

Programmatic Environmental Assessment of Co-Management of Reserved Forests in Guinea

Prepared by

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Foreword

This report is the outcome of the Programmatic Environmental Assessment (PEA) of the Co-Management of Reserved Forests activities being implemented under the aegis of the Expanded Natural Resources Management Activity (PEGRN) funded by USAID/Guinea, as mandated by the Initial Environmental Examination (IEE) prepared for the Mission's Strategic Objective 1 in 1998. It should be noted that this PEA was never construed nor was it carried out as an evaluation of the co-management activities of the PEGRN. Nevertheless, owing to the fact that many of the most salient steps in the co-management process for the second phase were completed for the Suti Yanfou and Bakoun in 2000, the PEA was the first real opportunity for a comprehensive overview of these activities.

Despite what may seem like an overwhelming array of issues, the PEA Team would like to first reiterate its strong convictions that co-management represents an excellent opportunity to use forest management for real development needs and purposes for the benefit of the local people and of the country. It is the team's hope that the discussion of the issues and the conclusions and recommendations related to each will be a useful contribution to much hard work that has gone into the development of the model.

Acknowledgments

As the list of people consulted (Appendix F) will readily attest, many people have contributed to the execution of this PEA. By its very nature, the co-management model in Guinea involves thousands of people, including the villagers who depend in part on these reserved forests for their livelihoods and subsistence. The PEA Team would, therefore, like to acknowledge the warm welcome it received on the part of these villagers on every occasion. It was a fine example of the graciousness and traditional hospitality for which the rural areas of the country have always been known.

The PEA Team recognizes as well, however, that this warm reception was due in large measure to the efforts of the many PEGRN staff—DNEF, Winrock, NGOs and others—whose commitment, dedication and earnest efforts to assist these villagers is constantly evident.

Several people also deserve special mention for their encouragement and kind support over the long course of this PEA, starting in 2000. Allen Fleming and Son Hoang Nguyen of USAID's Office of Natural Resource Management were unfailingly forthright and supportive throughout the PEA exercise. Martin Bush and his entire Winrock Team also gave generously of their time, efforts and understanding, which proved crucial to the PEA Team's comprehension of the co-management model and its methods and achievements. The PEA Team is also grateful to Mr. Mathias R. Haba, National Director of Waters and Forests, and his DNEF staff who responded with great collegial demeanor to the many demands of the exercise and the need for professional information.

Executive Summary

Programmatic Environmental Assessment of Co-Management of Reserved Forests in Guinea

The natural resource endowment of Guinea includes more than 100 reserved forests (*foret classée*). The primary responsibility for the management of these forests lies with the national government. The National Directorate of Waters and Forests (DNEF) has the mandate to manage these forests. However, because of a shortage of the necessary personnel and other resources, they are unable to properly control the use of these forests and to provide for their sustained yield, multiple use management.

The communities of herders, farmers and other local populations living around these forest reserves want to have access to these areas for a variety of uses. They recognize that it is in their long-term best interest to control the level of exploitation of the forests and to limit their conversion to other land uses and eventual degradation. Communities value the water resources, grazing reserves, potential cropland, wildlife populations, timber and other non-wood forest products, as well as the various environmental services provided by the remaining natural forests of Guinea.

By the mid-1990s, USAID and other international development assistance agencies were funding programs to support the DNEF in its efforts to promote the collaborative management or co-management of these reserved forests with the surrounding local communities. A community-based participatory approach to forest management was initiated with USAID funding in the 10,000 hectare Nialama Forest Reserve, and soon thereafter plans were made to prepare co-management plans for several other forest reserves in the surrounding region of Guinea. By 1999, USAID and DNEF had set a target of bringing 100,000 hectares of forest reserves under co-management over a five-year period.

In order to comply with USAID environmental regulations and special provisions established to conserve biological diversity and tropical forests, an environmental assessment was carried out for the Nialama Forest in 1997. In consideration of the need for an assessment of the potential environmental impacts of co-management activities in each of the forests targeted by the USAID funded program, and of the lengthy process and results of the environmental assessment completed for the Nialama Forest, USAID environmental officers suggested that a programmatic environmental assessment (PEA) be carried out. The PEA exercise was organized, therefore, to assess the environmental impacts of the ongoing and anticipated forest co-management activities, in lieu of individual environmental assessments (EAs) for each forest reserve.

The specific purposes and objectives of the PEA include: identification of environmental issues early in the planning cycle of management activities in targeted forests; improved understanding of state-of-the-art sustainable co-management of natural forests; strengthening of institutional capabilities and organizational systems designed to support forest co-management; facilitation of

compliance with USAID environmental regulations (reg. 216), particularly as they apply to tropical forests and biodiversity conservation.

In order to carry out the PEA process, a scoping exercise was organized in March 2000 to identify the primary issues to be addressed during the PEA and to develop terms of reference for the PEA team. After these preliminary consultations and approval of the scoping statement by USAID environmental officers, the PEA team was mobilized between January and March 2001 to complete six weeks of field work and in-depth analysis of the issues identified in the scoping statement. The four-person PEA team worked in Guinea from February 12 through March 17, 2001.

This report constitutes the findings and recommendations of the PEA team. Following the introductory section, the report provides a summary description of the general expectations and basic concepts of co-management of natural forests as foreseen with USAID support. The management activities are aimed at arresting deforestation, protecting the forest ecology and watershed, controlling access to locally valued resources, and enhancing supply of products and income-generating opportunities. The PEA team noted, however, the need to adapt the co-management model to take account of differences in the physical condition of the particular forest reserve, and the variable degree of demographic pressure on the forest.

The PEA team reviewed the alternatives to implementation of the co-management model, including the “no action” alternative, and concluded that choosing the no action alternative would deprive the country and its people of a much needed development activity. Without program support for co-management and an enhanced ability to rationalize the use of forest reserves, it is likely that the process of incremental degradation would go on unabated, with significant adverse environmental and socioeconomic impacts. Without assistance in identification of sustainable use patterns and organization of communities living near these forests, local people will most likely continue to exploit these reserves in unsustainable ways in the pursuit of their day-to-day survival. As the forest resources are degraded and made less productive, people become more impoverished and the eventual costs of natural resource rehabilitation and poverty alleviation increase exponentially. The PEA team concluded that the no action alternative would not simply be the status quo; it would lead to further environmental degradation and impoverishment in a country that can scarcely afford it.

Section 3 of the report reviews the policy and institutional framework for co-management in Guinea, including a brief overview of the national forest policy and USAID/Guinea program strategy and results framework. USAID support for forest co-management is designed to contribute to the achievement of the following strategic objective: increased use of sustainable natural resources management practices. Program activities are aimed at a series of intermediate results, including:

- Acquiring and applying planning skills for natural resource management
- Raising farm productivity
- Increasing micro and small enterprise activities
- Establishing an enabling policy environment

The PEA team noted their conviction that the forest co-management target will only be achieved if the full array of conditions for viable participatory forest management, embracing institutional capabilities, increased productivity, enterprise development and environmental policy, are also achieved. While the PEA exercise indicated that sound design and effective implementation of co-management of reserved forests can avoid negative environmental impacts, the premises that this will happen are related to all four of the intermediate results for the SO and will be self-reinforcing.

Section 4 provides a description of the affected environment and other baseline information on the geographic regions of Guinea and the reserved forests targeted for co-management. A number of topics covered in the baseline studies funded by USAID, such as climate, soils, hydrology and biodiversity were treated in considerable depth. Much of this information, however, was not extensively utilized in the preparation of the three co-management plans reviewed by the PEA team. Baseline studies are more cost-effective when the information collected is relevant to the needs and interests of those involved in the planned co-management activities and readily applicable to the forest management planning process.

The bulk of the PEA report is included in Section 5, which reviews the environmental consequences of co-management of reserved forests. This section begins with an overview of the impact analysis framework and the basic premises of environmental assessment. The PEA was not designed to be a performance evaluation of program activities. It does, however, necessitate a review of the proposed co-management model, both as planned and as implemented, to assess the likelihood that the model can be replicated effectively, efficiently—and sustainably. In essence, the PEA is expected to safeguard the contributions and planned results of co-management activities by:

- Assessing the possibility of **adverse impacts** and suggesting how they could be **avoided** through adaptations in design.
- Identifying **mitigation** measures that should be part of the approach where adverse impacts are unavoidable.
- Outlining the need for **monitoring** during implementation to counter the possibility of unforeseen adverse impacts.

A detailed Environmental Planning Checklist for the Co-Management of Reserved Forests in Guinea was prepared on the basis of design issues and mitigation measures identified during the assessment. Its main premise is that by using the checklist in the preparation and review of plans for co-management in other reserved forests, USAID and its partners will be able to justify the threshold decision of “negative with conditions” when preparing an initial environmental examination (IEE) for each activity. This in turn would allow these activities to proceed without a full environmental assessment.

The team organized their assessment in three general categories: technical, ecological, and socioeconomic and institutional. A number of technical issues were highlighted by the PEA team, including mapping, inventory and resource assessment methods, protection, agroforestry, silviculture and overall forest management planning. Significant concerns emerged from the PEA assessment in each of these areas.

The technical issues are related to the essential criteria for sustainable co-management—that land and resource use is matched to land and resource capability. Forest management planning is fundamentally about identifying needs and opportunities—needs for protection or restoration of degraded areas, and opportunities to provide a sustained yield of products and services from potentially productive areas. Determining management interventions and their location across the full forest area is the essence of forest management planning. Preparing good maps is an essential early step of forest management.

Accurate maps enable all concerned to identify specific areas on the ground where management interventions take place to ensure that the proposed practices are being applied where appropriate and to monitor results and impacts. Unfortunately, the maps made available to the PEA team are insufficient for good forest management planning and execution and often misleading. Attempting to use them either in the office or the field for management planning and implementation is likely to lead to adverse environmental impacts. The problems with the maps prepared to date for co-management in Guinea are a function of difficulties in discerning boundaries, use of outdated sources of information, lack of a good base map, inaccuracies in calibrating data sources, questions of scale and size and other related contradictions in the maps. The team recommends improving the maps for the forests of Nialama, Suti Yanfou and Bakoun. Additional detailed recommendations are provided with respect to avoidance and mitigation of potentially adverse environmental impacts associated with inadequate or inaccurate maps.

Together with maps, forest inventories and resource assessments are critically important in forest management. The information provided in assessments and inventories is key to determining the soundness of utilization practices and to monitoring the sustainability of prescribed uses. To date, the resource assessments carried out in connection with the co-management activities in Guinea have raised concerns about a lack of stratification, low sampling intensity and methodological lapses. The team concluded that the baseline studies provide an inadequate basis for sustainable management and directives that, if implemented, would lead to adverse environmental impacts. They endorsed the concerted efforts underway to strengthen the capabilities for resource inventory through the recruitment of a qualified forest inventory specialist. The team also urged the implementing agencies to address the related institutional strengthening issues.

The team noted there are three aspects of forest protection that need more attention if the co-management model is to succeed: fire protection, management of grazing pressure in some forests and control of hunting. Engaging rural people to take more responsibility for controlling access and use in the forest, in return for clearly empowering and authorizing them to use the forest sustainably, could help shift from the *de facto* open access status to a situation of controlled access which is needed to ensure adequate protection and more rationale use. The team outlined a number of suggestions for a protection strategy to help the communities cope with fire damage and grazing pressures. (Hunting was addressed under biodiversity conservation strategies and recommendations).

Agroforestry interventions were envisioned to provide useful products from an overstory of economically valuable trees in association with cultivated food crops. In this manner, local

communities would gain access to arable land, but, in theory, their cultivation practices would be less likely to lead to soil erosion and site degradation. Despite the potential applicability of agroforestry practices in the reserved forests, there are a number of issues that will need to be resolved to ensure that such interventions are sustainable. The guidance and prescriptions related to agroforestry in the management plans will need to be clarified. More effort will also be needed to ensure that the technical specifications are effectively applied. In some sites, the implementation of prescribed agroforestry practices was no less destructive than traditional land clearing for shifting cultivation. The team observed that the manner in which agroforestry techniques are currently being used is virtually the opposite of what was intended and has the greatest potential for causing adverse environmental impacts.

The team also noted that too little has been done to develop the vital information on the silviculture of these forests and the species within them. More explicit information is needed about the conditions under which the economically valuable crop trees will regenerate. The team recommended a number of measures to enhance the silvicultural knowledge of these forests as part of ongoing inventory, survey and monitoring activities.

With respect to the overall forest management planning process, the team noted the need to adopt clear criteria for the selection of forest reserves targeted for co-management. The model should also not be applied as rigid template, but adapted to the particular circumstances of each forest. The team also noted the benefits of greater local participation in all aspects of inventory, a staggered approach to mapping and management planning based on careful stratification and site specific analyses of needs and opportunities, in combination with a more judicious use of appropriate and cost-effective remote sensing and related inventory and planning best practices that are currently available. The team recommended that co-management activities not be rushed in a vain attempt to do it all at once, but rather be carried out in carefully phased steps. These steps would take account of the complexity of co-management and the need to address what should not be done (unsustainable practices), what can be done (protection, restoration, sustainable harvesting), where (accurate maps), when (calendar of activities), how (technical guidance, norms, financing arrangements) and by whom (institutional and organizational arrangements). While it was beyond the scope of the PEA team to exhaustively detail these steps, the team did provide several recommendations to enable the project team to follow through and address the concerns raised by during the PEA.

The ecological dimensions of co-management focused on issues related to biodiversity conservation. A number of concerns were raised about the extent to which biodiversity conservation issues were addressed in the baseline studies and the management plans. The team noted that hunting was not accounted for in the management plan for Nialama. Rules and regulations about hunting are also not well developed in the management plan for Bakoun, despite the presence of significant wildlife populations and hunting pressures. Guinea is a country where many people hunt and many others depend on game meat for an important part of the protein in their diets. Mere prohibitions against hunting are difficult to enforce and are thus not likely to be effective. There is also a need to manage wildlife populations to protect the animals, maintain their habitats and control animals that are raiding crops in adjacent areas. Additional expertise is needed to deal with wildlife and biodiversity conservation in the near term if the project is to take account of this important dimension of co-management.

The project co-management activities originated with a concern to protect critically important watersheds. The issue of watershed stability and maintenance of a forest cover in critical sites remains of paramount importance, locally, nationally and internationally, even if actions to protect the watersheds must take place locally. The team also noted that catchment protection and spring development are excellent ways to begin to address the protection needs of the reserved forests. The case of the Sincery-Oursa forest is particularly relevant in this regard and offers another version of the model where the central benefit of co-management is the enhanced protection of a valued water supply for adjacent urban areas.

The report includes a short commentary on the environmental issues related to the use of agrochemicals and the cultivation of sensitive wetlands and other lowland areas (*bas-fonds*). Vigilance and training will be needed to avoid problems stemming from the use of agrochemicals. The team finds that the decision to increase the availability of lowland areas within forest reserves for conversion to agriculture should be carefully reconsidered, and account should be taken of the full range of costs and benefits.

In the case of forest co-management in Guinea, as with most community-based natural resource management activities in other countries, the socioeconomic and institutional dimensions have proven to be the most difficult facet to put into place. Addressing the social act of management invariably involves behavioral change on many fronts and its attendant conflicts, resistance and reactions. While many of the most significant achievements of the co-management project are in the area of community participation in the identification of management objectives and in the performance improvement review (PIR) process, a number of socioeconomic and institutional issues still need to be resolved or fully addressed.

To date, the participatory process has engendered a concern about transaction costs, about the degree of transfer of authority and about the complexity and transparency of the steps involved in empowering local communities to assume a greater role in co-management. Arrangements for cost sharing, revenue sharing and equitable benefit distribution are still being developed. Adequate financial and economic analyses are key elements of sustainability, yet progress toward the establishment of financially viable commercial activities is still not fully underway. Existing analyses do not provide a clear indication of the cost structure for co-management, nor do they provide a clear indication of the separation of rights and obligations between the communities and the DNEF.

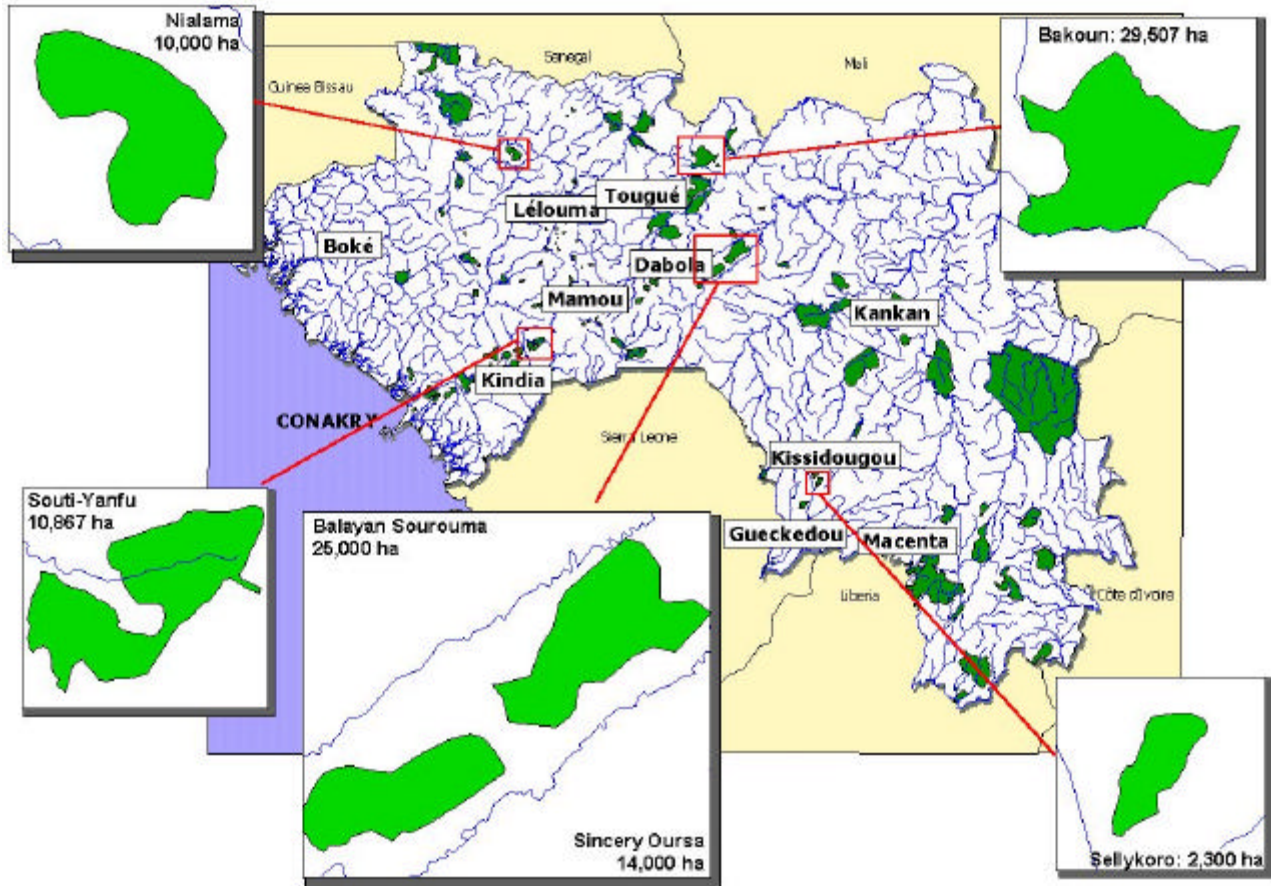
Similarly, there are a number of issues which hinder the effectiveness and efficiency of the institutional relationships needed for sustainable co-management. The legal and institutional framework for co-management is still unclear and incomplete, on several levels. While there are a number of revisions to legal texts, policy directives and declarations that have been adopted, the terms, conditions and procedures for co-management still need to be fully codified.

At the same time, the community level structure for co-management needs to be simplified. More attention is needed to ensure that NGOs are strengthened and better prepared to assume their role in forest co-management. The team recommends that an assessment of training needs be carried out and a focused training program be developed as needed. In all of these aspects,

those engaged in forest co-management would benefit from organizing a regular forum for discussion among the various partners engaged in supporting forest co-management in Guinea.

The concluding sections of the report provide a brief review of anticipated issues that did not emerge during the PEA, such as extraction methods for timber and the integration of market surveys. Monitoring measures for sustainable co-management are then presented in some detail, together with a summary on practical guidance/tools for environmentally sound co-management of forests.

Map of Guinea and its Reserved Forests



Acronyms

AAC	annual allowable cut
BCCT	Office of Thematic Mapping and Remote Sensing
BRP	Bassin Représentatif Pilote
CBD	Convention on Biological Diversity
CBNRM	community-based natural resources management
CERE	Centre D'Études et de Recherche en Environnement (University of Conakry)
CF	Comite Foret
CI	Conservation International
CITES	Convention on the International Trade in Endangered Species
DBH	diameter breast height
DNEF	Direction National d'Eaux et Forets
EU	European Union
GIS	geographic information system
GPS	global positioning system
GTZ	German Agency for International Development
IEE	Initial Environmental Examination
IPM	integrated pest management
NRM	natural resources management
NGO	non-governmental organization
PEA	Programmatic Environmental Assessment
PEGRN	Projet Élargi de Gestion des Ressources Naturelles
SOW	scope of work
USAID	US Agency for International Development

1. Introduction to the PEA

1.1 Importance of Co-Management of Reserved Forests in Guinea

There are over 100 reserved forests (*foret classée*) spread across the length and breadth of the country. Most were gazetted as reserved forests during the colonial period in the 1940s and 1950s, many with the specific intent of safeguarding fragile uplands areas. In recent years, the National Directorate of Waters and Forests (DNEF) has found it difficult to obtain the needed resources from government coffers to properly control and manage these forest areas. Increasing population pressures and lack of agricultural development on traditional farm lands has pushed rural people to invade these forests to meet household food security and income generation needs through shifting cultivation, grazing of domestic animals and harvesting of wood products. Many of the forests have been severely degraded in the process and others have become virtually devoid of forest cover.

In the 1980s, when Guinea, its West African neighbors and their donor partners began to turn their attention to the importance of the highlands of the Fouta Djallon—the so-called *chateau d'eau*, or water tower of the region—the importance of these reserved forests became even more manifest. Since that time, USAID/Guinea has been financing activities related to community based natural resources management in selected watersheds, first under the aegis of the Guinea Natural Resources Management Project (642-0219) and subsequently under its second phase, the Expanded Natural Resources Management Project or PEGRN (*Projet Élargi de Gestion des Ressources Naturelles*).

The Reserved Forest of Nialama, covering approximately 10,000 hectares in the Prefecture of Lelouma and a large part of the pilot watershed of Koundou, is one such area. In 1996, an environmental assessment of the activities described as the “Co-Management of the Nialama Reserved Forest” was conducted and a draft report prepared. Subsequently, the draft report was reviewed and modified, in the light of further information made available as the result of the completion of the Technical Management Plan for the Nialama Reserved Forest. The Environmental Assessment for the activities in Nialama Reserved Forest was approved by the Africa Bureau Environmental Officer in August, 1997 with a recommendation of Negative Determination with Conditions. Work in the Nialama Reserved Forest has been carried out since under the aegis of this authorization.

1.2 Introduction and Rationale for the PEA

In 1999, USAID/Guinea’s Natural Resources Management Strategic Objective Team, based on the potential and promise of the activities in Nialama, proposed an expansion of the community-based natural forest management activities as part of its new Strategic Objective Grant Agreement. A target of 100,000 hectares of forests co-managed by the communities and the government services in as many as 11 additional reserved forest areas was identified. On the basis of the preliminary planning for further co-management of natural forest activities under the Expanded Natural Resources Management Activity, two additional reserved forest areas where

the approach might be applied were identified. These areas were the Suti Yanfou Reserved Forest (11,000 hectares), part of the Dissa Watershed in Sougueta Sub-Prefecture, Kindia Prefecture, and the Bakoun Reserved Forest (28,000 hectares), part of the Diafore Watershed in Tougue Prefecture. Additional planning for other reserved forest areas to be included under this component of PEGRN has shifted from the forest region of Guinea because of the civil unrest there to the region around Dabola where two other reserved forests have tentatively been identified for possible action—Sincery-Oursa and Balayan-Souroumba.

The issue of the need for an environmental assessment for each of these areas, especially in the light of the lengthy process and ultimate determination for Nialama, prompted the mission to discuss these procedures during the visit that same year with the Regional Environmental Advisor from Washington. He suggested, and the mission agreed, that this series of very similar activities might be dealt with under the modality foreseen in Reg. 216 known as programmatic environmental assessment 216.6 (d).

As defined in Reg. 216, the programmatic environmental assessment methodology was seen as being possibly appropriate to the following situations:

- to assess the environmental effects of a number of similar actions and their cumulative environmental impact in a given country or geographic area, or
- the environmental impacts that are generic or common to a class of agency actions, or
- other activities which are not country-specific.

A preliminary Scoping Exercise for the Suti Yanfou Reserved Forest, prepared for the mission by the Regional Environment Officer from Bamako in 1998, described the conditions there and identified a series of issues associated with co-management there that were very similar to those experienced for Nialama (D. Panther, unpublished manuscript, 1998). The Bakoun Reserved Forest had also been visited by a USAID consultant team as early as 1988 and had been proposed as a site for co-management. It was therefore decided that the PEA might well be applied to the co-management of natural forests in accordance with the situational conditions for the use of this methodology as described above.

1.3 Purpose of the PEA

This PEA had multiple objectives:

- Facilitate and encourage the identification and understanding of environmental issues early in the planning cycle for co-management in these and future target forests; design environmental improvements into these activities and thereby avoid the need for mitigative or compensatory measures related to adverse impacts.
- Advance an understanding of the current state-of-the-art of sustainable co-management of natural forests in Guinea, by developing a document that will be useful to USAID, the government of Guinea, contractor personnel and others interested in working with these types of development investments, for determining the conditions under which they can be practiced effectively and efficiently and with assurances related to their sustainability and lack of adverse impacts.

- Further build up staff capabilities and understandings and institutional arrangements and organizational systems which lead to more sustainable co-management of natural forests approaches in Guinea.
- Facilitate the ability of the USAID mission and its government partners and implementing agents to comply with the requirements of Reg. 216 as they apply to tropical forests and biodiversity conservation.

1.4 Description of the Scoping Process

Following established U.S. procedures and the directives contained in USAID Environmental Regulations (Reg. 216), a Scoping Exercise to define the breadth of the activities to be assessed and possible environmental issues was undertaken by a multi-disciplinary team in March 2000. An environmental assessment specialist was contracted (through an Africa Bureau buy-in to the IRG, Ltd.–implemented EPIQ program) for this purpose and assisted in preparing the Scoping Statement (see Appendix A) by the USAID/Guinea Mission Environmental Officer, the Mission Strategic Objective Team Leader and the Deputy National Coordinator for the PEGRN Project.

This four person team, including the present Team Leader (who served in this capacity as he did for this PEA itself, as the environmental assessment specialist) carried out an extensive series of consultations with those involved with co-management from the government, NGO and donor communities. In addition, the team visited several of the forests intended as future sites for the development of co-management as well as other candidate reserved forests. There was an opportunity as well for an early review of the outputs of a Multi-Disciplinary Baseline Studies contract that was being carried out in the two new forests, both as background for the PEA and for management planning purposes. A comprehensive bibliography of pertinent literature related to both the on-going activities as well as community based natural resources management was drawn up at the time and efforts made to begin the compilation of the reference set for the PEA.

In March 2000, there was some expectation that the PEA might go ahead shortly after the completion of the Scoping Statement and its approval in Washington by USAID’s Regional Environmental Officer for the Africa Bureau. A number of issues that emerged during the scoping exercise as well as the need for more concrete examples of activities on the ground prompted the Scoping Team to propose that the PEA be postponed to early 2001. The draft Scoping Statement was circulated to the Mission, slightly revised and finally submitted to the REO who gave his approval for the PEA’s implementation. The AFR Environmental Officer as per the specifications of 216.3(a)(4)(ii) gave his official approval on December 11, 2000.

1.5 PEA Approach and Methodology

This Programmatic Environmental Assessment of Co-Management of Reserved Forests in Guinea being implemented under the aegis of the USAID–funded PEGRN was carried out largely as planned during the Scoping Process described above.

1.5.1 PEA Team Configuration

The PEA Team fielded by IRG, Ltd. under the aegis of the EPIQ contract was a multi-disciplinary group composed of the following individuals: a Team Leader/Environmental

Assessment Specialist, a Forest Management Specialist, a Rural Sociology Specialist, and a Biodiversity Conservation Specialist. The latter specialist was provided to the team through the special collaboration of Conservation International. A brief biographical sketch of each of the team members and their respective scopes of work may be found in Appendix B.

In addition, members of USAID/Guinea Natural Resource Management Team, the Winrock International Technical Assistance Team and staff of the National Directorate of Waters and Forests (DNEF) joined the PEA Team during different parts of its field work.

1.5.2 General Methodology

The team worked in-country from February 12, 2001, to March 17, 2001. The first week in Conakry was devoted to team building and compilation of data and information, review of pertinent literature (see Appendix C) and interviews with knowledgeable individuals familiar with the forestry sector in Guinea. An essential feature of the team building was consideration of a semi-structured interview protocol which highlighted the most salient questions relating to the work of each of the specialists and the interactions between them. This list of questions can be found in Appendix D.

Weeks two through four were spent in the field visiting the on-going sites where the PEGRN project was undertaking co-management, including the Nialama Reserved Forest in Lelouma Prefecture, Suti Yanfou Reserved Forest in Kindia Prefecture, and Bakoun Reserved Forest in Tougue Prefecture. Additionally, the team visited two other forests where the project was considering the expansion of co-management activities, namely, Sincery-Oursa Reserved Forest and Balayan-Souroumba Reserved Forest, both in Dabola Prefecture. In the course of its field visits which included four nights camping within the limits of Bakoun Reserved Forest because of its size and relative inaccessibility, the PEA Team traveled almost four thousand kilometers in the interior of the country. The detailed program/itinerary of the PEA Team may be seen as Appendix E.

In keeping with the public consultation approach inherent to environmental assessment technology as practiced in the United States, an important, indeed essential, feature of the PEA was an effort to meet and consult with a wide range of interested individuals including project staff, local authorities, staff of collaborating NGOs, staff of other projects and programs, and most importantly, members of the concerned communities and their representatives (Forest Committees). The full list of persons consulted—the stakeholders—can be found as Appendix F.

1.5.3 Report Preparation

To further facilitate the inter-disciplinary nature of its analysis and to lay the groundwork for efficient reporting, the PEA Team took the time to hold periodic “synthesis meetings” at the close of each week of field visits. These meetings and others like them were intended to share and review the observations and preliminary findings of each of the team members.

On March 14, 2001, the PEA Team held a Preliminary Findings Workshop in Conakry with representatives of the National Directorate of Waters and Forests, USAID/Guinea and the

Winrock International Technical Assistance Team. This half-day workshop gave the audience a first chance to hear and to offer comments and clarifications related to the main preliminary findings of the PEA Team.

As preparation for the workshop, a series of flipchart pages were prepared by each team member (with the exception of the Biodiversity Conservation Specialist who was only able to spend two weeks in-country with the team and whose findings, based on her early draft report, were presented by the Team Leader). These pages would later form the basis for the preparation of an annotated outline of this report and the assignment of drafting responsibilities to be carried out by each team member.

2. Alternatives Including the Preferred Activity

2.1 Description of the Present Co-Management Activity

The basic model for co-management involves a range of activities similar to those proposed for Nialama, and although the model will be tailored to the constraints and opportunities—technical, socioeconomic and institutional—specific to each site, the following section provides a summary description of the general expectations of co-management of natural forests as foreseen with USAID support.

Most (but not all) of the reserved forests of Guinea were classified during the pre-Independence period. The conventional notion of classified or reserved forest suggests that these areas were being set aside for future use. In the gazettelement documents associated with some of these forests, and in the literature, the classification process applied by the foresters of the time (late 1930s/early 1940s) also mentions the need for protection of these areas. Many if not most of them were established around steep lands, rocky outcroppings and escarpments zones so much a part of the topography throughout this rugged country. In certain forests, villages existing within the proposed territorial limits of the reserved forest before the classification were noted and their rights to land duly recorded as enclaves. In addition, the rights of local people living around and within the forests to cultivate certain areas within these forests (mainly lowland areas or *bas-fonds*) and for limited non-commercial extraction of building materials and fuelwood for domestic purposes, is also recognized.

Since Independence, the forestry services of the new Nation have found it difficult to maintain adequate guarding of these forests. Many of them, including both Nialama and Suti Yanfou, have been encroached upon by local people seeking new, fertile lands to cultivate for both rainfed and lowland agriculture. The original forest was cleared, sometimes on steep lands, and used for upland rice/peanut and manioc cultivation with attendant erosion and fertility losses. Large areas of Nialama and Suti Yanfou (and the Milo Reserved Forest in Macenta and Selly Koro Reserved Forest in Kissidougou, also visited by the Scoping Team) are now openly used by local people and are little more than unimproved bush fallow areas. In general, however, the steepest areas, those most inaccessible or too rocky for cropping remain intact, sometimes deliberately in an effort by local people to protect water sources (springs). The Bakoun Reserved Forest has experienced only limited encroachment because it is far from population centers and good roads.

Uncontrolled grazing, despite prohibitions in some classification documents, has also taken a toll. Herders are often cited as the cause of the frequent bush fires that ravage large portions of the drier areas of rural Guinea; it is thought that burning will refresh the grasses and provide forage for their animals. Bush fires also are caused by honey collectors who use fire to drive wild bees off their hives. Similarly, Guinea is a country where hunting small game is quite common and hunters often use fire to drive animals out into the open for ease of harvest. Hunting has also taken a significant toll on the animals that inhabit these forest areas. In short, despite their classification as reserved forests, many of these areas have suffered the fate of open access lands—used by all but the responsibility of no one.

The Co-Management Approach being promoted with USAID assistance is predicated on **a series of basic concepts**, worth noting here:

- Government financial and human resources are limited and it is unlikely that, even with great resolve, they would be able to successfully guard these forests against encroachment, especially against a backdrop of increasing land hunger.
- A participatory management approach calling for shared decision-making regarding the destiny and use of the forest and a sharing of the benefits derived from its protection, conservation and utilization among the adjacent villages, offers a better choice for improved public stewardship of these lands.
- Villager agreement to the management prescriptions will be achieved by consensus among the population, based on valorizing the resource base in their behalf, and providing them with tangible, near-term benefits in return for the production trade-offs essential to sustainable management and utilization.
- This working partnership for the co-management of the forest in question will be codified by means of a written agreement or contract between a Forest Committee representing the assembled adjacent villages and the DNEF which delineates the rights and responsibilities of both parties, describing utilization methods and limitations, protective measures to be followed, and revenue sharing mechanisms.

The management plans for the new forests being considered for inclusion in the program—Suti Yanfou and Bakoun—have now been developed and in essence, they are remarkably similar in nature to those identified for the Nialama Reserved Forest. This similarity, as it turns out, is something of a paradox considering the inherently different conditions in the two new forests and this subject will be discussed as part of the issues assessed below. For the purposes of this section, however, the present management planning proposes a general array of elements and activities along the following lines:

Arrest deforestation and forest degradation by:

- Affirming the classified status of Nialama Forest
- Maintaining the integrity of the boundary
- Preventing permanent conversion to other land uses
- Ensuring that forest remains the long-term vegetative cover
- Protection against fires and fire management

Protect the forest ecology by:

- Protecting and maintaining the health and vitality of forest resources
- Maintaining the biological diversity of forest resources, including fauna
- Protecting the population and habitat of all protected species such as chimpanzees

Protect the watershed by:

- Preventing soil exposure on steep slopes
- Limiting the duration of cultivation on gentle slopes
- Excluding production activities near sources of water courses and along their banks

Karoya’s “Haunted” Area:

Chimp nests were seen along the gallery forest on the bottom of the Karoya Valley in Bakoun Reserved Forest, along with considerable signs of other large wildlife, including buffalo, water buck, roan antelope and red pigs. Galleries make excellent habitats, as might be imagined, their typical long narrow configuration serving as a corridor for wildlife. Local people could not explain to the PEA Team why the area was “haunted,” though it had been so for generations—possibly something imposed by village elders years ago to protect vital water sources.

Provide access to cultivable land by:

- Introducing agroforestry systems in selected areas of the forest
- Continuing access to existing *bas-fonds*
- Providing limited access for grazing

Enhance the supply of forest products by:

- Introducing timber and firewood harvesting of Bani (*Pterocarpus spp.*)

Enhance the opportunities for income generation by:

- Permitting the commercialization of timber, firewood and other forest products
- Promoting the commercialization of bamboo on a pilot basis

2.1.1 Different Versions of the Co-Management Model

As noted immediately above, the PEA Team was struck by the inherent similarities of the management plans for each of the three forests presently under consideration given the very different set of circumstances of each. With the best of intentions, it would appear that those responsible for management planning for Suti Yanfou and Bakoun have interpreted **the thrust to apply the co-management model too rigidly, as almost a template of activities** to be implemented on each of the future reserved forests to be included under the PEGRN. This is a direct contradiction of the basic approach to natural resources management on which these activities are based—matching land-use to land capabilities.

Detailed management planning must necessarily be the result of the analytical process—baseline studies and interactions with the concerned communities—which examines the needs and opportunities, both physical/technical and socioeconomic, for each forest. The PEA Team believes, however, that a consideration of two general parameters of the circumstances—readily discernible early on as part of reconnaissance activities—can help to guide the more detailed analysis towards a generalized vision of the likely orientation of the co-management model. The two parameters are: physical condition of the forest and degree of demographic pressure. Applying these two parameters to the three forests in question suggest a general orientation to co-management in each.

Nialama—relatively intact with medium demographic pressure = a **production oriented model** where the harvest and sale of resources and products can be tapped for financing the management process.

