrative and technical capacity to develop and implement land management plans. Greater reliance on local land-use management efforts will therefore require accompanying changes in taxing authority, legal reform and extension policies.

B. Buffer Zones

In Uganda, LTC/MISR research on encroachment and settlement in forest reserves and national parks has identified several factors affecting settlement in protected areas. Settlement results from both 'push' factors (overpopulation and land shortages) and 'pull' factors (land availability, relatives and friends who have preceded incoming settlers, and employment opportunities). Access to resources in protected areas has changed dramatically in recent history as central government administration has broken down and is only now in the process of re-exerting itself; as areas are being redefined from forest reserves to national parks; and as income opportunities have changed with the changing economic and political situation existing in the country.

C. Agroforestry and Tenure

The LTC study of tenure and alley farming in the humid zone of West Africa indicates that customary tenure does not always constitute a constraint to alley farming adoption. The research pointed out important differences in tree planting behavior on land secured through inheritance, the principal means of access to customary holdings. Levels of tree planting and input use were considerably lower on "undivided" inherited land than on "divided" inherited land. The research also confirmed hypotheses that rates of tree planting would be lower on land farmed by tenants. The research provides a framework for understanding the variety of rules affecting tree planting on land held under various tenures. Planners will be able to better target alley farming to holdings farmed under tenures more likely to accommodate tree planting.

D. Common property study in Uganda

The LTC/MISR study on communal grazing reserves has identified a number of factors contributing to range use conflicts. Chief among the factors are 1) colonial attitudes that favored cash cropping rather than range management; 2) the belief that traditional pastoralist strategies are unproductive, and the subsequent introduction of state and commercial ranching schemes; 3) encroachment into pastoralist areas by cultivators; 4) a breakdown of cooperation among pastoralists; and 5) political instability in pastoral areas. The study will be used to help formulate strategies for the sustainable utilization of pastoralist land resources. An immediate concern is the need to ensure that proposed land reform legislation does not lead to premature enclosure of communal rangelands.

PROPOSED TIMING OF TRAVEL

- In April 1992, Rebecca McLain will visit the Sahel to identify researchers interested in presenting forest policy research findings at the upcoming Sahelian forest code conference.
- Mark Marquardt plans to be in Uganda until the end of 1993 to direct LTC research on common property resources and buffer zones.
- Frank Place has recently moved to Nairobi to direct LTC's collaborative effort with ICRAF on issues related to tenure and agroforestry in East and Central Africa. He will be in Nairobi until December 1993.
- In June 1992, Mark Freudenberger will be in Senegal to conduct research on the tenure framework governing natural resource management by the Communautés Rurales and other local institutions.
- In July, Mark Freudenberger will conduct a workshop in the Gambia to discuss the findings of a field research project on tenure and natural resource management in the Gambia completed in February 1992.
- LTC staff will begin field work in Rwanda, Guinea and Madagascar in mid to late 1992.

COOPERATION AND INTERCHANGE WITH OTHER COLLABORATORS

A. Buffering strategies workshop:

It is anticipated that LTC staffperson Peter Bloch will organize a workshop in collaboration with the Biodiversity Support Program and the Environmental Planning and Management Project. The workshop will be held in April 1992 in Washington.

B. Sahelian forest code studies:

LTC staff have presented findings to collaborators at a number of conferences and workshops (i.e. Segou Round Table on Natural Resource Management (1989), NRMS Workshop on Integrating Women into Natural Resource Management Projects (1990), and the OECD Conference on Decentralization and Land Tenure (1991). Collaborators will be invited to send representatives to the Sahelian forest code conference scheduled for late 1992.

C. Local Management Case Studies Literature Review:

LTC has assisted the Decentralization and Financial Management project in gathering case study materials on local management of natural resources from the LTC library.

125

CODEL
475 Riverside Drive
Room 1842
New York, NY 10115
Tel: (212)870-3000

Fax: (212)870-3545

CONTACT: Boyd Lowry, Caroline Njuki

PROJECT PURPOSE

The purpose of CODEL is to support ecumenical, small scale, sustainable, environmentally sound development activities of people in Third World nations who have limited opportunities to effectively participate in or contribute to the economic, social, and political decisions which effect their lives and environment. This mission is cooperatively funded by CODEL member organizations, other private donor sources, contributions of local project holders and the Office of Food and Humanitarian, of the Agency for International Development.

BRIEF SUMMARY OF PAST AND PRESENT ACTIVITY

CODEL's Environment and Development Program, E&D, is an integral part of its development efforts. CODEL has played a leadership role in the promotion of sustainable development among its staff, member organizations, project holders, and other voluntary agencies throughout the world. This education process has been implemented through informal meetings and discussions, seminars, workshops, and development of appropriate printed materials.

Sustainable development deals with a complex problem. CODEL believes that sustainable development is a process which identifies and implements strategies and tools to respond to five broad requirements: integration of conservation and development; satisfaction of basic human needs; achievement of equity and social justice; provision for social self determination and cultural diversity; and maintenance of ecological integrity.

CODEL projects are designed to deal with this process. Each reflects the basic principles of sustainable development. This is true despite the fact that projects differ greatly from rural and urban areas, are organized in varied ecosystems and involve people of varied cultures and experiences. CODEL supports sustainable projects which are part of larger world systems which can destroy such projects: debt burden, unequal land distribution, war, and corrupt governments. While CODEL obviously can not have much influence on global structural realities despite its advocacy role, it can monitor a very important safety net: the environment.

A 1991 evaluation of CODEL's development impact indicates that fully 76% of the projects it supports successfully identify and address environmental issues as part of their total activities. Examples of such projects in Africa include:

109

I-KEN-AG.ENV/UMOOR-06, COMMUNITY BASED ORGANIC FARMING PROGRAM

KIOF, the Kenya Institute of Organic Farming, cooperates with numerous community based associations, church groups, and non governmental organizations to implement its programs of conservation and development to achieve ecological integrity. Currently, KIOF is providing hands on teaching to 92 farmers groups in six districts in organic farming techniques using 22 community based promoters.

Difficulties have included: government extentionists' insistence on the use of chemical fertilizers which they consider the norm for small scale agriculture, and their lack of support for these innovative techniques as well as farmers' resistance to implement methods they fear may risk production.

Despite these problems, preliminary results after working with 2,800 farmers for about two years have been:

- reduction in production costs,
- higher crop yields,
- improved soil and animal management.

KIOF has also conducted an interagency workshop, with CODEL assistance. Participants from 18 governmental and non governmental agencies were exposed to the benefits of organic farming methods as well as the preparation and application of green manure. KIOF follow up to this training indicates that these techniques have been incorporated into the programs of agencies which attended this training.

I-BOT-AG.ENV/YWCA-02, WOOD LOTS - TREE FARMING

The Botswana YWCA is working with other agencies in Sehitwa, an area of creeping desertification, to replenish trees in the area.

This long term community development project will develop technical and management skills, employment and environmental benefits through the creation of wood lots and tree farming.

YWCA training in nutrition, child care and health education is provided in addition to workshops on conservation, plant care and planting. Since 1988, six thousand persons have benefitted from this project through training, relief from flooding, drought and erosion as well as planting seedlings for sale to surrounding areas.

Difficulties included: an alarmingly high initial mortality rate of seedlings as a result of termites and selection of trees which were not truly drought resistant. Despite these problems, the project has resulted in:

125

- planting of over 2,000 trees,
- government involvement in similar activities in the same area,
- potential income generation for women in the community who are planting seedlings for sale in the area,
- greater community self reliance as beneficiaries see that their collective efforts can bring about substantial changes and improvement in environmental conditions in the community.

Additional activities identified for the future include workshops in the region on conservation and tree management, and building an educational center to serve the needs in the area.

The above illustrative examples are typical of CODEL projects throughout Africa, Asia/Pacific and Latin America/Caribbean. These efforts are consistent with and representative of CODEL's definition of and commitment to sustainable development.

Program on Environment Information Systems in Sub-Saharan Africa
The World Bank
Environment Division, Africa Technical Department
1818 H Street, NW
Washington, DC 20433
Tel: (202)473-4332 **Fax: (202)477-2979**

CONTACT: Charlotte O'Brien

USAID CONTACT:

Mr. Daniel Dworkin,
Environmental Information Advisor,
Africa Bureau (AFR/ARTS/FARP);

Mr. Dworkin is a member of the EIS Program's International Advisory Committee.

PROJECT PURPOSE

The World Bank, with other donors and international agencies, initiated this program in early 1990. The aim is to help Sub-Saharan countries set up operational environmental information systems, to meet the priority demands of resource users, planners and decision makers for better renewable resource management. Such systems are a key element for National Environment Action Plans (NEAPs), which are being prepared in an increasing number of countries in Africa. Work on this program falls under the auspices of NEAP processes where these are in progress.

BRIEF SUMMARY OF PAST AND PRESENT ACTIVITY

The program supports African countries as they assess their priority needs in terms of environment and land information and analyze the technical, institutional, legal and economic issues hampering their possibilities of meeting these needs. It assists them in finding adequate, sustainable and long-term solutions to deal with these issues.

COUNTRY FOCUS

Sub-Saharan Africa. Among the countries which are interested in the program, and have participated by sharing relevant information, are Benin, Botswana, Burkina Faso, Cote d'Ivoire, Kenya, Lesotho, Madagascar, Senegal, Tanzania, Uganda, Zambia and Zimbabwe. Involvement depends on both the interest expressed by the countries and the capacity of the international community to provide the necessary funds.

136

INVOLVEMENT WITH OTHER GROUPS AND PROJECTS

Several bilateral and multilateral agencies are currently supporting the program. Links with UNSO, UNEP GEMS/GRID, UNITAR, UN FAO, USAID, OSS.

PRISM
Management Systems International
600 Water Street SW
NBU 7-7
Washington, DC 20024
Tel: (202)484-7170

Fax: (202)488-0754

CONTACT: Larry Cooley

USAID CONTACT

Mr. Gerald Britan, Project Officer AID/POIJEVAL/SDS

PROJECT PURPOSE

The purpose of the PRISM project is to provide evaluation and related technical services to A.I.D. and cooperating country agencies for the design, implementation, and institutionalization of program performance information and evaluation systems and activities in support of effective strategic management of bilateral assistance toward the attainment of development results.

PRISM is an acronym for program performance information system for strategic management. It is both the name of the contract and of the Agency-wide management information system. The Core contract includes three primary components:

Component 1: To assist in the design and implementation of program performance information systems (PPIS) in up to 18 AID Missions each year. This involves TDYs to help selected Missions refine strategic objectives, articulate program strategies to achieve those objectives, identify appropriate performance indicators, and obtain and use data.

Component 2: To refine, expand, and maintain the PRISM database established by CDIE this summer. This will involve entry of Mission-level strategic objectives, performance indicators, country trend data, and data from secondary sources. The PRISM database will also be linked to the PPIS of selected Missions and offices.

Component 3: To design and conduct PPIS workshops in Washington and in regional locations, provide a 2-week training course in project monitoring and evaluation, and develop manuals, videotapes and other tools to upgrade program performance assessment skills.

Under the "buy-in" provision of the project, the contractors are prepared to respond to additional Bureau and Mission needs under the three core components described above.

120

**Implementing Policy Change
Management Systems International
600 Water Street SW
NBU 7-7**

Washington, DC 20024

Tel: (202)484-7170

Fax: (202)488-0754

CONTACT: Dr. Ben Cosby

USAID CONTACT

Ms. Jean North, Project Officer AID/S&T/RD

PROJECT PURPOSE

The purpose of the Implementing Policy Change (IPC) project is to improve the policy implementation performance of leaders and managers in countries where A.I.D. is active. This is accomplished by providing expert and research services that enable such leaders and managers to better carry out their managerial roles. The IPC project has six components:

Project management is a principal responsibility of the core contract. Project services must be managed for quick response, effective logistics and timely accountability.