Suti Yanfou—highly degraded with high population pressure = a **rehabilitation oriented model** wherein the investment costs and production trade-offs for management and rehabilitation will be higher and may require possible subsidies or incentives to enable local people to comply with the prescriptions.

Bakoun—intact with low population pressure = a **conservation oriented model** where the needs are mainly for protection that may be achieved by enabling the local population to intensify the productivity of their own lands outside the forest to offset the demands on the forest.

2.2 The Proposed Activity and Its Alternatives

Sound environmental assessment procedure requires a consideration of the alternatives to the present set of activities being assessed. It should be stressed here, however, that the present set of activities are clearly intended as further

development of the pilot co-management model, given the context under which it is being considered and developed. There are three important components to this “context”: the overall nature of the program, the resources (human, financial and natural) available for program implementation, and the institutional capabilities for utilizing these resources in an effective and efficient way. Much of the present activities constitutes a concerted effort to experiment with and identify the right mix of these components.

This element of experimentation and refinement of the present approach and methodology makes a strict consideration of alternatives a moot point, especially considering the programmatic nature of this exercise. Ideally, however, the lessons learned in the process of development will further inform the choices available to all about the destiny of the reserved forests of Guinea. Indeed, this has already happened and those knowledgeable about the situation of the reserved forests of the country, both within the governmental organization responsible for them (the DNEF) and its partners in the PEGRN, and others, fully understand that other action modalities are possible. There is broad general agreement that the co-management approach offers the most promising alternative for securing a sustainable status for these forests and for ensuring that their contribution to development, both locally and nationally, can be optimized over time.

Nevertheless, and in the light of what is likely to be important differences in the situation of future forests where this approach may be put in place, both government and its partners will need to bear in mind that under certain circumstances, there may be better alternatives to co-management. This section also, following the procedures inherent to environmental assessment, must also consider the “no action” scenario and its outcome as the backdrop against which any and all alternative strategies for the sustainable management of the reserved forests of Guinea should be considered.

2.2.1 Alternatives to the Proposed Action

Table 2.1 provides a consideration of possible alternatives to co-management of reserved forests in Guinea and the advantages and disadvantages of each. The range of alternatives is only indicative of some of the other choices available to the government and the DNEF should they wish to consider other courses of action. The PEA Team, however, would like to point out that a real assessment of the applicability of these alternatives will only emerge as additional efforts are made to bring some of the reserved forests under co-management. In fact, it could be argued that additional experience with the co-management model and its implementation on a larger range of pilot sites, as is foreseen under PEGRN, is both the best step in the near-term and the key to developing the criteria for eventually choosing other alternatives.

2.3 No Action Alternative

All USAID-funded environmental assessment are required to consider the outcomes of the “no action alternative” [22 CFR 216.6(c)(3)]. In this case, it is not just a matter of a decision not to continue with the efforts to bring the various forests under management. Much of the intent of these activities under the PEGRN and its contribution to the achievement of the mission’s strategic objective is about the development of the general co-management of reserved forests model and its future applicability, beyond the 100,000 hectares of the performance indicator.

Table 2.1
The Alternatives to Co-Management of the Reserved Forests of Guinea

Alternative	Advantages	Disadvantages
<p>Enforce the rules: attempting to regulate the activities within the reserved forests as prescribed in the <i>Arrête de Classement</i></p>	<ul style="list-style-type: none"> • would secure the protection functions for which these forests were set aside • would slow the process of incursions into other forests 	<ul style="list-style-type: none"> • would require significantly enhancing the capabilities in both personnel and operational resources for each forest and require significant DNEF budget resources from government • would lead to further conflict with local populations • contradicts the policy decisions of decentralization
<p>Declassify certain forests: a realistic determination in the light of the disappearance of vegetative and forest cover</p>	<ul style="list-style-type: none"> • would allow the DNEF to concentrate its limited resources on other forests in better condition • eliminates the source of social conflict which creates inordinate burdens for the DNEF 	<ul style="list-style-type: none"> • overlooks the protection function for which these forests were set aside • sets a precedent that could accelerate the pace of incursions into other forests
<p>Declassify certain portions of some forests: release portions of the reserved forests suited to agricultural development to local use</p>	<ul style="list-style-type: none"> • eliminates part of the source of social conflict which creates inordinate burdens for the DNEF • overcomes the tenure constraints to improved management and productivity 	<ul style="list-style-type: none"> • would require a clear and transparent set of assessment tools to determine which areas could/should be released • might be misunderstood by local people who would invade other portions of the forest as a result • could lead to conflict with and among local users vying for these land rights; who would broker the decisions
<p>Increased attention to the “buffer zones” around classified forests: thereby taking some of the pressure off the forests by providing enhanced production options</p>	<ul style="list-style-type: none"> • an excellent choice for mitigating the production trade-offs by local people (already being implemented) • adds economies of scale to the use of scarce human resources • provides the opportunity to link conservation and use with off-site development (potable water supply) • avoids making reserved forests islands of sound management 	<ul style="list-style-type: none"> • requires additional resources within the program area to meet the needs and opportunities outside the forests • adds another important element to the criteria for choosing target areas and forests so as to avoid extremely difficult situations at the outset

<p>Trust-funded conservation and management: using a donor or other organization infusion of resources to set up a trust fund for co-management</p>	<ul style="list-style-type: none"> • particularly applicable for sites where there is global significance for biodiversity conservation • eliminates the recurrent costs to government • possible model with which to fund local NGOs interested in conservation and development 	<ul style="list-style-type: none"> • high initial contribution needed • needs a competent organization to manage and implement it • discerning the priority areas for such an approach can be difficult
<p>Conversion to national park status: certain of the reserved forests may be in better condition and under less demographic pressure, suggesting that they could become the core areas of a national park, as has happened with the Mafou Forest</p>	<ul style="list-style-type: none"> • eliminates the complicated business of having to discern allowable resource use limits • deals more directly and affirmatively, and perhaps more efficiently, with biodiversity conservation 	<ul style="list-style-type: none"> • could create more conflicts with users, including those who privileges were recorded as customary users in the Arrête • there will be substantial costs for guarding the area against unauthorized human use • limited benefits stream for local area
<p>Landscape orientation to conservation and management: adding the reserved forests to a broader zone of protected areas as required to meet ex-situ objectives, such as biodiversity conservation or watershed management</p>	<ul style="list-style-type: none"> • takes a more integrated approach wherein solutions to issues in one area might be met elsewhere • often essential for real achievements in biodiversity conservation where animals migrate 	<ul style="list-style-type: none"> • requires a larger and longer commitment of resources • could become complex as there are likely to be many institutional players, some with different priorities for the area in question • need for sound policy setting so as not to confuse local people concerned with different types of areas within the zone

Accordingly, and given the considerable promise which the co-management model has already demonstrated in Nialama, choosing the “no action alternative” would deprive the country and its people of a much needed development achievement. It should be further noted that a continuing inability to deal with rationalizing the use of the many reserved forests found throughout the country would allow the process of incremental degradation to go on unabated, with significant adverse environmental and socioeconomic impacts.

Without assistance of this nature, the future is already foreseeable, as can be readily observed in some of the smaller reserved forests that have been completely overrun by local people (e.g., the Reserve Forest of Milo in Macenta) and the forest cover eliminated along with its productive potential and protection functions. As population pressure increases around the reserved forests, local people will be tempted to invade these areas in response to land hunger and food insecurity. Marginal and fragile areas will be cleared and cultivated, uncontrolled runoff will lead to erosion, gully formation and soil depletion. As the process advances, the compounded impact on the watershed function of these steep areas will lead to downstream flooding and loss of vital perennial water sources. Uncontrolled hunting on these areas will further threaten biodiversity

assets in the area—one of the world’s 25 “biodiversity Hotspots,” and also gradually eliminate a source of game meat for animal protein on which a large portion of the rural population depends.

Without the assistance to identify sustainable use patterns and to organize the communities living in and around these forests, local people will continue to exploit these areas in unsustainable ways in the pursuit of day-to-day sustenance and survival. As people become more impoverished and their environment more degraded, the eventual costs of natural resources rehabilitation and achievements in terms of social well-being increase exponentially. The “no action alternative” will not simply be the status quo; it will lead to further environmental degradation in a country that can scarce afford it.¹

¹ Co-management-like approaches to forest management are being put in place in many countries of Sub-Saharan Africa. A recent FAO publication provides a wealth of information on this emerging experience: *Participatory Forest Management: A Strategy for Sustainable Forest Management in Africa*. Proceedings of the International Workshop on Community Forestry in Africa, Banjul, April 1999.

3. Policy and Institutional Framework for Co-Management

3.1 Government of Guinea Policy and Institutional Setting

The National Directorate of Water and Forests (DNEF) has recently published a flyer designed to provide a concise description of its commitments to policy and practice as agreed under the National Forestry Action Plan for Guinea (PAFN–Guinea). The development strategy outlined for the next 25 years identifies the following priority objectives:

- enhanced knowledge of the existing forest resource base
- sustainable management of the classified forest domain of the state and of the collectives
- management of watershed areas
- operations for production through reforestation and the promotion of technology
- conservation of biodiversity and the protection of fragile ecosystems
- development of forestry within the framework of village land-use planning
- promotion of community and private forestry
- establishment of a forestry research system

This concise document can be construed as nothing less than a specific endorsement of the present USAID–assisted efforts to promote and development co-management of natural forests which are the subject of this PEA.

Furthermore, in recognition of the ineffectiveness of the old “command and control” approach to forest conservation, the GOG enacted a new Forest Code, initially released in 1990, subsequently modified and enacted officially into law by the National Assembly in 1999. This new law explicitly recognized the need to engage the rural population in a participatory management process for both classified and community forests. Among other things, this legislation calls for the transformation of forest service agents from enforcers to advisors. It also recognizes the need for forest management plans (*plans d'aménagement*) to be prepared in collaboration with the local population. A forest management plan should balance the socioeconomic needs of the population with the need to protect resources, thus having both production and protection objectives. These encouraging developments in turn led USAID and other donors to help the DNEF engage in the long-term effort to develop and test different forest management models that adhere to these basic principles.

More to the point, it would probably be fair to say that the continuing contributions of USAID over the years, related to community management of natural resources have amply supported the policy shift towards people and their participation in the management, protection and conservation of the reserved forests of the country.

3.2 USAID/Guinea Strategy and Co-Management

Due to population growth, low incomes and high unemployment in rural areas, Guinean smallholders increasingly rely on extensive subsistence farming and environmentally

inappropriate cropping patterns to satisfy their demand for food. More marginal lands are being farmed, more woodlands converted to agriculture by slash and burn practices, the fallow duration is reduced and investment in soil conservation is low. As a result, soil erosion and the accompanying loss in soil fertility becomes increasingly serious, as manifested by the steady decline in agricultural productivity and increased environmental degradation, thereby further undermining the food security of the rural poor.

The current growth in agricultural production based on unsustainable practices is already causing serious degradation of the natural resources base throughout the country. Severe degradation of the Fouta Djallon Highlands, the source of three major rivers in West Africa—the Senegal, the Niger and the Gambia—is reducing the amounts of arable land per household and lowering overall crop yields (USAID 1999). Many of Guinea’s smallholder farmers are actively seeking new lands for cultivation and this has led to inexorable pressures on the reserved forests throughout the country. Because of the inherently fragile nature of much of the lands that were originally protected under the category of reserved forests, this conversion is leading to longer-term degradation with little prospect of reversing the trends. The Guinean Directorate of Waters and Forests estimates that approximately 36,000 hectares are being destroyed annually. USAID/Guinea seeks to address this situation through attention to its **strategic objective**:

Increased Use of Sustainable Natural Resources Management Practices

The realization of the results foreseen under this strategic objective involves achievement along the lines of four intermediate results:

- IR 1—Natural resource management planning skills acquired and applied.
- IR 2—Farm productivity increased.
- IR 3—Micro and small enterprise activities increased.
- IR 4—Favorable policy environment established.

The activities being assessed by this PEA—the co-management of reserved natural forests, begun under the Guinea Natural Resources Management Project and being continued under the new Expanded Natural Resource Management Activity—will address all of the above intermediate results. Achievement in this area will be one of the flagship performance indicators for this strategic objective. This programmatic environmental assessment aimed at corroborating the sustainability of the activities foreseen under this component of the project is a key step towards guaranteeing that the foreseen results, by definition intended to be “sustainable,” can be achieved.

Although this PEA is being carried out primarily to comply with the requirements of Reg. 216, the team would like to reiterate its conviction that the focus of the PEA will fit well with the performance based criterion adopted by USAID as its primary measures for continuing support to the program and its co-management activities. Accordingly, this PEA was designed from a broader perspective and with a focus on results and not just on the completion of planned activities. The quantitative measures of achievement for the co-management of natural forests—“100,000 hectares of forests in the activity zone managed according to a sustainable management plan”—is an SO level indicator. Reaching the target will only be achieved if the full array of

conditions for viable participatory forest management (embracing institutional capabilities, increased productivity, enterprise development and the policy environment—the four focal areas for the intermediate results) are also achieved. Thus while this PEA is intended to demonstrate that sound design and effective implementation of co-management of reserved natural forests will avoid negative environmental impacts, the premises that this will happen are related to all four of the intermediate results for the SO and will be self-reinforcing.²

² It should be noted that a significant part of the target indicator of 100,000 hectares will also be achieved by working with communities on the management and improvement of non-classified community forests through a *groupements forestiers* approach. These areas are typically much smaller in size and do not involve, at least for the foreseeable future, forest extraction activities as they are mainly concerned with protecting and enriching the forest stands owned by the communities. They were not assessed during the PEA; rather because of their inherently proactive operations in tree-planting and protection, they would probably qualify for a IEE threshold decision of “negative with conditions” because of their beneficial impact on the environment.

From Collecting Wild Honey to Beekeeping: Collecting wild honey in the forest is a long tradition—but also, occasionally, a destructive one. Whole trees are felled to collect honey from a wild hive (upper right), often with the use of fire, which can spread through the forest. Local hives (lower left) are made from the bark of *Danielia oliveri*, a species relatively abundant in these forests (upper left). The improved Kenyan hives were promoted by the last phase of the project. Neither traditional nor improved hives can be placed deep in the forest because they are easy prey for chimps and baboons, who also enjoy honey.

4. Affected Environment

This PEA was expected to assess the environmental sustainability of the planned co-management activities foreseen under the USAID/Guinea-funded PEGRN. The project began in October 1999 and will continue for a period of 6 years, pending availability of funding, until September 2005. During that period, and building on the Nialama Reserved Forest model, this component of the Project is expected to bring roughly 100,000 hectares under co-management on an indeterminate number of existing reserved forests.

In the original plan, co-management activities were envisaged in six Prefectures of the country: Kindia in the Maritime Guinée region, Lelouma and Tougue in Moyenne Guinée (Fouta Djallon) and Macenta, Kissidougou and Gueckedou in Guinée Forestière. Because of the civil unrest in the latter region beginning in September 2000, the activities there had to be suspended and the project's area of influence was shifted to Dabola Prefecture in Haute Guinée and staff relocated to reinforce ongoing activities in the Kindia, Lelouma and Tougue Prefectures. The project's implementing partners are now collecting information that will be used to assess options regarding alternative expansion zones.

4.1 Baseline Information on the Country³

The Republic of Guinea is located in West Africa, approximately 10 degrees north of the equator and covers an area of approximately 245,875 square kilometers. It is bordered on the south by Sierra Leone and Liberia, on the north by Senegal and Guinea-Bissau, on the east by Mali and Ivory Coast, and on the west by the Atlantic Ocean. According to the 1996 census, Guinea's population was estimated at 7,165,000, 48.8 percent male and 51.2 percent female. Estimated population growth rate is 2.9 percent, though this has been highly affected in recent years by an influx of refugees from Sierra Leone and Liberia.

Guinea has the potential to be a major agricultural producer of both food and cash crops, owing to its wealth of arable land and a favorable climate. Arable land is estimated at 6–8 million hectares or about 24 to 33 percent of the total land area of the country. These estimates do not include much of the rocky highlands used to cultivate fonio or the steep sloping land cultivated in upland rice.

In addition to its tremendous potential for agricultural development, Guinea possesses considerable mineral and hydropower resources. Its mineral wealth consists of bauxite, diamonds, gold and iron. However, Guinea remains one of the poorest countries in the world. The infrastructure such as rural roads is still inadequate to support the efficient transport of agricultural inputs and outputs. The literacy rate is low, especially among females and the health care services are of poor quality and do not meet the needs of the majority of the people living in the rural areas.

³ Much of this information has been drawn from the 1998 Initial Environmental Examination (IEE), which gave rise to the need for this PEA.

The climate is predominantly Sudano-Guinean, with a unimodal rainfall pattern. However, a variety of sub-climates ranging from Sudano-Sahelian to Humid Tropical offers possibilities for many different crops. Annual rainfall averages range from 1,200 millimeters at the Senegal and Mali borders to 4,200 millimeters in Conakry. The high runoff from this rainfall has resulted in the development of an estimated 130,000–160,000 hectares of alluvial plains.

Guinea is known as the “water tower” of West Africa because the three major rivers of the region—the Senegal, the Niger and the Gambia—originate from its highlands. The country is divided into four natural regions: Maritime Guinea, Middle Guinea, Upper Guinea and Forest Guinea.

4.2 The Regions for Co-Management

The sections which follow will briefly describe the environmental conditions in the three natural regions where the PEGRN is presently implementing or planning to implement co-management.

4.2.1 Maritime Guinea

This region encompasses 15 percent of the country and supports 23 percent of the population, including that of Conakry, the capital city. It is composed of piedmont and coastal plains at the southern base of the Fouta Djallon highlands. Elevation is from sea level to approximately 600 meters. Monsoonal rainfall averages between 2,000 and 4,500 millimeters in the region and falls during a six to seven month rainy season. The region has two principal zones: the littoral zone where the principal income generating activities are firewood collection from mangrove areas, rice cultivation, fishing and salt production; and the non-littoral zone where cereals, vegetables and fruits are grown. Livestock grazing occurs in both of these zones.

Maritime Guinea has an estimated 1.1 million hectares of arable land. There are an estimated 8,000 hectares of flood plains and about 45,000 hectares of river plains with the potential for irrigation. An estimated 380,000 hectares are cultivated in all crops each year. Only six percent of the potential irrigation land has been developed. Iron toxicity problems are reported on some mangrove soils that have been converted to agriculture. Numerous springs occur in the piedmont area, some of which could also support small-scale irrigation development and aquaculture.

Conversion of steep forest land to upland rice cultivation is one of the most prevalent practices leading to land degradation. Significant amounts of Conakry’s fuelwood are harvested from the 250,000 hectares of mangrove (*Rhizophora spp.* and *Avicenia nitida*) and half of this area is considered manageable for fuelwood production, with an estimated standing volume of 6.6 million cubic meters, or about 55 cubic meters of fuelwood and poles per hectare. Gallery forests occupy 7 percent of the region along the water courses.

4.2.2 Middle Guinea

This region occupies about 25 percent of the country and supports 26 percent of the population. It is comprised largely of the Fouta Djallon highlands, a central plateau with flat to rolling topography surrounded by more mountainous terrain. At an elevation of between 600 and 1,500

meters, this region constitutes the headwaters of the Senegal-Bafing-Faleme, Gambia and Tene river systems. Average annual rainfall ranges from 1,200 to 2,000 millimeters and creates an area of savannas and open forests.

The region has 800,000 hectares of arable land, of which about 450,000 are cultivated each year. There are approximately 80,000 hectares of more intensively cultivated areas known as *tapades*. The soils in this region are generally very acid and have low inherent fertility. A large part of the region is occupied by eroded, very degraded soils. Shallow rocky soils, known as *bowal* and used primarily for grazing, are common. The region's agricultural wealth lies in its estimated 3,000 hectares of flood plains and 29,000 hectares of river plains that have the potential for the development of irrigation. The principal crops are fonio, maize, rice, cassava and peanuts. Dry beans, onions, potatoes and fruit are also extensively cultivated. The climate of the region is especially suited for production of citrus, avocados and cashews.

Approximately 13 percent of the region is forested, with 800,000 hectares of dry forests and 50,000 hectares of fragmented relic gallery forests which occur along drainage ways. Wooded savanna occurs at less than 800 meters elevation, with *Parinari excelsa*, *Parkia biglobosa* and *Erythrophlum guineensis* as common species. The relatively high population density of the region, high competition for natural resources, less favorable climate and poor soils make improved natural resources management a priority.

4.2.3 Upper Guinea

This region occupies 40 percent of the country and supports 25 percent of its population. It is composed of plateaus and alluvial plains of the Niger River system and has an elevation of 200 to 400 meters. Predominantly a savanna region, average rainfall is 1,300 to 1,700 millimeters.

It is a region of high agricultural potential, however, it remains the least populated region because of relative isolation and limited road accessibility. As a result of the eradication of black flies—a vector for river blindness (*onchocerciasis*)—colonization of the area has now created resource tenure conflicts. In some cases, irrigation development has inflamed these land tenure conflicts. There are an estimated 2.7 million hectares of arable land, of which 400,000 hectares are in cultivation. There are 4,000 hectares of flood plains and 70,000 hectares of river plains with potential for the development of irrigation. The principal crops are upland rice, cassava, peanuts, cotton and flooded rice.

The region's wooded savanna vegetation is Sudanian in transition to Guinean-Congolese forests. The predominant species are *Detarium senegalense*, *Afzelia africana*, *Khaya senegalensis*, *Albizia ferruginea*, *Chlorophora regia*, *Cola cordifolia*, *Calium guineense* and *Sterculia tragacantha*. Dry forest occupies 8.3 percent of the region. The gallery forests in the southern part of the region are characterized by *Berlinia grandiflora*, *Cola laurifolia*, *Cynometra vogueii*, *Diospyros eliotii*, *Parinari congensis* and *Pterocarpus santalinoides*. The drier northern gallery forests are characterized by *Syzygium guineensis*, *Khaya senegalensis*, *Terminalia glaucescens* and *Vitex doniana*. Around its towns, the forests have been converted to cropland, and soil erosion is reported to be a serious problem.

4.3 Reserved Forests Targeted for Co-Management

For the three reserved forests now actively targeted for co-management, there is an extensive discussion of their environmental characteristics in the baseline studies, and subsequently, in the management plans for each. The following table attempts a synthesis of that information (and other details considered pertinent), albeit with obvious voids where the data and information was not readily available.

It should be noted that a number of topics in the baseline studies (CERE 2000), namely, climate, soils, hydrology and biodiversity, have been treated in considerable depth. This depth of treatment, however, brings up two important questions: Where did the information come from? And how was it used for forest management planning? The PEA Team must remark that despite the considerable effort in recording information on climate and soils, it apparently was not extensively used in the management plans. This is not an uncommon occurrence with forest management planning—a tendency to collect considerable amounts of data and information without real application to the planning process.

Table 4.1
Characteristics of the Reserved Forests Proposed for Co-Management

Information and characteristics	Targeted forests			
	Foret Classée de Suti Yanfou	Foret Classée de Bakoun	Foret Classée de Balayan Souroumba	Foret Classée de Sincery Oursa
Region	Basse Guinée	Moyenne Guinée	Haute Guinée	Haute Guinée
Prefecture	Kindia	Tougue	Dabola	Dabola
CRD(s)	Sougueta	Kouratongo/Fello-Koundoua	Bissikrima	CU–Dabola
Year/information on classement	Arrête No. 3410 SE/F - 27/9/1943	Arête No. 3110 - 25/4/1955	Arête No. 1177 SE/F - 19/2/1952	Arête No. 2118 SE/F- 10/6/1943
Original classement documentation exists ?	Yes, copy held with DNEF in Conakry (BCTT)	Yes, copy held with DNEF in Conakry (BCTT)	Yes, copy held with DNEF in Conakry (BCTT)	Yes, copy held with DNEF in Conakry (BCTT)
Additional dispositions of the Arrête de Classement	- <i>Culture de riz de marais</i> - <i>Parcours de moutons/chèvres interdit...</i>	- <i>Maintien de bananeraies</i> - <i>Pâturage des bœufs</i> - <i>Culture de riz de marais</i> - <i>Récolte du miel et cire</i> - <i>Coupe de paille et bambous</i>	- <i>Sont autorises l'exercice du pâturage pour les bovins et sous réserve que des feux tardifs ne soient pas allumes</i> - <i>La culture du riz de marais dans les bas-fonds naturellement inondes</i> - <i>Sur permis spéciaux, délivrés par le SE/F la coupe des espèces non protégés et bambous</i>	- <i>Culture de riz de marais</i> - <i>La pâturage des seule bovidé est admis</i> - <i>La récolte du miel sera faite sans feu</i> - <i>Sont interdits la culture, le coupe du bois vert, lat pâturage des ovidés et des caprides, et le feux de brousse</i>

Present forestry authorities— staffing	Chef de Cantonnement et Adjoint	Chef de Cantonnement et Adjoint		
Forest map exists from classement	Yes	Yes		
Area as classified	10,517 hectares	28,000 hectares	25,000 hectares	14,000 hectares
Present area (after mapping)	10,215 hectares	29,507 hectares	Not yet mapped	Not yet mapped
Accessibility	Easy...on Conakry to Mamou Road	Difficult...75 kms northeast of Tougue on unimproved roads	Easy...on the road between Dabola and Dinguiraye	Easy...along the national roads from Mamou to Dabola and from Dabola to Kouroussa
Existing key documentation	<i>Études de Base</i> (CERE 2000) <i>Plan d'Aménagement</i> (PEGRN 2000)	<i>Études de Base</i> (CERE 2000) <i>Plan d'Aménagement</i> (PEGRN 2000)	<i>Justification pour le choix des forêts classées de Balayan Souroumba et Sincery Oursa</i> (DNEF 2001)	<i>Justification pour le choix des forêts classées de Balayan Souroumba et Sincery Oursa</i> (DNEF 2001)
Overview of local population	33 villages, with a population of 6,830 in 850 households	22 villages, present population unknown	Not yet surveyed	Not yet surveyed
Existing conflicts between people and the SPEF		“ <i>Défrichements</i> ” occurring on the periphery of forest	Position of village of Hafia within limits of the forest	
Present uses by local people	- Largely (75 percent) cultivated - Grazing - Protected “ <i>tête du source</i> ” providing potable water - Hunting	Hunting, some cultivation in bas-fonds and some illegal cultivation	- Illegal timber extraction - Cutting <i>Danielia oliveri</i> for beehives - Hunting - Grazing	- Karite plantations on the eastern slope - Illegal charcoal making - Hunting - Grazing
Present land use/ forest types	(See separate table in text of report)	(See separate table in text of report)	No recent survey	No recent survey
Topography in general	Steep rising to two separate massifs	Variable, with plain areas and plateaus and some deep ravines	Steep rising to two separate massifs	Steep rising to two separate massifs
Water resources	Series of small sources that begin at the base of the cliffs	Several perennial streams that serve local populations		- Some lakes on the top of the hill - Source of water for Tinkissu Barage
Climatic conditions			To be surveyed	To be surveyed
Soil conditions				
Status of biodiversity	Depleted like the habitat but some chimps still present	In relatively good shape; more hunting pressure on western side	Priority area for chimp conservation	Unknown and unsurveyed

Forest Management Begins in the Forest: Camping on the Northwestern side of Bakoun, the PEA Team developed some real *esprit du corps* that helped to overcome the minor hardships—heat and bugs. Two commercial tents were supplemented with one made from a large tarp and bamboo, and all slept comfortably. Camping out makes it possible to optimize the time spent learning about the forest and its ecology, and few team members would dispute that it was an enjoyable experience—the essence of forest management.

5. Environmental Consequences of Co-Management of Reserved Forests

5.1 Impact Analysis Framework

It should be noted that this PEA was predicated on the conviction that the current co-management approach is fundamentally sound and, building on some years of accumulated experience, has accounted for all dimensions of the model to ensure the chances for its effective and efficient implementation in the field. Furthermore, the clear and declared intent of the co-management approach is to arrest the present forces leading to the degradation and destruction of these forests.

In short, the objective of the co-management approach is to have a very positive impact on the environmental stability of these reserved forest areas by applying the basic tenants of sound natural resources management which can be summarized as matching land-use to land capability, thereby enhancing the opportunity for sustainable development. Adding to the complexity of the model, but also to the likelihood of its success, is the clear recognition of the need to pursue management in a participatory manner. The co-management approach, as illustrated in the box which follows, highlights the true nature of management as a social act. Local people living in and around the reserved forests are being provided with the opportunity to participate fully in the forest management planning and implementation. Their exercise of the social process of management involves collective and consensual decision-making about how to use the resources (limits) of the forest and how to share them among themselves. Both dimensions are important because one without the other may inevitably lead to poor choices about resource use that could undermine the sustainability of the model.

The Essential Elements of the Co-Management Model	
<p>Conventional Forest/Resource Management</p> <p>Matching land or resource use to land/resource capability equals sustainability</p>	<p>Management as a Social Act</p> <p>Putting in place the mechanism for community decision-making about how to use (limits) and share natural resources</p>

5.1.1 The Nature of Environmental Assessment

By definition and based on the fundamental premises of ecology on which it has been developed, the nature of environmental assessment encourages a need to look at the linkages across typical design criteria and implementation modalities and how they interact in leading to environmental stability. Environmental assessment is about sustainability and not just a matter of short or medium-term impact. Not so incidentally, however, and also by definition, there is a strong

likelihood that results or performance indicators for forest management will be organized along the same lines as the criteria for sustainability.

As concerns forest management, sustainability is viewed as “changes in the production and/or distribution of desired goods and services from forests and vegetative cover which result in an increase in the welfare of the people involved (local people but also society in general) that can be sustained over time.” The concept implies production of goods and services that people need combined with protection of the natural resources base on which such production and services depend.

As has been repeatedly stressed from the outset, a programmatic environmental assessment is not a performance evaluation of the program activities themselves or how they have been implemented. It is, nevertheless, a matter of reviewing the model—both planned and implemented—and assessing the likelihood that it can be replicated effectively and efficiently (replication being the first step towards sustainability) and will be sustainable. In essence, the programmatic environmental assessment of co-management in Guinea set out to look at a series of basic questions which include:

- the likelihood that the fundamentals of forest management planning (assessments of the resource and projections of the limits of use) are sound;
- that utilization practices (timber and forest products harvest, agroforestry, and lowland agriculture) foreseen for the implementation of these plans will not lead to further forest degradation;
- that areas now degraded can and will be incrementally rehabilitated or restored according to their inherent land-use capability (whether for forestry, agriculture or protection purposes);
- that these plans can be successfully implemented by means of “co-management”;
- that co-management of these forests will not lead to irreversible impacts on biodiversity conservation or watershed management functions of the forests; and
- that, as a result, the rate at which areas best suited for multi-purpose forest management are being converted to other less sustainable uses slows down.

Specifically, the outcome of this PEA, however, is expected to lead to results that will safeguard this contribution of co-management to sustainable development, in three ways, namely by:

- 1) Assessing the possibility of adverse impacts and suggesting **how these could be avoided** by adapting to the design of the approach (along with the elaboration of a checklist for sound design).
- 2) Identifying **mitigation measures** that should be part of the approach where adverse impacts are unavoidable.
- 3) Outlining **the need for monitoring** during implementation to counter the possibility of unforeseen adverse impacts.

5.1.2 The Presentation of Findings

The sections which follow report on the PEA Team’s assessment findings regarding the overall sustainability of the co-management of reserved forests model. These findings identify issues

organized in three general analytical categories: technical, ecological, socioeconomic and institutional. The reader will note that in many cases the issues are linked but have been separated here for ease of analysis, interpretation and response.

Each issue topic will be presented in a similar format, including a discussion of its importance for achieving sustainability and/or avoiding adverse environmental impacts, the findings of the Team related to its environmental consequences, and conclusions and recommendations. The latter are specifically intended as directives to USAID and its partners in the PEGRN for addressing the issues through avoidance, mitigation or monitoring. Monitoring recommendations will all be presented in a subsequent section as they are intended to address co-management as a complete system.

An important outcome of this PEA is intended as an **Environmental Planning Checklist** for Co-Management of Reserved Forests in Guinea. It will be developed on the basis of the issues identified in the course of the assessment matched to an understanding of the forestry co-management planning and implementation model. Its main premise is that by using it to examine the emerging plans for co-management activities in other reserved forests, USAID will be able to justify the Threshold Decision of Negative with Conditions in the IEE prepared to cover these activities and allow these activities to proceed without need of an environmental assessment. The checklist may be found as Appendix G.

5.2 A Technical Assessment of Co-Management

The main premises of the technical assessment, as mentioned above, are that the essential criteria for sustainable co-management of reserved forests—matching land/resource use to land/resource capability—have been attained. Forest management provides the means for addressing the multiplicity of needs and opportunities associated with the condition of the forest identified during analysis and planning and implicit in the management objectives.

These needs and opportunities can be characterized as:

- degraded areas in need of protection and/or treatment to restore them so that they may again provide the benefits and ecological services critical to environmental sustainability, and
- potentially productive areas able to provide a sustained yield of products needed by local people and society.

Although there must be absolutes where protection and/or rehabilitation is the only course of action, in practice the actual conditions in most forests under intensifying human pressures constitute a gradient of varying conditions demanding a combination of management interventions. Determining conditions and their location across the full forest area and identifying the strategy and interventions applicable to each is the essence of forest management planning.

During the Scoping Exercise in March 2000, a number of issues emerged about the technical feasibility and sustainability of the co-management operations. These issues, clearly identified in Section 3.2 of the Scoping Statement, along with the additional questions developed during the PEA team building period, constitute both the analytical framework and reporting format for this

assessment. The findings regarding these issues, across all three categories of the assessment have been grouped by major subject area to facilitate analysis and understanding. In principle and practice, however, many of them are closely interlinked and the implications of one may affect the outcome in another area. The technical assessment of co-management led to the following findings, corroborating the importance of some and eliminating others from consideration (see Section 5.5 for a discussion of the deleted issues).

5.2.1 Mapping and Sustainability

Preparing good maps is an essential early step of forest management; indeed, it may be argued that mapping is management. Importantly, maps provide a template against which it is possible to begin to further refine one's understanding of the environmental baseline. The preparation of good maps also enables those involved in co-management, both the DNEF and the local people (as well as the technical assistance teams and NGO partners) to take early decisions about management operations, roles and responsibilities. For example, a good base map makes it possible to begin the process of allocation of use rights and responsibilities among the villages located in and around the forest by easing the identification of the operational management units (*Unités de Gestion*). Good mapping also gives the first indication of the needs and opportunities for co-management by making it possible to compare, at least to some degree, land/resource capability with land/resource use. A good land capability map with sufficient detail on topography and soils, prepared at a reasonable scale, would make it possible to identify areas in need of protection. When compared with actual land-use, these maps would then make it possible to identify areas requiring rehabilitation, for example, steep areas that had been converted to rainfed agriculture.

Exacerbating the Confusion?

To assist the PEA Team in its visit to the Sincery-Oursa Reserved Forest in Dabola, the BCTT furnished a photo mosaic with the limits of the forest drawn on it. When the forest was gazetted, 61 concrete markers with the letters SF and a number were located around it. The PEA Team found one marker with SF 12 embossed on it. However, on the photo mosaic, the BCTT had used letters to code these markers.

Additionally, mapping quickly helps to get a sense of the priorities for management that will aid further planning and help to achieve cost savings. For example, the mapping process provides the means for stratifying the forest for inventory purposes (as will be discussed in the next section in more detail), additional study and for beginning to table a discussion about the priorities of management interventions and investments with the local people involved.

Most importantly, appropriately geo-referenced maps allow all concerned to identify specific areas on the ground where management interventions can take place, to ensure that the proposed practices are being applied where appropriate, and to monitor results and impacts. In the absence of reference works about the ecology and silviculture (e.g., volume tables) of Guinea's forests, an ability to document observations of cause and effect is essential. Both DNEF foresters and local people, represented by their Forest Committee, need to be able to locate areas on the ground with certainty and understand and record their history over time—whether they have been cut over, burned, grazed or otherwise treated. Doing so will provide the basis for the useful

record keeping and the eventual development of sound management prescriptions which ensure sustainability (and lead to the an improved understanding of forestry science for these forests).

Observations: Mapping measures and procedures was not an issue raised during the Scoping Exercise in March 2000. This is due to the fact that during that period none of the key maps were then available for scrutiny as they were only prepared in the last quarter of the 2000. Since then, two basic maps for each of the forests (Nialama, Suti Yanfou and Bakoun) have been prepared by the Thematic Mapping and Remote Sensing Office (BCTT) of the DNEF under contract with Winrock: 1) a vegetation and land-use map (*carte de végétation et d'occupation du sol*) and 2) an operational map (*carte opérationnelle*).⁴ In addition, using data provided by the USAID/Guinea-funded Chimpanzee Project, USAID's Strategic Planning and Results Center has produced an Operational Chimp Habitat Map for Nialama using their GIS system.

Unfortunately, the **present maps are insufficient for good forest management planning and execution**, and indeed, **often misleading**. Attempting to use them either in the office or the field for management planning and implementation **will lead to adverse environmental impacts**. The issues associated with these maps are as follows:

- **Difficulties in Discerning the Actual Boundaries of the Forests.** When these reserved forests were originally gazetted, most during the colonial period more than 50 years ago, the foresters in-charge identified the boundaries using compass and chain and recorded them in terms of compass directions and distances (e.g., “*Le point situe sur le marigot Kogbala a 7.500 metre de N sur le droite issue de N et faisant avec le Nord géographique un angle de 55 grades vers l’Est*”). These were sometimes further referenced as a result of changes which came about after gazettelement or in the act of placing the boundary markers (*bornes*) along the limits. Some of these survey points were subjective, identified by natural features that may have changed.