Technical cooperation is supported largely by USAID Mission buy-ins through the Requirements (buy-in) Contract. Teams are identified to conduct diagnostic and short-term technical cooperation efforts in developing countries.

Research. Core contract research 1) compares and draws lessons from technical cooperation in several countries and 2) supports and documents lessons of experience in understanding policy implementation needs and problems, and in improving approaches and methods to achieve solutions.

Network development among managers of policy implementation and other specialists in order to share experiences and build cadres of professional policy implementation managers.

Strengthening the capability of developing country management resource institutions for policy implementation.

Dissemination of lessons learned.

132

Appropriate Technology International (ATI)

1331 H Street NW, Suite 1200

Washington, DC 20005

Tel: (202)879-2900

Fax: (202)628-4622

CONTACTS: Eric Hyman, Ken Locklin, Jeanne Downing

USAID CONTACT

Dr. Roberto Castro, R&D/EID, Room 622-F, SA-18,
Washington, DC 20523, Tel. (703) 875-4564, Fax (703) 875-4394

PROJECT PURPOSE

Appropriate Technology International works with and on behalf of small-scale farmers and entrepreneurs in developing countries to create new enterprises, forge viable livelihoods and generate sustainable economic growth. ATI provides technical assistance and leverages financial resources for development programs that use appropriate technologies. ATI's integrated approach to development combines

1. Commercialization of income-enhancing, productive technologies, including those developed or improved by ATI
2. Commodity sector development with multiple interventions in the production, processing, and marketing chain
3. Financing for technology dissemination and small enterprise development
4. Identification and dissemination of sustainable technologies with favorable effects on natural resources and the environment

SUMMARY OF PAST AND PRESENT ACTIVITY

Invention of a low-cost, manual ram press for extracting sunflowerseed oil in Tanzania without using diesel fuel. This project won the U.S. National Center for Appropriate Technology (NCAT) first place award for sustainable agriculture in 1991.

Invention of manual small-scale expellers for palm oil production in Cameroon.

Design of a jigger jolly for increasing the quantity and quality of ceramic liners for fuel-efficient household charcoal stoves in Kenya and transfer of this stove to Senegal.

Adaptation of the Bangladesh treadle pump for production in small workshops in Mali and Senegal.

12

Dissemination of efficient kilns for making high-quality charcoal for activated charcoal production from coconut shells.

Established a small-scale leather processing facility using upgraded technologies for greater productivity and reduced environmental impacts.

Promotion of low-input shrimp aquaculture.

Demonstrated the feasibility of small-scale production of rhizobium and blue-green algae biofertilizers.

Processing of nonwood forest products, such as annatto, shea nut butter, and coconut products.

Supported the development of the Linares pump, a stream-powered device for water supply.

Supported the development of an improved kiln for small-scale lime production that saves fuelwood and reduces occupational health and safety risks.

Transferred technologies for placer gold mining that increased productivity and reduced mercury contamination in processing.

Supported development of a reversible multi-toolbar plow for steep hillsides was developed that has substantial replication potential on other fragile lands.

Promoted improved pasture management for sheep and alpaca production.

Prepared a feasibility study for EPA and possible project on the commercialization of strategic feed supplementation to reduce ruminant release of methane and increase livestock productivity.

Identified low-cost biological techniques for a centralized effluent treatment plant for small-scale textile dyeing industry.

BRIEF SUMMARY OF FUTURE ACTIVITY:

Replication of technologies that have proven successful in other countries will continue. Consideration of environment and natural resource impacts has always been an important aspect of the definition of appropriate technologies. To give this even greater emphasis, in 1990, ATI's new management designated natural resource/environment projects as one of the organization's four main priority program areas. By 1995-96, ATI plans for at least half of its projects under development to have a strong component of direct environmental benefits.

ATI has prepared a strategy paper to guide its future environment/natural resource

activities (Appropriate Technology and the Environment: A Strategy for Ecodevelopment by Eric L. Hyman). Initially, ATI's priority areas will be sustainable agriculture (adaptation of farm equipment for fragile lands, small-scale irrigation, integrated pest management, biofertilizers, and tissue culture); use of agricultural and industrial wastes; renewable energy conservation and production; (efficient household stoves and kilns for charcoal, lime, and pottery production; biomass substitution; microhydro and wind for mechanical power; solar dryers for industries; and photovoltaics); water pollution prevention and control from small industries, and common property resource management (extractive reserves, nonwood forest product processing, ecotourism, and game ranching and farming).

Listed below are some environment/natural resource projects under development:

- Tissue culture for improved kapok trees
- Mulberry reforestation, sericulture, and silk processing
- Fuel-efficient pottery kilns
- Small-scale biotechnologies research and dissemination network
- Rhizobium for leguminous fodder trees
- Permaculture
- Animal waste management
- Forest product processing to support reforestation

COUNTRY FOCUS

ATI currently works in over 20 countries in Africa, Asia, and Latin America. In Africa, current countries of focus include Cameroon, Kenya, Mali, Nigeria, Senegal, Tanzania, and Zimbabwe.

INVOLVEMENT WITH OTHER GROUPS AND PROJECTS

ATI is increasing its collaborations with other organizations. Since September 30, 1989, ATI has received funding support from Africa Now, Agricultural Cooperative Development International, A.I.D./Mali, A.I.D./Senegal, Development Alternatives Inc. (GEMINI Project), FMO (Netherlands), Food Industry Crusade Against Hunger, Global Action (Japan), IDRC, IFAD, Lutheran World Relief, Robert R. Nathan Associates, Royal Tropical Institute (Netherlands), U.N. Capital Development Fund, UNDP, U.N. HABITAT, UNIDO, UNITEM, U.S. EPA, and the World Bank. ATI has also had joint projects and activities with ITDG, Lutheran World Relief, and TechnoServe among others.

158

**Tropical Forestry Program
USDA Forest Service
IF (RPE Room 711)
P.O. Box 96090
Washington, D.C. 20090-6090
Tel:(703)235-1676 Fax:(703)235-3732**

CONTACT: Jamie Watts

USAID CONTACT

PROJECT PURPOSE

The Tropical Forestry Program (TFP) was initiated by the USDA Forest Service in 1990, based on money appropriated by Congress under a Tropical Forestry Initiative, with the goal of increasing the United States' role in the management and conservation of global tropical forest resources.

The broad objectives of TFP are:

- o To help reduce deforestation in the tropics;
- o To augment the knowledge of tropical forestry ecosystems and how these ecosystems can be managed or restored in an economically viable way;
- o To increase the contribution of all forest resources to the economic, social, and cultural well-being of tropical populations.

During Fiscal Year 1992, the Forest Service's TFP received about \$1 million to continue its international forestry work in Africa programs.

Funds are allocated for work in three areas:

- o technical assistance;
- o training;
- o support to international organizations.

(Note that tropical forestry research is coordinated by the Forest Service's Research branch, not by TFP).

Through TFP, the Forest Service has cooperated in development and implementation of workshops, training sessions and technical assistance efforts with a wide variety of organizations such as The Land Tenure Center, PVO-NGO-NRMS, the World Wildlife Fund, the Smithsonian Institute, and the United States Peace Corps.

DESFIL Project
2000 M Street NW, Suite 200
Washington, DC 20036
Tel: (202)331-1860 Fax: (202)331-1871

CONTACT: Jim Chapman

PROJECT PURPOSE

The purpose of this paper is to continue a dialogue between DESFIL and the Africa Bureau on potential DESFIL contributions to developing approaches to resolving fragile lands/NRM problems in sub-Saharan Africa. The approach taken in this regard is to examine proposed natural resource activities under AFR's NRM Analytical Agenda and identify areas of potential confluence with DESFIL's emerging research framework and agenda. This exercise identified certain areas which we feel are important in fragile lands/natural resource management in Africa and in implementing the NRM Analytical Agenda.

Before going any further, we would briefly like to highlight where DESFIL currently stands in framing its research agenda, with a view toward determining a set of activities where both DESFIL's and the Africa Bureaus' interests could best be served. DESFIL views problems in natural resource management as primarily dependent on the behavior of people, who we call resource users. Solutions to natural resource degradation problems, as well as the potential for future sustainable management, depends on the structure of incentives and the economic opportunities for people living on or near fragile lands. Over the remaining life of the project, DESFIL will look at ways of changing negative behavior and reinforcing positive behavior, primarily by modifying the social and economic environment through facilitative policy change at the macro level, by incentives and property rights at the local level, and finally through the identification and adaptation of new and existing technologies to manage fragile lands in a more sustainable manner. We also see gender roles as a cross-cutting issue with potentially profound importance in understanding and modifying resource user behavior.

The above definition of DESFIL's scope is quite broad, and we are attempting to focus is by introducing priority research themes which are particularly current and relevant to natural resource management problem solving. These are:

- o Indigenous/Traditional Resource Users, which focusses on people who have been progressively marginalized and obliged to move into fragile environments given their cultural patterns and limited economic alternatives;
- o Forest Management, which will attempt to find improved ways of managing natural forests by involving local communities and by establishing positive economic and social incentives; and

- o Sustainable Agriculture, looking particularly at ways that improved agricultural development of high potential areas can help draw population away from the more fragile areas, as well as techniques for more sustainable agricultural production on some fragile lands.

The rest of this paper briefly outlines a set of five activity areas in which DESFIL and the NRMAA could mutually reinforce each other. The first two activities are generic in nature and involve the development and application of natural resources policy and technology taxonomies aimed at understanding and affecting resource user behavior. The second set of activities include Africa-specific topics covering social organization and forest management and indigenous technical knowledge systems related to natural resource management.

Generic topics: Policy and Technology Analytical Tools

During the course of the Implementation, DESFIL core staff will develop an analytical tool kit which will be used to understand impacts on resource user behavior. These tools include a policy taxonomy and a taxonomy of fragile land management technologies. Ultimately, a framework will be developed which integrates these methodologies and produces recommendations for policy changes and land management techniques for specific fragile land types and socioeconomic conditions. This effort logically fits in the NRM Analytical Agenda Theme 3: Improved Analytical Tools. The policy work would also contribute to answering questions under Theme 1: Policy, Institutions and Socioeconomic Conditions, while the technology work would be relevant to Theme 2: NRM Practices. Specific collaboration may involve support for basic tool development as well as subsequent application of the tools to several better understand and analyze policy and technology issues in several African countries.

1. Policy Taxonomy

The policy taxonomy is designed to provide an orderly classification of policies according to their presumed relationships in order to explain to policy analysts and interest groups the effects of policies as they impact on the interaction of resource users and their management of the natural resource base. The taxonomy addresses analytical problems by identifying the most critical policy elements contributing to an environmental or natural resource management problem, be it deforestation, soil loss or other forms of degradation. The effects of many types of policies, especially those without a direct intuitive link to natural resources, are not normally examined and understood--the taxonomy can facilitate identification of such policies. Furthermore, by including the entire range of existing and potential policies, the taxonomy can speed the development of new policies that can contribute to solving natural resource problems.

These objectives suggest that the policy taxonomy must be able to: 1) identify key policies and their effects on behavior and thereby identify reform or research activities; 2) provide a baseline and set of indicators to track policy change; 3) be able to be updated and flexible as policy change occurs and a better understanding of effects are

learned; 4) allow comparison within and between policy sectors; 5) provide a convenient and useful organizing structure for Missions, NGOs and national decision makers in policy dialogue situations and decision-maker workshops; 6) track policy issues across various units of analysis (countries or problem areas) to synthesize lessons learned from DESFIL activities; and 7) function as a vehicle for transferring the policy solutions being generated under other AID policy project activities.