The various DNEF study teams have consistently found difficulty in accurately locating either the starting points for their own surveys or intermediate markers around the perimeter which may no longer exist or which may have been moved. In some cases, instead of concrete markers, piles of local stones were used. This was the situation in the case of Nialama, and some of these piles are no longer discernible because of human interference—or even because baboons routinely unpile the stones looking for insects to eat. Then too, it would appear that attempts to follow the original boundaries have been miscalculated because compasses were not adjusted for magnetic declination which is about 19 degrees in these areas.

Examples of this problem were identified for Suti Yanfou, Bakoun and Sincery-Oursa reserved forests and appear to have had implications in the placement of the forest inventory sample plots. Because of the mosaic of land types, particularly on forests that have been

⁴ The careful reader will note that there are two sets of these maps for both Suti Yanfou and Bakoun—one set prepared by CERE as a result of its contract with Winrock to produce the Multi-disciplinary Baseline Study and another set appended to the management plan prepared by the BCTT. Why two versions exist and display significant differences is not explained in any of the reference materials available to the PEA Team.

under significant human pressure, even minor distortions between the real limits on the ground and those mapped can lead to imprecision in typing the forest and mistakes in planning for its use, with the real risk of proposing activities that are incongruent with the land capability. Similarly, it should be borne in mind that “edges count” both in terms of appropriate land use and for biodiversity conservation measures.

- **Outdated Sources of Information.** The most recent data sources for the preparation of the vegetation and land-use maps, at least in the case of Nialama and Suti Yanfou, were aerial photos and photo-mosaics from 1989. In forests under increasing human pressure, this is probably inadequate for getting an up-to-date map of the actual land use. This was readily obvious when the Suti Yanfou vegetation and land-use map was taken to the field. With the exception of the strictly protected areas (plantations and catchment areas for springs), virtually every fringe or boundary of vegetation physically examined had shrunk compared to its geographical boundary on the map (see Figure 5.1).
- **Lack of a Good Base Map.** The purpose of maps is to represent features on the ground symbolically so that one can find one’s way around and understand the relationships between direction and distance. Many of the colleagues who accompanied the PEA Team to the field seem to have difficulty reading and using maps. This is in part because both types of maps now available are difficult to read and interpret. They have instances of too much data (overlying management plots on the management series or zones), too little data (lack of fixed field identifiable points, distances or terrain features), and confusing mapping symbols (using the same narrow red line to represent roads and contour intervals, representing corridors or areas with lines such as those for livestock migration routes or spring headwaters or using different colors for the same polygons on different copies of the maps).
- **Inaccuracies in Calibrating Data Sources.** Recurrent difficulties were noted in several forests (Suti Yanfou, Bakoun and Sincery-Oursa) with the location of boundaries and other features on the maps and their actual location on the ground. This appears to be due to the inadvertent use of different map/image sources without calibration to a common datum or geographical reference point. The result is a horizontal shift of the geo-features relative to their “real” location on the ground. Furthermore, the shift differs from layer to layer, presumably because different sources of data were used for different layers. For example, the shift of the boundaries of the Suti Yanfou Forest were about 260 meters to the southwest whereas the rivers and streams were about 300 meters to the south-southwest. Similarly, there appears to be no match between the GPS initialization parameters (most importantly, the datum the GPS uses to calculate its position) and the map initialization parameters of the GIS software when GPS data is plotted on the map. This leads to additional horizontal shift errors, as described above (H. Baeyens, personal communication).
- **Questions of Scale and Size of the Polygons.** The Operational Map for Nialama has been produced in four separate sheets at a scale of 1:10,000, meaning that each centimeter on the map is the equivalent of 100 meters on the ground. It would appear, however, that the base map on which the polygons and symbols appearing on the larger scale map were originally drawn was of a much smaller scale and the 1:10,000 maps are simply just a blow-up of the same data as the original. The issue of scale and the loss of critical detail is an important one.

In forests like Suti Yanfou and Nialama where man's influence over time has been significant, the natural mosaic of forest types and vegetative covers is con-founded by different levels of intervention. Similarly, because of the broken topography of many of the reserved forests of Guinea, originally set up to protect fragile upland catchment areas, the natural mosaic can be more complex than areas of plains forests.

- **Protection Prescriptions: Can They Be Mapped?**

This issue became dramatically apparent during the visit to Suti Yanfou where many of the small niche areas appear not to have been mapped (see Figure 5.1). In the northeastern quadrant of Suti Yanfou, between the villages of Koumbeya and Tafori, many small but important gallery forests occur just under the cliff faces and are in effect, the headwaters of the springs which provide water to these villages. Chimp nests were observed in one of these areas. None of them are mapped.

- **Mapping Contradictions.**

The major concern, however, about the present approach to mapping are the recurrent contradictions that can be readily discerned by the user. The operational maps for both Suti Yanfou and Bakoun use a completely different approach for identifying operational management units. Within the management plans in which these maps have been bound, there is a description of operational management units featuring three "series" of the following categories: production, partial production and complete production. The maps themselves, however, use "zones" and include up to six different types of management classifications: fully protected zone, partially protected zone, sylvopastoral zone, pasture zone, agroforestry zone and timber zone. Moreover, the verbal descriptions of the series differ significantly from the zones represented on the maps. These discrepancies are not explained anywhere and this issue is compounded by the fact that the different criteria for defining either series or zones are not recorded in the plans or in the BCTT reports about the preparation of the maps.

The following protection prescriptions are part of the "Contrat de Gestion Forestière" between the DNEF and the "Comite Foret" of Nialama.

**Programme d' Intervention
Protection de la foret**

Limites générales des activités de production:

- L'abattage d'arbres, le pâturage et la culture seront interdits dans les zones protégées.

Les zones protégées sont définies comme étant:

- les forets galeries
- les sources ou les cours d'eau
- les pentes raides de plus de 30 degrés or 60% (environ) de dénivellation
- une zone tampon de 10 mètres de long au bord (soit 20 mètres au total) des ruisseaux permanents
- une zone tampon de 5 mètres de long au bord (soit 10 m au total) des autres ruisseaux
- les zones d'habitat des mammifères légalement protégés (y compris une zone tampon de 100 m de long)
- les voies de passage identifiées de la faune
- les zones de regeneration ou de plantation"

Obviously, even at a scale of 1:10,000 where each cm is equal to 100 meters, some of these areas would be hard to map.

Source: Contrat de Gestion Forestière No. 048/MAE/DNEF/99.

Clearly, without either criteria or appropriate mapping procedures, the chances for errors in assigning attributes and activities is very real. BCTT staff told the PEA Team that the criteria for assigning operational management zones was suggested by the Management Planning Team, which insisted on the use of elevational limits (e.g., 500-meter elevation and below for

agroforestry areas). Although this assertion does not hold up under closer scrutiny, applying this designation in Suti Yanfou would appear to target many steep areas unsuited for agriculture as well as existing protected areas (e.g., the headwaters above the springs serving the village of Sougueta) and adjacent plantations for conversion to agroforestry.

- **Land Capability Mapping—the Missing Piece.** Although there is wide recognition (see Box above) of the need for protection of marginal areas (areas with a slope exceeding 60%, although this figure is well within excess of what is recommended—a 30% limit—elsewhere) and sensitive sites (spring headwaters, chimp habitat, gallery forests, margins of water courses, wildlife corridors and areas being regenerated), there are no land capability maps on which these sites are marked. Such maps would have been produced using a combination of topographic sheets at a large scale (e.g., 1:10,000) with a suitable contour interval and soils maps. It is unclear whether such maps exist in Guinea at a suitable scale and level of detail which would make such mapping possible, ideally through the use of a GIS system.⁵ Land capability maps are essential for appropriate definition of required treatments according to existing conditions and greatly simplify the co-management planning process because they assist in the early determination of areas needing protection and those suitable for production.

Conclusions: If the limits of a forest or the internal boundaries of different ecological settings within it cannot be clearly defined, the likelihood of conflict with the local users and among them increases substantially, placing the whole enterprise in jeopardy. Furthermore, without relatively realistic area totals for the different forest, vegetation or use types measured by planimetry of the different polygons, it is very difficult, if not impossible, to calibrate allowable resource use. Correctly geo-referencing limits are fundamental to accurately locate specific areas where planned activities could take place. If the maps cannot be used to locate actual sites on the ground, it will be difficult to correctly fix the limits of areas to be intervened and to later find them for the purposes of monitoring results and impact, **opening the possibility of adverse environmental impacts from overuse or off-site placement of interventions.**

Without accurate details, the operational map may also completely overlook a real management opportunity—small patches of forest in steep areas that constitute the headwaters of springs—and perhaps worse, may inadvertently target these areas for transformation, for example, as agroforestry plots as is evident on the Suti Yanfou operational map. When compounded by the issues of scale and size of polygon, locating actual areas for suitable interventions is impossible thereby enhancing the probability of adverse environmental impacts from mistaken prescriptions. Finally, in the absence of a land capability map, and despite the expressed intentions to rehabilitate these forest areas, **there is a significant risk of perpetuating the cycle of unsustainable use by inadvertently placing certain activities (especially timber harvest, fuelwood cutting, agroforestry) on sites where they would cause increased runoff, erosion and watershed degradation.**

⁵ There is a need to examine the topographic maps produced in 1989 for each of the Representative Pilot Watersheds (BRP's) in the Fouta Djallon by the Société Maps Geosystems. Perhaps the contour interval used on these maps is smaller, i.e., less than the 100-meter changes used on the operational maps, and might make it easier to distinguish steep areas needing protection.

Défrichement in Bakoun Forest: Although Bakoun seems largely intact, there is still some evidence of incursions. Both of these sites were being prepared for cultivation again this year. Both are near the road, on the periphery of the forest, and local people made no effort to hide them. Any real presence of those in charge of the forest might have been able to avoid this *défrichement*. But despite the evidence of human pressure on Bakoun, there is little justification for introducing agroforestry plots, as the area around the forest is sparsely populated and people could have gone elsewhere in search of un-gazetted land for farming.

Recommendations: The PEA Team is convinced that there is a clear and present need to enhance the skills and capabilities available for producing **useful mapping products as a key element for the planning and implementation of co-management of reserved forests in Guinea.** In the opinion of the PEA Team, this will entail re-doing and amply improving the maps for the three forests currently mapped—Nialama, Suti Yanfou and Bakoun.

Avoidance and Redesign: In light of the fact that the issues surrounding the mapping exercises for Suti Yanfou and Bakoun have been known for some time, Winrock International in consultation with USAID has already acquired additional up-to-date SPOT imagery. The PEA Team further recommends that Winrock and USAID consider contracting short-term specialist expertise to carry out the following activities (the basis for a scope of work for the consultant specialist):

- Working with the BCTT, develop a **concise and cost effective methodology** for using remote sensing and GIS/GPS facilities, including correct calibration of these tools, for **preparing the following data layers and mapping products essential to sound co-management planning and implementation:** base map, land capability map, land-cover/land-use map and indicative operational map (in that order).
- Proceed with **the interpretation of the recently acquired SPOT images** for necessary informational layers on the GIS for the preparation of the updated maps mentioned above.
- Give particular attention to **ensuring that the base map is correctly geo-referenced** and conveys the most important physical attributes and real limits of the forest to enable finding particular sites on the forest and on the maps **which will greatly facilitate the preparation of the subsequent data layers within the GIS.**
- **Carefully document the methodology** used for the above (in particular as concerns map scales and polygon size, criteria for different mapping units and a key to a practical legend) and for field verification by **preparing an instructional manual on the methodology;** ensure an understanding of the level of effort and qualifications needed for these methods.

Mitigation: In order to justify the expense in producing these mapping products, there must be greater capability in the field for using them effectively and efficiently. Accordingly, it is recommended that the following additional steps be implemented:

- Provide a **training course for DNEF/SPEF** particularly those involved in PEGRN at cantonnement and regional levels, **NGO partner staff and designated members of the Forest Committee,** in the preparation, interpretation and use of these maps.
- Ensure that **DNEF field staff** (and others) are **trained in the use of the GPS** in plotting management units (polygons) and finding specific locations identified on the maps, perhaps as a practical exercise applicable to the mapping improvements mentioned above, by involving them in **updating the boundaries of each forest** in collaboration with the representatives of the Forest Committee and the BCTT.
- **Publish the updated maps in sufficient quantities and ensure that they are available to field personnel,** perhaps offering a plasticized version for field based forestry staff, NGO staff and forest committee members.
- Develop a **general field data recording sheet** (to complement the monitoring forms already prepared by the forest inventory consultant for timber harvest and agroforestry) and institute

a **companion records system** for co-managed reserved forests aimed at facilitating regular reporting by *Cantonnement Forestier* personnel while on inspection, management and monitoring visits to the forests under their responsibility. The actual responsibilities of these two officers in each forest needs further specification, ideally in the form of a clear mandate or terms of reference for their positions (see discussion below).

5.2.2 Inventory and Resource Assessment Methods

The principles of sustainable forest management—achieving a balance between net growth and use—must rest on a sound foundation of natural resource inventory and environmental baseline surveys. The resource inventory builds on the general characterizations of land capability (mapped by applying the criteria established for determining production, partial protection or full protection areas) and actual land use or vegetative cover types (mapped by applying the criteria for the determination of the different ecological or forest types; see box below).

The resource inventory then gathers additional data and information to further guide the management planning choices to ensure that the production areas and their assets can be sustainably used or that fragile areas can be proactively protected or rehabilitated. This practical baseline—quantitative, qualitative and geographic—is the key to being able to measure achievement, corroborate the soundness of use and management practices and effectively monitor for impacts and sustainability.

Polansky (2000) succinctly identified the usefulness of a forest inventory:

- “...a baseline study of average values against which to measure changes in quantity or quality of forest resources...”
- ...it produces data in tabular and mapable form that can be used to plan production or conservation activities...
- ...it can be used to identify resources that need further precision and quantification...
- ...it results in knowledge of where resources are located in a forest, how much is out there, and ultimately who is in a better position to manage them...
- ...knowledge that can be used to calculate financial worth of the forest...
- ...suspicions that villagers often hold toward Forest Service personnel...can be assuaged as they participate in data collection and see how the data are used...
- ...data collected are not restricted to timber products, thus the information interests everyone involved in the management plan.”

In short, the inventory or baseline study provides the information needed for both matching land-use to land capability and deciding how to use and share the resources—nothing could be more essential to sustainable co-management.

Uniform Criteria for Forest Vegetation Classification— Part of the Foundation of Any Assessment

In any future effort at vegetative cover or land-use mapping, it will be fundamental to use standardized terminology and criteria for defining the mapping units. In all three forests inventoried—Nialama, Suti Yanfou and Bakoun—a different typology was used. Furthermore, nowhere in any of the reports are the criterion recorded for choosing between these types. Typologies used were as follows:

Nialama	Suti Yanfou	Bakoun
1–Foret galerie	1–Foret dense humide	1–Bas-fond
2–Savane	2–Galerie forestière	2–Champs
2a–S. arboree dense	3–Foret sèche de montagne	3–Galerie forestière
2b–S. arboree claire	4–Savane arboree	4–Bowe
2c–S. arbustive	5–Savane arbustive	5–Enclave
2d–S. de Bowe	5a–Savane arbustive sur montagne	6–Savane arbustive
3–Bowal	5b–Jachère 1≥7	7–Savane boisee
4–Culture	5c–Jachère 4-6	8–Savane arboree
4a–Jeune Jachère	5d–Jachère 2-3	
4b–Tapade	6–Plantations	
4c–Défrichement	7–Champs de culture	
4d–Bas-fonds	8–Bowe	
	9–Affleurement rocheux	

Observations: The Technical Management Plan for the Nialama Reserved Forest noted the difficulties—unstratified design and low sampling intensity—of the forest inventory work carried out by the DNEF (Lowe 1996). One of the main intentions of the Sub-Grant Agreement signed between CERE and Winrock International was to overcome these difficulties and to streamline the resources inventory process by carrying it out in a multi-disciplinary manner in the new forests being targeted for co-management. As implemented, however, the multi-disciplinary study by CERE for Suti Yanfou and Bakoun Forests did not achieve its objectives and, in fact, seems to have made many of the same mistakes of the earlier Nialama inventory. A number of issues emerged from a review of the Baseline Studies Reports and their application in the preparation of the Management Plans for Suti Yanfou and Bakoun. They include:

- **Lack of Stratification.** Because the CERE Study Team did not use the available maps and remote sensing products to identify the different vegetation/land-use types for these forests, they have no way of linking the data collected in the sample plots to actual conditions on the ground. Hence, the assembled data can only be used, as was the case with the Nialama Forest, as “indicative figures for the forest as a whole” (Lowe 1996). The data collected is wholly inadequate for estimating the standing volume of different patches or stands or territorial units of forest cover across the forest, and cannot be used to calculate the annual allowable cut or to plan for its utilization correctly.
- **Low Sampling Intensity.** Confusion about sampling intensity compounded the lack of stratification. Had the forest been appropriately stratified, the forest inventory efforts could have been concentrated on those areas identified as potential production zones (no physical limitations for use) with interesting amounts of exploitable timber and forest products. Furthermore, the choice of a systematic sample frame at 0.3% meant that the distances between plots was so large (more than 1.2 km in both forests) that it was apparently possible to overlook significant concentrations of forest resources. For example, the forest inventory

data for Bakoun does not record the presence of relatively large stands of *Isoberlina doka* which actually straddle the road along the northwest side of the forest between Balagan and Bama N'dire or stands with an abundance of *Danielia oliveri* in both Bakoun and Nialama.

- **Significant Methodological Lapses, Contradictions and Dubious Reporting.** In addition to the two issues above, it would appear that neither the description of the work required of the multi-resource inventory team in the TOR of the Sub-Grant Agreement nor the outcome of their efforts as reported in the Baseline Studies were not adequately reviewed. Many of the specifications of the methodology were intrinsically flawed, not the least of which was the miscalculation of the sampling intensity. This was compounded by errors such as the following: failure to test the sample form, “measurement techniques and criteria different in all three forests,” subjective assessments of regeneration data, lack of quality control in data collection, slope distances used instead of planned horizontal differences, and overall “insufficiently described and executed” data analysis for all forests (Polansky 2000).

Furthermore, and finally, although the management plans were supposedly built on the basis of the inventory data from the baseline studies, numerous contradictions and errors suggest a total lack of reliability. Rather than belabor this point, as an example of the irreconcilable difficulties with the inventory data, the following table has been prepared on the basis of the reported vegetation/land-use data presented in the two documents for the Bakoun Reserved Forest.⁶

**Table 5.1
Vegetation/Land-Use Data for Bakoun**

Forest Type Units	Baseline Study Report		Management Plan	
	Area in hectares	Percentage	Area in hectares	Percentage
Bas-fond	51.30	0.16%	—	—
Champs	105.33	0.34%	74.806	0.25%
Galerie forestière	1,495.53	4.81%	610.136	2.07%
Bowe	1,771.50	5.69%	6,487.66	21.99%
Enclave	2,710.59	8.71%	—	—
Savane arbustive	3,215.30	10.33%	2,404.83	8.15%
Savane boisée	6,043.53	19.42%	11,855.42	40.18%
Savane arborée	15,731.30	50.54%	8,074.56	27.36%
Totals	31,124.37	100.00%	29,507.42	100.00%

Conclusion: It is evident that the results of these **baseline study** efforts provide an inadequate basis for sustainable forest management planning and indeed provide directives that **if implemented will lead to adverse environmental impacts.**⁷

⁶ A similar comparison cannot be carried out for Suti Yanfou because in fact the Management Plan never presents this data; Table 10 on page 30 is blank.

⁷ Additional significant problems and concerns with the inventory and planning methodology will also be addressed in separate issue discussions which follow.

From the forest inventory standpoint, the issues associated with the reliability of the methods and their execution casts **serious doubts on the projections (quantitative or qualitative) of activities that can take place**, both in space and time on these forests. For example, it is extremely unclear how the number of trees to be cut in either Suti Yanfou (5 trees per year) or Bakoun (120 trees per year) were determined or whether in fact there is adequate information on the actual location of the stands where they might be cut.⁸

Recommendations: Winrock International has already embarked on a concerted effort to strengthen the capabilities for resource inventory in the reserved forests by contracting the services of a qualified forest inventory specialist. Polansky's work with DNEF staff in the field and the reports she has prepared (2000, 2001) are already beginning to have an important positive effect on the quality of the resource inventory work and on the in-house capabilities for addressing these recurrent needs associated with co-management planning and implementation.

The **PEA Team endorses what it understands as Winrock's intention to continue to employ this consultant** to address the needs in this area. It should be noted that the forest resources inventory work will be greatly simplified with the availability of accurate, up-to-date mapping products. Not only will these products allow for more accurate determinations of the location and extent of potentially productive concentrations of forest resources, they will reduce the level of effort required overall for forest inventory. It is further recommended, however, that the PEGRN partners seriously consider the institutional home for these skills and capabilities, including a consideration of the role of the DNEF's Forest Management Planning Division and the field staff at the *antenne* and *cantonnement* levels.

5.2.3 Protection

The Scoping Statement raised the issue of the reality of fire protection in the context of co-management of Guinea's Reserved Forests. As the definition of natural resources management mentioned above makes clear, fragile areas must be protected if the approach is to succeed. This is especially true in many of the Reserved Forests of Guinea which were established with the expressed intent of protecting steep, hilly areas around different massifs to maintain the watershed function.

As it turns out, there are at least three dimensions to the protection equation that will need attention if the co-management model is to succeed—fire protection, management of the grazing pressure (at least in some forests) and control of hunting to maintain biodiversity conservation. Despite their classification as Reserved Forests, many of these areas have been treated over recent decades as “open access resources”—with rights of use (*de jure* and *de facto*) to anyone

⁸ Indeed, the entire premise of cutting trees for timber (*bois d'œuvre*) in Bakoun needs to be carefully examined from the social and economic perspective. Local people report that they are not in the business of sawing timber (*madriers*) on a commercial basis in Bakoun. Then too, the PEA Team found it difficult to believe, on the basis of their admittedly small sample field visit, that there are 120 trees per year within the forest to be cut, with the exception of those found in the gallery forests which in any event are supposed to be protected areas. Finally, the economic feasibility of timber harvest must take account of the what are likely to be very high costs of transport over the 140 kms of poor roads between Bakoun and its nearest markets in Labe or Dalaba.

but the responsibility to no one. One of the central principles of co-management is to engage the rural people living in and around these forests to take greater care in using the resource base in return for authorization to use them over the long term.

In effect, the co-management approach changes the tenure status of the forests by ensuring that those who invest in managing and protecting them will have access in the future to the fruits of their efforts. It is a formula that has worked around the globe—guaranteeing the rights to a return on investments by local people in the form of sustainable management and on the costs of necessary production trade-offs needed for the conservation of the resource base. There is every reason to believe that it can also work in Guinea.

Observations: Both the Nialama Co-Management Contract and past efforts at protection in Suti Yanfou demonstrate the importance of this dimension of forest management. The box in Section 5.2.1 outlines the expectations regarding protection that were built into the contract for Nialama. In Suti Yanfou, during the first phase of the project, an agreement with the local villagers in Sougueta led to the protection of small catchment areas above springs that furnished water for the village. Both cases offer illustrations of the importance and difficulty of protection as a key element of forest management.

- **Absolutist Views of Protection Are Untenable.** The PEA Team observed that, despite the signed contract between the Forest Committee in Nialama and the DNEF, almost none of the protection prescriptions are being observed; there is no control of grazing animals and none of the firebreaks specified in the plan have been constructed. Animals (mainly cows) were seen grazing in the agroforestry areas and on the steeper slopes of the hills below the enclave of Kagnegande. There does appear to have been some success with early burning (*feux précoce*)—a traditional practice adopted long ago to protect the village infrastructure and thatched roofed homes from rampant bush fires. No signs of any firebreaks were observed. In Nialama, Suti Yanfou and Bakoun, fire appears to have spread widely across the forests, as it does almost yearly.

Reportedly, when the committee read the Pular translation of the contract—and in particular its prescriptions about protection—they balked, arguing that the costs of grazing management and fire protection were too high and could not be implemented.⁹ There seems to have been little appreciation of the costs, either direct or indirect, involved in managing grazing rights which might involve fencing, providing herders to control the animals or reducing the number of animals in the forest. Apparently, there was an ad hoc decision to defer the imposition of these requirements of the co-management plan—something that would be taken up as part of ongoing efforts to assist the committee in establishing its internal regulations. Similarly, as the management efforts have as yet to generate the expected amount of revenues for the Forest Committee, there were no resources available to pay for the labor to open and maintain firebreaks within the forest. Despite the constraints, there is no escaping the very real needs for protection and the costs these entail—either direct investments or indirect production trade-offs—as part and parcel of the efforts to manage, rehabilitate and conserve the forests.

⁹ The co-management agreement and contract for Nialama apparently completely overlooked the matter of hunting in the forest. This issue will be dealt with below in the section dealing with biodiversity conservation.

Maps in the Forest: The PEA Team brought copies of all the PEGRN maps with them to the forests (below). Cantonnement Forestière personnel do not yet have copies, though these maps were made in October 2000. More work on improving the maps and DNEF staff capabilities for using them are needed (as well as perhaps some plastic copies of the maps for field use). Note the flowering bamboo (right)—a rare sight in Bakoun.

Conclusions: The decision to postpone the imposition of protection regulations—allowing local people to use marginal areas for grazing or to defer fire protection—is understandable from the social and economic perspective because of their very real needs. However, it must be candidly noted that in effect **the project is postponing the real solutions to inappropriate land use** in these forests, i.e., making an effort to intensify production on the lands best suited for it (both within and outside the forest) while beginning to rehabilitate or protect degraded areas. Continued degradation for whatever reason simply adds to the closely linked forces leading to greater poverty and further destruction of the natural resource base. Finally, the inability to correctly map the so-called “protection areas” on the operational maps whether as contiguous blocks, for example, of steep lands or wildlife habitat, or as part of the mosaic of land capability polygons, suggests just how difficult this situation will be to resolve.

Recommendations

Avoidance and Redesign Efforts. The enormity of the protection issue on the Reserved Forests of Guinea, particularly in the drier savanna forest areas of the Fouta Djallon should not be underestimated. An all-or-nothing approach (the “absolutist view”) clearly is going nowhere and a **coherent strategy** to select criteria for identifying areas in need of protection, to carry out realistic assessments of the area within each forest to be protected and to begin to address the inherent needs, opportunities and realities of this problem is needed. Several important principles need to be borne in mind in shaping this strategy:

- The Sudano-Guinean-Congolian forest types of the Fouta Djallon are, with the exception of the forests occurring in the deep galleries, fire types that have evolved over the ages with fire as a constant of their ecological conditions. Fire, quite simply, cannot be avoided. And if it were, there would be a good chance that the resulting buildup in biomass would burn during a drier year—and have a much more severe impact on the ecosystem.
- Under these conditions, firebreaks probably will not work unless they are widely and expensively developed and maintained. Even then, they would need to be backed up by an effective fire control brigade able to quickly put out and mop up any incidental fires that occurred between them.
- Free-range cattle and other animals allow local people to harvest the widely dispersed resources of the dry forests in an efficient manner, returning them in the form of meat, milk and manure. Without controls on the numbers of animals, however, the average return is minimal, the range is overgrazed and the productivity of the system declines. Raising the productivity of individual animals is a matter of giving them more to drink and eat, which could be linked to a progressive improvement of the resource base through staggered and shifting protection measures.
- Finally, as will be emphasized in the recommendations of this report, recurrent costs for co-management must be kept to a minimum. This does not mean that all the costs for protection can or should be avoided. Very clearly, however, a genuine positive cost-benefit ratio for the participating villagers is paramount to success. Conservation cannot be built on the backs of

those least able to absorb its costs, even if they have been implicated in the processes of degradation.

Accordingly, the PEGRN Team should develop a **protection strategy** to cope with grazing pressures and fire damage that could gradually and incrementally be put in place in collaboration with the Forest Committees. The discussion of these issues with the local people should also include the overall provisions about protection related to sound natural resource management and avoidance of land-use options that may cause soil erosion.

In many cases, dealing with protection issues can be most effectively and efficiently addressed through informed collective and consensual decision-making at the community level. Individuals will be more inclined to accept production trade-offs or pay for protection investments if these are shared, and if there is some guarantee that unscrupulous behavior will not be acceptable and will be sanctioned. Strategy discussions about protection should encourage analysis rather than impose solutions. It should therefore be the role of the technical personnel to present these issues to the communities or forest committees in such a way that facilitates analysis and decision-making.

Table 5.2
Elements for a Protection Strategy

Fire Protection	Grazing Management	Soil/Water Conservation
<ul style="list-style-type: none"> • Continue to emphasize early burning to protect the villages • Strictly apply a wider protective band (say, 10 meters in width) of early burning and narrow (say, 3 meters) firebreaks around the agroforestry plots to protect the trees being nurtured within (and the fences established as part of the approach) for at least the first 2–4 years after initial cultivation • Continue to promote improved beekeeping practices to minimize or restrict the use of fire for wild honey harvesting • Ensure early burning in bands around areas that have been cut over for timber, fuelwood or bamboo to give areas a chance to regenerate 	<ul style="list-style-type: none"> • Maintain traditional fencing around agroforestry plots to ensure that the widely spaced regeneration of valuable trees can grow beyond the reach of cattle (see discussion of agroforestry) • Promote intercropping with fodder species (perhaps through low-cost direct seeding) to accelerate the fallow process on agroforestry plots, with provisions for carefully managed grazing (after the tree crop has grown beyond the size where it can be damaged) or even cut-and-carry systems • Set aside small areas of degraded lands for a few years to protect them from fire and grazing as “exclosures” to allow regeneration to take place 	<ul style="list-style-type: none"> • Ensure respect for site limitations (slope and soils) where tree or bamboo cutting or agroforestry are being implemented • Identify additional opportunities to protect catchment areas (“<i>tetes de source</i>”) above springs, using natural barriers or even fences with early burning; link the latter efforts to provision of safe water supplies for both people and cattle through modest investments in captation tanks, piping and drinking troughs • Apply soil and water conservation practices on agroforestry plots to enhance rainfall infiltration and contain erosion

Such an approach might entail presentation of the problem and its real costs, clear definition of the cause(s), suggested options for addressing it and a discussion of the advantages and disadvantages of each of the options. Experience worldwide with these key approach to CBNRM has shown that once local people see the linkages between cause and effect in terms of environmental degradation and its costs, they will choose even more conservative solutions than the technicians.

Some of the **elements of such a strategy** might include the following notions (hunting issues are dealt with below) depending on the conditions of the reserved forest to be co-managed.

Mitigation Measures. Project personnel have already taken a decision earlier this year to begin to concentrate the activities and investments and interventions of the other project components—agricultural production and marketing and small-scale enterprise development—in the areas immediately around the reserved forests. There should be **an understanding with the local people that by working to assist them to increase the productivity of their farming systems outside the forest and to better market and use the products, they in turn would accept some of the protection related production trade-offs** where necessary for sustainable forest co-management. Incremental improvements off-the-forest would presumably make it possible for sequential additions to the marginal, fragile or degraded areas under appropriate management on the forest without unduly undermining household economy or food security, thereby achieving over time greater sustainable development.

5.2.4 Agroforestry—a Response to Human Pressures on the Forest

The decision to include agroforestry practices as part of the co-management model has dual motives and purposes. Relatively high population densities in the rural areas around some reserved forests have led to gradual incursions by local people seeking land for basic crops and household food security. In Nialama, for example, pressures are high and nearly all of the more level plains areas were apparently cropped at one time or another. In Suti Yanfou, a large portion of the forest—perhaps as much as 75 percent—has been converted to agricultural or fallow lands.

Agroforestry can play an important role in both forests but its development must be linked to developing a more sustainable and stable land-use system. In Nialama, in recognition of genuine land hunger, the DNEF has agreed to an agroforestry system instead of just trying to keep people out. The nature of the system will be a “managed canopy system” intended to provide useful products from an overstory of valuable trees and thereby speed the fallow process through the site amelioration contributions of the tree crop.

In Suti Yanfou, large areas of lands have already been converted to agriculture and left fallow, often on very steep lands which eroded during the crop phase. Agroforestry can play a role on many sites within this forest. A number of options—quite different from the canopy system in Nialama—might be appropriate, depending on the site conditions. Clearly, however, lands with slopes over 30 percent need to be left fallow to restore their vegetative cover and the watershed function that is likely to be their greatest contribution. Where the slope is more moderate, other approaches may be feasible, such as leaving strips of bush fallow following the contour to

contain runoff and arrest erosion, or allowing farmers to plant fruit trees on small individual terraces cut into the slope. It should be noted that on slopes between 10 and 30 percent, soil conservation engineering solutions such as those introduced by the first phase of the project (rock bunds, plant hedges or *cordons biologiques* and contour planting) should be promoted on agroforestry areas to arrest soil erosion and contain runoff.

Observations: Despite the potential applicability of agroforestry practices in the reserved forests of Guinea, there is still a number of issues that will have to be resolved to ensure that it is a fully sustainable intervention. The issues with agroforestry include:

- **Lack of a Clear Vision of the Place of Agroforestry:** The discussion of agroforestry in the management plans is unclear. At times, it appears that the intention is to use the agroforestry systems to restore forest cover (e.g., in Nialama and Suti Yanfou). Elsewhere, it appears intended as a means to rationalize land use as an effort to cope with growing illegal incursions (*défrichement*) in all the forests. While the system can indeed do both, it cannot always do so on the same sites.

In Nialama, the current sites being chosen for agroforestry are the oldest fallow areas, often with the best stock of trees (suggesting reasonably good soils), relatively near to the villages. Here the technique will be used to develop a more sustainable agricultural system involving a continuous canopy of trees valuable to local people whose presence will speed the fallow process. Polansky's 2001 consultancy report pointed out a number of issues associated with these practices:

- Without a map of the protected zones (steep lands, gallery forests, chimp habitat, etc.), the choice of agroforestry sites cannot proceed rationally (as was also pointed out by J. Carter who identified agroforestry plots in prime chimpanzee habitat in Nialama).
- Land that has been destined for agroforestry will never again be forestry production land, as the remaining trees will be thinned, pruned and their regeneration eliminated in the course of the next rotation.
- The best lands for agroforestry, at least from the villagers' perspective, are also the best lands for forestry production because of their deeper, richer soils; therefore, agroforestry becomes a competing land-use option with forestry, which must be factored into management planning.
- In effect, the potential area to be taken out of forest production will be more than 2,000 hectares over the course of the 14-year rotation, which authorizes the clearing of 145 hectares per year for agroforestry.

In Suti Yanfou, a broad band of land—apparently anything below an elevation of 500 meters—has been identified as an agroforestry zone. As was pointed out above, this designation fails to take into account steep slopes and existing or potential (spring catchments) protected areas. In Bakoun, rather than containing incursions into the forest, the proposed agroforestry area of 2,440 hectares would expand it considerably. At present, there are only minor illegal incursions into the reserved forest that could be displaced outside the forest.

Suti-Yanfou's Hidden Forests: Along this escarpment in the Suti-Yanfou Reserved Forest, fringes of dense forest still remain. The photo interpretation that went into this forest's vegetation mapping all but missed these important areas. Worse yet, the operational map suggested that this area was suitable for agroforestry development, while illegal cultivation reaches almost to the rock face just above the town of Sougueta (below). These small patches of forest are the best choices for starting forest conservation: they can be protected and, in many cases, linked to spring development that could supply water to many surrounding villages whose water sources all but disappear during the dry season.

Agroforestry Systems for Co-Management in Guinea

The following descriptions suggest how these practices should be shaped to ensure positive benefits for farmers and the environment.

Over-story Canopy System. The intent here is to mimic the traditional practices of leaving valuable trees (such as Nere) in the fields and cultivating the land underneath them. The assumption is that 40 large trees per hectare (or thereabouts) would help to protect the site and speed the fallow process. In order to establish it, farmers will need to protect selected existing trees, whether large or small, to maintain the canopy. Pruning the tree canopies to let in more sunlight is acceptable. Removing certain mature trees for timber or building materials would also be allowed, although recruitment of new saplings or seedlings would be required. Prior to burning the site, farmers would be encouraged to harvest useful products—poles, bamboo, fuelwood. Rustic fencing, as is commonly used in Guinea, would be built from the materials cut at the outset of the clearing process. Trees left as the canopy must be protected against damage by the fires. If the canopy trees were being established from young stock, grazing would not be allowed for a few years until after the trees had attained a size immune to the impact of cows.

Strip Cropping in Fallow Areas on Sloping Ground. Rather than complete clearing of a site, farmers would be required to leave 3-meter-wide strips of vegetation on the contour and vertical margins of their agroforestry plots, to control runoff and catch eroding soils. On slopes above 10 percent and below 30 percent, contour planting and bunds would add to the protection of the site. Inter-cropping with leguminous cover crops and perhaps the use of such fertilizers as manure and mulch could be used to allow these plots to be used more or less continuously.

Improved Bush Fallow System. Trees or leguminous cover crops may be planted on lands left fallow, ideally through direct seeding and sometimes at the end of the current cropping system based on residual moisture. These plants together with the naturally regenerating vegetation take hold and accelerate the restoration of the vegetative cover. Selective cutting or harvest for poles, fuelwood or fodder may be possible depending on the reaction of the plant cover. The soil recovers its quality and fertility more quickly meaning less years in fallow and thereby slowing down the land clearing process. When the land is ready to be tilled again for agriculture, it is possible to leave selected trees and shrubs as the basis for the beginning of a canopy based system as mentioned above.

Fruit Tree Crops on Moderate Slopes. Farmers would plant fruit trees on widely spaced individual terraces at the beginning of the fallow period. These perennial crops would be better choices as they would avoid the erosion possible with open furrow ag crops. The small terraces could be fertilized with organic matter (manure and compost) to speed growth and production.