The taxonomy will be structured as both a loose-leaf notebook and eventually as a computer data base. The foundation of the taxonomy will be a general analysis of what is known and not known about each of the policies in the taxonomy. This analysis will describe and define the policy, explain theoretical and empirical issues, explain the trade-offs between environmental, economic and welfare effects and list further research issues necessary to address what is not yet known about the policy. If viewed as a matrix, the taxonomy represents the rows and this general analysis the first column. The general analysis will reduce redundancy in the information provided. The remaining column structure will be by country, program or some combination of the two. The cells in these columns will describe the existing policies and assess their impacts. This package is designed to be in a constant state of interactive and iterative development as well earn more about the impact of policy interventions and develop more policy tools.

The potential uses of the taxonomy include; 1) a synthesis of the state-of-the-art in policy issues related to fragile lands; 2) a tool to define a policy research program for DESFIL; 3) a method to incorporate DESFIL activities into an on-going synthesis of lessons learned; 4) a strategic planning tool through rapid policy appraisal and policy inventory activities; 5) an educational tool to demonstrate the role of policies in fragile lands management solutions and, finally; 6) a model for structuring information for the other components of DESFIL.

2. DESFIL Soil Conservation/Fertility Enhancement Taxonomy

DESFIL will be compiling global inventories of both soil conservation/fertility enhancement technologies and site characteristics to provide development workers with a list of potential alternatives appropriate to their specific area. The inventory will be extremely large and dynamic. The written materials on the subject fills more than one library. The task of actually using an inventory of soil conservation and soil fertility enhancement technologies to select an appropriate technology that responds to a specific "problem" requires some sort of tool to provide logic. Without such a guide the user will be likely to simply select example technologies based on a personal preference or familiarity.

DESFIL will develop and test an analytical taxonomy for classifying soil conservation technologies according to their appropriateness to specific environments, both socioeconomic and biophysical. To ensure the maximum complementarity with other DESFIL analytical tools, the taxonomy will be patterned on the policy taxonomy described above. The taxonomy will be organized and cross referenced such that users

142

can enter it by focussing on a specific problem (it: sheet erosion caused by short duration high intensity rainfall events) or type of technology (ie: living grass hedges along the contour). By providing an orderly classification of technologies, the taxonomy will provide development workers and extensionists a concise complete set of technology options for resolving soil erosion and fertility enhancement problems in a specific fragile environment. The taxonomy will also allow researchers to identify specific gaps in important information and prioritize their research efforts.

Similar to the policy taxonomy, the taxonomy must be: 1) provide development workers with concise discussion of potential benefits and potential problems, 2) able to provide comparisons both within and across specific fragile environments, and 3) flexible and adaptable to new information and technologies as they become available from work of DESFIL, other USAID projects and other research.

Specific topics of interest to the Africa region and DESFIL:

Relative to other parts of the world, the particular geographic experience of the current DESFIL core staff is deficient. Recognizing this, we asked Jim Seyler to assist DESFIL in determining some areas of potential importance in the African context which fit in well with the DESFIL mandate. The following are four specific topics which may be of sufficient interest and importance as to warrant DESFIL/Africa Bureau collaboration.

1. Social Organization and Natural Forest Management in the Sahel - NRMAA Theme One

DESFIL would build on natural forest management research by the NRMS project which identified causes for arid and semi-arid forest degradation as 1) the need for agricultural land; 2) the need for livestock forage; and 3) the need for fuelwood (ARD 1991). Like the NRMS project, DESFIL emphasizes the importance of involving local resource users in managing natural forests, but also recognizes that population growth and socioeconomic change have caused traditional management systems to break down. Involving local users in forest management planning helps adapt customary arrangements to current conditions. Incorporating provisions for dispute resolution helps assure that economic benefits from forests are more equitably distributed. Local communities often have active social groups, some of whom engage in forest management, as demonstrated by Seyler's (1991) study in Senegal. It is important to examine such groups' contribution toward sustainable management, particularly assessing

- factors influencing their development
- decision making processes
- who wins and who loses (right to exclude -is it other villages or people within the village
- questions of authority (e.g. fines, right to sanction, etc.)
- obstacles impeding group performance/management/sustainability (policy, technology, etc.)

Demand for fuelwood near urban areas has caused significant forest depletion. Yet, the Guesselbodi project in Niger and Nazinon in Burkina Faso have shown that proximity to urban markets also makes sustainable management of dry forests profitable (personal communication Ed Karch). In addition, the NRMS project found that managing forests for multiple uses improves profitability. Oftake of grass, hay and foliage for forage often produces as much income as the fuelwood itself (ARD 1991). Management systems can be strengthened by incorporating a wide range of forest users in planning, including occasional users such as pastoralists who migrate to forest areas in times of drought. Finally, because management areas are often exploited by only some households in local communities (e.g. members joining a cooperative), sustainability requires that wider interests, such as local women's fuelwood needs, are taken into account.

In addition to work on natural forest management, DESFIL also has interest in investigating linkages between forest degradation and problems in the agricultural sector. Such research would test the hypothesis that improving agricultural productivity and sustainability can slow forest degradation. Projects could provide the forum for that research.

2. Soil erosion in the East African Highlands (and Madagascar) - NRMAA Theme Two

The East African highlands covers a geographical area which includes parts of Kenya, Uganda, Tanzania, Rwanda, Burundi, Eastern Zaire and Ethiopia. One of the more serious agricultural problems in the region is water erosion which is primarily a result of vegetation loss. While farmers often attribute vegetation loss to climatic change, human activity appears to be the dominant cause. Trees and shrubs are cut for firewood, animal feed and in some instances, to facilitate mechanized tillage. Population increases (the area has some of the highest population growth rates in Africa) have led to more and more land being cleared for agriculture each year and increased pressure on the region's few remaining natural highland forests.