- **Confused Technical Specifications and Errors in Its Application.** Again, on the Nialama Reserved Forest where significant areas of agroforestry have been developed, there are major issues, some fundamental to the prescription and others linked to faulty understanding of the intention. Farmers need to understand that they are expected to leave and protect about 100 trees per hectare as the residual stand; the 15-cm-or-less diameter limit may be adding confusion to the prescription and is perhaps unnecessary. This could be a combination of both large and small trees of the species most appreciated by them. On some parts of the 20-hectare-plus agroforestry site below Kagnegande village, there were no trees over 15 cm; the entire stand has been cut and there are no canopy trees remaining. On the back side of the same plot, although the farmers left many of the larger trees, a high percentage of them were

killed during the burning as a result of scorching of their trunks. Yet others, because of the serious changes in opening the stand for agriculture, have been subsequently wind-thrown, reducing the remnant stand even more. On that same plot, animals were seen grazing on the crop residues. The area cleared for agriculture borders a small stream into which erosion off the steeper edges of the agroforestry plot is running. Likewise, fire protection through early burning was apparently unsuccessful, and the fence designed to protect the trees was burned.

Elsewhere in the Nialama Forest, on the sites known as Kansouma, all of the trees—regardless of diameter—were cut, and there was no fencing and no early burning around the periphery. In effect, the site was little more than the start of traditional *défrichement* and shifting cultivation. Polansky (2001) also noted that of the five agroforestry plots visited, only one was done correctly and that the others were either illegal or had failed to respect the norms (including incidences of tree girdling to kill the overstory canopy trees). In Suti Yanfou, as most of the area where agroforestry might take place are fallow, there are no trees over 15 cm in diameter and, therefore, the system would not work.

Conclusions: The current issues constitute a very serious situation that is the exact opposite of what was intended. Indeed, the manner in which the technique is being used leads the PEA Team to conclude that **agroforestry as presently practiced has the greatest potential for causing adverse environmental impacts.**

Recommendations: While agroforestry may be a justifiable intervention, linked to meeting land capability constraints and sound resource use, as well as the needs of participating local people, it is neither a panacea nor a foolproof alternative in every case and on every forest. The PEA Team recommends that **efforts to introduce agroforestry in Suti Yanfou be approached very carefully** and in full cognizance of the slope limitations for agriculture common throughout this forest. Likewise, there would appear to be **little justification for introducing agroforestry in Bakoun** as there is little pressure on the forest and ample areas outside the forest for expanding the agricultural frontier.

Avoidance and Redesign Efforts: The PEA Team recommends that PEGRN partners carefully reconsider their policy for favoring agroforestry, how these technologies should be used, and the technical assistance needs for implementing them, taking into account the following:

- There is nothing particularly simple about these systems other than the over-riding paradigm that the combination of trees and crops should yield a net benefit for both the people using the system and the environment in which it is being implemented.
- There can be little justification for ensuring that all families who request a plot have agroforestry plots or even relatively large plots—the decisions of whom should get a plot must be brokered in terms of need, distance to the concerned villages and available land suitable for agroforestry.
- Similarly, many of the agroforestry technologies and models may be just as applicable on private lands outside the reserved forest, and this technology is just another format for intensifying agricultural technology and increasing crop yields.

Overlooked Stands: An extensive stand of *Isoberlina doka* found along the road in the northwestern quadrant of Bakoun Forest (upper left). A *Karite* (*Butrospermum parkii*)—a very popular species whose fruits are collected to make Shea-Nut Butter, an important forest product traded across West Africa (upper right). Extensive stands of *Danielia oliveri*, in the central portion of the northwestern part of Bakoun (below). These are among the plots overlooked in the forest inventory. Most of the trees are small but why these almost pure stands of *Danielia* exist, for example, is worth researching to identify conditions that promote natural regeneration of the species.

- There are many different situations on these forests where different agroforestry technologies (including the tree-canopy system, strip cultivation on fallow lands, improved bush fallow and fruit tree terraces, etc.) could be used. Matching the practice to the conditions will be fundamental to avoiding mistakes, disappointments in terms of production increments and adverse environmental impacts.
- Under some circumstances, such as those noted for Nialama, agroforestry will compete directly with productive forestry potentials for suitable land and this trade-off must be examined by all concerned, including the forest committees.
- Because of the broken topography inherent to these forests, and while it may be possible to map broad areas within the forests as potential agroforestry zones, it will probably always be necessary to carry out a more systematic site identification process to locate suitable parcels within the zones, avoiding areas adjacent to watercourses, endangered species habitats and steep slopes, facilitated through the preparation of a simple agroforestry site selection guide.
- Local people must respect the technological norms (i.e., in the case of the approach being promoted in Nialama—the protection of “leave trees” within the tree-canopy parcels to ensure the eventual development of the overstory) that will ensure that these are indeed agroforestry plots.
- Failure to respect these norms must be quickly and effectively sanctioned.

Mitigation Measures. Considering the broken topography of the reserved forests, there is clearly a limit to the amount of land available for agroforestry. The best choice for mitigating the demographic pressures that are leading local people to invade the reserved forests will be to do everything necessary to ensure that their own holdings outside the forest are optimally productive. Recent decisions to focus the activities of the other project components on the areas occupied by the participating farmer communities is a sound measure for reducing the pressures on the forest and fully endorsed by the PEA Team. Additionally, a realistic appreciation of the applicability of agroforestry alternatives will become possible as a result of improved land capability mapping which identifies land suitable for such practices.

5.2.5 Silvicultural Implications of Planned Activities

There has been considerable emphasis on assessing resource conditions on the forests to be brought under co-management. From a strictly forestry perspective, there has also been an attempt to gauge the degree of resource use which might be permitted, i.e., the concept of annual allowable cut (AAC) for timber, fuelwood and bamboo. Despite the issues associated with the flawed inventory (now on the road to resolution), all parties now seem cognizant of the need to make every attempt to ensure a sustained yield from these products.

This is an excellent start, but it will not be enough; there has been too little done or too few plans apparently made for developing vital information on the silviculture of these forests and the species within them. Guaranteeing a sustained yield from the present growing stock may not be enough to ensure the continuing replacement or regeneration of desired species. For example, despite noting that there was little or no regeneration of two of the most valuable species—

Khaya and Lingue—the co-management plan for Bakoun listed them among the species to be harvested for *bois d'œuvre*.

Conclusion: More explicit information is needed about the conditions under which these species regenerate their silviculture.

Recommendations: Silviculture is a big word, but what it really comes down to is observation—both planned and spontaneous. The following measures are suggested to enhance the knowledge of the silviculture of these forests:

- The reports on inventory methodology suggest that **permanent sample plots** will be established in Suti Yanfou and Bakoun (Nialama too). These will be important, and the staff of the Cantonnement Forestier should ensure that they are indeed established and regularly monitored. This will involve finding the permanent sample plots, increasing the presence of staff members in the forests themselves and equipping them with maps and tools to know where they are.
- Added presence in the forests also provides the opportunity for the casual observations about the conditions there. “Unless this fundamental knowledge is there, in future years it may be difficult to reconstruct the actual variables of management or silviculture practices that one seeks to replicate. Was there a small fire that went unobserved and unrecorded? Did local people exercising their customary usage rights harvest minor forest products, fuelwood or poles or allow grazing animals into an area thereby changing the stand structure? **Inventories provide the baseline; observations provide the understanding** of the forest as the dynamic system and all its elements” (Catterson et al 1991).
- As a start, it would be useful to **establish some basic ecological monitoring capacity** in each of the forests in question. A start was made in the first phase of the project to monitor weather conditions—hence the simple rain gauges and maximum-minimum thermometers found at the *cites*. Are these being currently used and if not, can they be placed in service again and regularly monitored? This simple technology could also be added at the village level among the cooperating communities. The meteorological data, so critical to fine-tuning an understanding of both forestry ecology and agroecology in the developed world, has been built on the basis of numerous small stations widely spread across rural areas and through the efforts of many unnamed individuals.
- **Purposeful observations of many other kinds are both possible and necessary.** For a start, however, there is a need to monitor some key variables related to regeneration. The first among them is additional information on the phenology of the important tree species—when do they flower, set seed and release, and under what conditions? Routine observations of wildlife seen in the forest should be recorded. The outcome of regeneration on the agroforestry plots will be an important point. Perhaps the most critical variable that must be accounted for in understanding the silviculture of these forests will be the impact of fire—how did the vegetation respond when protected, or what happened in terms of the fire history of a given plot? The foresters at the cantonnement should also begin to assess soil conditions within stands and areas of particular interest. All of this is long-term work but “this direct

knowledge of the day-to-day conditions and operations...and their results...will validate the basic premise of forest management—that someone is in charge and knows what is going on” (Catterson et al 1991). Some of these matters could provide the subject for university students preparing their end-of-study theses.

5.2.6 An Overall Assessment of Forest Management Planning and Implementation

Although much of what has been discussed above will certainly suggest the need for a wholesale overhaul of the manner in which co-management planning and implementation is carried out, the PEA Team feels that it is also worth looking at this component as a whole. On the one hand, as was mentioned previously, the present achievements in Nialama have certainly served to corroborate the potential of the co-management approach. There have been some frustrations with the pace of its development, however, and accordingly, a concerted effort to simplify and accelerate these efforts have characterized the work under this component during the present phase. Regrettably, although the intention was good, it seems to have gone significantly awry in the doing. The PEA has been the first real opportunity to look at the component activities in an holistic fashion; until late last year, such an effort would not have been possible because many of the most salient outcomes and products of the management planning and implementation have only been realized in the last quarter of 2000.

Observations

- *Choosing Reserved Forests for Co-Management.* No clear criteria for selection of classified forests targeted for co-management activities seems to be available. As the discussion of alternatives in Section 2.2 suggested, co-management may not necessarily be the best solution for all classified forests in Guinea. This method may be appropriate in areas such as Nialama or Suti Yanfou, where population pressure is high, but is not necessarily the solution for areas of extreme biodiversity importance where the pressures on the forests are not that great. If that is the case, why promote utilization of these areas by local populations? Bakoun is an example of how other activities, such as intensified agriculture outside of the protected area, could likely have greater benefits for both biodiversity conservation and the welfare of the people. Furthermore, co-management is not necessarily the best solution for areas where forest loss has been so great that the area should simply be declassified. Working in these areas would be a waste of funds that could be better invested in areas that would benefit from co-management.
- **The Template Approach to Management Planning Does Not Work.** The project seems to be applying a template for co-management in all areas concerned, whereas each situation requires a different set of activities and agreements between communities and the Forestry Service. Trying to implement a plan that has evolved for Nialama in Bakoun could have catastrophic impact on the environment, by promoting such activities as logging that are not presently being used in Bakoun. Similarly, proposing further timber extraction on Suti Yanfou where the resource is all but depleted seems contrary to the principles of management. Co-management should not be a rigid template, but rather a fluid process that is adaptable to varying circumstances in different locations. Each forest therefore should be regarded separately. Lessons learned from other locations can be incorporated in a general

sense into the plans, but each new forest should be regarded on the basis of its own special set of circumstances.

- **Understanding Best Practices in Forest Management Planning.** Many will suggest that costly, sophisticated, detailed forest inventory is not required for co-management of the reserved forests in Guinea. They are probably right—albeit not for the reasons they perhaps think, i.e., that somehow more intensity with a participatory management approach requires less quality control. Big investments in forest inventory will not be necessary because good mapping with up-to-date remote sensing tools and products can go a long way to identifying the patches of forest that could be exploited. On these reserved forests in Guinea, established as protection forests in many cases, around distinctive upland areas, there is probably a lot less production area than anyone suspects, so the inventory will be on a much smaller area. If one can identify potential production areas on a land capability or land cover map, their limits can be verified in the field with GPS technology and a staggered inventory developed to quantify the resource base.

Conclusion: The PEA Team believes that one of the most telling issues, if not the major issue, with the current approach to co-management is **the attempt to do it all at once**. The complexity of the permutations and combinations of co-management—what should be done (management interventions), what should not be done (protection), when (the calendar of activities) and how (technical prescriptions)—is further exacerbated by the need to make it all clear (institutional and organizational arrangements) to the many stakeholders involved.

Recommendation: Rather than attempting to put a complete co-management package in place, as has happened in Nialama, albeit over many years and doubtless in many steps, the PEA Team believes that **the new efforts in Suti Yanfou and Bakoun be carried out in carefully phased steps involving incremental understanding and achievement** by all concerned. A fulsome description of the steps and choices of a phased approach to co-management planning and implementation is beyond the scope of the PEA and, as stated above, dependent on the conditions in each forest.¹⁰ Clearly, the present DNEF, Winrock and USAID teams are better placed to suggest how this might be accomplished. Among the suggested steps are:

- Enhance the capabilities of the Winrock technical assistance team with **the addition of a full-time, competent forest management planning and implementation specialist** as soon as possible.
- Pay greater attention to **the basic step of good mapping capabilities and methodologies** to make many of the other steps along the way easier to accomplish. At a minimum, four distinct mapping layers will be required: base map, land capability map, actual land-use map and, using these three, the operational map (see box below).
- Come to terms with sorting out the use of this technology and **developing additional in-house skills and capabilities for deciding the limits of use for different forest products**.

¹⁰ These recommendations also take account of some of the other findings of the PEA Team related to socioeconomics and institutions which are treated in the sections which follow in this report.

Technological Steps to Sustainable Implementation of Co-Management

Despite the caveat in this section to carefully considering each forest's real needs and opportunities, a number of specific and most salient steps from the technological perspective could go a long way to further ensuring that co-management is planned and applied in a sustainable manner. They include:

- *Choosing “Win-Win” Situations.* In the opinion of the PEA Team, all five forests visited seem amenable to some form of co-management. Suti Yanfou might be the exception because it is so highly degraded it is too late to turn back there. In the medium term, however, the proponents of co-management will need a set of pre-selection criteria as a guide to the choice of the next reserved forests on which to begin co-management. A set of proposed criteria is suggested in Table 7.1; further refinement of this criteria should be one of the important lessons learned from the experience in these pilot cases.
- *Re-Establishing the Boundaries.* An early step in the process should be the resurvey and marking of the limits of each reserved forest and reconciling conflicts related to the changes detected since the forest was classified. The outer boundary of the forest is important for a number of reasons including as a basis for the fundamental understanding with the local communities and as a guide for mapping and management planning.
- *Developing Clear Land-Use Criteria.* The important distinction between potential production areas and those needing some form of protection for whatever reason (physical attributes, biodiversity conservation imperatives or watershed concerns) should not be arbitrary or subjective. They provide the rationale for explaining to local people why management prescriptions make sense and should be respected.
- *Elaborating a Good Base Map.* Management prescriptions and plans will be mere abstractions if the people concerned, whether DNEF personnel or local villagers, do not understand and cannot locate the geographical limits of different zones, compartments or parcels. Ample familiarity with these internal limits may require additional marking if natural features do not lend themselves to this purpose. Similarly, these clear geo-references are the key to further planning and subsequent monitoring of results.
- *Land Capability Mapping.* With the clear land-use criteria in place and a good base map as a layer in the GIS system, it should be possible to zone the forest according to its land capability. This map is essential to knowing where slope and soil characteristics dictate the need to condition the possible use of the forest for any and all purposes.

The Foundation for Planning—the Operational Map. The upper limits of what is possible from a production perspective or what is required from a protection-rehabilitation perspective need to be known early on to guide overall planning and avoid setting unrealistic expectations. Comparing the limits of actual land use (from the land-use data layer or map) with land capability will result in a series of polygons within the forest whose needs and opportunities are obvious—whether as production forestry areas, potential agroforestry areas, catchment areas for springs, potential grazing areas, habitat requiring protection or steep areas needing protection or rehabilitation. These different polygons need to be planimeted to tabulate the quantitative limits of future interventions. With such a map in place as a backdrop for further planning, co-management proponents can proceed incrementally with fine-tuning the dimensions of the annual plan in collaboration with the concerned villagers in each management unit. Forest inventories could then be carried out in different areas annually to quantify the amount of the annual allowable cut.

***Isoberlina Doka* Stands in Bakoun:** It was surprising to note that the forest inventory of Bakoun did not identify the presence of *Isoberlina doka* as a possible timber species. Somehow the inventory missed these stands, despite the fact that the road goes right through them along the forest's northwestern side. Is this the result of sample plots being so widely spread (1.6 km apart)? Despite this evident potential, the decision to carry out cutting *bois d'œuvre* on Bakoun must be seriously questioned. The nearest markets, in Labe and Dalaba, are about 140 kms away on extremely rough roads.

Forest Exploitation in Nialama:

Cutting the Bani (*Pterocarpus erinaceus*) as part of the second year of operations of the co-management plan is a labor-intensive approach that will be much easier to control than understand. Twelve individuals from villages around Nialama estimated that they could only cut about 40 such trees over the course of the season. After squaring the log, a scaffold is made out of its branches and the tree is sawn into large boards (*madriers*) while in the air. It is hard work done by decent folks who are not out to destroy the forest—and who have proven themselves ready and willing to participate in management planning and working with the forest inventory consultant.

- **Rectify the approach to agroforestry** to ensure its ecological and socioeconomic sustainability. Several other agroforestry models could be used under different conditions typical of the reserved forests. Additional inputs of technical assistance, at a minimum from the team Agronomy Specialist, will be useful, but it may also be efficient to seek the counsel of others familiar with agroforestry systems in West Africa for this purpose (e.g., from Mr. Mike McGahuey of AID/AFR/SD) or tap the wealth of information available from the International Center for Research in Agroforestry (ICRAF) in Nairobi.¹¹
- The importance of developing a **strategy for dealing with protection** bears reiteration here. Special efforts will be required to ensure that local people understand that their investments in protection are designed to lead to tangible results that will directly benefit them (see box in Section 5.4.1).
- Costs and benefits will sink this ship if they are not dealt with and fully analyzed. The need for a **greatly enhanced capability for financial and economic analysis of co-management** is paramount. Conservation cannot be built on the backs of those least able to afford it. Similarly, over the medium term there will be a need to gauge the recurrent costs that the DNEF will have to muster to continue to apply the co-management technology elsewhere in the many reserved forests of the country.

5.3 An Assessment of the Ecological Dimensions of Co-Management

In the main, sustainability is—or should be—about how local people use these forests, how they affect them and how they are, in turn, affected by them. The easiest adverse environmental impact scenario to understand (although not necessarily to address) is that the choices local people make about resource use ultimately affect them or their own future generations.

Many poor environmental choices, however, have off-site consequences that reach well beyond the local user community, affecting those living downstream, in the nation or in the world. The costs associated with these off-site effects need to be accounted for and may provide the justification for external investments to subsidize local costs needed for environmental rehabilitation or protection, as in the case of growing worldwide concerns about carbon sequestration, global warming and biodiversity losses. These off-site consequences can be singular, such as the degradation of an important watershed area that causes downstream flooding or the loss of potable or irrigation water supplies, or where a particular forest is the last refuge of an endangered species. They may also be significant because of their cumulative

¹¹ A useful publication that might help to shed some light on agroforestry options is *Agroforestry in Dryland Africa*, by D. Rocheleau, F. Weber and A. Field-Juma, International Council for Research in Agroforestry (ICRAF), Nairobi, 1988, p. 224 and appendices. ICRAF can be reached through its Web site, <http://www.icref.cgiar.org>. Several other member organizations of the Consultative Group for International Agricultural Research (CGIAR) have programs related to agroforestry in Sub-Saharan Africa; they include: the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria; the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) with a station in Niamey, Niger; and the International Livestock Research Institute (ILRI) in Addis Ababa, Ethiopia. All of these international agricultural research centers can be reached on the Internet through hotlinks on the main CGIAR Web site, <http://www.cgiar.org>.

landscape level impacts occurring over a series of areas—affecting the functions of the larger ecosystem—where the total impact will be greater than the sum of their individual impacts.

5.3.1 Co-Management Goals and Biodiversity Conservation

Biodiversity by definition means the variety and variability of life on earth. The idea behind biodiversity conservation is that to have a healthy ecosystem, it is necessary to have most species present. If one species is removed, it may have consequences for other species in the system. Certain species may be necessary for the successful pollination of a type of tree. For example, certain bats are important pollinators of the Nere tree (*Parkia biglobosa*). Other species may be extremely important for seed dispersal of plant species. Chimpanzees, for example, are common dispersers for many trees, such as *Parinari excelsa*. These seeds are swallowed whole and then defecated away from the parent tree hours later, increasing the likelihood of successful germination.

People, especially those living in rural areas, also rely on biodiversity for provision of fuel, food, medicine and household building and artisan needs. Top predators such as leopards, lions and hyenas are important for regulating the number of other species such as warthogs and baboons, which may raid crops and undermine food security.

When one species is removed from an ecosystem, therefore, it often has direct consequences on other species in the system. This is the reason that in speaking of biodiversity issues, and in spite of the importance of endangered species and their protection, the overall aim is to protect whole ecosystems rather than individual species. Natural forest management lends itself well to biodiversity conservation because, if properly done, an important part of the results will be the maintenance of forest cover on a wide variety of habitat types.

Biodiversity in Guinea

Guinea is particularly important from the biodiversity conservation standpoint. The Guinea Forest Ecosystem is the Guinean portion of the Guinea-Congolian forest. It extends from the Fouta Djallon in Guinea to northeastern Cameroon. The original forest covered about 1,265,000 square kilometers. This forest has been drastically reduced and fragmented and is now estimated to cover only 141,000 square kilometers—15 percent of its original size.

Conservation International (CI) has identified 25 biodiversity “Hotspots” on earth, believed to be the most important in terms of biodiversity—but also under the greatest threat. The Guinea Forest System is one of them. Approximately 9,000 species of vascular plants are estimated to live in the Guinean Forest Hotspot. Among the plants found there, 2,250 (25 percent) are believed to be endemic. Similarly, levels of endemism are fairly high for reptiles with 46 species (33 percent) and amphibians with 89 species (77 percent) found only with the Guinean Forest Hotspot. What also makes this area outstanding is its mammalian diversity. With 551 species, it ranks first among the world’s 25 Hotspots, representing almost half the 1,150 mammals native to continental Africa. Finally, the Guinean forests are among the two highest global priority regions for primate conservation (along with the Indo-Burma Hotspot).

Sincery-Oursa and Balayan-Souroumba

No baseline study or management plan have yet been completed in the classified forests of Sincery-Oursa and Balayan-Souroumba. The visit to these areas was mainly to investigate an area to which the project has proposed to expand.

Both Sincery-Oursa and Balayan-Souroumba are extremely important areas in terms of biodiversity and natural resources. The mountains, reaching an altitude of 1,036 meters, could be an important migration corridor for wildlife. They are very steep and not easily accessible. As a result the habitat is not heavily exploited. On either end of this mountain chain are two wilderness areas important for wildlife: the Haute Niger National Park to the southeast and the forests of Bani, Dar-es-Salam, Dokoro, Boula and Bakoun to the northwest. This area encompasses many of the important features constituting the different habitat types of the Fouta Djallon, including cliffs, bowals, wooded savanna and gallery forests. The forests lie at an interface between two ecological zones and are therefore expected to be rich in species diversity. Species found near Mamou, such as red colobus and black and white colobus, would be expected to be found here, as well as species from hotter and drier areas, such as waterbuck, roan antelope and lion.

They also play a very important role in water conservation. At the base of the mountains near Dabola, the dam of Tinkissu was built in order to supply the people of Dabola with drinking water and electricity. Villagers living at the base of the mountain, however, have already noticed that the amount of water is declining. Whereas there used to be streams running off the mountain all year round on the south slope of the mountain, these are now few and far between, according to villagers.

During a walk in Balayan-Souroumba, an abundance of chimpanzee nests were noted and chimpanzees were also observed directly by members of the team. Baboons and a genet were also seen. Evidence of human activity in the forest was observed, including timber extraction, tree-cutting for the construction of traditional bee hives, honey harvesting, and the removal of bark for cords. The human impact, nevertheless, seemed minimal.

A drive along the road joining Bisskrema to Dinguiraye gives a spectacular contrast between the reserved forest on the east side of the road, which remains forested, and the non-reserved area of the forest to the west, which is all farmland or fallow areas. It is obvious that even if Sincery-Oursa and Balayan-Souroumba exist only as paper protected areas, to date this has been fairly well respected.

There are, however, several growing threats that may change this situation. In Guinée Forestière, much of the wildlife has disappeared, except in some of the last remaining reserved forests such as Ziama, Dieké and Mont Nimba. For the most part, taboos on the consumption of warthogs, bushpigs and primate species do not exist in Guinée Forestière as they do in other regions of Guinea. Because much of the wildlife in this area has disappeared, there is an increasing trend for people from Guinée Forestière to go to other regions to hunt wildlife, smoke the meat and then bring it back to sell for higher prices in the southeast of the country. Dabola sits on the one of the few main highways of Guinea and therefore is extremely vulnerable to this type of exploitation.

A second threat to this region is population expansion. Dabola is a booming city and expanding rapidly. In addition to normal population growth, there are plans to move refugees from the frontier with Sierra Leone farther into the country, and an area near Dabola has been targeted for the construction of a camp. Many of the refugees also eat primates and pigs, so there is a risk that the pressure for hunting in these forests will increase.

In summary, this is a spectacular area of Guinea and extremely important for wildlife conservation. Great caution should be taken in starting any activities here that encourage increased use of the forest. National Park status should be considered here, not only for the wildlife, but also for watershed protection to secure the future of the city that lies in the valley of these forests.

Protection—How to Start: A group of people from Guinée Forestière were found near the Nialama Village smoking game meat (baboons and warthogs) traded for cartridges by local hunters (above). No hunting is allowed in reserved forests unless a management plan is in place that indicates what may be hunted. Traditional cattle (below) use the forest successfully but are not very productive, and free-range animals need more food and water to be more productive. Both issues will be difficult to deal with, but the absence of management will completely undermine the goals of the management plan.

Guinea is a signatory of CITES (Convention on the International Trade in Endangered Species) and the CBD (Convention on Biological Diversity). The country also has a Forestry Code and a Faunal Code that specify rules and regulations about use of natural resources. These codes specify rules about seasons for hunting, burning, and so on, forbidding the hunt of integrally protected species. The list of these animals, however, has never actually been made law. The codes list different levels of protection within different categories of protected areas in Guinea. In reality, however, there are really only two levels of protection in Guinea: National Parks and Reserved Forests. There are two National Parks in Guinea: Parc de Badiar and Parc National de Haute Niger. Within the core areas of these parks, no hunting, grazing or harvesting of forest products is allowed.

Scattered throughout Guinea are a range of reserved forests. For each forest, rules of what is and is not permitted in the forest were set by ministerial decree at the time of their gazettelement, mainly during the colonial period. The present codes allow hunting in the reserved forests only if they have been placed under a management plan and according to the prescriptions within that plan. Today, many of these reserved forests are severely degraded. Despite this degradation, there are several reserved forests around the country that are still fairly intact. Indeed, most of the last remaining fragments of forest and wildlife populations are living within these areas.

Nevertheless, with increasing human population, the pressure for use of these lands for production is also increasing. Many of the reserved forests that are still fairly intact are those that are relatively inaccessible as a result of the lack of roads, or mountainous terrain. For the others, human encroachment is slowly diminishing the integrity of these areas and with it, biodiversity conservation assets of value to the country and the world at large.

This series of boxes offer some direct observations on biodiversity assets in the reserved forests visited in the course of this PEA.

Suti Yanfou

Very little forest cover still exists in Suti Yanfou. The area is severely degraded and only a few forest patches exist, usually at the heads of water courses. Several chimp nests were observed. Some people in this area do eat chimpanzees, so hunting of chimpanzees and habitat destruction threaten their long-term survival. Leopards are reported to exist here. Large caves and holes in the ground were observed where the leopards may be able to hide during the day, however, no scat or prints were observed. The cliff sides may provide important habitat for rock hyraxes

It seems that very little wildlife still exists here and for what wildlife does still exist, hunting pressure is very high. On the national highway close to the Suti-Yanfou, a hunter was seen selling an African porcupine by the side of the road. Interviews with hunters suggest that even such endangered species as chimpanzees and leopards are hunted.

According to the hunters, a few important wildlife species still exist here that are typical of lower Fouta and Maritime Guinea, such as the black and white colobus and the red colobus. These species have become extremely rare in Guinea, so it would be important to work for their protection if they really do exist. However, although hunters reported their existence, no evidence of their presence was seen.

Observations Regarding Current Efforts at Biodiversity Conservation

- **Concerns Related to the Baseline Study.**

As might be expected after reading the above section on forest inventory methods and outcomes, the work done on documenting the biodiversity assets also has a number of problems. These baseline studies are very important for three reasons. First, by identifying which species are present, it is possible to identify those that are endangered and must have special attention. Second, it is necessary to know how many individuals of a given species there are in order to have an idea of how many can be hunted per week, per month or per year. Third, it is necessary to know which species and how many individuals of each are present so their numbers and existence can be monitored over time to determine how the management of the forest is affecting wildlife.

The methods of wildlife sampling for the Baseline Study is not clear, and the results of these studies are extremely inaccurate. It is stated that all prints, feathers and droppings from wildlife were noted along 19 transect lines. The area on either side of the transect, as well as the length of the transect are not specified, so it is impossible to know which areas were covered.

Some species identified to be present in Bakoun exist only in central Africa (*Cephalophus leucogaster*), east or southern Africa (*Cephalophus natalensis*, *Canis mesomelas*) or northeast Africa (*Genetta abyssinica*). The type of hyena found in Guinea is probably the spotted hyena, not the striped hyena.

There is an apparent lack of credible expertise available to deal with biodiversity conservation issues in the preparation of the co-management plans.

- **The Management Plan and Its Implications for Biodiversity Conservation.** Any number of the proposed activities within the Bakoun Forest are likely to lead to adverse impacts on biodiversity assets. These include:

Bakoun

Bakoun consists mostly of bowals, wooded savanna, gallery forests and fallow land. It is typical of many of the ecosystems found in northern Fouta Djallon and Haute Guinea. The evidence of fauna here is also typical of other forests such as the National Parks of Haut Niger and Badiar and the classified forest of Fello Digué. Signs of lions, as well as hartebeest, roan antelope and waterbuck, are promising, as there are many areas in Fouta Djallon and Haute Guinea where these species have all but disappeared.

Although these species were present, evidence of their presence was slight. The paucity of animal sign, especially of large antelope, compared to several other areas in Guinea, suggests that hunting pressure is high, especially on the west side of the forest.

The area of Karoya seemed among the richest in the forest, and it was here that the greatest animal sign was observed. This could also be a factor of the time of year; as it was the end of the dry season, water was scarce, and animals may be concentrated around the river for water.

Chimpanzees are present in the forest but in relatively low density compared with some other areas in Guinea, especially in the Fouta Djallon. This is typical, however, for chimpanzees living in hot and dry climates; as they often have to travel longer distances for fruits and for water, their density is lower. The population, however, seems healthy, and it appears that multiple groups could live in this area and breeding between groups could take place. Interviews with villagers revealed that the greatest pests to the people were lions, which are estimated to kill about 10 cattle per year.

- Construction of roads: This will increase accessibility to the forest and will almost certainly increase pressure on the forest and therefore probably result in a decrease in biodiversity.
 - Reintroduction of species: In terms of wildlife, this is an implausible idea. If people are able to sustainably use what exists already in the forest, numbers of wildlife will naturally increase. While introduction of species would not have a negative effect on biodiversity (unless introduced animals brought disease or were introduced at unnatural levels) this activity is not advised.
- **Hunting Goes Unaccounted for in the Co-Management Plans.** There is no mention of the rules about hunting in the Nialama Contract for Co-Management. During its visit to the forest, the PEA Team came across a woman and two young men in the process of smoking game meat—apparently baboons and wart hogs—on the fringe of Nialama village. This woman was reportedly the same one from Guinée Forestière found by J. Carter during her recent village visit. There is a general lack of procedures for dealing with hunting and those that violate the rules.

Similarly, there is a distinct absence of rules and regulation about hunting in the draft Bakoun Forest Co-Management Plan. It states, “*La chasse au gibier est l’une des principales activités pratiquée tous les jours par les villages riverains de la forêt*” (pg. 37) and “*La plus importante richesse de la forêt classée de Bakoun reste la faune*” (pg. 52), yet this activity receives little attention. Confusion about the presence of given species on this forest and others (e.g., the assertion that leopards are “abundant” in Suti Yanfou) compounds this issue.

How will you know that you have a “*diminution du braconnage*” (pg. 43)? As the baseline study is inaccurate and no numbers are given for each species, it is impossible to know if hunting has increased or decreased.

The only fully protected areas will be Karoya, Bama and a band of 1 kilometer along the animal migration route. The Management Plan is proposing to reduce the protected area. The area left for wildlife is extremely small, and since many of the species in Bakoun have a much greater territory they will inevitably leave this fully protected area often. Increased hunting pressure therefore could cause populations of many species to decline

Partially protected areas will be closed to hunting for at least 5 years and then a faunal inventory will see if and what species they can hunt. Given that even baseline numbers are unknown, it therefore seems difficult to know if the population has risen or declined. How will the quota for each village be determined? What does “*l’aménagement de l’habitat de la faune*” mean (pg. 40)? There are some general statements like this without any detailed explanation or methodology of how it would be conducted.

Many people speak of people coming from Dabola, Labé, Tougué as well as Guinée Forestière in order to hunt in Bakoun. Increased ownership of the land by the villages surrounding the forest should hopefully discourage this. But what system will be put into place to deter the hunters from selling meat to foreigners?

Agroforestry Technology Misunderstood: At these sites, near Kagnegande Enclave Village in the Nialama Reserved Forest, the intent was to create an Overstory Canopy-based Agroforestry System with a prescription to leave any tree over 15 cm dbh. Among the issues found here: cultivation on sloping lands, large areas with no leave trees, leave trees scorched by fire, and no protection from fire (the fences were burned) or grazing (cows were seen grazing on crop residues on the day of the visit).

Agroforestry—Better and Worse: On the agroforestry plots near Nialama Village in the Nialama Reserved Forest (top photo), the site has about the right density of leave trees, and the flat land is most suitable for agriculture and has been protected, though there are some areas where more trees should have been left (even if under 15 cm dbh). The agroforestry plots of Kansouma Village, also in Nialama (bottom photo), showed little more than *défrichement*; any and all trees, irrespective of size, were cut, and there were no signs of protection of any kind.

Conclusions: The mistakes, contradictions and general lack of detail suggest that the work done on biodiversity conservation lacks both depth and professional capacity. If implemented as proposed in the plans, **it will most likely result in a net loss of biodiversity assets**—something that would be unconscionable in the light of the management goals of the project and the USAID regulations which govern it.

Rules about hunting are important but the **PEGRN will need to be very realistic and practical about biodiversity conservation objectives and plans**. The question is how to apply and enforce them. In Guinea, on the main street in front of the main hotel, one-half kilometer from USAID and 300 meters from the headquarters of the DNEF, one can see leopard skins for sale in open view.

Recommendations: Guinea is a country where many people hunt and many others depend on game meat for an important part of the protein in their diets. So mere prohibitions will not work; they cannot be enforced, and even if they could, there is still a need to manage animals populations, both to protect the integrity of the overall populations as well as to control situations where animals are raiding crops. It is manifestly clear that additional expertise will be needed to deal with wildlife and biodiversity conservation in the near term if the PEGRN is to take account of this important dimension of co-management.

The PEA Team recommends that if such expertise cannot be found in-country, it will be necessary to **bring in a specialist short-term consultant to develop these methodologies and train Guinean DNEF staff** (and others, possibly from an NGO) to do this work properly. This issue needs a near-term solution because, although it is possible to prohibit hunting in the reserved forests under co-management according to both the Forest Law and the Wildlife Law, until a proper management prescription has been elaborated, the issue of crop raiding and its impact on the livelihoods of local people demands a response.

Avoidance and Redesign: Given the many issues associated with present attempts to deal with biodiversity conservation, the major recommendation is to work to create greater capacity in this key area. A number of suggestions seem pertinent:

- If a **core team could be trained** in rigorous up-to-date methods of animal censusing, this team could help teach others in the future locations if USAID is going to expand from 10,000 hectares to 100,000 hectares. In addition to the staff at the DNEF who would be needed for developing professional approaches to biodiversity conservation and hunting, it may also be useful to think of converting some of the more able hunters into para-technical game guards for each of the forests under co-management.
- There are **several possible methods (transects, interviews with hunters, market surveys) that could be used to census wildlife**, depending on the resources available and the species of concern. Although following these methodologies may seem like a large investment up front, building the capacity for people to count and monitor wildlife is essential for the future management of ecosystems in Guinea. It is essential to get this right so the populations can be monitored and good estimates of off-take can be made.

Biodiversity Conservation Measures

The present data on biodiversity assets is insufficient for management prescriptions. However, the PEGRN may wish to consider some management options typically associated with timber management practices for biodiversity conservation (some of which have already been suggested in the current plans):

- Using buffer strips along watercourses.
 - Retaining snags or dead trees on timber harvest sites.
 - Retaining selective live trees on these sites.
 - Minimizing new road construction.
 - Retaining appropriate logging residues.
 - Using prescribed burning
 - Extending rotation ages on tracts of mature forest.
 - Establishing corridors between large tracts of mature forest.
- USAID and the DNEF may wish to look to the future possibilities of **a working relationship with international and national NGOs or other donor projects** with experience in this area, as a collaborating partner for introducing a sound approach to biodiversity conservation as part of the co-management process. The expectations of the cooperation with the USAID/Guinea-funded Chimpanzee Project is an example. Perhaps it would also be possible to identify a working relationship with Conservation International which currently has funding available for biodiversity conservation in this West African “Hotspot.”

5.3.2 Watershed Stability

The PEGRN activities in co-management of reserved forests originated with the continuing and abiding concerns about watershed stability in the Fouta Djallon. The Reserved Forest of Nialama covers more than half of the Pilot Representative Watershed (BRP) of Koundou, one of the original three watersheds where USAID, in consultation with the government of Guinea and other donor partners (EU and GTZ), agreed to concentrate its NRM program.

Many of the reserved forests in Guinea were established with protection of the upper slopes and water sources of the country in mind. Although the overall goal of forest management is to improve forest cover, certain areas will require a higher degree of effective protection, based on unambiguous criteria for protection and cost effective methods for its application. This issue of watershed stability remains of paramount importance, both nationally and internationally, however, to achieve results action must take place locally.

Observations

- *Watershed Management—Bringing Home the Benefits.* Convincing local people to invest in or absorb production trade-offs to achieve watershed stability that will benefit distance lands and peoples is almost always an issue in any country. All three of the present management plans seem to have lost sight of this objective despite the tangible achievements realized during the first phase of the project. At the base of the Suti Yanfou Forest, captation works and piping for perennial springs were built to supply water for the village of Sougueta in return for an agreement to protect the catchment areas directly above (“*têtes de source*”).

These areas remain very much intact and carefully protected and constitute excellent examples of community-based agreements to manage natural resources.

In Sougueta, local people and their leaders value the direct benefits of protection and fully abide with the prescription to protect these areas. Safe potable water supply is fundamental to food security and social welfare—an excellent indicator of real development. Around all three forests presently targeted for co-management, there are areas with similar opportunities, yet there is no direct allocation for similar activities in these forests’ plans and budgets. The PEA Team believes that overlooking spring development and catchment protection may be a missed opportunity for real achievement in forest protection and watershed management linked to real benefits for the local people who must accept the production trade-offs. Some may argue that spring development is being overtaken by government and donor sponsored programs at borehole development. While this may be true in some areas (as has occurred with the borehole at Linsan Saran and the adjacent protected spring on the edge of Nialama Forest), a much larger network of safe water sources will eventually be needed to serve the needs of a growing population. In any event, these protected catchments are in many cases probably also feeding the aquifers on which boreholes also depend.

Conclusion: The PEA Team believes that **catchment protection and spring development are an excellent way to begin to address the protection needs of the reserved forests.** It is important to emphasize that such development works are not just simply “gifts” to the local people to buy their cooperation in co-management. They constitute rational investments with tangible returns for both the local people and society.

Recommendation: The PEGRN partners are encouraged to **study this option and its implications** which will include: cost analysis for spring development and water piping; cost-sharing and management arrangements for both the initial investment and maintenance of the system at the village level; and the improved technology (mapping methods) to facilitate identifying these potential areas.

A Special Note about Sincery-Oursa Reserved Forest

Although the PEA Team recommends that **the present co-management approach and methods be further developed and improved before moving on to the new forests** in the Dabola area (or anywhere else for that matter), some comments on the opportunity and challenges of co-management and its applications for watershed management in Sincery-Oursa seem pertinent.

- The Classified Forest of Sincery-Oursa offers another possible version of the co-management model—one where the central benefit is water that will be used by the adjacent urban area of Dabola. This water, captured by the *barrage de Tinkissu*, provides potable water for the city and generates electricity for other areas of the country. Although the mayor of Dabola asserts that drinking water supply is adequate for the present system, he would like to expand the system to other parts of the fast-growing city. Electricity is now only provided at night because the water behind the dam is inadequate to allow 24-hour generation.

- In fact, the reservoir behind the dam seems both small and somewhat silted up. This makes the system that much more dependent on the quality and condition of the watershed and its capability for absorbing rainfall and slowly releasing it over the course of the dry season. The mayor would like to expand the canal system to bring water from the lakes on the heights of Sincery-Oursa Forest to enhance generating capacity and potable water supply. Although this may be a solution for the near term, it is probable that the lakes would also be affected by the condition of the watershed and the forests that cover it. At present, the forest cover is being slowly degraded, owing to grazing, fires, illegal cutting and perhaps even charcoal making (there was smoke rising on the heights above the city that looked like charcoal kilns). As the watershed becomes more degraded, its function will decline and the runoff will become more torrential, leading to higher runoff (possible flooding) and lower lows (water shortages in the late dry season for hydropower generation and water supply).
- The PEA Team visit to Sincery-Oursa, albeit rather short, did serve to identify some more specific points that must eventually be taken into account when co-management is attempted. These points include:
 - Issues associated with the actual limits of the forest, including the fact that much of the area on the plain in front of the mountain seems to have been converted to agricultural land and that process is continuing despite the existing bornage.
 - Concerns about the mapping of the limits done by the BCTT on the photo-mosaics, which for some reason has changed the numbering system of the bornes from numbers to letters, suggesting confusion about their placement as well as different limits seen on the Russian maps.
 - The rather obvious reality that the face of the forest closest to the city of Dabola is—or should be—almost entirely a protection area because of the steepness and rockiness of the slope; this contrasts with its exposure to the pressures from a growing urban population, now exacerbated by the arrival of refugees from conflicts in the south.
 - The likely complications to a co-management approach from having to deal with this large urban population.
 - The fact that villagers living on the plain adjacent to the forest report that once perennial springs are now drying up during the dry season, suggesting that the degradation of the watershed function has already begun to be evident.

Sincery-Oursa offers the opportunity for financing co-management by taxing—albeit very lightly—electrical generation and potable water supply for the urban areas. Naturally, it is a more complex issue that would require the cooperation of both municipal authorities and their service providers (for power and water) and doubtless others. However, should management not be done, it will be a *prima facie* case of degradation of the classified forests having significant and tangible adverse environmental impacts (water and electricity shortages) on a larger segment of society (beyond the villages on its periphery). Because of the urban stakeholders involved, the PEGRN Project would have to be very sure that it is able to properly implement co-management before it starts there or they would risk considerable criticism. Both USAID and the DNEF need to be aware of this risk lest such a high profile situation turn against them.

5.3.3 Wetlands and Agrochemicals—Two Sensitive Topics

In many of the original proceedings from when these reserved forests were gazetted, the needs and existing uses by local people were discussed, often with them, and some provisions made to accommodate them. For all three of the forests currently targeted for co-management (and also in Sincery-Oursa and Balayan-Souroumba), there is explicit language in the *Arrête de Classement* allowing “*culture de riz de marais la ou se prêt*” or, more precisely, “*dans les bas-fonds naturellement inondes.*” Accordingly, and not surprisingly, many of these bas-fonds are currently being used for agricultural purposes, especially in those forests under tighter human pressures. Areas being used for these purposes were seen on the Nialama, Suti Yanfou and Bakoun forests.

The management plans for two of these forests discusses the possibility of allowing additional areas to be used for the same purpose. In Nialama, the plan calls for an additional “*nombre maximum de 5 bas-fonds supplémentaires ou d’une superficie de 1 ha (la plus petite),*” although it notes that the original areas of this kind would be “*avalises et consignes en annexe au contrat d’aménagement entre la DNEF et le Comite Foret*” (although this list is not attached to the version of the contract made available to the PEA Team). In Bakoun, there is a proposal in the management plan to bring an additional 19 hectares of bas-fonds under cultivation during the first 5 years and a total of 50 such hectares over the 20-year course of the plan. For Suti Yanfou, no additional areas are foreseen, presumably because of the limited scope of these areas on the forest and the fact that all have been already cultivated.

In all the plans about these forests, mention is made of a prohibition against the use of agrochemicals. When questioned about this prohibition, project staff indicated that this was in response to a condition placed upon them by USAID because of its internal environmental regulations. In the past, mission and project personnel in many countries have sought to avoid the strict regulatory requirements associated with the use of agrochemicals, simply by prohibiting the use of USAID funds for that purpose. This is no longer a satisfactory response to this issue. A more enlightened approach holds that if a program or project seeks to establish a farming system where full production would normally entail the routine use of agrochemicals, the personnel in charge must address the matter of agrochemical use as an indirect but nevertheless real impact of the activity.

Observations

- **Wetlands and Environmental Sustainability.** The adjudication of use rights in these bas-fonds involves potentially sensitive wetland areas with the consequent likelihood of adverse environmental impacts should they be converted for agricultural purposes. It is not hard to appreciate the fact that wetlands and water courses play an unusually important and multi-functional role within the dry forest areas of the Fouta Djallon. Acting as sponges to absorb runoff, they serve as regulators of stream flow over the course of the year and may be fundamental in avoiding flooding and to maintaining perennial supplies of water for both humans and wildlife. As mentioned above, even modest water resource supplies change ecosystem parameters considerably and provide an element of habitat diversity not found on adjacent savanna areas.

The PEA Team finds that the decision to increase the availability of lowland areas within the reserved forests for conversion to agriculture must be carefully reconsidered. This decision contrasts sharply with the prescriptions for protecting stream courses by enforcing non-intervention buffers (5–10 and 20 meters wide) along different types of water courses. It should be recognized that these bas-fonds are actually wetlands that occur along wide spots in the drainage pattern. Therefore, the transformation of these vital wetland areas is likely to have a profound effect on the overall ecosystem and on the sustainability of the co-management plans.

- **Agrochemical Use.** Little could be learned about the actual use of agrochemicals on the bas-fonds or, for that matter, on the farmsteads of the local population in the surrounding area. Presumably, their use is relatively limited, given the subsistence nature of smallholder farming systems. However, one of the basic premises of allowing cultivation on the lowlands within the reserved forests is the potential for the intensification of agriculture on these areas, including lowland rice and vegetable production and contra-season farming opportunities, to counter pressures on the rest of the forest and meet local food security needs. To realize the fullest benefits of this enhanced production opportunity, farmers will have to turn to agrochemical use—fertilizers to maintain the fertility of the more intensively cultivated site, pesticides to protect more fragile or pest-sensitive vegetable crop species, and pesticides to counter an increase in plot infestation due to mono-cropping or repeated rotations of horticultural crops. The wise use of agrochemicals in conjunction with a wide array of improved agronomic techniques (including integrated pest management, or IPM) will eventually be part of an improved farming and natural resources management strategy for the areas in question and should not be avoided.

Although there is presently no direct USAID contribution for the purchase of agrochemicals, experience worldwide points unequivocally to the need for vigilance and training to avoid future problems. Farmers with few resources to spare are actually more likely to use agrochemicals incorrectly—without protection and appropriate equipment, applying faulty dosages or applications. It is manifestly clear that the use of agrochemicals in the lowland or wetland areas can exacerbate adverse environmental impacts through contamination of soils and waters, which may have serious environmental health implications (toxic substances in surface water supplies), or affect biodiversity (the unique species that inhabit the limited wetland areas). In short, the matter of agrochemicals cannot be avoided if co-management activities (and similar activities under other PEGRN components) are to be fully sustainable.

Conclusion: While it is easy to understand the rationale for allowing local people to continue to cultivate on these wetland areas within the reserved forests because of the precedents established under the original classification proceedings, **continued expansion onto new areas of this kind needs careful scrutiny from the environmental perspective.** Similarly, the rationale for and efforts to avoid the issue of the environmental review of agrochemical use are incongruent with present accepted practice by USAID and must be dealt with effectively in order to realize the full benefits of the enhanced natural resources management activities of the greater project.

Recommendations

Avoidance and Redesign. The PEA Team recommends that the PEGRN staff begin to **examine the issue of wetlands conversion, taking account of the full range of costs and benefits** (both socioeconomic and environmental) that this decision entails, for all concerned. Clearly, the issue of wetland resources (as well as many of the other dimensions of the water resource situation on these forests) deserves special attention in both mapping and resource inventory efforts associated with co-management planning.

Having said that, it would appear likely that there are very few reserved forests under significant human pressure where large areas of wetlands have been left untouched. In those cases, further inroads into this valuable land-use type would be unacceptable. In other such instances, as in the case of Bakoun where human pressures are minimal, it would be incongruent with the proposed conservation orientation of a co-management plan best suited for such forests, to propose expansion of the area of bas-fonds being cultivated.

On the agrochemicals front, USAID should work with the PEGRN to clarify its approach to agrochemical use and ensure that this topic is dealt with affirmatively in the near term. The following more specific actions are proposed:

- As a first step, the PEGRN should **designate specific staff members to be responsible and accountable for developing the project's policy and approach to agrochemical use**—both inorganic fertilizers and pesticides.
- These staff members should prepare **a list of known pests (insects and fungi) of the traditional crops being grown by farmers** in the areas around the reserved forests. Such a list could be further developed with recommendations about occurrence, detection and treatment as **an early contribution on pest control and pesticide use to an eventual up-to-date project field manual on improved agriculture and natural resource management.**
- Along similar lines, there is a need to **compile the corresponding information on approved pesticides and their safe crop-wise application, handling and storage.** The PEGRN would also be well advised to survey the present agrochemicals being used and proactively provide advice on alternatives should non-compliant chemicals be identified. The alternatives would include safe pesticides and other agronomic measures, including integrated pest management.
- All of the above measures would be fundamental precursors to compliance with the agency's regulations on the use of agrochemicals and pesticides under Reg. 216. The PEA Team recommends that USAID and the Winrock technical assistance team undertake the above activities with a view to **complying with the formal regulations by the end of 2002.**

Mitigation Measures. Once the safe pesticides are known, it will be important to ensure that they are being correctly used. The PEGRN should prepare **local level training courses** for participant farmers on the safe storage, handling and application of pesticides and the safe disposal of pesticide containers. A **village-level para-technician**—a farmer well trained in these procedures—might be appropriate given the current low-intensity use of pesticides. It would also

Natural Resources Management Is about Making Good Choices

The following is a list of the issues that prompt local people to make poor choices about how to use and share forest resources (the social act of management):

- **Land and Tree Tenure Issues**—lack of certainty that they will benefit from conservation.
- **Equity Concerns**—others appear to be getting a disproportional share of benefits.
- **Stakeholder Representation**—their interests not well represented during planning and execution.
- **Lack of Understanding**—they simply do not fully understand their roles, rights and responsibilities.
- **Poor Cost/Benefit Ratio**—real costs underestimated or benefits overestimated.
- **Conflicts of Interest**—the management system provides mixed messages about behavior.
- **Unwillingness to Internalize the Costs of Management**—projects as social welfare.
- **Improbable Solutions Offered to Them**—unsound technological prescriptions.
- **Non-Consensual Behavior**—no consequences for failing to abide with community consensus.

be incumbent on PEGRN staff to ensure that full efforts are being made to introduce both organic farming and integrated pest management techniques as part of improved farming systems and natural resources management activities.

5.4 Socioeconomic and Institutional Assessment

The above issues notwithstanding, few familiar with community-based natural resource management elsewhere around the globe would be surprised to hear that the socioeconomic and institutional dimensions have consistently proven to be the most difficult facet of these programs to put in place. Perhaps that is because the change from the status quo—often one of open conflict, and worse, between local people and the forestry authorities—means significant human behavioral change on many fronts.

The technological feasibility of co-management plans and operations and, in turn, their environmental sustainability are predicated on the idea that the communities understand them and will implement them as agreed. Anything that leads to poor implementation of these agreements—in the main as a result of changes in the cost-benefit ratio for community investments or

perceptions of the same—which cause local people to choose less than optimal practices, may lead to adverse environmental impacts. As has been recorded elsewhere, many of the most significant achievements of the PEGRN are in the area of participatory management. Having said that, there are still clearly some significant issues associated with the community dimensions of the present co-management approach and methods.¹² The following section discusses the PEA Team's findings about the socioeconomic issues, some related to technology implementation problems mentioned (e.g., protection and agroforestry) and others, issues in and of themselves related to the community dimensions of the model and their potential effect on sustainability.

5.4.1 Achieving Genuine Social Consensus and Making the Right Choices

To the credit of all concerned with the PEGRN, there was a clear recognition early on that the key to improving the situation of the reserved forests in Guinea and enhancing their contribution to development, would require a participatory approach. Much of the present degradation in

¹² The PEA Team found the rather forthright *Performance Improvement Review* (Fischer and Furth 2000) particularly useful in understanding the continuing challenges to genuine participatory management of the reserved forests. This section builds on that very cogent analysis, itself carried out in a participatory manner.

these forests is due to the fact that people living in and around them have used them without rules or limits as “open access resources”—the right of all but the responsibility of none. The social processes for co-management are clearly on the right track and exemplify the kind of work on governance issues that is so much in vogue today in discussions of community-based natural resource management.

The introduction to this section of the report underscored the importance of understanding management as a “social act” whereby local people make collective and relatively consensual choices and decisions about the use (limits) and sharing of resources. The present approach to developing co-management agreements (the actual instances where the co-management model is being applied) is to combine the growing understanding of the needs and opportunities for resources management, derived in participatory consultation with the users and work together with them to suggest solutions, responses, interventions and the roles, rights and responsibilities of all concerned for implementing what has been decided. It is not an easy task (and has not been elsewhere either); even in stating it, the combinations and permutations of interests, needs and opportunities already suggest the complexity of the challenge.

Table 5.3
Present Proposals for Co-Management Fee Structure¹³

Activities/ Resource Use	Nialama	Bakoun			Suti Yanfou
		FC I	FC II	FC III	
Agroforestry plots	20 measures of crop per harvest	1,000 FG per person per year	2,000 FG per person per year	1,000-2,000 FG per person per year	3,000 FG per person per year
Bas-fond cultivation		3,000 FG per person per year	3,000 FG per person per year	3,000 FG per person per year	
Grazing		500 FG per animal per year	500 FG per animal per year	500 FG per animal per year	500 FG per animal per year
Hunting		5,000 FG per person per year	1,000 FG per permit per year	1,000 FG per person per year	500–1,000 FG per permit per year
Commercial bamboo cutting	5 FG per piece	<i>Aucune redevance</i>	<i>Aucune redevance</i>	<i>Aucune redevance</i>	Not mentioned
Firewood	50 FG per stère				
Karite	No information	500 FG	1,000 FG and one liter	1/10 liter	No Karite exists
Nere				500 FG per year	
Beekeeping		10% of annual production	10% of annual production	10% of annual production	
Gunpowder		225kg per year	225kg per year	225kg per year	
Membership fee (each member) of Comite	No information	1,000 FG per three months	1,000 FG per three months	1,000 FG per three months	Not yet decided
Commercial timber cutting	Changing the approach	Not yet defined	Not yet defined	Not yet defined	Not yet defined

¹³ The PEA Team could not help but remark that there appear to be many different views of the level of these fees, among the participant population and that which is mentioned in the management plans.

Observations

- **Local participation and representation and an understanding of co-management.** One gets a sense that part of the difficulties as reported in the PIR about the process of participation are very similar in nature to the observations above about forest management planning in general: the PEGRN Team appears to be attempting too much too soon, in this case, in building the governance structures for co-management. Form should follow function, as recommended by Polansky (2001), for example, by setting up interest groups directly related to the incremental steps to co-management operations, such as a sawyers group, non-wood forest products group, beekeepers and so on in the new forests being brought under management. Promoting understanding and transparency within the present multi-tiered village-level management structure all at once, in terms of territories, rights and responsibilities, may simply be too complex or too time consuming. And without a well defined system and reasonable consensus, it will always be more challenging to deal with the more difficult issues of investment and production trade-offs that are most likely to have the greatest impact on sustainability of the management plan. Small wonder that the issue of protection so fundamental to the agreement in Nialama has not actually been addressed.
- **Transaction costs and bureaucracy.** A collateral effect of this complexity is the higher transaction costs of efforts by the forest committee members (and others) needed for decision-making. There is a manifest concern that the process is becoming too bureaucratic. This has also led to a situation whereby those who have spent so many tedious hours trying to resolve issues and manage the implementation of the agreement feel compelled to require compensation for their services. This could further become a conflict of interest in that those making the decisions about resource use may be tempted to increase off-take to generate resources to pay themselves.
- **Leaving time for village-level decisions.** However complicated the process may appear, it is likely that the most difficult and time consuming decisions will be made by the villagers themselves as they decide how to share resources. Official decisions and internal processes within co-management should respect the need for this time and ensure that decisions are also linked to the imperatives of the agro-ecological calendar (e.g., the time for land clearing, for early burning, for sowing, for beekeeping). As an example, the double-tiered system of *ententes* to release lands for agroforestry seems like an over-structuring of the process, which has needlessly delayed the decisions this year of where to carry out agroforestry on Nialama. There is some risk that farmers will not have time to clear and burn their plots this year in time to sow at the beginning of the rains—especially if the PEGRN personnel are going to attempt to reverse the setbacks and negative impacts experienced last year.

The PEA Team recognizes that efforts related to designating agroforestry plots for use by different villages and villagers are presently being developed and tested. It believes that the ultimate outcome of a sustainable agroforestry system is one where the local people involved understand that they will have tenurial rights over these plots and that their efforts to protect the canopy of “leave trees” will benefit them by accelerating and improving the fallow process. When this principle is fully appreciated by the local people, the lesson learned—and indeed an important one—will be that real incentives are a better choice than organizational

prerequisites in achieving sustainable land use. The PEA Team is confident that those involved in setting up the organizational arrangements for co-management fully understand this principle of community-based natural resource management related to security of tenure.

- **Taxing subsistence use—does this make sense?** In Nialama, one of the Forest Committee's reactions to the high transaction costs of its work was the decision, albeit apparently taken in close association with the PEGRN partners, to tax resource use within the forest as a means of generating an operational budget for the committee. While this may appear justifiable for such commercial extraction as timber cutting or fuelwood production for the marketplace since these activities will be more closely managed and monitored, applying it to other user groups bears some scrutiny. This is especially the case for taxing subsistence users collecting or harvesting basic necessities. Why should people be taxed to pay for customary user rights, particularly something that is an example of subsistence use and, in many cases, even documented in the *Arrête de Classement*?

These proposed fees might be more easily understood and justified if there were some indication that they are anything but arbitrary—that they were calculated on the basis of the costs of managing or administering the various interventions, that there was some kind of analysis of how much could be collected or that there was some kind of estimate of the costs of general administration by the Forest Committees. This matter is the “transparency” issue personified: the notion that community organization and structure must affirmatively seek to be clear and forthright about decisions taken by an executive body which affect its members.

This issue also calls into question the actual intentions and capabilities of the PEGRN to provide substantial financial support for the interventions on a given reserved forest being brought under co-management. In effect, it is the test case to quantify the magnitude of the recurrent costs that the government of Guinea will have to provide to meet management objectives that are clearly beyond the capabilities of the local communities. The PEGRN seems disposed to allocate significant budgetary resources for Suti Yanfou and Bakoun according to the budget tables within the new co-management plans. The PEA Team endorses the idea that in certain cases both subsidies and incentives by the government, or in this case, by the donor, are justified for a number of reasons. These reasons include the experimental nature of the program itself and the fact that they are justified by the off-site costs to society, in both social and ecological terms, from the failure to reverse natural resources degradation and the poverty so directly linked to it. The issue, however, is one of finding the least cost approach that eventually can be supported by government itself.

The Forest Committee in Nialama will be presenting their table of fees to the General Assembly soon; the reaction of the villagers and their compliance bears watching. Participating villagers who see their tenuous hold on financial security eroded rather than enhanced by these management plans, prescriptions and responsibilities can quickly turn against the program and go back to making the wrong choices about resource use.

Conclusions: Although the **progress with organizing the villagers to participate in co-management is probably the most advanced part of the whole enterprise**, its great

complexity, as put in place in Nialama, and starting in the other two forests, makes it very difficult to understand for all concerned.

Recommendations: The PEA Team believes that one of the most important results of the development of the co-management of reserved forests process in Guinea to date is the experience gained in participatory natural resources management by all involved. It whole-heartedly **endorses the continuation of the Performance Improvement Review process**, and would make the following remarks about it and its mandate:

- Genuine **participatory co-management arrangements** are not simply the means to managing and conserving the reserved forests. Their establishment **should state formal objectives** (and intermediate results within the USAID Strategic Planning matrix) of the process that epitomize the best practices of community-based natural resource management where people learn to work together to diagnose their problems and identify and implement solutions.
- The PEGRN Team may wish to consider adapting the participatory model for the Suti Yanfou and Bakoun Forests that formalizes the working agreement between the Forest Committee and the DNEF. The co-management process is new to Guinea and both local communities and state authorities are not used to establishing a working dialogue based on partnership. This difficulty may be greater than it needs to be simply because the DNEF sees the *Contrat de Co-Gestion Forestière* in all its complexity and an appended *plan d'aménagement* as the starting point for management interventions. This approach forces everyone, including the villagers, the DNEF authorities, their representatives at the *cantonnement* level, the NGO agents facilitating the process and the technical assistance team to have all the pieces in place before the real nature of the relationship can truly be engaged. Perhaps a better choice in the sincere quest to simplify the Nialama experience would be to **develop a model contract that can be incrementally put in place based on sequential steps to understanding and performance.**

Incremental Steps to a Co-Management Agreement

The PEA Team recognizes that its recommendation about incremental implementation of co-management is easier said than done. The following are some suggested staggered levels of understanding, agreement and actions that could be steps along the way—to be brokered with the DNEF by the *comite inter-villageois* on behalf of participating communities:

- Cessation of “illegal” activities within the forest in return for PEGRN support.
- Agreement on the redefined forest boundaries and territorial limits (*unités de gestion*) within the forest with DNEF support for sound forest management on the area immediately *hors forêt*.
- Prohibition on the use of fire to collect wild honey in return for apiculture development support. Early protection of key *têtes du source* in return for spring development.
- Full protection for sensitive areas—fragile sites or species habitat.
- Adoption of improved agronomic and soil and water conservation techniques in areas to be sanctioned for agriculture.
- Strict adherence to agroforestry prescriptions on these plots as a prerequisite for continued participation.
- Limits to the numbers of animals on areas identified for grazing in the forest.
- Full respect for hunting regulations in return for managed hunting rights in the forest and authority to exclude others.
- Adjudication of forest lands suited for agriculture to local farmers occupying them on the fringes of the forest with cessation of further incursions.

Prime Wildlife Habitat in Bakoun: Escarpments found in many forests, like this one along Bakoun's northwestern side, are interesting sites for wildlife. Here there were many signs of baboons and porcupines, and possibly leopards, emphasizing the need for their protection. In addition, because of their steep terrain, they should be protected for watershed purposes. And climbing to these rugged heights provides the forestry staff with an excellent overlook for reconnaissance observations of the forest.

Baboons in Bakoun: Troops of baboons were seen in several places in Bakoun. These, seen on the western side of the forest, followed the team's vehicles and appeared unafraid—though they scattered on seeing someone descend from a vehicle on foot. Although larger game animals and their signs were little seen on this side of the Bakoun Forest, suggesting hunting pressure because of ease of access, there are obviously still interesting game populations worth protecting here.

Tinkissu Barage and Its Watershed: The Tinkissu Barage and Hydropower Center provides electricity and piped water to Dabola Town. Electricity in the late dry season must be rationed for use at night only, and the reservoir seems rather small and shallow, filled with sediments brought down from the hills behind it. These hills are part of the Sincery-Oursa Reserved Forest and already rather degraded, especially on the side nearest the barage and the city. Fires, probably the result of unauthorized charcoal-making, were seen on the hills above the dam, in plain site of the town that this watershed serves. Illegal forest use and watershed degradation cause water supplies to falter—and may make this important piece of development infrastructure lose its effectiveness.

- **Getting a handle on the real costs of the forest committee** and trying to make them more manageable will be fundamental to simplifying the co-management approach. There is ample reason to believe that the forest committees in the new forests of Suti Yanfou and Bakoun will learn about the compensation issue in Nialama and also want to be paid for their services. In both cases, given the different constraints on production, it will be more difficult to arrange. This issue needs to be addressed head-on to avoid creating the circumstances that lead to conflicts of interest and misunderstandings.

5.4.2 Financial and Economic Analysis—A Key Element of Sustainability

The most promising forest co-management experiences worldwide are founded on community-based enterprises that carry on financially viable commercial activities derived from the various resources of the forest in accordance with a management plan to ensure social and ecological sustainability. Additionally, forest management funds fed by a part of net profits are created to cover recurrent forest management costs, such as road and trail maintenance, guarding, timber stand improvement, fire protection and operational costs. A forest management committee or some other formal organization is normally established with the purpose of implementing the management plan, representing the villagers' interests, handling the forest management fund, and coordinating the management responsibilities of the community with those of the DNEF.

If the main purpose of implementing a co-management system for a public forest is the sustainability of the forest resources through the involvement of the local population, a corollary purpose would be the improvement of the well-being of the local population. This improvement in well-being would be derived from economic activities conducted by the local communities, based on the sustainable use of the resources of the forest. In this process, financial and economic analysis has a role to play in helping decide which activities should be undertaken in order to optimize the welfare of the population involved within the potentialities of sustainable resource use. Therefore, it should be an essential factor in the preparation of management plans, especially if they are to be the contractual basis of forest co-management arrangements.

Similarly, co-management efforts involve the local villagers and the DNEF in the implementation of a number of changes in resource use that will bring about sustainable management of the forest over time. Such changes imply investment and continuing costs in time and effort, materials, and funds on the part of both the villagers and the DNEF. Financial and economic analysis can be particularly helpful in selecting a sustainable course of action, which, over time, will reverse the current state of affairs.

Observations: The present efforts and documents, including the economic and financial analyses in the management plans and the more recent consultant report¹⁴ present a number of issues in terms of using these analyses for ensuring sustainability, including:

¹⁴ A draft report on the "Economic Analysis of Management Plans: Suti-Yanfou and Bakoun Classified Forest" by Christophersen and Bah was submitted for review on March 5, 2001. The analysis in this report used the management plans for the two forests as a basis. As this PEA Report points out, these two management plans have important shortcomings that, combined with errors of analysis by Christophersen and Bah, render their report difficult to apply. Additionally, economic analysis needs to go beyond the scope of such plans if it is to contribute to an adequate assessment of the environmental effects of the proposed co-management schemes.

- **Lack of a Base Case Scenario—Understanding the Economic Implications of Forest Degradation.** To analyze investment options, they need to be compared to a base case. Normally, a base case means that things continue along their current trends unless there are objective reasons to believe that some other scenario is more likely. These trends need to be projected into the future. Such projections must take account of population growth, overall development plans of the areas under consideration (e.g., physical and social infrastructure), the evolution of markets for the commodities currently being produced, expected impacts of continued present activities on the condition of the resources contained in the forest, and expected external effects (e.g., on water flows, microclimate, erosion, biodiversity). Basic information for most of these factors can be obtained by working through the checklist in Appendix G.
- **Cost-Benefit Analysis—Who Pays, Who Gains.** The next and perhaps most important step in the financial and economic analysis is the assessment of a limited number of management options and their consideration by the decision makers. The options should consider land use practices and other activities with which the villagers are familiar, in which they are interested, and which produce goods that can be sold in accessible markets. Many of these practices will probably require investments or recurrent costs. On the other hand, these costs may be compensated by income generation opportunities and new marketable products. A careful assessment of the costs and benefits expected over time from these investments and new outputs needs to be conducted in order to compare the value of the options under consideration with the base case. In this part of the analysis, the decision makers must have as clear as possible an understanding of the access to markets, the competition, the prices that can be expected for the products considered and the expected costs of production.

In both management plans, and in the separate report on economic analysis (Christophersen and Bah 2001), there is a strong focus on the *Comité-forêt*, while it is not clear how the villagers would be improving their income. The central focus of the analysis should be what types of economic activities, to be conducted by the participating local population, involving changes in use of the forest resource, will bring about a higher degree of well-being that will encourage sustainable resource management. It would already appear that financial expectations have been overstated which may tempt villagers to find ways to increase their benefits that are outside the management plan and lead to adverse environmental impacts.

- **Understanding the Full Picture for Co-Management Economics.** Apart from analyzing the productive activities to be conducted by the villagers, there may be a need for other investments, like the rehabilitation of degraded areas and other expenditures related to forest protection. This brings up a substantive issue in forest co-management, which is the sharing of responsibilities regarding investments and other costs between the local communities and the DNEF. While it is normal to expect that the villagers will be willing to invest and pay for recurrent costs (including taxes and other legally required charges) for activities that benefit them directly, it is not evident that they should or could pay for activities that benefit society at large but have no direct payout for them. Additionally, some investments and recurrent costs could be a legally required responsibility of the DNEF (e.g., delineation and

demarcation of a classified forest, construction and maintenance of major access roads, fire control measures and other basic forest management infrastructure).

Interventions related to the rehabilitation of degraded areas should be estimated on the basis of what society would have to forgo (or endure) by not incurring such costs. External impacts derived from continued degradation of forest resources often include damage to roads and bridges, irrigation infrastructure, inland fisheries, farmlands and human settlements. Other impacts include reductions in water supply, soil productivity and biodiversity. While these do not affect the villagers directly, they represent impacts on society at large that are derived from a given intervention, and therefore should be included in the economic calculations. The economic value of these effects is not easy to measure. However, reasonable estimates can be obtained, for example, by assessing costs of repairing infrastructure that may suffer damages, by evaluating productivity losses in potentially damaged farmlands and other productive assets, or by calculating the value of forgone production resulting from affected irrigation systems.

Ultimately, decisions will be made jointly by the Forest Management Committee and the DNEF based on a number of considerations, one of which is the expected economic efficiency of the various options. While there may be objective reasons to select an option other than the most economically efficient one, the decision makers will have been informed of what they would give up by making such a choice. This should clearly demonstrate the essential value of financial and economic analysis in the preparation of management plans in forest co-management arrangements.

- **Shortcomings with the Present Financial and Economic Analysis.** It is extremely unlikely that the present management plans and their economic and financial analyses could serve as a starting point for the eventual preparation of effective contractual documents. The present plans and their analyses will require major revisions, in a more credible approach to management prescriptions and a sounder methodology for financial and economic analysis.

The information provided in the documents reviewed does not permit an assessment of overall economic implications of the co-management model, or of the needs and opportunities involved in this type of model. Furthermore, while the management plans in their current form do not seem encouraging, they are not based on a thorough economic analysis of the opportunities presented by the Suti-Yanfou and Bakoun forests. More thorough analytical exercises may reveal opportunities not yet identified. Additionally, the management plans for these two forests do not provide a review of the experience in the Nialama Forest Reserve, which could provide additional insights.

Financial profitability sustained over time from the standpoint of the local populations is essential. Investments, changes in practices (production trade-offs to achieve protection and conservation) and other activities must be selected with this criterion in mind, otherwise participation on the part of the populations cannot be expected. It would appear that the financial and economic analysis of the present management plans has been applied after they have been designed. Financial and economic analysis should be considered early on as a key factor in the selection of the activities to be conducted. Because farmers are poor does not

mean that they will not feel financial disadvantages from ill-conceived plans for certain interventions.

- **The Cost Structure for Co-Management.** Another major issue is that there is no clear indication on the separation of rights and obligations between communities and the DNEF. This is fundamental since the returns to the communities will depend on their cost structures, which will be affected by their obligations. Both management plans and the separate report, “Economic Analysis of Management Plans: Suti-Yanfou and Bakoun,” assume the self-financing of anticipated interventions. This does not seem realistic, especially in the case of Suti-Yanfou, where so much seems to be needed in the way of protection investments. Should the local populations be charged with these activities, or should they remain the responsibility of the DNEF? This is particularly important, considering that the villagers would probably not gain any revenue from these protection or rehabilitation investments, while a substantial part of the benefits would accrue for the society at large. In this same context, some infrastructure investments like firebreaks and concrete boundary markers seem excessive if what is pursued is sustainable resource use. If legally required, why should these investments not be part of the obligations of the DNEF?
- **Living with the Marketplace and the Costs to Supply It.** In the particular case of the Bakoun forest, there is a major problem of accessibility. This is a disadvantage for the marketability of products—and an advantage for resource conservation. If this area is not under any real threats and has no clear current potential for commercialization of products, attempts to place it under a co-management scheme under the management plan in its current form, may be premature.

Conclusion: Financial and economic analyses have an important role to play in helping decide **which activities should be undertaken to optimize the welfare of the population** involved, within the potential of sustainable resource use. Unless local people realize sufficient near-term, tangible benefits from their participation in co-management, there is some likelihood that they will go back to past practices of unsustainable use.

The eventual **economic and financial sustainability** of co-management of reserved forests, without donor **support should be a basic goal** and a principle. However, this may not be possible in every *forêt classée* in Guinea given the present condition of some of these forests.

Recommendation: A set of more thorough and rigorous financial and economic analysis exercises should help in identifying candidate forest areas with high probability of success.

5.4.3 Institutional Capabilities—Replication on the Road to Sustainability

Institutional sustainability takes on great importance with co-management because it is something new to both the communities and the DNEF. Early proof of a sustainable model is the ability to replicate it elsewhere under similar conditions. Co-management by definition is about relationships, in this case between the local people or user groups and the National Directorate of Waters and Forests. The DNEF represents the national interests of the country and the larger

society in maintaining and managing the reserved forests of Guinea. In the past, that relationship was largely one of “command and control” with the state body in charge of implementing the regulations under which these forests were gazetted. Because this relationship has broken down under increasing population pressure and the inability of the DNEF to muster the staffing, resources and capabilities to fully protect these forests, a new and more progressive relationship is being developed: co-management.

The objective is to engage the communities living in and around these forests with the DNEF in a partnership with shared roles, rights and responsibilities for both. To fully perform their respective obligations under this new arrangement, each side will need both structural and functional attributes. In addition, they will need a smooth working relationship founded on both *de jure* and *de facto* principles.

Observations: Not surprisingly, and despite the fact that this working relationship is a result of concerted efforts by project personnel and quite advanced, there are still issues that hinder the effectiveness and efficiency of the institutional relationships needed for sustainable co-management.

- **Tentative Notions of Partnership.** In discussing participation above, there was an observation that there is still a lack of understanding of the notion of partnership in natural forest management. This may be in part the result of an overly conservative approach to relinquishing decision-making responsibilities to the communities. The management plan for Bakoun states, for example, that the “General Assembly is looking forward to receiving its attributions from the DNEF during the signature of the contract” (p. 57). Furthermore, it states that the general assembly needs to get an authorization from the DNEF about programming activities. Indeed the whole section within this management plan seems both tentative and overstated in the case of the forest committee. Twelve attributes “thought” to be their roles are mentioned. On the other hand, the role of the *Cantonnement Forestier* is simply described as monitoring the implementation of the plan and the forest, to corroborate infractions, and, in an “expanded co-management role,” co-animate the structures and commissions—whatever that means.