DESFIL's experience in hillside agriculture in Latin America appears to be directly relevant to the East African highlands as well as Madagascar. Wilken (1991) reports that DESFIL produces 17 papers/reports on hillside agriculture with topics including technologies for managing steep slopes, soil loss and sedimentation processes, review procedures for relating climate and soil to erosion, a list of techniques for measuring erosion rates, and measurement methods, strategies and data availability on erosion processes.

DESFIL's objective in this research theme would be the eventual development of guidelines for appraisal of land management situations and selection of appropriate technologies under conditions common in the East African highlands and Madagascar, including methods for evaluating alternatives. We propose a three-step collaborative approach:

(1) Conduct an inventory of indigenous and "improved soil conservation technologies in the East African highlands as well as Madagascar. The inventory would provide sufficient detail with respect to socio-economic information (e.g., costs and benefits, adoption problems, etc.), and biophysical elements (site characteristics). Particular attention will also be accorded to direct and indirect consequences of particular technologies and potential goal conflicts;

(2) Incorporate into the NRMAA and Africa Mission knowledge base techniques and lessons learned from the other regions, particularly DESFIL experience in LAC, and identify gaps in coverage either of environmental situations or of technologies;

(3) Explore positive incentive systems favoring the adoption of soil conserving technology with a view toward facilitating the development and adoption of such technology, as well as understanding the situations in which adoption does or does not take place.

3. Indigenous agroforestry/soil management systems - NRMAA Themes 1 and 3.

One of the objectives of DESFIL's forest management and sustainable agriculture research themes is to increase awareness of the importance of indigenous agroforestry/soil management systems, quantify the benefits of such systems and analyze factors which may block or enhance their wider use/replication. In order to accomplish these objectives, DESFIL could use a case study approach centered around three related themes:

- o **Identification, selection and description of indigenous agroforestry/soil management systems.** Drawing on the International Council for Research in Agroforestry (ICRAF) Agroforestry Systems Inventory, DESFIL would initially conduct a desktop study of indigenous systems and then select one for case study development. Factors for system/case study selection would include both biophysical/social (importance of the system, potential for replication/modification, benefits gained, etc.) as well as administrative (Mission interest/buy-in possibilities, logistics, etc.). After selection of the system, DESFIL would then provide a detailed description of the system (benefits, extent, species, impact, etc.).
- o **Determination of factors (internal or external) are influencing the decline, maintenance and/or expansion of these systems.** For example, the economic incentives facing Africa's rural populations are major determinants of how natural resources are managed. Some of these incentives relate directly to such conservation practices as erosion control, tree planting and forest (natural and plantation) management. Other incentives relate to crop mix, input use, expansion of cultivated area and herd size, all of which can have a positive or negative effect on sustainable agriculture. While low productivity per se is often the cause of cultivation

pressing into fragile lands causing rapid loss of vegetative cover there are instances where the process may be enhanced by local laws and policies. For example, among the Tahoua in northern Niger, some farmers clear more land than they can harvest. Their incentive is the law that prescribes heavy fines for herders whose cattle trample growing crops.

- o **Determination of the actual and potential social and economic benefits of these systems, or in combination with other inputs (e.g. fertilizer, improved varieties, etc.)?** In addition to providing soil organic matter and nutrients, traditional systems have provided a wide variety of other forest products. In the context changing macro-economic policy and structural adjustment in much of sub-Saharan Africa, products from indigenous trees appear to be gaining in importance as a means of increasing household income. For example, in Senegal, Seyler (1991) found that due to the removal of fertilizer subsidies, farmers put less of their farm area into peanuts, the major cash crop. However, he found an increased interest among farmers in protecting and in enhancing the natural regeneration of indigenous fruit, fodder and medicinal trees as a source of on-farm income to replace income lost from peanuts.

APPENDIX E

NRM COLLABORATORS WORKSHOP PARTICIPANTS

Larry Abel
USAID
R&D/EID/RAD
Room 608, SA-18
Washington, DC 20523-1814
Tel: (703)875-4445
Fax: (703)875-4949

Richard Affleck
USDA/OICD
14th & Independence Ave. SW
Washington, DC 20250
Tel: (202)690-1918
Fax: (202)690-8942

Peter Alpert
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20253-1515
Tel: (703)235-3770
Fax: (703)235-3805

Joan Atherton
USAID
AFR/DP
2495 NS
Washington, DC 20523-0049
Tel: (202)647-2964
Fax: (202)647-3364

David Barker
Winrock International
1611 N. Kent Street
Arlington, VA 22209
Tel: (703)525-9430
Fax: (703)516-0481

Betsy Bassan
Chemonics
2000 M Street NW, Suite 200
Washington, DC 20005
Tel: (202)466-5340
Fax: (202)331-8202

Bonni van Blarcom
P.O. Box 6131
Falls Church, VA 22040
Tel: (703)525-0468

Greg Booth
1427 Oronoco Street
Alexandria, VA 22314
Tel: (703)684-8961

Barbara Braatz
Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)861-8337
Fax: (202)293-9211

Derick Brinkerhoff
Int'l. Development Management Center
University of Maryland
2349 Computer Science Building
College Park, MD 20742
Tel: (301)314-7720
Fax: (301)314-9328

Michael Brown
PVO-NGO/NRMS
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)293-4800
Fax: (202)223-6971

Sharon Cleary
National Park Service
P.O. Box 37127
Washington, DC 20013-7127
Tel: (202)343-7063
Fax: (202)343-7059

Brenda Bushouse
USAID
R&D/EID
Room 608, SA-18
Washington, DC 20523-1814
Tel: (703)875-4722
Fax: (703)875-4949

Gary Cohen
USAID
AFR/ARTS/FARA
2941 NS
Washington, DC 20523-1515
Tel: (202)647-9352
Fax: (202)647-2993

Jim Chapman
DEFIL
Chemonics
2000 M Street NW, Suite 200
Washington, DC 20036
Tel: (202)331-1860
Fax: (202)331-1871