In fact, during the field visits it was easy to corroborate the fact that the DNEF field agents at the *cantonnement* level do not fully understand their roles and responsibilities. There would appear to be an absence of efficient record keeping at the DNEF field level; the *Cantonnement Forestier* agents do not have records on resource allocations (agroforestry, bas-fonds and tree cutting) within the Nialama Forest. Similarly, they do not apparently have knowledge of other sector activities taking place off the forest within the prefecture. During the visit to Nialama, the PEA Team came across a series of large valuable trees (Khayas and a Linque) that had recently been cut with a chain saw right on the periphery of the forest. When questioned about these activities, the *chef du cantonnement* said that any cutting was authorized at the *chef du section* level.

It seems clear that the great expectations for the role of the Forest Committee, so amply described in the management plans, will require a parallel structure for the local agents of the DNEF. Unless their role is more clearly specified, they are likely to fall back on their older

authoritarian roles which would be the antithesis of partnership. Furthermore, as the *Cantonnement Forestier* has been strengthened with additional transport and per diem resources, they must also exercise their role in the greater prefecture around the forest. It is inconceivable that the reserved forests are being brought under co-management while, just over the limit, chaos still reigns. Such a situation would completely undermine the motivation of the villagers who are being exhorted to respect the management prescriptions within the forest. Moreover, it is likely that if the prescriptions can successfully be enforced within the forest, some of the pressures for forest resources will be shifted to other areas.

- **The Legal Status of Co-Management.** Although the DNEF is engaged in promoting co-management in a number of reserved forests, the legal and institutional framework is still unclear and incomplete on several levels. For example, the agreement to substitute 25 hectares of forest land with the enclaves in Nialama to accommodate chimpanzee habitats, while a significant milestone for the project, has yet to be made official by the DNEF with an amendment to the *Arrête de Classement*. Reference to the policy framework for co-management in Guinea often cites the National Forestry Code, the National Forestry Action Plan, recent decisions of decentralization policy and the Joint Ministerial Declaration about Sharing Revenues from Natural Resources with local CRDs. These various policy statements are an excellent start but co-management still needs to be fully codified.

Among the institutional challenges that need urgent attention (and that perhaps may be slowing the pace of implementation of co-management activities) are: delay in the approval of the enforcement texts for the new forestry code; need for greater specificity about taxation, revenue distribution formulas and benefits sharing modalities; and recognition of an inter-village association as a decentralized structure. Adding difficulties to all of the above is a lack of adequate budgetary resources for the DNEF to enable them to carry out their role in promoting co-management.

- **Simplifying the Co-Management Structure at the Community Level.** Among the five committees already constituted for the three forests (one in Nialama, one in Suti Yanfou and three in Bakoun), Nialama is the only one to gain full legal recognition to date. The process to obtain legal stature includes organizing the communities into an inter-village association, drafting a statute and bylaws, and requesting official recognition from the DNEF. The process as stated appears relatively easy and encouraging. All of the committees have completed their drafts of the general statutes and some of the bylaws for approval by the general assemblies and will soon turn to the DNEF for official recognition. In Nialama, during the PEA Team visit, the Forest Committee there spent almost three days discussing the fees structure and amounts. As pointed out above, full acceptance by the individual general assemblies will have important implications for the long-term sustainability of the co-management arrangements.

In her latest report, Polansky (February 2001) also made some recommendations about the role of the Forest Committee that the PEA Team believes merit serious consideration. She suggests that “the role of the Forest Committee needs to be redefined so that it does not become another bureaucratic strata that must be subsidized with the management of the forests.” She goes on to propose that the “Forest Committee not become a bank or a

merchant with the exclusive right to buy the products of the user groups, transforming the user groups into simple laborers of the committee” (informal translation, p.8).

Finally, in this regard, the PEA Team noted that all the community actors involved do not fully understand their roles and responsibilities in the co-management process. In Nialama, for example, there are some members of the Forest Committee who still do not know to which commission they belong and the expectations for the roles and responsibilities for these commissions. The role of the zonal supervisors designated by the Forest Committee and chosen from people considered knowledgeable about the forest and their familiarity with certain types of activities still needs to be more fully clarified.

- **The Preparation of the NGOs for Their Role.** In Nialama, the NGO in charge of facilitating the process is UGVD (*Union Guinéenne des Volontaires du Développement*) based in Labé; in Bakoun, Ballal-Guinea based in Tougué; and in Suti Yanfou, ADEG (*Association pour le Développement de l'Environnement Guinéen*) based in Mamou. In Bakoun and Suti Yanfou, Ballal and ADEG facilitated the organization of the forest committees. As part of the fieldwork for the PEA, it was possible to observe the level of understanding and mastery of the process by some field agents of these NGOs, as well as the ways they perform their roles and duties. It would appear that there is still a lack of good understanding and capability among them as far as their roles are concerned. This may be related to a lack of clear definition of their roles, to a limited level of training or to a lack of measure of responsibility. For one reason or another, the lack of dynamism is remarkable on their side.

Certainly, part of the problem is the expectations of a corps of earnest young people trying to be helpful to their client communities by inducing them to take up the co-management process. Given some of the technical as well as organizational issues mentioned above, one can only wonder if indeed these relatively inexperienced agents are fully able to appreciate the nuance of what they are being asked to promote. Several case examples suggest that they do not fully understand the process, the most notable of which was instances in Bakoun where confusion over the “template approach” led to an irrational discussion of the numbers of trees to be cut. According to the villagers, the NGO agents were exhorting them, most probably in the spirit of full participation, to propose cutting of timber trees well in excess of their interests, priorities or capabilities.

Conclusion: The PEA Team applauds the concerted efforts made to organize the various institutional elements of the co-management process and while recognizing that good progress has been made on many fronts within this structure, cannot help but comment that it seems to be attempting to go too far, too soon. The many tiers of the structure and the level of complexity suggest that many individuals may not be fully prepared to carry out their roles and responsibilities, both within the community structure and on the part of the DNEF and NGO agents who are supposed to assist them. Clearly, the real test of representation and transparency will come as the many villagers understand what is expected of them, both in behavior and in fees for using the forest and its resources. **Leaving these sensitive matters to the last could cause problems for the overall consensus at the community level that will be required if co-management is to be sustainably implemented.**

Sincery-Oursa—One of These Days: Two views of the slopes of the Sincery-Oursa Reserved Forest on the side facing Dabola Town show that fire, grazing and tree and bamboo cutting have accelerated the natural run-off potential of this slope, which serves as the primary watershed area for the Tinkissu Barage. It will be challenging to turn this situation around given the forest's current state and its proximity to a large population center. It will be necessary to collaborate with the municipality, which may be severely affected by the loss of electricity and water supplies if co-management is unsuccessful. Before moving onto this forest, the PEA Team recommends that the PEGRN ensure that the co-management model and methods are better developed and understood by all concerned.

Recommendations: The PEA Team believes that the intended simplification of the co-management process enunciated recently by the PEGRN merits serious continuing attention, in particular in institutional terms. Their short visit to the various sites and the overall scope of the PEA prevents them from simply second-guessing the present institutional arrangements. In general, however, the PEA Team believes that the ample experience now gained with trying to put these structures in place in Nialama can and must lead to modifications in the present structures. Those on-site are obviously well-placed to judge how this will be accomplished. Some more specific recommendations are noted below.

- Polansky has recommended, after working closely at many levels within the current Nialama co-management structure, a more simplified structure for the community organization. She recommends **an organizational structure based on user groups** oriented to the actual interests in different activities among the participating villagers. At a minimum, she proposes the following groups: hunters, herders, beekeepers, sawyers, fuelwood artisans (*fendeurs de bois*), those who make bamboo products and those who cut and carry grass. The role of the Forest Committee would be to resolve conflicts among the different interest groups should these arise. Each of the interest groups would ultimately retain exclusive rights for exploiting and marketing their particular resource within the reserve forest with the stipulation that they respect the prescriptions for sustainable use.
- The PEA Team endorses this interest or user group approach and feels it would synch well with **a more staged approach to the development of the co-management plan** recommended above. In Suti Yanfou, some of **the easier targets of institutional opportunity** might include: water users groups linked to the development of springs and the protection of their headwaters; the organization of beekeepers and the marketing of honey along the national road; and agroforestry cum soil and water conservation groups as the starting points for concerted efforts to improve the present agricultural practices on the less steep lands around the base of the forest. In Bakoun, organizing the hunters to further develop an understanding of the wildlife resources and to protect the area from unauthorized use by outsiders might also be a start, as would beekeeping and improved agricultural practices and marketing opportunities within the village lands outside the forest.
- The key to understanding institutional roles and responsibilities can be simplified if **simple terms of reference are prepared for each element** of the structure—both for the community organizations as well as for the DNEF and NGO personnel. These written

Characteristics of Sustainable Organizations

A number of essential characteristics of a sustainable grassroots or community organization have emerged from worldwide experience; they include:

- Clear objectives defined for its programs
- A good system of documentation
- Efficient leadership
- Good diffusion of information
- High levels of participation
- A consistent strategic plan
- An ability to mobilize funding
- Good financial management

Source: From the World Neighbors in Action bulletin summarizing their new publication, *Du Bas vers le haut: Renforcer les capacités organisationnelles a travers l'auto-evaluation assistée*. Information on this publication and others may be found on their Web site: www.wn.org or by e-mail to: info@wn.org.

statements should form the basis for the eventual production of an operational manual which can be incrementally enhanced as the pieces of the co-management operations are decided and improved.

- With such terms of reference in hand, **a training needs assessment** should be carried out and **a focused training program** developed as required. The objective would be to ensure that basic skills and understanding are in place and then to begin a training of trainers process to widen the depth of capabilities, both within the communities and the DNEF and the NGOs.
- Although the forest committees report on all their actions and activities to the general assemblies, there is no real process in place for conflict resolution. As Polansky suggests, the **Forest Committee**, made up of elected and well respected individuals from within the communities **could evolve to take on the conflict resolution process**.
- The **DNEF must take more affirmative actions to put in place the companion policy framework for co-management**. This can begin with short-term actions related to specific amendments to the basic agreements and co-management plans, such as the situation in Nialama related to the transfer of lands to accommodate the chimps. For the medium term, it will entail enacting the eventual laws and regulations that define rights and responsibilities in real terms for the different actors, mechanisms of accountability, both for the communities and the staff who assist them, and a decentralized and clear fiscal system that will lead to greater autonomy of organized local bodies.
- As part of the above recommendation, **there is a need to table a regular forum for discussions with other development partners and organizations who are engaged in similar efforts leading to participatory management of reserved forests**. For example, the present efforts funded by the European Union in the transboundary protected areas with Guinea and Mali should attempt to reconcile their approaches to participation in order not to put out conflicting messages. A wider forum for these practical policy determinations will eventually involve both the CRDs and those projects that assist them with their development efforts so that sound natural resources management gradually spreads across the countryside.

5.5 Anticipated Issues which Did Not Emerge during the PEA

The Scoping Statement for this PEA identified a fairly long list of issues to be considered by the team during its assessment. Most of these issues listed therein have been treated in this report, in the main in the sections immediately above. The PEA Team noted, however, that despite expectations, a number of issues which might have been anticipated as likely adverse environmental impacts, did not emerge in the course of the assessment. Rather than simply passing over them, and in order to allay further questions and doubts in the minds of others reading this report, the PEA Team believes it would be useful to list those issues which did not emerge and provide some field-informed discussion of why they did not.

- **Extraction Methods for Timber**. This issue was formulated and included in the list because of the traditional impacts associated with logging and timber extraction. It was unclear at the time of scoping that the PEGRN project personnel did not plan to upgrade the local

capabilities for logging. They wish to continue to rely on pit-sawing and manual transport of squared timbers (*madriers*) to the existing roadsides for collection by local truckers. If such methods are used, the likelihood of adverse environmental impacts is nil.

- **Livestock and Forest Management.** This issue has already been dealt with under the section discussing protection from where it cannot nor should not be separated.
- **Landscape Level Management Strategies.** This issue is also dealt with under the sections dealing with biodiversity conservation, forest management and watershed stability and need not be addressed separately.
- **Forest Based Enterprises and Related Economic Development.** The present programs and plans do not call for the establishment of “forest-based enterprises” beyond that foreseen by the extraction of forest products (timber, fuelwood and bamboo) for which the matter of sustainability has been dealt with at some length in the sections above.
- **Integration of Market Surveys and Marketing Strategies into Co-Management Plans.** Here again, the issue of marketing strategies and the issue of distance to market and its impact on the feasibility of the activities has been dealt with in the section on the economics of some of the production activities.
- **Compliance with National Environmental Legislation and Forest Products Certification Standards.** Guinea is only just beginning to develop and apply environmental standards regulations to development activities, concentrating their early efforts on industry and agribusiness. There is as yet no overarching environmental standard regulations (beyond the Forestry Code and the Wildlife Code, both of which figure prominently in the co-management planning) that apply to forestry management in rural areas. Similarly, there is no intention to seek “green” certification for the products emanating from the forests under co-management. All of the timber produced therein is for local and national consumption and none will be exported, making forest certification a moot point.
- **Integration of Program Activities.** The DNEF and USAID made a decision to begin to concentrate the activities of their other PEGRN components on the areas surrounding the reserved forests which they were targeting for co-management planning and implementation. This is a very positive step and one likely to alleviate the pressures on the natural resource base by making agriculture, community and enterprise development activities more productive.

6. Monitoring Measures for Sustainable Co-Management

6.1 The Framework for Environmental Monitoring

Developing an environmental monitoring plan, as mentioned above, is an important outcome of any environmental assessment. An environmental monitoring plan for any activity has two major objectives: 1) to determine if mitigation measures identified as necessary are being implemented correctly and are meeting expectations and 2) to check against unforeseen adverse environmental impacts that may arise over the course of implementation of the activity. Environmental monitoring, however, like the baseline studies on which it depends, can be a costly undertaking and must be carefully planned to be effective (covering the most important themes needing monitoring) and efficient (using scarce human and financial resources appropriately).

Furthermore, and importantly, under PEGRN, the performance indicators for the activity are explicitly linked to on-the-ground achievements in environmental management. As pointed out in the Scoping Statement, the “quantitative measures of achievement for the co-management of natural forests—100,000 hectares of forests in the activity zone managed according to a sustainable management plan—is an SO level indicator.” Accordingly, every effort should be made to seek synergy in the elaboration of a monitoring plan so as to ensure that it does not needlessly duplicate results-related performance monitoring now the key feature of USAID’s approach to the administration of the activities it funds.

It is also worth noting that environmental monitoring takes on special importance for an activity of this nature—the co-management of reserved forests—for a number of reasons:

- The semi-experimental nature of these pilot co-management activities designed to develop an understanding of the requirements for the approach and its methodology as it applies under different conditions.
- The many recommendations of corrective actions for avoidance and redesign mentioned in this PEA report which will bear scrutiny to determine if they are indeed effective over time.
- The continuing challenge of improving the data and information collected for the baseline studies against which co-management plans are elaborated and against which their performance will be judged.
- The absence of a monitoring plan in the present draft co-management plans.
- The longer-term need to develop a better understanding of the ecology of these forests and how they react under different treatment scenarios.
- The fundamental importance of ensuring that lessons learned about the causes and effects of the various component activities contribute to building enhanced institutional capacity for the principal actors involved—the DNEF and the participating communities.

6.2 Genuine Co-Management Means Participatory Monitoring

The effective development and implementation of the monitoring plan will require a participatory approach. Section 5.4.1 highlighted the value of viewing the development of

participatory co-management arrangements as a specific development objective for this component of the PEGRN. Experience worldwide has demonstrated that the best practices of community-based natural resources management are those where people learn to work together to diagnose their problems and identify and implement solutions to them.

A fundamental part of the learning process associated with developing community level organizations and their ability to manage their own destiny is to reinforce their capabilities for making the “right choices” so frequently mentioned above. Part of that capacity will arise with improved participation in co-management planning. Monitoring too can play a critical role in the learning process as it provides a framework for focused attention and analysis of what works and what doesn’t work. Being asked to draw conclusions about their efforts reinforces the notion of accountability, both within the community itself and in respect to the responsibilities of other actors in the process, e.g., the DNEF and the NGOs.

Nothing succeeds like success, but there are also bound to be setbacks of some measure with this new technology and partnership. Greater confidence in their own capabilities will come from an understanding of how to analyze these setbacks and propose solutions or alternatives. **With monitoring, the participatory process comes full circle and builds on the growing collective strengths of the community organization.** “These attributes—a capacity to analyze their situations, suggest and implement solutions through co-management activities, and justify the outcomes—go a long way to preparing a community to ‘draw-down’ the resources and support they need from government and other partners...which is **the ultimate response to the abiding problems of the ‘top-down’ approach** to development” (Catterson, unpublished manuscript).

6.3 Operational Implications of Monitoring

Because monitoring can be costly, a certain amount of preparation and organization are extremely useful in putting in place an environmental monitoring plan. Too often, monitoring plans simply list the parameters to be assessed without dealing with other important elements of an operational nature. While proposing a monitoring plan in great detail is well beyond the scope of the present PEA, however, the following operational questions should be addressed:¹⁵

- **What needs to be monitored?** The selection of indicators of environmental quality to be monitored depend on the type of activities chosen in each forest and how they affect the environment. The table below is a first attempt to outline some of the most likely indicators that should be monitored (and also identifies some of the other operational features of the monitoring plan). A sound knowledge of the key relationships vis-à-vis the ecology of these forests borne of sound co-management planning and the baseline studies that went into them, should provide a first matrix of potential impacts, including those that may be unforeseen. In addition to the positive impacts that are being sought as part of the co-management activities, certain mitigation measures may need to be monitored to ensure that they are really effective or have been properly executed. Every effort should be made to combine performance

¹⁵ This section of the report draws upon the ample advice on environmental monitoring currently available in USAID-sponsored reference materials. Particularly applicable are the sections on monitoring in the USAID-FAM publication *Environmental Documentation Manual*, Second Edition, January 1999.

monitoring with environmental monitoring in order to avoid needless duplication of effort and burdens on those responsible for implementing the activities.¹⁶

Similar to the Results Indicators now used by USAID, the environmental monitoring plan should also be assessing impact, and not just the completion of activities. In other words, from an environmental perspective, success with agroforestry would be measured in terms of the establishment of a stable farming system in which the tree canopy serves to protect the site and enhance the fallow process. Therefore, monitoring agroforestry would entail ensuring that a reasonable canopy of trees were left on the site, and protected after the two years of cultivation.¹⁷ In instances where timber and wood products, including bamboo were being harvested, assuming that the sawyers have respected the number and size limits for the stand in question, monitoring will focus on the condition of the residual stand—stand structure and the presence of regeneration of desired species.

- **When should it be monitored?** Ideally, monitoring must be accomplished annually. This does not mean that all monitoring will take place at the same time at the end of the program or calendar year. Certain activities may best be monitored at different times of the year, keyed to the biological calendar and the implementation plan. For example, it would make little sense to attempt to monitor wildlife numbers at the height of the dry season on a forest with few surface water resources as the animals may have migrated to other areas. Similarly, it will take a year or so for results in terms of regeneration to appear on a site that have been cut over.
- **Who will monitor?** Although monitoring should be a participatory process, as mentioned above, it is still essential to designate or delegate some individuals who will be responsible for it. Within the Forest Committee structure, there is a monitoring commission (*commission de suivi*) and certain individuals have been named to that commission. This is an excellent start and hopefully within the overall organigram for co-management, the monitoring functions have also been allocated to individuals within the DNEF and the NGOs. In addition to naming those who will do it, it is useful to estimate the level of effort required (person-days per year) so that these individuals have a clear understanding of what is expected of them.
- **What Monitoring Tools and Techniques Should Be Used?** Inevitably, sound design of a proposed activity has already highlighted the subjects needing monitoring and the indicators that will serve in each case. In order to reduce the burden of monitoring for environmental purposes, the PEGRN should consider how some of the indicators can be derived from data

¹⁶ The PEA Team has noted that Mr. M. McGahuey of AFR/SD has been consistently involved with the USAID/Guinea Mission in developing the performance indicators related to the natural resources management and this Strategic Objective and its portfolio of activities. There is ample reason to believe that he could also help to develop the monitoring plan for co-management.

¹⁷ The PEGRN has been struggling with quantifying the number of trees that should be left on a site for the agroforestry system. Suggestions have ranged from 40–100 trees per hectare. In all probability, the number of trees to be left is a function of their average size—more smaller trees would be left than larger ones. The key to knowing this number will be a function of the average basal area (*surface terriere*) of the remaining stand. The forest inventory consultant could be asked to look into the calculation of this figure.

already being collected or through simple modification of performance based monitoring forms. For example, the two forms (*fiches*) prepared by the inventory consultant, Ms. Polansky—on timber harvest and agroforestry—could easily be modified to serve the dual purpose of performance and environmental monitoring.

This report has already recommended the establishment of simple meteorological stations within the forests, as part of the learning process about the ecological conditions obtaining there. Simple stream-gauging stations might also prove useful especially in areas where forest rehabilitation is expected to have a positive impact on the watershed function. Another important tool is the use of photo-records: pictures taken periodically according to the seasons at established sites that will aid the layman in visualizing the impact of the management activities. These sites could include: panoramic viewpoints, permanent sample plots, and sites where a particular phenomena affecting the forest has taken place (e.g., fire sites).

The PEA Team does not counsel using satellite imagery or aerial photography as a monitoring tool, at least not within the life of the program. Even five years may be too short a time frame with which to be able to see physical impact within the resolution capabilities of these relatively expensive tools. A ten-year time frame for using satellite imagery might, however, make more sense.

Bas-Fond Cultivation in Nialama: Large individuals of *Borassus spp.* and *Danielia oliveri* have been protected in the Nialama Reserved Forest, as seen with this fairly large piece of cultivated bas-fond. Cow grazing on rice stubble and crop residue has left lots of manure, which will allow the soils to continue to be productive. Good well-watered soils are at a premium, and, as these have been cultivated for years as part of the original agreement with local people, agricultural intensification is both possible and recommended.

Table 6.1
Environmental Impact Monitoring for Co-Management of Reserved Forests in Guinea

Impact/Issue	Indicator	Period	Who Monitors	Monitoring Mechanisms	Prerequisites/Notes
Macro-Indicators of the Effectiveness of Co-Management					
Status of Forest Cover	- Changes in area covered by different forest types (hectares) - Both quantity and quality	5 years	DNEF-BCCT and Comite Foret	- GIS-based interpretation of satellite imagery w/ field verification by GPS - Carefully prepared annual operational maps available - Possible photo records used - Sample inventories in areas being protected for regeneration purposes - Effective forest records system	- Baseline map essential - Forest stand history data is invaluable background information - Seek community viewpoints - Assess against cumulative annual protection goals - Regular inspections record losses and causes of same
Fire and Its Impact	- Fire occurrence in sensitive/protected areas - Early burning sites being implemented	Annual	Cant. Forestier w/ Comite Foret	- Regular field inspections w/ GPS to mark - Reports by protection commissions within each Comite Foret - An early burning calendar - Fire-related weather data collected - Possible in-depth fire ecology studies (grad student projects)	- Clear and doable fire protection strategy established and agreed - Annual fire protection plan established w/ Comite Foret - Annual operational map layer produced by GIS - Simple meteorological stations operational
Watershed Stability	- Area of protected <i>têtes du source</i> - Steep areas free of illegal activities - Perennial water supplies maintained/improved	Annual	Cant. Forestier w/ Water Users Commission in selected villages	- Verify achievement of annual operational plan for spring protection, development and water supply to villages - Community satisfaction w/ water supply	- Watershed protection strategy in place w/ annual operational plan - Critical steep areas adequately mapped and marked on the ground - Simple meteorological stations established - Water gauge installed and used

Livestock Grazing and Its Impact	<ul style="list-style-type: none"> - Numbers of animals using the forest (animal units) - Absence of late season fires for fodder production - Area set aside for protection from grazing 	Annual	Cant. Forestier w/ Comite Foret and Livestock Commission	<ul style="list-style-type: none"> - Indicative livestock census at the village level (sampling approach) - Grazing fee records - Develop estimates of carrying capacity for different land types - Overview of animal health - Success with protected grazing areas set aside for regeneration purposes 	<ul style="list-style-type: none"> - Baseline numbers available - Grazing management strategy in place and agreed w/ Comite Foret, including productivity enhancement and rotational grazing goals identified - Established production indicators to gauge results - Account for wildlife use of grazing
Habitat and Biodiversity Conservation Impacts	<ul style="list-style-type: none"> - Annual game meat production figures - Population status of “indicator” species - Population status of fully protected species, e.g., chimps - Respect of protected habitat sites within forest 	Annual	Cant. Forestier w/ Comite Foret and Hunters Association	<ul style="list-style-type: none"> - Field inspections and routine patrols - Cadre of game guards (local hunters) established and operational - Access controls to prevent outsiders from hunting within the forest - Hunting permit records and receipts - Proper wildlife census methods in place and being used - Village surveys (samples) - Crop raiding incident reports 	<ul style="list-style-type: none"> - Baseline wildlife survey data in place - Wildlife management strategy and annual operational plan and clearly identified and demarcated protection areas for biodiversity conservation - Recognition of the importance of game meat protein in diet of local population (can it be quantified?)
Micro-Indicators Related to Environmental Impacts of Co-Management Operations and Interventions					
Harvesting of Wood Products— Timber, Fuelwood and Bamboo	<ul style="list-style-type: none"> - Number of trees cut or basal area extracted - Status of regeneration within the plots that have been harvested - On-site disturbance - Off-site consequences 	Annual, but to include regular site visits over the course of the season	Cant. Forestier w/ Comite Foret & Wood Harvest Group	<ul style="list-style-type: none"> - Field inspections of the harvest sites in combination with the reporting forms (<i>fiche de marquage et cubage des arbres</i> by Polansky, 2001) - Phenology studies of selected species - Regeneration status studies on selected plots (permanent sample plots); seedling and juvenile demography counts - Growth studies on PSPs 	<ul style="list-style-type: none"> - Incremental improvement of the data available on species growth and yield must be developed over time - Careful records of site conditions of the permanent sample plots so as to be able to relate regeneration to site characteristics - Incidence of negative factors affecting regeneration (uncontrolled grazing and late season fires)

Agroforestry Plots	<ul style="list-style-type: none"> - Quantity and quality of the remnant canopy - Success of protection measures - Application of appropriate soil and water conservation measures - Appropriate site selection and avoidance of marginal or fragile sites 	<p>Annual, but to include regular site visits over the course of the season</p>	<p>Cant. Forestier w/ Comite Foret and Agro-forestry Group</p>	<ul style="list-style-type: none"> - Field inspections of the agroforestry plots in combination with the reporting forms (<i>fiche de suivi d'agroforesterie</i> by Polansky, 2001) - Possible site for photographic/video record of evolution of the remnant canopy trees - Eventually soil sampling and analysis to track the soil rehabilitation process from fallowing 	<ul style="list-style-type: none"> - Careful initial site selection is paramount to success - It is important to gauge people's satisfaction with the system, both qualitative and quantitative (average crop yields) so as to know they will respect rules
Cultivation in the Bas-Fonds	<ul style="list-style-type: none"> - Respect of setback norms associated with protection of water courses - Contamination of surface waters - Pesticide poisoning incidents 	<p>Seasonal—this is a sensitive area and needs close scrutiny</p>	<p>Cant. Forestier w/ Comite Foret and Bas-Fonds Farmers Group</p>	<ul style="list-style-type: none"> - field inspections during the cropping season of the bas-fonds farming plots in combination with the reporting form (<i>fiche de suivi de bas-fonds cultive</i> by Polansky 2001) - Interviews with farmers and discussions of pests and fertility problems 	<ul style="list-style-type: none"> - Ensure local people are not using surface water sources for human or animal consumption near cultivated bas-fonds - Guidelines and training programs on agro-chemical use developed and implemented by the PEGRN - Introduction of IPM measures

7. Practical Guidance/Tools for Environmentally Sound Co-Management of Reserved Forests

7.1 The Context for the Guidance and Environmental Review Tools

As was mentioned at the outset of this report, the programmatic environmental assessment (PEA) is expected to provide some practical guidance for complying with USAID's environmental regulations (Reg. 216) as concerns co-management of reserved forests in Guinea. Under the present regulations, and abiding with the determinations of the Section 118 and 119 amendments to the Foreign Assistance Act (FAA), such activities which include harvesting in the tropical forests require an environmental assessment. Indeed, this was the outcome of the Initial Environmental Assessment prepared for the PEGRN in 1968, i.e., a Positive Threshold Determination and the ruling that an environmental assessment would be required.

Although it is not within the purview or authority of those carrying out this PEA to change the rules, it was subsequently recognized that requiring full scale environmental assessments for each reserved forest site, as was the case with Nialama, would be an unnecessary burden for all concerned, particularly given the scale and impact of these forest management activities.

This section of the report presents guidance and tools that will ensure that concerns about adverse environmental impacts and the sustainability are taken fully into account in the design, planning and implementation of these co-management of reserved forest activities under the PEGRN. The following text reviews a series of scenarios for how environmental review within the framework of Reg. 216 will be applied to future forestry co-management activities funded by USAID/Guinea.

7.2 Next Steps

Procedurally, it is expected that this PEA Report, its recommendations regarding design modifications and mitigation actions in Section 5 and the recommendations in this section will be reviewed by the USAID Mission in Guinea and submitted to the Africa Bureau Environmental Officer for official scrutiny and approval. The scenarios and the guidance associated with each of them, is as follows:

- **Responsibility for Preparation of IEEs.** The preparation of the IEEs will continue to be the responsibility of the Mission Environmental Officer (or the officer's designee, such as the Regional Environmental Advisor). The IEE will be prepared following the guidance contained herein and using the checklist for submission to the USAID Africa Bureau Regional Environmental Officer. As related to co-management activities, the timing and need for another IEE will occur when the PEGRN is ready to move into additional forests other than those dealt with directly in this PEA, namely, those other than Suti Yanfou and Bakoun.
- **Threshold Decision.** As part of the outcome of its detailed review of the co-management activities on three forests (Nialama—the model, and Suti Yanfou and Bakoun—the next forests to be brought under co-management) this PEA has corroborated the principle that in

many, if not most, cases such activities would qualify for a Threshold Decision of Negative with Conditions. This PEA has identified the conditions wherein the PEGRN staff could justify such a decision to the Mission Environmental Officer. **These conditions are presented in the form of an “Environmental Planning Checklist for Co-Management of Reserved Forests,”** which specifies the type of information that must be presented as part of the IEE (see Appendix G).¹⁸ The final section of this report (Section 7.4) also discusses the use of this checklist as a tool for application during the IEE process.

- **Redesign Measures.** It should also be noted, however, that the presumption is that the redesign and avoidance measures that have been recommended as part of the outcome of this PEA will be taken into account and implemented. Also as recommended above, the expectation is that **the co-management approach and methods will have been substantially improved and enhanced before the PEGRN moves to include additional forests**—Sincery-Oursa or Balayan-Souroumba (or others) as part of the activities of this component. The affirmative engagement of additional technical assistance skills by Winrock International has already begun in the person of the Forest Inventory Consultant and will be further enhanced by the recruitment of a long-term forest management planning and implementation specialist.
- **An Amended IEE.** USAID/Guinea should soon be able to prepare and present an Amended IEE that will cover the environmental review considerations for the two new forests—Suti Yanfou and Bakoun. **This amended IEE will utilize the specifications contained in the Environmental Planning Checklist and the recommendations for redesign and mitigation found in this report.** With these recommendations and the checklist tool, the Mission Environmental Officer will be able to verify that the activities planned for these two new forests merit a threshold decision of “negative with conditions.” Once approved by the Africa Bureau Regional Environmental Officer, there will be no other regulatory barriers for proceeding with the full range of activities foreseen in the co-management plan.

7.3 Potential for Positive Determinations

By definition and by choice, the PEA mechanism that was employed here presumed an assessment of “the environmental impacts that are generic or common to a class of Agency actions” [216.6(d)]. It is thus important to note that the possible outcome of an IEE reaching a Threshold Determination of Negative with Conditions, under the terms (or conditionality) suggested above, would in principle only apply where similar circumstances for co-management obtain. This PEA cannot, however, specify where, when or why such a determination would be appropriate or not. It is possible, nevertheless, that there are instances or circumstances where a co-management of reserved forests site might require a higher level of environmental review, that is, a Positive Threshold Determination and the Environmental Assessment so mandated.

In the light of this possibility, the following list of characteristics or circumstances which might trigger a determination by USAID to seek environmental assessment is presented. This list is neither an absolute set of criteria nor is it intended to be regulatory in nature. The objective is to provide some guidance to those responsible for environmental oversight of these programs to the

¹⁸ The Environmental Planning Checklist of Co-Management of Reserved Forests is intentionally included as the final appendix, rather than being incorporated into the text of the PEA Report, only to facilitate its subsequent extraction and use.

circumstances under which a sight might fall outside of the realm of the “typical sites” that were the object of this review.

These circumstances include:

- **Larger-Scale Logging Activities.** A great deal of the concern about harvesting in the tropical forests rests on the impacts on the environment and the residual stand from logging. The PEA Team’s assessment of this dimension of the co-management activities centered on the typical, small-scale, low-impact manual logging as currently practiced by sawyers in these forests. Should a plan take a more mechanized or commercial approach to logging, these would require greater environmental scrutiny.
- **Extensive Road Building.** Although the Bakoun Co-Management Plan called for extensive road building, the PEA Team’s discussions determined that these plans were predicated on the larger scale efforts at timber harvesting which have been subsequently discounted for cost reasons. If a future co-management plan presented a more rational financial and economic justification for extensive road-building to make harvesting or other activities feasible, an environmental assessment would probably be required.
- **Activities that Lead to a Significant Displacement of People.** If by some chance, co-management activities were planned which proposed the displacement of people and villages (e.g., removal of enclave villages) or restricted or eliminated their traditional and sanctioned user rights within the forest, these would be considered human environmental impacts and would require greater scrutiny and ample justification.
- **Different Ecological Conditions:** This PEA did not look at the implications and possible environmental consequences of co-management in Guinée Forestier where greater stand densities, larger trees and higher rainfall might constitute significantly different ecological conditions against which the fundamentals behind this PEA might not stand up. The PEA Team does not believe that activities in Guinée Forestier would categorically be excluded from the purview of this guidance but feels that the matter will require additional examination at the IEE stage.
- **Dramatically Different Co-Management Models.** This PEA is not directly applicable to the circumstances found under the activities to promote forestry development with the *groupements forestiers*, even though these activities are essentially positive in their impact on the environment and very small in scale and scope. Similarly, if a co-management plan was to attempt large-scale plantation forestry as the primary intervention, this would require another set of environmental criteria which were not included in this PEA.

7.4 Using the Environmental Planning Checklist

The development of the environmental planning checklist (see Appendix G) is not an attempt to either redefine the tenets of sustainable forest management or to radically alter the present course of these activities as they are generally foreseen under the PEGRN. Indeed, the PEA Team, as has been stated in this report, fully endorses the applicability of the co-management approach and its methodology for the reserved forests of Guinea. Properly planned and executed, they represent an extremely viable option for appropriate land use within these areas and for optimizing their potential contribution to the socioeconomic development of the local villagers and of the country. However, without greater attention to the quality and professionalism of the

work and the basic tenets of forest management, they could indeed lead to adverse environmental impacts and continuing degradation of this important segment of forestry sector resources in the country.

7.4.1 Using the Checklist and Preparing the IEE

In a complex undertaking like participatory co-management of reserved forests, nothing succeeds like advanced planning. Indeed, one of the fundamental premises on which the findings of this PEA are based is the inherent opportunity for achieving greater probabilities of sustainability by moving environmental review to an early and prominent position in planning these activities. Expectations for the enhancement of the co-management planning process identify the critical need for improved data and information on the condition of the resource base and its production potentials and protection needs. There should be a good deal more information available to the PEGRN staff about the parameters for management on each new forest. The use of this information—in particular from the quality perspective—is geared to an affirmative use of the environmental planning checklist.

A persistent dilemma in an environmental review requiring a compliance document like an IEE is that the considerations of the environmental issues are frequently brought to the table when it is already too late. An environmental review should be an integral part of the project cycle. It should begin with the concept of the project when changing or revising design to ensure environmental soundness is both cheaper and easier than it is anytime later. The data and information required for using this checklist will be essential as well for sound environmental planning of co-management. It should also promote a greater degree of awareness for and understanding of important environmental considerations associated with co-management of reserved forests. It will also lead to improved overall understanding of the issues of all types (social, technical, economic and institutional) critical to sustainable management of the reserved forests of Guinea.

The basic premise of the environmental planning checklist is simple: those proposing activities on a given forest site will not really be ready to affirm its suitability for co-management or the basic premises of the plan until after they have thoroughly used the checklist to verify that they have the data and information essential to avoid and/or mitigate possible adverse environmental impacts of management activities. In effect, they will be compiling the information that will be required to condition their choice (or in fact, the mission's choice) of an IEE Threshold Determination of “negative with conditions.” The PEA Team also believes that the application of the checklist will also reinforce and systematize the need for an in-depth analysis and response to many of the primary questions regarding the overall feasibility (technical, social, economic and institutional) of co-management on a given reserved forest.

7.4.2 Pre-Selection Criteria

A number of individuals have raised their concerns about the need to use a set of criteria for pre-selection of candidate reserved forests as part of the planning process. The PEA Team would argue that all of the forests discussed and visited during this exercise seem like good choices and

could be included under the present set of informal criteria that have been proposed.¹⁹ It is, however, true that pre-selection is a wise move because the participatory planning approach may raise expectations among local villagers which cannot be fulfilled if the conditions are not right. Should such a situation arise, the PEGRN and the DNEF may wish to consider one of the other alternatives to co-management discussed in Section 2 of this report.