Gary Costello
Int'l. Development Management Center
University of Maryland
2349 Computer Science Building
College Park, MD 20742
Tel: (301)314-7727
Fax: (301)314-9328

Eric Chetwynd
USAID
R&D/EID
Room 608, SA-18
Washington, DC 20523-1814
Tel: (703)875-4710
Fax: (703)875-4949

Pierre Crosson
Resources for the Future
1616 P Street NW
Washington, DC 20036
Tel: (202)328-5068
Fax: (202)939-3460

Kjell Christophersen
International Resources Group
1400 I Street NW, Suite 700
Washington, DC 20005
Tel: (202)289-0100
Fax: (202)289-7601

Ron Daniel
USAID
AFR/SWA
3491 NS
Washington, DC 20523-0033
Tel: (202)647-8834
Fax: (202)647-3364

S.K. De Datta
Virginia Polytechnic Institute
1060 Litton Reaves Hall
Blacksburg, VA 24061-0334
Tel: (703)231-6338
Fax: (703)231-6142

Peter Freeman
DATEX
1400 I Street NW
Washington, DC 20005
Tel: (202)789-4300
Fax: (202)789-6030

141

Josh Dickenson
Tropical Research & Development
519 NW 60th Street, Suite D
Gainesville, FL 32607
Tel: (904)331-1886
Fax: (904)331-3284

Peter Frumhoff
USAID
R&D/EID/RAD
Room 822, SA-18
Washington, DC 20523-1814
Tel: (703)875-4532
Fax: (703)875-4949

Dan Dworkin
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3687
Fax: (703)235-3805

Jim Gage
Int'l. Development Management Center
University of Maryland
2349 Computer Building
College Park, MD 20742
Tel: (301)314-7727
Fax: (301)314-9328

Brian Fischer
USDA Forest Service
Forestry Support Program
P.O. Box 96090
Washington, DC 20090-6090
Tel: (202)205-1589
Fax: (202)205-1603

Therese Glowacki
Peace Corps
OTAPS/ENV
1991 K Street NW
Washington, DC 20526
Tel: (202)606-3100
Fax: (202)606-3024

Richard Ford
SARSA
Clark University
Worcester, MA 01610
Tel: (508)793-7201
Fax: (508)793-8820

David Gow
World Resources Institute
1209 New York Avenue NW
Washington, DC 20006
Tel: (202)652-2528
Fax: (202)638-0036

Jan Flora
Virginia Polytechnic Institute
Dept. of Agricultural Economics
Blacksburg, VA 24061-0401
Tel: (703)231-9441
Fax: (703)231-4163

Albert Greve
Multi-Donor Secretariat
The World Bank
1818 H Street NW, J-7005
Washington, DC 20433
Tel: (202)473-4428
Fax: (202)473-5147

Eric Hyman
Appropriate Technology, Inc.
1331 H Street NW, Suite 1200
Washington, DC 20005
Tel: (202)879-2974
Fax: (202)628-4622

Sara Guthrie
Tropical Research & Development
519 NW 60th Street, Suite D
Gainesville, FL 32607
Tel: (904)331-1886
Fax: (904)331-3284

Bill Helin
USDA Forest Service
Forestry Support Program
P.O. Box 96090
Washington, DC 20090-6090
Tel: (202)205-1589
Fax: (202)205-1603

Jeff Hill
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3787
Fax: (703)235-3805

Tom Hobgood
USAID
AFR/ARTS/FARA
2941 NS
Washington, DC 20523-1515
Tel: (202)647-7197
Fax: (202)647-2993

Susan Huke
USDA Forest Service
Forestry Support Program
P.O. Box 96090
Washington, DC 20090-6090
Tel: (202)205-1584
Fax: (202)205-1603

John Michael Kramer
DATEX
1400 I Street NW
Washington, DC 20005
Tel: (202)789-4300
Fax: (202)789-6030

Pat Isman
USAID
R&D/EID
Room 606, SA-18
Washington, DC 20523-1814
Tel: (703)875-4625
Fax: (703)875-4949

Cynthia Jensen
African Wildlife Foundation
1717 Massachusetts Avenue NW
Washington, DC 20008
Tel: (202)265-8393
Fax: (202)265-2361

Gerald Karaska
SARSA
Clark University
Worcester, MA 01610
Tel: (508)751-4628
Fax: (508)751-4625

Dennis King
University of Maryland
Box 38, C.E.E.S.
Solomons, MD 20688
Tel: (410)326-4281
Fax: (410)326-6342

Walter Knausenberger
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3826
Fax: (703)235-3805

Boyd Lowry
CODEL
475 Riverside Drive, Room 1842
New York, NY 10115
Tel: (212)870-3000
Fax: (212)870-3545

Glenn-Marie Lange
Institute for Economic Analysis
New York University
269 Mercer Street, 2nd floor
New York, NY 10003
Tel: (212)998-7486
Fax: (212)995-4165

Nadine Laporte
Biodiversity Support Program
NASA/Goddard Space Flight Center
Code 923
Greenbelt, MD 20771
Tel: (301)286-7568
Fax: (301)286-3221

Steve Lawry
Land Tenure Center
1300 University Avenue
Madison, WI 53706
Tel: (608)262-1150
Fax: (608)262-2141

Peter Little
Institute for Devp't Anthropology
99 Collier Street
Binghamton, NY 13902
Tel: (607)723-2580
Fax: (607)773-8993

Melanee Lowdermilk
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3803
Fax: (703)235-3805

Julia Morris
USDA Forest Service
Forestry Support Program
P.O. Box 96090
Washington, DC 20090-6090
Tel: (202)205-1589
Fax: (202)205-1603

David McCauley
USAID
R&D/ENR
Room 509, SA-18
Washington, DC 20523-1812
Tel: (703)524-4406
Fax: (703)524-3164

Mike McGahuey
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3774
Fax: (703)235-3805

Tom Mehen
USAID
R&D/EID
Room 606, SA-18
Washington, DC 20523-1814
Tel: (703)875-4422
Fax: (703)875-4949

Russell Misheloff
USAID
R&D/ENR
Room 509, SA-18
Washington, DC 20523-1812
Tel: (703)875-4046
Fax: (703)875-4639

Donald Moore
U.S. Geological Survey
EROS Data Center
Sioux Falls, SD 57198
Tel: (605)594-6008
Fax: (605)594-6589

Stan Peabody
Winrock International
1611 N. Kent Street
Arlington, VA 22209
Tel: (703)525-9430
Fax: (703)516-8410

Robert Mowbray
USAID
R&D/ENR
Room 503, SA-18
Washington, DC 20523-1812
Tel: (703)875-4062
Fax: (703)875-4639

Mike Philley
USAID
R&D/ENR
Room 509, SA-18
Washington, DC 20523-1812
Tel: (703)875-4058
Fax: (703)875-4639

Kate Newman
Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)778-9524
Fax: (202)293-9211

Barbara Pitkin
Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)778-9524
Fax: (202)293-9211

Caroline Njuki
CODEL
475 Riverside Drive, Room 1842
New York, NY 10115
Tel: (212)870-3000
Fax: (212)870-3545

Tony Pryor
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3832
Fax: (703)235-3805

Jeanne North
USAID
R&D/EID
Room 606, SA-18
Washington, DC 20523-1814
Tel: (703)875-4581
Fax: (703)875-4949

Steve Pulaski
USAID
AFR/EA
3909 NS
Washington, DC 20523-0013
Tel: (202)647-5235
Fax: (202)647-9805

Charlotte O'Brien
The World Bank
1818 H Street NW, J-2112
Washington, DC 20433
Tel: (202)473-4332
Fax: (202)477-4979

Gordon Rausser
Institute for Policy Reform
1400 16th Street NW, Suite 350
Washington, DC 20036
Tel: (202)939-3450
Fax: (202)939-3458

Tim Resch
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3786
Fax: (703)235-3805

Carolyn Shumway
USAID
R&D/AA
Room 522, SA-18
Washington, DC 20523-1813
Tel: (703)875-4086
Fax: (703)875-4639

Taryn Rounds
USAID
R&D/EID
Room 606, SA-18
Washington, DC 20523-1814
Tel: (703)875-4450
Fax: (703)875-4949

Kathy Saterson
Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)846-8330
Fax: (202)293-9211

Alan Schroeder
USAID
AFR/ARTS/FARA
Room 602, SA-8
Washington, DC 20523-1515
Tel: (703)235-3844
Fax: (703)235-3805

David Seckler
Winrock International
1611 N. Kent Street
Arlington, VA 22209
Tel: (703)525-9430
Fax: (703)525-1744

Asif Shaikh
International Resources Group
1400 I Street NW, Suite 700
Washington, DC 20005
Tel: (202)289-0100
Fax: (202)289-7601

Ben Stoner
USAID
AFR/ARTS/FARA
2941 NS
Washington, DC 20523-1515
Tel: (202)647-7202
Fax: (202)647-2993

Louis Siegel
Associates in Rural Development
110 Main Street, 4th floor
Burlington, VT 05402
Tel: (802)658-3890
Fax: (802)856-4247

S.H. Sohmer
USAID
R&D/ENR
Room 509, SA-18
Washington, DC 20523-1812
Tel: (703)875-4669
Fax: (703)875-4639

Fred Sowers
USAID
CDIE
Room 215, SA-18
Washington, DC 20523
Tel: (703)875-4810
Fax: (703)875-5269

Pam Stanbury
USAID
R&D/EID
Room 622, SA-18
Washington, DC 20523-1814
Tel: (703)875-4528
Fax: (703)875-4949

Gloria Steele
USAID
R&D/EID/RAD
Room 608, SA-18
Washington, DC 20523-1814
Tel: (703)875-4567
Fax: (703)875-4949

Jamie Watts
USDA Forest Service
Tropical Forestry Program
P.O. Box 96090
Washington, DC 20090-6090
Tel: (703)235-1676
Fax: (703)235-3732

Compton Tucker
NASA/Goddard Space Flight Center
Code 923
Greenbelt, MD 20771
Tel: (301)286-7122
Fax: (301)286-3221

Dan Tunstall
World Resources Institute
1709 New York Avenue NW
Washington, DC 20006
Tel: (202)638-6300
Fax: (202)638-0036

Remko Vonk
CARE
660 First Avenue
New York, NY 10016
Tel: (212)686-3100
Fax: (212)532-6162

Dwight Walker
USAID
AFR/ARTS/FARA
2941 NS
Washington, DC 20523-1515
Tel: (202)647-7622
Fax: (202)647-2993

Sam Wasser
Smithsonian Institution/National
Zoological Park
Conservation & Research Center
Front Royal, VA 22630
Tel: (703)635-6562
Fax: (703)635-6551

Elisabeth Zebrowski
AMEX International
1725 K Street NW, Suite 402
Washington, DC 20006
Tel: (202)429-0222
Fax: (202)429-1867

Jim Webster
Biodiversity Support Program
c/o World Wildlife Fund
1250 24th Street NW
Washington, DC 20037
Tel: (202)778-9786
Fax: (202)293-9211

Russ Webster
Management Systems International
600 Water Street SW, NBU 7-7
Washington, DC 20024
Tel: (202)484-7170
Fax: (202)488-0754

Robert Wilson
USDA/OICD
14th & Independence Ave. SW
Washington, DC 20250-4300
Tel: (202)690-1945
Fax: (202)690-1953

Jerry Wolgin
USAID
AFR/ARTS
2851 NS
Washington, DC 20523-1515
Tel: (202)647-5993
Fax: (202)647-2993

Joanne Yeager
Abt Associates, Inc.
4800 Montgomery Lane, Suite 500
Bethesda, MD 20814
Tel: (301)913-0695
Fax: (301)652-7791

153

APPENDIX F

DOCUMENTS DISPLAYED AT THE WORKSHOP

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