Having said that, it would appear that **some method of pre-planning screening is needed and could help to avoid false starts and/or unrealistic expectations among the communities.** It is clear that there must be greater certainty about some of the critical parameters of successful co-management of reserved forests before an activity can or should proceed to more detailed planning and full-scale community involvement. While the PEA Team believes that action possibilities are not strictly limited by resource potential (even degraded areas can be rehabilitated through practical co-management interventions) and that, indeed, the present efforts to develop the approach and methodology will help to define reasonable courses of action, certain pre-selection criteria (after Diakite 2000 and Winterbottom 2001) have been proposed (see Table 7.1).

One final word on this subject of pre-selection screening criteria is worthwhile. All concerned should recognize that in reality, the PEGRN is very near to being able to fulfill the performance indicator established for this intermediate result—that is, reaching a total area of 100,000 hectares under co-management by the end of the current phase in 2005. Indeed, as was mentioned above, if all the forests presently being considered (Nialama, Suti Yanfou, Bakoun, Sincery-Oursa and Balayan-Souroumba) were to be included, the total affected area would be approximately 90,000 hectares. Part of this performance indicator was also expected to be the result of activities in Guinée Forestier carried out with the *Groupements Forestiers* on small village woodlots establishment, thus bringing the target well within reach of the PEGRN even at this early stage.

7.4.3 Teamwork: Using the Checklist

The current co-management planning efforts, as demonstrated by the new plans available for Suti Yanfou and Bakoun, suggest that most of the critical and technical judgments and decisions related to the design of these activities remain the specific purview of the forestry staff. This is one of the problems identified by PEGRN staff working assiduously to implement the co-management scheme for Nialama—in particular as concerns the social and economic dimensions and expectations of that plan.

¹⁹ It could further be argued that Suti Yanfou is not a good choice because of the high level of degradation that will make it difficult to generate the resources needed for its rehabilitation. The PEA Team, however, believes that it is too late to withdraw from Suti Yanfou and that, in addition, it is probably representative of many reserved forests in Guinea that are under heavy human pressure. It would therefore be worthwhile to, at a minimum, attempt to deal with the circumstances there in the expectation that important lessons will be learned over the course of the actions there that will have implications elsewhere. Furthermore, since there are some plantations in the forest that could generate resources, the situation might not be as difficult as originally foreseen.

An Unexpected Outcome of Co-Management? The Chef du Cantonnement Forestier of Linsan Saran and a member of the PEA Team inspect a recently cut Khaya tree on the limits of the Nialama Forest. The tree was cut with a chainsaw, as were three others found nearby on a fragile site at the edge of the escarpment. The limits of the forest pass just beyond the tree, leading the PEA Team to speculate that when the boundary was re-marked, the local people discovered that these trees, previously thought to be in the reserved forest, were actually outside. The Chef du Cantonnement had no knowledge or records that cutting was taking place, as a permit and inspection visit would have been required. The PEGRN needs a strategy to deal with this phenomena as it re-establishes the limits of the reserved forests.

Table 7.1
Pre-Selection Criteria for Choosing Reserved Forests for Co-Management

Screening Criteria	Observations and Notes
Area of the Forest	Many reserved forests in Guinea are relatively small (2,000 hectares or less). Program proponents must bear in mind that fact that there are economies of scale associated with the planning and implementation of co-management. For example, a smaller forest may have just as many villages adjacent to it as a large one and the transaction costs for organizing participation will be as greater or greater for these smaller forests.
Legal Status of the Forest	It may be preferable to avoid reserved forests on which there are significant conflicts, either with the DNEF or among the neighboring villages. Unfortunately, some of these issues may not arise until after the PEGRN (or anyone else for that matter) has begun to demonstrate an interest in the forests in question. Proponents should carefully check the historical record as some of these conflicts have their origin in the original classification actions or immediately thereafter, and though now apparently forgotten, smolder below the surface.
Resource Status of the Forest	This PEA Report has suggested that there are different orientations (production, rehabilitation, conservation, and possibly municipal watershed management) for co-management. An early reconnaissance visit to the forest should help to determine the overall condition of the resource base, the general topography of the area, and its relationship to other natural areas from the landscape perspective which could affect a decision as to whether to include the forest and if so, how to approach co-management planning. The PEA Team believes that the PEGRN is well advised to continue to develop a range of models or orientations rather than just one model which in any case is probably only a theoretical abstract.
Accessibility	It is unlikely under the present phase of PEGRN that staff will wish to undertake activities that require the construction or significant upgrading of lengthy access roads to a remote area, if only because project resources are insufficient to finance such investments. Doubtless, however, there are some reserved forests with real production potentials (and less conservation value than, for example, that found in Bakoun) whose development would be constrained by difficult access to markets over long and bad roads.
Community Motivation	A willingness to participate and an understanding and commitment to the principles of co-management among the populations living in and around a reserved forest are often cited as pre-selection criteria. While this is a valid premise, measuring it is exceedingly difficult as villagers astutely recognize the development projects as opportunities for gaining the support they need and rarely turn them down or demonstrate early disinterest. Those responsible for early reconnaissance of a given forest will need to carefully explain the full overview of co-management and the expectations regarding roles, rights, responsibilities and accountability.
Institutional Capacity	An abiding issue with all of these reserved forests will be an ability to field the staff, whether of the DNEF, NGOs or other organizations who can assist in the development of the co-management process in each case. Although this has not proven to be an obstacle to-date, realism is required in this aspect. The present arrangements for Nialama whereby the Cantonnement Forestier and NGO staffs commute to their work site from Labe is less than ideal.

In the future, during the planning stage (and for using the environmental planning checklist) there will be a critical need for inputs from others—the population living in the affected villages around these forests, the CRD and local authorities whose role is to help plan local development, and from a variety of other technical specialists. The PEA Team encourages USAID, the DNEF and Winrock to carefully consider the make-up of the multidisciplinary co-management planning and implementation teams assisting the communities with the development of these schemes.

In addition to the forest management specialists (including team members and in-house staff of the DNEF, such as the BCTT and the Forest Management Division), the co-management team carrying out the planning for a new forest (and also in upgrading the quality of what has been proposed for Suti Yanfou and Bakoun) should include the following skills (at a minimum on a part-time basis): an agronomy or farming systems specialist to work with the communities in the off-forest areas and to aid with the technical prescriptions for agroforestry; a hydrologist or watershed management planning specialist to assist with the development of springs and the protection of *têtes du source*; a wildlife and biodiversity conservation specialist to help develop a reasoned strategy for managing hunting pressures and protecting endangered species; a practical natural resources economist to work out the realities of the costs and benefits of co-management; and, an enterprise cum agricultural marketing specialist to assist with developing income generation activities associated with co-management.

This multi-disciplinary team must also work on an inter-disciplinary basis. It is readily apparent that this did not happen during the preparation of the new co-management plans for Suti Yanfou and Bakoun. The multi-disciplinary team will carry out the inter-disciplinary preparation of the basic planning documentation—baseline studies and co-management plans—and use them in responding to the questions of the environmental planning checklist. The emphasis on the distinction between “multi” and “inter” is intentional. The team must work together, responding to the questions in the checklist and planning activities. This can best be done with team meetings rather than assigning the responsibility for specific questions on a compartmentalized basis—something that appears to have happened in the baseline studies where information is presented that is occasionally contradictory and rarely used effectively together.

7.4.4 Participation—Another Objective for the Checklist

However important the completed checklist may seem, it will be the process by which it is prepared that will be the best measure of its utility. This process must be a dialogue with the villagers and users of the forests and the organizations put in place among them for co-management. The preparation of the checklist becomes a tool in facilitating the genuine participatory planning and public consultation that should be part of the environmental review process from the outset.

Section 5 made the very important point that building community and organizational skills as part of a systematic process approach to co-management should be elevated to the status of one of the development objectives of this activity. Doing so will make it far more likely that the communities involved and the forest committees and their interest groups will understand their respective rights, roles, and responsibilities and will engender an important degree of self-determination and self-reliance, making it a “real” development activity.

Be Prepared—It’s Rugged out There: Extensive areas of “bawal” formation are found in Bakoun, including this one just east of the Karoya Valley (top photo). It is an austere environment at this time of the year (February)—hot, dry and dusty after it has been burned. Those who cross it need good boots, as the rocky surface is hard on footwear. In an unburned part of the bawal (bottom photo), fodder biomass is evident, and it is easy to see why these areas are important for grazing both wildlife and livestock. It may be even more difficult to penetrate in the rainy season when the rocks underfoot will be hidden by the grass—as will the lions, whose signs were seen in this area.

Epilogue

The early drafts of this report generated a good deal of interest and enthusiasm among its readers for co-management of reserved forests in Sub-Saharan Africa. Its findings have triggered a series of well-informed questions related to the technological, socioeconomic and institutional dimensions of the co-management approach. The PEA Team made a concerted effort to respond to the points raised, particularly to concerns on practical guidance, in revising the initial drafts. Not all of these points, however, could be addressed, mainly because they go well beyond the scope of the present exercise—a programmatic environmental assessment—and the resources available for it. There are also other issues that have arisen for which answers will emerge only over time and with the continued accumulation of field experience with co-management.

The very enthusiastic and collegial response by those interested in co-management in Guinea has prompted the PEA Team to add this additional brief section to address some of the remaining concerns and provide insight into the likely evolution of the approach and its various models. The remarks are offered here to further underscore the conviction, hopefully shared by many, that co-management represents an approach of high potential, indeed in many cases, the only option for bringing the reserved forests of West Africa more fully into the mix of appropriate and productive land-use and participatory development.

*The following section addresses a number of recurring themes raised on the drafts of the PEA report. The PEA Team is convinced that these themes will be among **the most important future topics for study and key issues for the success of the Co-Management Approach in Guinea and elsewhere.***

Appropriate Levels of Forest Management Science. A recurring concern for several people who read the earlier drafts, both professional foresters and others, was that the PEA report recommends forestry science measures—particularly in mapping and forest inventory—that are too sophisticated and too costly. For example, the following question was posed: “Given the detail recommended for conducting the inventory and preparing the management plan, will their costs discourage (in some cases prohibit) people from putting many threatened forests under management?”

This is an extremely important point, but the short answer is, of course, as compared to what? The pilot nature of these activities dictates that learning the means is as important as reaching the outcomes. Technology and participatory methodology are results that matter and will be critical to replicating these activities elsewhere on the road to sustainable land-use systems in the hills of Guinea.

Both mapping and inventory activities are essential for effective and efficient forest management planning and implementation, whether done unilaterally by the Forest Department or in a participatory manner under co-management. These activities will provide the important quantitative context for discussions with local people and communities, who often have a fine-

tuned qualitative appreciation of the forests and their resources, about what can be done and where and when. The maps and inventory data make it possible to calibrate co-management activities and understand their likely costs and benefits. They are key to making the right collective choices about how to use and share resources without depleting them.

Finding the Right Institutional Model. Another issue that looms large for the future sustainability of co-management is the institutional model for planning and implementation. Several commentators have voiced their concerns that these activities cannot be driven by expatriate advisors or external consultants, whether local or from outside the country. The PEA Team fully agrees and believes that another outcome of the pilot activities should be the identification of the right mix of players, both at the community level and on the government side of the co-management equation. Building these capabilities at home will also help deal with the cost implications of the application of forestry science mentioned above.

Fortunately in Guinea, some of the basic institutional capacities are already clearly in place. Within the DNEF, the BCTT is charged with and equipped for the production of the required mapping products. The technical office of the DNEF is charged with the preparation of forest management plans, including inventory and silvicultural prescriptions. An array of modern technologies (geographic information systems, global positioning systems, satellite imagery and computer based inventory programs) are also already being employed. Enhancing the capabilities of these two units of the DNEF to carry out their roles and responsibilities as part of the government side of co-management for mapping, inventory and management planning will involve technical assistance and training, presumably already foreseen under the provisions of the PEGRN. There will also be a need to ensure that the government of Guinea is willing and able to finance the recurrent operational costs of these activities, including possible incremental staffing and purchasing up-to-date imagery and financing field-based operations.

Of greater concern is the matter of which unit, if any, within the DNEF is prepared to take over the roles and responsibilities currently being implemented by the Winrock team for initiating contacts and engaging as a partner to the communities for the establishment of the vital co-management pact. One might envisage the creation of a community forestry unit within the DNEF, appropriately staffed with an array of personnel fully conversant with rural sociology, participatory development and forestry extension. They in turn would be able to call on the services of the technical units mentioned above for forestry science-based interventions and hand over established working co-management models to the territorial staff of the DNEF to service and backstop the relationship between the forest committees and the communities they represent. This participation of the DNEF could be enhanced, as it is now, by allowing the community forestry unit to facilitate the localized NGOs, which could also help initiate such co-management programs in other forests, providing the communities with assistance in getting organized and operationalizing a multi-community contract with the DNEF.

A View of the Financial and Economic Operations for Co-Management. Management has costs, both direct and indirect, in any context. It is largely about investment, capitalizing the resource base and using the capital accumulated and safeguarded to generate sustainable yields and benefits over time. Overall, the finance and economics of co-management of reserved forests needs more attention for a number of reasons. Community participants need to ensure that they

are optimizing their returns on these investments (microeconomics) to fully benefit from co-management. The government of Guinea (and its donor partners, including USAID and others working in forestry) will be interested in considering the unit cost per area treated as a factor affecting the choice of sector and the larger land-use planning strategy and options facing the country (macroeconomics).

On a more mundane level, there is a prevailing need to build cost consciousness and a capacity for financial analysis into these activities. If investment decisions or technology innovations are eventually going to be proven effective, there will need to be more attention paid to the microeconomics of their use. Can present activities finance such investments? Do local people involved with co-management understand the costs and benefits in real terms? And are they building a capacity for self reliance as a result of their involvement in these activities? Studies of the financial returns should be a more routine part of the analysis of the appropriate technology development. Developing a sound database regarding the cost and benefit structure of co-management would appear to be an ideal role for the capacities of the DNEF Planning and Program Division.

Natural Forest Management and Biodiversity Conservation. Several commentators appeared puzzled by the report's suggestion that certain reserved forests (Bakoun and Balayan-Souroumba) visited by the PEA Team might offer greater potential as sites for protection of wildlife or national parks. They suggested that this might be a contradiction because the intent of co-management is to harness the resources of the forests to the benefit of local people.

At one point, those supporting natural forest management, particularly if it involved logging, seemed to be in direct conflict with the global proponents of biodiversity conservation, which stresses protection of nature. In recent years, growing field experience has led to important findings that belie this supposed dichotomy between natural forest management and biodiversity conservation. While forest management is decidedly not pure biodiversity conservation or absolute protection, it is much better than the typical next choice for tropical forest lands—conversion, often irrational and destructive, for agricultural or livestock purposes.

It should also be noted that in many countries of the Sub-Saharan Africa, biodiversity conservation needs are not well known beyond the fact that some important keystone species are endangered. Even less is known about how to manage for biodiversity conservation or the more delicate matter of reconstitution of biodiversity assets. For this reason, natural forest management which proactively aims to maintain forest cover and natural habitats can have wide-ranging positive impacts on biodiversity conservation for both flora and fauna—while at the same time generating an array of benefits for the local people.

Appendix A

USAID/Guinea

Scoping Statement for a Programmatic Environmental Assessment of Forest Co-Management in Guinea (Revised November 2000)

1. Introduction and Rationale for a PEA

USAID's environmental regulations (22 CFR 216), commonly known as Reg. 216, establish the conditions and procedures for the environmental review of the activities funded with Agency resources. These regulations also define classes of actions that have been generally determined to have a significant effect on the environment [216.2 (d)] and for which an environmental assessment is required. Natural forest management activities are not included in this list of activities and indeed, in the past, it was thought to be inherently beneficial because the general premises of natural forest management were intended to bring the area in question under sustainable management. However, rising worldwide concerns about tropical forest deforestation and the loss of biodiversity conservation prompted Congress to enact amendments to the Foreign Assistance Act (FAA) of 1961 that increased the environmental scrutiny for such activities.

Section 118 of the FAA requires that any program or project which significantly affects tropical forests be a) based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and b) take full account of the environmental impacts of the proposed activities on biological diversity. Section 118 denies assistance for:

- a) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner which minimizes forest destruction and that the proposed activity will produce positive economic benefits and sustainable forest management systems; and,
- b) actions which significantly degrade national parks or similar protected areas which contain tropical forests or introduce exotic plants or animals into such areas.

Section 118 further denies assistance for the following activities unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development:

- a) activities which would result in the conversion of forest lands to the rearing of livestock;
- b) the construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands;
- c) the colonization of forest lands; and
- d) the construction of dams or other water control structures which flood relatively undegraded forest lands.

Additionally, Section 533 (c) (3) of the 1986 amendment to the FAA of 1961 states: “none of the funds appropriated in this Act shall be available for any program, project or activity which would:

- a) result in any significant loss of tropical forests; or
- b) involve commercial timber extraction in primary tropical forest areas unless an environmental assessment:
 - (i) identifies potential impacts on biological diversity;
 - (ii) demonstrates that all timber extraction will be conducted according to an environmentally sound management system which maintains the ecological functions of the natural forest and minimizes impacts on biological diversity; and
 - (iii) demonstrates that the activity will contribute to reducing deforestation.”

Since the mid-eighties, USAID/Guinea has been financing activities related to community based natural resources management in selected watersheds of the Fouta Djallon Massif under the aegis of the Guinea Natural Resources Management Project (642-0219). One of the apparent opportunities emerging from this work has been the potential for developing community-based forest co-management arrangements (*co-gestion*) within classified forest areas that are found in the area. Guinea has a large number of such reserved forests, many of which were originally established with a view to protecting steep areas or other fragile ecosystems. Over the years, with growing population pressure, some of these forests have been degraded as a result of land hunger for upland agriculture, frequent bush fires and uncontrolled livestock grazing.

The Reserved Forest of Nialama, covering approximately 10,000 hectares in the Prefecture of Lelouma and a large part (approximately 50%) of the pilot watershed of Koundou, is one such area. The USAID/Guinea funded Guinea Natural Resources Management Project, and now its successor, the Expanded Natural Resources Management Project have been working there to develop a model for *co-gestion* of the area. In 1996, an environmental assessment of the activities described as the “Co-Management of the Nialama Reserved Forest” was conducted and a draft report prepared. Subsequently, the draft report was reviewed and modified, in the light of further information made available as the result of the completion of the Technical Management Plan for the Nialama Forest Reserve (Lowe 1996). The Environmental Assessment for the activities in Nialama Forest Reserve was approved by the Africa Bureau Environmental Officer in August 1997 with a recommendation of Negative Determination with Conditions. Work in the Nialama Forest Reserve has been carried out since under the aegis of this authorization.

In 1999, USAID/Guinea’s Natural Resources Management Strategic Objective Team, based on the potential and promise of the activities in Nialama, proposed an expansion of the community based natural forest management activities as part of its new Strategic Objective Grant Agreement. A target of 100,000 hectares of forests co-managed by the communities and the government services in as many as 11 additional reserved forest areas was identified. The issue of the need for an environmental assessment for each of these areas, especially in the light of the lengthy procedures and ultimate determination for Nialama, prompted the Mission to discuss these procedures during the visit that same year with the Regional Environmental Advisor from Washington. He suggested and the mission agreed, that this series of very similar activities might

be dealt with under the modality foreseen in Reg. 216 known as programmatic environmental assessment [216.6 (d)].

As defined in Reg. 216, the programmatic environmental assessment methodology was seen as being possibly appropriate to the following situations:

- to assess the environmental effects of a number of similar actions and their cumulative environmental impact in a given country or geographic area, or;
- the environmental impacts that are generic or common to a class of agency actions, or
- other activities which are not country specific.

On the basis of the preliminary planning for further co-management of natural forest activities under the Expanded Natural Resources Management Activity, two additional reserved forest areas where the approach might be applied and where the conditions were indeed similar were identified. These areas were the Suti Yanfou Reserved Forest (11,000 hectares), part of the Dissa Watershed in Sougueta Sub-Prefecture, Kindia Prefecture, and the Bakoun Reserved Forest (28,000 hectares), part of the Diafore Watershed in Tougue Prefecture. A preliminary Scoping Exercise for the Suti Yanfou Reserved Forest, prepared for the mission by the Regional Environment Officer from Bamako in 1998, described similar conditions and identified a series of issues associated with co-management there that were very similar to those experienced for Nialama (D. Panther unpublished manuscript 1998). The Bakoun Reserved Forest had also been visited by a USAID consultant team as early as 1988 and had been proposed as a site for co-management. It was therefore decided that the PEA might well be applied to the co-management of natural forests in accordance with the situational conditions for the use of this methodology as described above.

Therefore, following the procedures specified in Reg. 216, this document constitutes a Scoping Statement [216.3 (a) (4)] as required for all environmental assessments. At the request of the USAID/Guinea Mission, the Scoping Exercise was carried out by a consultant specialist under the aegis of the Africa Bureau buy-in to the EPIQ contract managed by International Resources Group, Ltd. The consultant was assisted in the preparation of this statement by a team including the Deputy National Project Coordinator of the Project, the Mission Environment Officer, and the Mission Strategic Objective Team Leader. The Scoping process was carried out during the period March 13–25 and consisted of a in-depth review of pertinent reference materials (see Appendix A, which lists the Scoping Team and provides a copy of the Scope of Work under which it was carried out), field visits over an 8-day period to the two subject Reserved Forests mentioned above as well as to other Reserved Forests and project activity sites, consultations with government of Guinea officials, community members in villages adjacent to the forests, contractor and mission staff (see Appendix B).²⁰ The process also benefited from an opportunity to meet and discuss the preliminary findings of a subcontracted team, fielded by the Environmental Studies and Research Center of the University of Conakry, that had been carrying

²⁰ This Scoping Exercise built upon earlier work carried out by the Regional Environmental Advisor who prepared a preliminary outline for the Scoping Statement (W. Knausenberger 1999). The work of the consultant entailed completing the consultative process, formalizing a list of issues for scrutiny during the PEA, and suggesting practical operational/logistical arrangements for the implementation of the PEA.

out a series of Multidisciplinary Baseline Studies in the Reserved Forests of Suti Yanfou and Bakoun. This Scoping Statement will be submitted by the mission to the Africa Bureau Regional Environment Officer for review and approval as per the specifications of Reg. 216 [216.3 (a) (4) (ii)].

1.1 Purpose of the PEA

This PEA will have multiple objectives:

- Facilitate and encourage the identification and understanding of environmental issues early in the planning cycle for co-management in these and future target forests; design environmental improvements into these activities and thereby avoid the need for mitigative or compensatory measures related to adverse impacts.
- Advance an understanding of the current state-of-the-art of sustainable co-management of natural forests in Guinea, by developing a document that will be useful to USAID, the government of Guinea, contractor personnel and others interested in working with these types of development investments, for determining the conditions under which they can be practiced effectively and efficiently and with assurances related to their sustainability and lack of adverse impacts.
- Further build up staff capabilities and understandings and institutional arrangements and organizational systems which lead to more sustainable co-management of natural forests approaches in Guinea.
- Facilitate the ability of the USAID Mission and its government partners and implementing agents to comply with the requirements of Reg. 216 as they apply to tropical forests and biodiversity conservation.

2. Brief Background Description of Program Being Assessed

2.2 PEA in the Context of the USAID Mission Strategic Plan

Due to population growth, low incomes and high unemployment in rural areas, Guinean smallholders increasingly rely on extensive subsistence farming and environmentally inappropriate cropping patterns to satisfy their demand for food. More marginal lands are being farmed, more woodlands converted to agriculture by slash and burn practices, the fallow duration is reduced and investment in soil conservation is low. As a result, soil erosion and the accompanying loss in soil fertility becomes increasingly serious, as manifested by the steady decline in agricultural productivity and increased environmental degradation, thereby further undermining the food security of the rural poor.

The current growth in agricultural production based on unsustainable practices is already causing serious degradation of the natural resources base throughout the country. Severe degradation of the Fouta Djallon Highlands, the source of three major rivers in West Africa—the Senegal, the Niger and the Gambia—is reducing the amounts of arable land per household and lowering overall crop yields (USAID 1999). Many of Guinea’s smallholder farmers are actively seeking new lands for cultivation and this has led to inexorable pressures on the reserved forests throughout the country. Because of the inherently fragile nature of much of the lands that were

originally protected under the category of reserved forests, this conversion is leading to longer-term degradation with little prospect of reversing the trends. The Guinean Directorate of Forestry estimates that approximately 36,000 hectares are being destroyed annually. USAID/Guinea seeks to address this situation through attention to its **strategic objective**:

Increased Use of Sustainable Natural Resources Management Practices.

The realization of the results foreseen under this strategic objective involves achievement along the lines of four intermediate results:

IR 1—Natural resource management planning skills acquired and applied.

IR 2—Farm productivity increased.

IR 3—Micro and small enterprise activities increased.

IR 4—Enabling policy environment established.

The activities being assessed by this PEA, the co-management of reserved natural forests, begun under the Guinea Natural Resources Management Project and being continued under the new Expanded Natural Resource Management Activity will address all of the above intermediate results. Achievement in this area will be one of the flagship performance indicators for this strategic objective. This programmatic environmental assessment aimed at corroborating the sustainability of the activities foreseen under this component of the project is a key step towards guaranteeing that the foreseen results, by definition intended to be “sustainable,” can be achieved.

Although this PEA is being carried out primarily to comply with the requirements of Reg. 216, the Scoping Team would like to reiterate its conviction that the focus of the PEA will fit well with the performance based criterion adopted by USAID as its primary measures for continuing support to the program and its co-management activities. Accordingly, this PEA must be designed from a broader perspective and with a focus on results and not just on the completion of planned activities. The quantitative measures of achievement for the co-management of natural forests—100,000 hectares of forests in the activity zone managed according to a sustainable management plan—is an SO level indicator, reaching the target will only be achieved if the full array of conditions for viable participatory forest management (embracing institutional capabilities, increased productivity, enterprise development and the policy environment—the four focal areas for the intermediate results) are also achieved. Thus while this PEA is intended to demonstrate that sound design and effective implementation of co-management of reserved natural forests will avoid negative environmental impacts, the premises that this will happen are related to all four of the intermediate results for the SO and will be self-reinforcing.²¹

²¹ It should be noted that a significant part of the target indicator of 100,000 hectares will also be achieved by working with communities on the management and improvement of non-classified community forests through a *groupements forestiers* approach. These areas are typically much smaller in size and do not involve, at least for the foreseeable future, forest extraction activities as they are mainly concerned with protecting and enriching the forest stands owned by the communities. They will not be assessed during the PEA; rather because of their inherently proactive operations in tree-planting and protection, would probably qualify for a IEE threshold decision of “negative with conditions” because of their beneficial impact on the environment.

2.2 Relationship of the PEA with Government of Guinea Programs.

The National Directorate of Water and Forests (DNEF) has recently published a flyer designed to provide a concise description of its commitments to policy and practice as agreed under the National Forestry Action Plan for Guinea (PAFN–Guinea). The development strategy outlined for the next twenty-five years identifies the following priority objectives:

- enhanced knowledge of the existing forest resource base;
- sustainable management of the classified forest domain of the state and of the collectives;
- management of watershed areas;
- putting into practice operations for production through reforestation and the promotion of appropriate technologies;
- conservation of biodiversity and the protection of fragile ecosystems;
- development of forestry within the framework of village land-use planning;
- promotion of community and private forestry; and
- putting in place a forestry research system.

This concise document can be construed as nothing less than a specific endorsement of the present USAID–assisted efforts to promote and development co-management of natural forests which are the subject of this PEA. More to the point, it would probably be fair to say that the continuing contributions of USAID over the years, related to community management of natural resources have amply supported the policy shift towards people and their participation in the management, protection and conservation of the reserved forests of the country.

2.3 Synopsis of USAID-funded Co-Management of Natural Forest Activities

The PEA for which this Scoping Statement is being prepared will address all foreseen activities in co-management of reserved natural forests to be undertaken under the aegis of the USAID-funded Expanded Natural Resources Management Activity in Guinea. The intention is to replicate the model of participatory forest management of reserved forests begun on the Nialama Reserved Forest on other candidate forests in selected prefectures, including: the three prefectures targeted during the past Guinea Natural Resources Management Project: Lelouma, Tougue and Kindia, and on three additional prefectures in the Forest Region of Guinea: Kissidougou, Gueckedou and Macenta. As mentioned above, two new reserved forests as potential sites for co-management have already been identified; they are the Suti Yanfou and Bakoun Reserved Forests. Both have now been the subject of an intensive set of multi-disciplinary studies designed to lay the foundation for forest management planning and eventual consultations with concerned villages.

Co-Management of Natural Forests—The Basic Model

The basic model for co-management involves a range of activities similar to those proposed for Nialama, and although the model will be tailored to the constraints and opportunities—technical, socioeconomic, and institutional—specific to each site, the following section provides a summary description of the general expectations of co-management of natural forests as foreseen with USAID support.

Most (but not all) of the reserved forests (*forets classées*) of Guinea were classified during the pre-Independence period. The conventional notion of classified or reserved forest suggests that these areas were being set aside for future use. In the gazettelement documents associated with some of these forests, and in the literature, the classification process applied by the foresters of the time (late 1930s/early 1940s) also mentions the need for protection of these areas. Many if not most of them were established around steep lands, rocky outcroppings and escarpments zones so much a part of the topography throughout this rugged country. In certain forests, villages existing within the proposed territorial limits of the reserved forest before the classification were noted and their rights to land duly recorded as enclaves. In addition, the rights of local people living around and within the forests for limited non-commercial extraction of building materials and fuelwood for domestic purposes, is also recognized.

Since Independence, the forestry services of the new Nation have found it difficult to maintain adequate guarding of these forests. Many of them, including both Nialama and Suti Yanfou, have been encroached upon by local people seeking new, fertile lands to cultivate for both rainfed and lowland agriculture. The original forest was cleared, sometimes on steep lands, and used for upland rice/peanut and manioc cultivation with attendant erosion and fertility losses. Large areas of Nialama and Suti Yanfou (and the Milo Reserved Forest in Macenta and Selly Koro Reserved Forest in Kissidougou, also visited by the Scoping Team) are now openly used by local people and are little more than unimproved bush fallow areas. In general, however, the steepest areas, those most inaccessible or too rocky for cropping remain intact, sometimes deliberately in an effort by local people to protect water sources (springs). The Bakoun Reserved Forest has experienced only limited encroachment because it is far from population centers and good roads.

Uncontrolled grazing, despite prohibitions in some classification documents, has also taken a toll. Herders are often cited as the cause of the frequent bush fires which ravage large portions of the drier areas of rural Guinea; it is thought that burning will refresh the grasses and provide forage for their animals. Bush fires also are caused by honey collectors who use fire to drive wild bees off their hives. Similarly, Guinea is a country where hunting small game is quite common and hunters often use fire to drive animals out into the open for ease of harvest. Hunting has also taken a significant toll on the animals that inhabit these forest areas. In short, despite their classification as reserved forests, many of these areas have suffered the fate of open access lands—used by all but the responsibility of no one.

The Co-Management Approach being promoted with USAID assistance is predicated on **a series of basic concepts**, worth noting here:

- Government financial and human resources are limited and it is unlikely that, even with great resolve, they would be able to successfully guard these forests against encroachment, especially against a backdrop of increasing land hunger.
- A participatory management approach calling for shared decision-making regarding the destiny and use of the forest and a sharing of the benefits derived from its protection, conservation and utilization among the adjacent villages, offers a better choice for improved public stewardship of these lands.
- Villager agreement to the management prescriptions will be achieved by consensus among the population, based on valorizing the resource base in their behalf, and providing them with

tangible, near-term benefits in return for the production trade-offs essential to sustainable management and utilization.

- This working partnership for the co-management of the forest in question will be codified by means of a written agreement or contract between a Forest Committee representing the assembled adjacent villages and the DNEF which delineates the rights and responsibilities of both parties, describing utilization methods and limitations, protective measures to be followed, and revenue sharing mechanisms.

Although the management plans for the new forests being considered for inclusion in the program have as yet to be developed, they are likely to be similar in nature to those identified for the Nialama Reserved Forest. For Nialama, the present management plan (which still needs to be made operational²²) proposes **the following elements and activities for its management strategy** (Lowe 1996):

Arrest deforestation and forest degradation by:

- Affirming the classified status of Nialama Forest
- Maintaining the integrity of the boundary
- Preventing permanent conversion to other land uses
- Ensuring that forest remains the long-term vegetative cover
- Protection against fires and fire management

Protect the forest ecology by:

- Protecting and maintaining the health and vitality of forest resources
- Maintaining the biological diversity of forest resources, including fauna
- Protecting the population and habitat of all protected species such as chimpanzees

Protect the watershed by:

- Preventing soil exposure on steep slopes
- Limiting the duration of cultivation on gentle slopes
- Excluding production activities near sources of water courses and along their banks

²² Great strides have been made in the preparations for co-management of the Nialama Reserved Forest. In addition to the Technical Management Plan (Lowe 1996) and an Environmental Assessment (McDonald et al 1996) which cleared the way for forest management operations, a good deal of the important work with the surrounding villages has now been accomplished. The latter includes the nomination of a Forest Committee and the signature of an Agreement between the Forest Committee and the DNEF as the basis for management operations, including the full range of activities discussed here. However, as Lowe pointed out, the forest inventory for Nialama can only provide figures indicative of the forest and its stocking as a whole, as the sampling intensity was low (0.3% overall), and it was neither stratified or randomized. Lowe noted that “the inventory cannot be used to estimate population parameters for particular forest types or territorial subdivisions...and accordingly...could not be used to locate or assess potential harvest areas.” The understanding was that the DNEF, and in particular, its Bureau Technique, was expected to prepare an operational management plan, either through repeated inventory assessments or from direct measurements of selected areas. This plan has as yet to be finalized, and is presently the main constraint for moving forward with operations in the forest.

Provide access to cultivable land by:

- Introducing agroforestry systems in selected areas of the forest
- Continuing access to existing *bas-fonds*
- Providing limited access for grazing

Enhance the supply of forest products by:

- Introducing timber and firewood harvesting of Bani (*Pterocarpus spp.*)

Enhance the opportunities for income generation by:

- Permitting the commercialization of timber, firewood and other forest products
- Promoting the commercialization of bamboo on a pilot basis

3. Determination of the Issues to Be Analyzed: Scope and Significance

3.1 Issue Identification Methodology

In defining the issues to be assessed during the PEA, the Scoping Team benefited from earlier environmental assessments of co-management for Nialama and the scoping exercise drafted for the Suti Yanfou Reserved Forest. There is also an emerging body of practice related to assessing the sustainability of forest management for the purposes of certification with which the Scoping Team leader is familiar. To further confirm a practical list of issues to be examined in the PEA, the Scoping Team reviewed the pertinent literature related to the program; visited a variety of sites in both the Fouta Djallon Highlands and in Guinea Forest Zone; held extensive interviews and consultations with USAID, contractor, program and DNEF/SPFF staff. Where possible, consultations with concerned villagers also took place. The Scoping Team also had the opportunity to hear of the preliminary findings of the Multi-Disciplinary Studies team that had been engaged to analyze the situation in Suti Yanfou and Bakoun Reserved Forests.

3.2 Issues to Be Addressed in the PEA: Scope and Significance

As a result of its efforts, the Scoping Team leader was able to circulate and discuss a draft issues list. After the conclusion of the field visits, this list has been further refined and a number of focus issue areas for a programmatic environmental assessment of co-management of natural forest in Guinea has been defined and is presented below. These issues have been grouped by major category so as to facilitate both understanding and the future assessment, although in principle, many of them are interlinked and the implications of one may affect the outcome in another area. They include:

Technical Issues

- **Inventory or Resource Assessment Methods.** An essential criterion for ensuring the sustainability of forest management activities is a sound baseline related to the condition of the resource base at the outset of the program. Without a practical set of baseline data and

information, obtainable at reasonable cost and readily monitored, it will be difficult if not impossible to measure achievement, corroborate sound utilization practices and monitor and evaluate sustainability.

- **Forest Management Planning.** The orderly application of forest management activities, in time and space, will also be critical to the effective and efficient implementation of sustainable forest management. The forest management plan provides a basis as well for the understanding of the roles, rights and responsibilities of both parties (the DNEF and the participating communities) associated with effective co-management. It constitutes the blueprint against which performance can be measured and environmental impact assessed.
- **Realities of Fire Protection.** Fire can be both a tool for forest management as well as the cause of significant degradation. A sound and practical fire management strategy will be an important part of the sustainable management practices for these forests, particularly in the drier areas of the Fouta Djallon. The implications of harvesting on fire danger must also be assessed and taken into account in management planning.
- **Silvicultural Implications of Planned Activities.** The sustainability of forest management operations is predicated on achieving reasonable amounts of natural regeneration to rehabilitate degraded areas of the forests in question and to ensure continuing forest cover after harvest. Little is known locally about the silviculture of the natural forests of Guinea and therefore it will be essential that operational planning takes these uncertainties into account and puts in place a conservative approach to off-take and ensures that its results (impacts) are being monitored.
- **Feasibility and Outcome of Agroforestry Practices.** The intent with these activities is to mitigate the existing pressure for cultivable land by allowing local farmers temporary access to lands suitable for rainfed cultivation. Clear criteria for the selection and use of these lands will be needed to ensure that they do not impede the protection functions of the forest, either through watershed degradation or soil erosion, that they do not further impoverish the soil conditions and that they will lead to satisfactory levels of natural regeneration of forest cover after agricultural production.
- **Extraction Methods for Timber.** Moving timber products resulting from planned utilization out of the forest often leads to unforeseen environmental impacts, as a result of skid trails and logging roads and their impact on the land, and because they open up access to otherwise inaccessible areas.
- **Livestock and Forest Management.** Livestock can have a significant deleterious effect on forest cover through overgrazing or the elimination of desirable forest species. It can also have a positive impact in forests of this kind by serving to reduce grass and herbaceous cover that would otherwise add to the fire danger. Managing livestock within large areas, however, can be difficult and costly and an agreed plan for doing so efficiently and effectively must be part of the plan.

Ecological Issues

- **Watershed Stability.** Many of the reserved forests were established with protection of the upper slopes and water sources of the country in mind. Although the overall goal of forest management is to improve the forest cover, certain areas will require a higher degree of protection, based on unambiguous criteria for protection and cost effective methods for its application.

- **Biodiversity Conservation.** Maintaining natural forest cover and promoting natural regeneration will be important measures for ensuring the conservation of plant and animal biodiversity. Little, however, is known about the status of many of the plants and animals of the native forests in Guinea and thus a strategy is needed to begin to explore the implications of forest management operations, both their positive and negative impacts (if any).
- **Threatened and Endangered Wildlife Species.** It has already been noted that endangered chimpanzees are present in a number of the reserved forests and efforts will be required to protect their habitat, food sources and migration/movement routes. Other threatened species (e.g., leopards) may also be present and a strategy will be required to address the needs for protecting them. Similarly, subsistence hunting is common in many areas of Guinea and methods will be needed to control the off-take to sustainable levels.
- **Cropping in the Bas-fonds.** Irrigated rice and vegetable farming in the bas-fonds areas is already permitted in many forests. In order for these agronomic practices to be fully productive, the rationale use of agro-chemicals will probably be required. A program to train farmers in the wise use of these substances so as to avoid negative impacts on the lands and waters will be needed. Similarly, bas-fonds may be extensive enough to constitute wetlands areas with important implications for the functioning of the hydrological cycle of the area; criteria will be needed for deciding if they can and should be so used.
- **Landscape-level management strategies.** Will the co-management plans be able to take account of ecological dynamics (structure and function of ecosystems) that extend beyond the boundaries of the designated reserved forest? For example, migration of wildlife populations, seasonal movements of livestock/grazing pressures, use of upstream and downstream water resources, and changing population pressures/market demands are influenced by activities extending well beyond the boundaries of a given forest reserve; how will the co-management plans address these larger ecosystem and regional landscape issues?

Socioeconomic Issues

- **Achieving Genuine Social Consensus.** The outcome of co-management is based on a reasonable level of consensus among the concerned villages and villagers for respecting the management plan. Clear understandings of “who gains/who pays” and of the production trade-offs that may be required to achieve conservation and rehabilitation is needed as an insurance against conflicts. Reasonable methods will be needed for dealing with inappropriate behavior on the part of non-conformist local people.
- **Economic/Financial Returns to Co-Management.** The design of co-management and its eventual success are also predicated on sufficient benefits sharing that will lead to appropriate behavior on the part of the communities concerned. Are the assumptions regarding the costs of production and the saleability of products realistic and will they lead to adequate levels of returns sufficient to continue to motivate the agreements. The issue of how to finance co-management on severely degraded areas where the potential for off-take is limited must also be accounted for. There is a need for a financial analysis of the production trade-offs mentioned above and the investments in time and labor required by the local people to ensure their motivation in adhering to the management prescriptions and limitations.
- **Taxation, Revenue Distribution Formulas and Benefit Sharing Modalities.** The policy and legislation framework have been revised and are being reviewed to support co-

management, however, the exact formulas and modalities for taxation, revenue distribution and equitable benefit sharing with respect to co-management natural forests have yet to be worked out in a manner which meets the needs and expectations of national (DNEF, Fonds Forestier) and local government (CRD, district) as well as community-based organizations and other local stakeholders? The resolution of these matters is critical to long-term economic sustainability as well as continued community support and participation. What are the prospects for successful negotiation and agreement on these issues?

- **Forest-Based Enterprises and Related Economic Development.** In keeping with the likely management objectives of co-managed natural forests, what are the prospects for integrating the development of forest-based enterprises and associated local economic development activities into the forest co-management plans? In view of community priorities that are likely to be voiced through the Forest Committees, can the proposed co-management activities be successfully implemented without associating some degree of local enterprise and economic development activity? Can such activities be supported in a manner consistent with the principles of sustained yield and environmentally sound management of the targeted natural forests?
- **Integration of Market Surveys and Marketing Strategies into Co-Management Plans.** Access to markets and current or potential demand for forest management products and services (including locally consumed, traded or marketed non-timber forest products as well as other forest products and uses of the natural forests) needs to be assessed and taken into account during the forest management planning process. Have adequate provisions been made in the proposed forest co-management methodology to address forest products demand and marketing issues?
- **Overall Cost-Benefit Analysis of the Co-Management Model.** What are the economic implications of the model (cost per unit area treated) and the overall needs and opportunities for these types of programs (magnitude of the problem country-wide)? Will it be sustainable without donor support? How could economic sustainability be ensured should donor support come to an end?

Institutional Issues

- **Policy and Criteria for Selection of Forest Areas for Co-Management.** Despite the very positive advances made in process of starting co-management, it is clear that both government and its donor partners would find it beneficial to establish the terms under which this program can go forward. Working out the details on the conditions under which the program is most likely to succeed, including selection of appropriate sites, localized and decentralized arrangements for co-management, including the role of the SPFF, roles and responsibilities of both parties (government service and forest committee), and a conflict resolution process, should further issues arise, would enhance the regulatory framework under which the program currently operates and increase its effectiveness over the long-term.
- **Institutional Capabilities.** The co-management arrangements presume roles and responsibilities for a number of institutional players: the DNEF/SPFF, the villager based forest committees, the NGO community and to some extent, contracted service providers. What are the minimum institutional requirements (skills, capabilities, operational means) needed for the model to function? Do they exist and how are they being strengthened?

- **Compliance with National Environmental Legislation and Forest Products Certification Standards.** What are the prospects for using forest co-management guidelines and other checklists or procedures associated with USAID environmental assessment concerns to address environmental requirements related to national legislation (*Code Environnementale*) and to lay the groundwork for satisfaction of forest certification and development of a capacity to produce certified forest products?
- **Integration of Program Activities.** Part of the USAID funding is used for activities that strengthen the production and income generation capabilities of rural communities throughout the program areas. Should these activities be brought to bear among the communities around the reserved forests and are they?
- **Other Stakeholders and Their Views.** What are the roles of other stakeholders (herders and hunters, men and women, those who collect non-timber forest products or forest-based pharmacopoeia) in these areas and how will they affect the co-management model; for example, in the case of the CRD and the private sector and their plans/expectations regarding these forest areas?

3.3 Brief Discussion of Issues Not to Be Covered by the PEA

After the scoping exercise, several issues identified earlier were excluded from the PEA because they were judged unlikely to occur under the situations involving the co-management of natural forests and therefore unlikely to be having a significant impact on the environment; they include:

- Greenhouse gas increases: These activities are expected to have an overwhelmingly positive net impact on carbon sequestration as the result of their efforts in addressing the issues of uncontrolled bush fires.
- Agricultural mechanization and its impact on air pollution and/or energy use will not be a problem because there are no plans to use machinery of any kind for the very limited agricultural activities foreseen in the program.
- Improved nutrition through safeguarding sources of potable water for the villages surrounding the forest are expected to have an overwhelmingly positive impact on environmental health conditions in the areas affected by these activities.
- Historical and cultural resources?—primarily in the forms of special forest groves—are already well protected and will not be subject to any form of disturbance as a result of the forest management activities.
- Urban tree resources and the quality of life will not be affected by these activities as they do not take place in any urban area.

4. PEA Procedures

4.1 Outcome of the Scoping Process

The Scoping Process, carried out March 13–25 in Guinea has confirmed the utility of the Programmatic Environmental Assessment methodology, noting that the similarities in the activities foreseen under the program with USAID funds are sufficient to warrant their assessment as a class of actions. The Scoping Process has also laid the foundation for the

implementation of the programmatic environmental assessment of co-management of natural forests in Guinea; by achieving the following:

- identified the key issues to be assessed during the PEA;
- led to the identification of the disciplines to be covered by a small multi-disciplinary team to carry out the PEA;
- identified an additional series of issues related to the basic design and implementation of co-management of natural forests which will be essential for its success as a viable land-use and development option in the subject areas; and
- suggested conditions related to the present program that will be necessary for an effective PEA exercise, to wit: resolution of the issues related to resources inventory and a satisfactory report from the multi-disciplinary baseline study effort at Suti Yanfou and Bakoun Reserved Forests, and the start-up of actual field interventions in Nialama Reserved Forest as the pilot case for these activities.

4.2 Methodology, Timing and Phasing of the PEA

In order to carry out the PEA, the Scoping Team envisions the following additional arrangements, methods, timing and phasing:

Approval of the Scoping Statement: This Scoping Statement will be reviewed at the USAID/Guinea Mission level and then submitted to the Regional Environment Officer, Africa Bureau for his review, consultation and eventual approval.

Interim Period: While this Scoping Statement is being reviewed and approved in Washington, USAID/Guinea with the technical assistance contractor will support enhanced activities under the Expanded Guinea Natural Resources Management Activity to strengthen the present range of activities. The thrust will be focused on resolving the issues associated with practical resources inventory methods so as to have a sound baseline against which to monitor the impact of management activities (essential for compliance under Reg. 216 and for activity related performance monitoring). Additional technical assistance, possibly in combination with the above, will be furnished to develop a methodology for operational planning of co-management of natural forests, in order to properly launch the interventions tentatively foreseen under the Nialama Forest pilot model.

During this interim period, and once it is clear that the technical issues related to the feasibility of co-management of natural forests have been sorted out, preparations will begin for the actual implementation of the PEA. These will include (to be carried out by the PEA Team Leader designate, to be identified): further development of the Scopes of Work for PEA team members; development of a series of analytical tools (e.g., semi-structured interview protocol and site description data sheet); development of a tentative schedule for field visits and preparation of the logistical support needs (USAID provision of transport, introductions to local authorities, limited office facilities for the PEA team); preparation of a budget for the PEA; compilation and acquisition of additional reference materials pertinent to co-management of natural forests in this region of West Africa; and, eventually, the recruitment and hiring of local PEA team members.

PEA Implementation Period: The proposed period of implementation of the PEA will be seven weeks in January/February 2001, broken down as follows: one week staging/briefing and team building in Conakry, three to four weeks of field visits; two to three weeks of report preparation. More specifically, it is envisaged that the implementation period will involve:

- Identification, compilation and review of **additional relevant literature** related to co-management of natural forests in West Africa.
- A continuing series of interviews with central government authorities, local authorities including CRD officials, and with similar projects promoting co-management of natural forests in Guinea. These will be carried out using semi-structured interview procedures with key DNEF/SPFF officials and staff from CRD and related projects. The PEA team will convene small discussion groups in key activity sites and with key staff as a vehicle for **the all-important consultative process typically associated with environmental assessment**. These sessions serve the dual purpose of facilitating the identification of important issues that may be of concern to those not directly involved in the co-management activities, and in raising general awareness of the importance of avoiding unforeseen environmental impacts as key to longer-term sustainability of the investments.
- **Field visits:** The PEA team will visit all of the sites identified as potential areas for co-management of natural forests where USAID funds will be utilized. Likely target areas include: the Suti Yanfou and Bakoun Reserved Forests, Selly Korou and Milo Reserved Forests, and others that may be identified by the DNEF/technical assistance team. It is also foreseen that the PEA team will visit the pilot activities sites in the Nialama Reserved Forest where co-management activities will be already underway in order to compare them with the activities tentatively foreseen in other forest areas. Although the activities expected to take place under the Expanded Guinea Natural Resources Management activity with the *groupements forestières* differ slightly from those to be undertaken in the reserved forests, mainly because of the land tenure of the areas concerned, the PEA team will also visit a series of these more modest activity sites in order to discern their impacts and decide if they too can be included within the scope of the PEA. Prior to any and all field visits, USAID and its contractor team (Winrock International) will ensure that all relevant information related to each site has been compiled and copies made available to the PEA team to facilitate their work. Field visits will be concentrated in the Moyenne Guinea and Guinée Forestier zones of the country where these activities are expected to be concentrated.
- **Inter-disciplinary Team Approach:** The multi-disciplinary team (see following section) will follow a rigorous inter-disciplinary approach in its work, including: joint preparation for each field visit (identification of key issues and their interplay); interviews with local personnel and community members (in each case, the semi-structured interview procedure will be used and a lead person and rapporteur designated for each site); comprehensive screening guidelines (to be prepared by the PEA Team Leader) for each site to ensure that all issues are covered and team responsibilities for that coverage clearly understood; post-visit wrap-up and review sessions, both with local staff and among the team itself so as to build on the lessons being learned, to discuss preliminary findings and highlight procedural as well as substantive issues; focused inter-team discussions to identify mitigation and monitoring actions; and, finally, assignments of responsibilities for preparation of report pieces emanating from each site as may be the case. As possible, the PEA Team should be accompanied by activity team members representing the DNEF/SPFF and the contractor

technical assistance team to ensure an in-depth understanding of the sites being assessed and to further stimulate their discussions of issues related to environmental impact.

Report Preparation and Review: The following plan for the preparation of the PEA report is foreseen: draft PEA report prepared and compiled, with contributions from each team member, by the Team Leader; inter-team review of the draft; circulation of a debriefing *aide mémoire* with all principal players of the Expanded Guinea Natural Resources Management Activity (DNEF/SPFF, USAID, contractor personnel) at a half-day workshop to be held in Guinea prior to the departure of the Team Leader; written comments based on the debriefing memo to be submitted by the above participants within two weeks of the workshop; and preparation of a final draft report incorporating the comments and suggestions made, by the Team Leader, for submission to USAID and subsequent submission for review and approval to the Bureau Environment Officer (BEO), Africa Bureau, Washington.

Post-PEA Activities: After the PEA has been approved by the Africa Bureau BEO, the report will be translated into French and distributed to all interested parties (to be determined by the USAID Mission). Further implications related to additional technical assistance and possible training in the application of its findings will be discussed by USAID, the DNEF/SPFF and the contractor at that time.

4.3 PEA Team Make-Up

In order to carry out a multi-disciplinary PEA of co-management of natural forests in Guinea, the following disciplines will be represented on the Team:

- **Team Leader: Tropical Forestry/Environmental Assessment Specialist** (8 person/weeks)
- **Tropical Forestry Management Specialist** (locally recruited), (6 person/weeks)
- **Socioeconomic/Rural Sociology Specialist** (locally recruited), (6 person/weeks)
- **Natural Resources Management Specialist** (USAID/Guinea representative or the Regional Environmental Advisor, REDSO/West Africa) (6 person/weeks)

Recruitment of local personnel will be the responsibility of the contractor chosen to field the PEA Team as arranged for by USAID/Guinea under a contractual mechanism suited to USAID procedures. USAID will also furnish a vehicle, fuel and driver for the conduct of the field visits. As mentioned previously, the DNEF/SPFF and the technical assistance contractor will be responsible for providing all detailed information on each of the assessment sites, and may furnish observers or potential PEA Team participants to accompany the PEA Team.

4.4 Guinea Co-Management of Natural Forests Programmatic Environmental Assessment—Outline of the Report.

The Scoping Team proposes the following draft outline of the eventual PEA Report, following the guidance in 22 CFR 216, to include: (1) Executive Summary, (2) Purpose of the PEA, (3) Alternatives including the proposed action, (4) Affected Environment, (5) Environmental Consequences of Co-Management of Natural Forests, (6) List of Preparers, and (7) Relevant Appendices.

Appendix B

PEA Team Members and Their SOWs (Brief biographical sketches)

Thomas M. Catterson, PEA Team Leader and Environmental Review Specialist. MSc International Forestry 1973. Independent International Consultant. More than 30 years of community-oriented natural resources and forestry management experience in over 65 countries around the globe. Focused experience with natural resources management and agricultural development and environmental issues and programs in Ethiopia, Eritrea, Niger, Chile, Cambodia, El Salvador and Peru.

Dr. Rebecca Ham, Biodiversity Conservation Specialist. Rebecca Ham received her BSc at the University of Guelph, Canada, in Biology, MSc in Psychology at the University of St. Andrews, Scotland and PhD in Biology at the University of Stirling, Scotland. Rebecca has lived and worked in conservation in Africa for five years. She lived in the Lopé Reserve in Gabon for two years, conducting the research for her Ph.D. thesis on the behavior and ecology of grey-cheeked mangabeys. She then returned to Gabon for another year to work for ECOFAC doing training in wildlife identification, tracking and behavior and ecology, as well as setting up of the infrastructure (hides, paths, mapping, etc.) as part of an ecotourism project in the Lopé Reserve. She then moved to West Africa where she lived in the Republic of Guinea for two years, doing the first nationwide chimpanzee survey. Rebecca returned to North America in 1998 to work for the Biodiversity Support Program directing a project looking for ways to mitigate the negative effects of armed conflict on the environment. Rebecca is now Senior Director of the West Africa Program at Conservation International.

Dantily Diakite, Tropical Forestry Management Specialist. Forest Engineer specializing in collaborative management of natural forests. Previously held positions include Prefectural Forester in Labé and Guéckuédou, and Forest Inspector in the Forest Region. Mr. Diakite was the Regional Coordinator for PGRN and now serves as the Assistant to the National Coordinator of PEGRN. He has also participated in the environmental impact study of the management plan for the Nialama forest.

Boubacar Thiam-Rural Sociology Specialist. MSc in natural resources. Mr. Thiam has ten years experiences in land tenure, property rights, and local natural resources management practices in Africa (mainly in Guinea). In recent years, he has worked as a consultant: to analyze and summarize the evolution of NRM policies and legislation in Sub-Sahara Africa during the last twenty years; assisting with updating and popularizing the Frame and NRM Tracker web sites. In Guinea, his consultant work included: a USAID funded project to facilitate initiating the co-management process around Nyalama national forest; research on land tenure systems and local natural resources management practices for Land Tenure Center (LTC); for Guinea Ecology (a national NGO) to facilitate the resettlement of local people around a hydroelectric dam project. He has also conducted research with LTC and the Environmental Sciences Institute of Senegal on land tenure and management of the Samba Dia biosphere. Mr. Thiam's first field experience was as an intern in 1992 from a World Bank/UNESCO funded project around the Nimba biosphere in Guinea prior to graduating from College as a Rural Sociologist.

Appendix C

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- . 1999b. *Implementing Forest Co-Management in Guinea: Proposals for the Nialama Work Program and Replication in Other Forests*. Guinea Natural Resources Management Activity. Summary Assistance Report submitted to USAID/Guinea by Winrock International. Morrilton, Arkansas, September 1999. p. 38 + map.

PEGRN Maps and Images Related To Co-Management

Available to the PEA Team

- Carte de Végétation et d'Occupation du Sol de la Foret Classée de Bakoun*
BCTT, Oct. 2000. Scale- 1:30,000.
- Carte de Végétation et d'Occupation du Sol de la Foret Classée de Suti Yanfou*
Carte de Vegetation et d'Occupation du Sol de Nialama
BCTT, Juin, 2000. Scale—1:25,000. Not titled.
- Carte Opérationnelle de la Foret Classée de Bakoun*
BCTT, Oct. 2000. Scale- 1:30,000.
- Carte Opérationnelle de la Foret Classée de Nialama*
BCTT, Juin 2000; Scale—1:10,000, 8 maps in all; Two versions of each sector (A,B,C and D) Map: earlier version fully colored and latest versions without full coloring.
- Carte Opérationnelle de la Foret Classée de Suti Yanfou*
Nialama Operational Chimp Habitat Map
USAID-Strategic Planning and Results Center/GIS, Nov. 2000. Scale- 1cm = 300m.
- Russian Topographic Map* of the forests (Sincery Oursa and Balayan Sourmouba) near Dabola proposed for inclusion in the program.

Appendix D

Team Building Questions

Themes and Ideas Related To the Environmental Assessment of the Technological Dimensions of the Co-Management of Reserved Forests in Guinea

Introduction

It should be noted that this PEA is predicated on the conviction that the current co-management approach is fundamentally sound and, building on some years of accumulated experience, has accounted for all dimensions of the model to ensure the chances for its effective and efficient implementation in the field. Furthermore, the clear and declared intent of the co-management approach is to arrest the present forces leading to the degradation and destruction of these forests. In short, the objective of the approach is to have a very positive impact on the environmental stability of these areas by applying the basic tenants of sound natural resources management which can be summarized as matching land use to land capability, thereby enhancing the opportunity for sustainable development.

The outcome of this PEA, however, is expected to lead to results which will safeguard this contribution of co-management to sustainable development, in three ways, namely by: 1) assessing the possibility of adverse impacts and suggesting how these could be avoided by adapting to the design of the approach (with the elaboration of a checklist for sound design); 2) by identifying mitigation measures that should be part of the approach where adverse impacts are unavoidable; and 3) by outlining the need for monitoring during implementation to counter the possibility of unforeseen adverse impacts.

The questions and ideas which follow are intended to be read in conjunction with the list of issues identified in the Scoping Statement prepared for the PEA in March 2000 and approved by the Africa Bureau Environment Officer.

Policy and Strategy Considerations

- Is the present program supported by national forestry and rural development sector policy, and if so, how?
- Review the co-management model in the light of the Code Forestier and its regulations and identify possible opportunities and constraints.
- How does the present program of activities fit within the decentralization thrust of the government and what are the views among local level authorities (prefecture, CRD, etc.) regarding the co-management of reserved forests?
- Are there development plans/activities/programs in the areas around the reserved forests that contribute to or constrain the implementation of co-management?

- Review the current institutional arrangements by the DNEF/SPEF for the reserved forests and adjacent area and their capabilities and needs for continuing to implement co-management of the reserved forests.
- What is the typical background and training of the DNEF/SPEF field agents who will act as the primary contact points with the rural communities and assess its adequacy for successful implementation of their roles? Suggest additional training requirements.
- What are the mechanisms for accountability of the actions and achievements of the staff of the DNEF/SPEF?
- Review the present selection criteria and justifications for the choice of candidate reserved forests for inclusion in the program in the light of its declared objectives.
- Examine the present arrangements for cost/benefit sharing and the application of permit fees and taxes and their impact.
- Are there other stakeholders—industry, wood merchants, timber contractors—or institutions and/or individuals engaged in agricultural development who have views about the present plans for co-management of reserved forests?

Management Infrastructure

- Discuss the requirements for improving access to the forests if any and the environmental implications of same.
- Discuss the construction plans for training cum meeting centers associated with the program of activities and briefly review their environmental impacts if any. Are there any other likely investments in rural infrastructure that will be required?
- The program of activities also includes protection of the catchments (*protection des têtes de sources*) associated with springs and other surface water sources of considerable importance of considerable importance for both human and wildlife use. Will the scope/size and location of these protection areas be adequate for ensuring that the catchment functions are maintained thus guaranteeing the perennial nature of the water supplies? How will this activity be measured and monitored?

Forest Management Technological Dimensions

- Review the present forest mapping/classification system/land capability identification/actual land use/cover systems and inventory procedures in the light of the minimum data sets (also to be defined) that will be required to meet management objectives.
- What are the criteria for deciding the designation of areas of the forests into one of three series: production, partial protection and total protection? Similarly, what are the criteria for deciding between the different management activities (agriculture, grazing, hunting, timber and fuelwood extraction, beekeeping, non-wood forest products collection, gunpowder manufacturing) within the production series?
- Will the forest management planning be compatible with past usage rights and practices of the communities? (others?)
- Review the management objectives defined for each forest and the decision-tree, sets of activities, designated actors and critical assumptions associated with the achievement of each of them (development of an action matrix—see draft matrix—tbd).

- Review the protection (against fire, illegal off-take, grazing controls, watershed and catchment area needs, hunting restrictions, land clearing, and land capability requirements) plan and its implications for environmental impact and overall feasibility.
- Although present projections of off-take for fuelwood, *bois d'œuvre* and bamboo are decidedly modest and conservation oriented, what indications/assurances are there that they will be sustainable and how? How were these choices made and quantified regarding harvesting of forest products?
- What system (three basic types: selection, small group clear-cutting or shelterwood) will be used to identify the trees to be removed by harvest and what are the likely/intended implications regarding regeneration? How will the magnitude of these operations be monitored?
- What are the plans for extraction of forest products, in particular timber and bamboo and will these extraction activities have an impact (soil erosion or compaction) on the environment (roads, skid trails and collection points)?
- Will there be any impact of extraction on water quality of streams and rivers within the forest or beyond?
- What is known about the silviculture of the species or forest types intended to be used as “bois d'œuvre” and bamboo to be harvested and how will this information be used and/or enhanced? Is there a need or opportunity for timber stand improvement activities and investments?
- The program of activities envisages assisting the local communities to develop micro-enterprises related to the improved collection and processing of non-wood forest products (e.g., bush honey, “Nere” and “Karite”). How will timber, fuelwood and bamboo harvesting affect these traditional enterprises and their supplies? Are there other non-wood forest products, given their importance to local communities as sources of medicinal plants, fiber, food, and building materials, that must be accounted for in management planning and implementation?
- The program of activities includes agroforestry, grazing in the forest and agriculture in the bas-fonds. What steps have been taken to assure that these will be sustainable? Is the use of agrochemicals foreseen or likely to be induced?

Biodiversity Conservation and Co-Management

- The Chimpanzee issue has been receiving considerable attention in the context of co-management of the Nialama Forest. Describe the present methodology for addressing this issue and how and if it could also be applied to other biodiversity assets of importance within these forests.
- Will this methodology be applicable in the other forests targeted for co-management (Suti Yanfou and Bakoun) and does it appear to be compatible with the present co-management plans prepared in October 2000?
- What measures can be used to gauge hunting pressure on the forests? Are there hunting pressures on the forests in question from beyond the local villagers engaged in co-management, are there any residual rights of these hunters to use the forest, and how can it be accounted for and managed in order to achieve biodiversity conservation goals?
- Describe the present sociology of game meat in the villages of the Fouta Djallon. Who hunts? What percentage of the protein of the average diet comes from game meat and what

percentage of income, if any? Are there collective hunts? Is fire used as a hunting technique. Are snares and traps being used?

- What are the current governmental policies and programs related to hunting? Where does the government stand on biodiversity conservation issues? Is it a signatory of CITES and how well is this being applied? Provide a summary of the current regulations related to subsistence hunting and/or commercial hunting.
- Are there traditional norms or regulations about hunting currently operational among local hunters/villagers—seasons, size limits, bag limits, area restrictions, species prohibitions, gear limitations—and what procedures are in place for applying these and sanctioning those that do not adhere to them?
- Do the Classified Forests constitute areas of unique biodiversity that are not being protected elsewhere in the country or the Region? Or are the Classified Forests generally seen as better hunting areas or poorer hunting areas?
- Discuss the social and economic implications of biodiversity conservation: will there have to be trade-offs; how serious is animal damage to crop production; what gains can be made in terms of nutrition and/or income?
- Discuss the Bakoun Forest and its possible role within the context of the planned Guinea/Mali Transfrontier Protected Area (eventually a park).

Socio-Economic Dimensions of Co-Management of Reserved Forests

The technological feasibility of co-management plans and operations, and in turn, their sustainability from an environmental perspective are predicated on the idea that the communities understand them and will implement them as agreed. Anything that leads to poor implementation of these agreements—in the main as a result of changes in the cost/benefit ratio for community investments or perceptions of the same—which cause local people to choose less than optimal practices, may lead to adverse environmental impacts. The questions which follow seek to highlight the various socioeconomic dimensions of the co-management plans and their potential implications for the sustainability of the activities.

- Describe the full array of potential stakeholders (farmers, wood cutters, non-wood forest product harvesters, herders, hunters, men and women, young and old) at the community level concerned with the decisions affecting the use of the reserved forests and resources.
- Describe the present composition of the Forest Committees—age, gender, rank in the community, status/wealth in the community, positions within the community.
- What are/might be the roles of traditional/religious leaders in promoting or undermining co-management?
- What kind of power remains in the hands of traditional leaders after decentralization (in this case, decentralized forest management) has taken place?
- Has full consensus and community approval of the management plans been achieved and if not, why not and with what implications? Are there “outsiders” who use or have used or feel they have the right to use the forests in question and how, if at all, have they been dealt with? Are there power differentials among the stakeholders with certain groups being marginalized and what will be the impact on co-management, if so?
- Are there other development programs or projects currently working in these communities involved with co-management and if so, what are their general objectives? Does the local

development agenda—policy and programs—provide an enabling framework for co-management?

- Do the communities have other objectives of higher priority than participating in co-management of the reserved forests, and if so, what are they?
- These forests were gazetted many years ago, most during the colonial period. Are there lingering doubts or assertions within the communities which suggest that they do not share the same view as the DNEF regarding the tenure of these lands?
- Describe the participatory strategy and process in general and how it has functioned in the case of each of the forests. Analyze the make-up and representativeness of the forest committees. How is information about co-management shared within the communities? Discuss the nature of the “transaction costs” associated with promoting the co-management plan and getting it approved and operational in the communities?
- Describe the rights and responsibilities of the co-management committees and what is their legal status and the process involved in establishing, organizing and legally recognizing these committees. Has the process been sufficiently decentralized and transparent?
- How are these committees to be held accountable for their actions, both upwardly (to the state) and horizontally and downwardly (to the communities)? Are they or will they operate in a way consistent with the principles of good governance and democratic, representative procedures? Do all interest groups and user groups have a say in the decisions of the committees, or get a hearing on their positions?
- Is there general harmony between the precepts of use rights and responsibilities contained in the co-management plan and agreement and customary law and usage rights? With the present national laws and policy, for example, as concerns issues such as tenure, access rights, use rights and the powers of exclusion?
- What are the identified capacity building needs and training programs that have been provided to the communities and the forestry committees established within them for the purposes of co-management?
- What mechanisms and methods are in place for evaluating program performance on a routine basis with the participant communities? Any mechanisms for conflict or dispute resolution and are they traditional or new to the forestry activities?

Economic Dimensions of Co-Management

Another of the basic principles of co-management is that by valuing the resource base for the communities surrounding the reserve forests, they will have a direct and tangible stake in its wise use and conservation. In short, they stand to materially benefit from their new enfranchisement as co-managers of the forest and earn revenue and other benefits in the near-term and the years to come. Therefore, they will agree with protecting the forest and its resources even if some production trade-offs are required and make the right choices needed for sustainable management. The wrong choices, in most cases, will lead to adverse environmental impacts related to unsustainable use.

The questions which follow seek to examine the likelihood that the benefits or the prospects of benefits are actually there and sufficient to continue to convince the people to cooperate with the management plan; these benefits should be understood as net returns to their efforts to implement

the management plan and must also thus include a clear understanding of the costs of management. The questions are as follows:

- Describe the overall cost/benefit model and its different components.
- Are there reasonable quantitative estimates of the benefits presently derived by the communities before the management plan was put in place?
- What expectations are there of investments of time, labor, materials and cash (the costs of management) on the part of the communities/forest committees engaged in the various production models and for co-management overall (estimate the external costs to prepare management plan and get it approved)?
- Provide a projection of estimated returns to the typical village/villager participating in co-management, under various use (timber, fuelwood or bamboo harvest, agroforestry, non-wood forest products and forest grazing) models.
- How will the financial returns (net benefits) be used and/or distributed at the community level?
- Based on the overall model, estimate the unit cost per hectare brought under management (the macroeconomics of co-management).

Appendix E

Preliminary Work Program/Calendar for Co-Management of Reserved Forests PEA Team
Programme Préliminaire de Travail/Calendrier de Équipe de PEA Co-Gestion Forêts Classées

Dimanche	Lundi	Mardi	Mercredi	Jeudi	Vendredi	Samedi
11/2- Travel to Guinea	12/2- Équipe arrive a Conakry (pm)	13/2- Team Building Exercise (am) - Pickup rental vehicle - Briefings avec USAID y DNEF	14/2- Team Building Exercise (am) - Diakite: Present situation actuel les activities de co-gestion - M. Bush: Present other components of PEGRN	15/2- Reunions - at Conakry - DTCC for presentation on the making of Carte Opérationnelle - Revise docs. - Review/finalize logistical arrangements	16/2- Reunions - at Conakry - Kjell C. to discuss outcome of his consultancy - Revise docs. - Logistical arrangements	17/2- Depart pour Labe - Revise docs.
Nuit- voyage/avion	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Labe
18/2- Rest - revise docs.	19/2- Aller a Nialama - Premier Reunion a/ Comite Foret	20/2- 2 sous-équipes: DD/TMC visite foret - BT/Winrock visite communites	21/2- Equipe visite des villages	22/2- Reunion de Equipe de synthèses - Depart pour Labe	23/2- Reunion Equipe avec Staff PEGRN - Reunion avec Cecelia Polansky, Consultant Inventaire Forestier	24/2- Depart Labe pour Kouroutoungo
Nuit- Hotel Labe	Nuit- Cite- Nialama	Nuit- Cite- Nialama	Nuit- Cite- Nialama	Nuit- Hotel Labe	Nuit- Hotel Labe	Nuit- C' Kouroutoungo
25/2- Rest - Rebecca Ham arrives/transport to Kouroutoungo w/ USAID staff	26/2- Aller a Bakoun - Reunion a/ Comite Foret	27/2- Tournée dans le foret - Objective visite sites potentielles de activities	28/2- Tournée continue, avec visite au village y les villageoises	1/3- Suite de tournée pour sortir del autre cote de la foret - Visite village	2/3- Rentrer a Kouroutoungo - Reunion de Equipe de synthèses	3/3- Depart pour Dalaba in route to Dabola and other reserved forests
Nuit- C'Kouroutoungo	Nuit- C'Kouroutoungo	Nuit- Camp Foret	Nuit- Camp Foret	Nuit- Camp Foret	Nuit- C'Kouroutoungo	Nuit- Hotel Dalaba

4/3- Rest	5/3- Aller a Dabola et Visite a Foret Classee de Balayan	6/3- Continue visite a Foret Classee de Sincery - Oursa	7/3- Aller a Sougeta/Linsan Visite a Foret de Suti Yanfou	8/3- Continue visite a Foret de Suti Yanfou	9/3- Reunion de Equipe de syntheses	10/3- Depart pour Conakry
Nuit- Hotel Dalaba	Nuit- Hotel Dabola	Nuit- Hotel Dabola	Nuit- Hotel Linsan	Nuit- Hotel Linsan	Nuit- Hotel Linsan	Nuit- Hotel Cam./cky
11/3- Rest	12/3- Reunions Supplementaires-cky - Reunion de Equipe pour synthese final	13/3- Chaque membre d'Equipe commence a rediger ses resultates preliminaires	14/3- Atelier de Restitution (am) - Reunion de Equipe pour discuter les resultates d'Atelier	15/3- Reunion d'Equipe pour organiser redaction de rapport	16/3- Membres Expatries d' Equipe depart - return rental vehicle and settle account	17/3-
Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	Nuit- Hotel Cam./cky	—	----
18/3-	19/3-	20/3-	21/3-	22/3-	23/3-	24/3
	Chaque membre d'Équipe prépare ses brouillons des sections de rapport final assigne				Chaque membre d'Equipe envoyer ses rapport a Catterson pour e-mail	

Appendix F

List of Persons Consulted

Name	Position
Conakry	
Harry F. Birnholz	Mission Director, USAID/Guinea
Robert Boncy	Deputy Director, USAID/Guinea
Allen Fleming	Environment Team Leader, USAID/Guinea
Son Hoang Nguyen	Natural Resources Management Specialist, USAID/Guinea
Susan van Keulen-Cantella	Community-based NRM Specialist, USAID/Guinea
Mohamed Lamine Fofana	Environment Team, USAID/Guinea
Ibrahima Camara	NRM Office, USAID/Guinea
Hendrik Baeyens	GIS Specialist, USAID/Guinea
Jeanny Wang	Environment Officer, USAID/G/EN/ENR
Rebecca Niec	West Africa Regional Program, Environment Officer, USAID/Bamako
Mathias Rodolphe Haba	National Director, DNEF
Alpha Kabine Camara	Deputy National Director, DNEF
Amadou Cherif Bah	Head, Planning and Programming Division, DNEF
Daniel Camara	Researcher, Management Division, DNEF
Bademba Barry	Head, Thematic Mapping and Remote Sensing Office (BCTT), DNEF
Ibrahima Say Barry	Thematic Mapping and Remote Sensing Office, (BCTT), DNEF
Martin Bush	Chief of Party, PEGRN/Winrock
Sekou Fofana	Technical Coordinator, PEGRN/Winrock
Richard Kimball	Enterprise Development Director, PEGRN/VITA
Alphonse Faye	Agricultural Production Specialist, PEGRN/Winrock
Sidibe Sedibinet	Bureau d'Etudes ECO-CONSULT
Kjell Christophersen	Economics Consultant, PEGRN/Winrock
Cecelia Polansky	Forest Inventory Consultant, PEGRN/Winrock
Labe	
Julie Fischer	PEGRN/Winrock
Mohamed Saliou Diallo	PEGRN/Winrock
Bernard H. Oniyogui	Chef d'Antenne, PEGRN/Gueckedou
Abdoulaye Kouye Bah	Chef d'Antenne, PEGRN/Labe
Kemoko Dioubate	Chef du Cantonnement Forestier, Linsan Saran
Saikou Balde	Adjoint Chef du Cantonnement Forestier, Linsan Saran
Aboubacar Sidiki Oulare	Chef du Projet, Projet Air Protege Transfrontalier
Lelouma-Nialama Reserved Forest	
Ibrahima Laho Bah	President, Comite Foret

Ibrahima Bowal Diallo	Membre, Comite Foret, Commission Production
Abdoulaye Balde	Secretary, Comite Foret
Samba Diallo	Membre, Comite Foret, Activités de Suivi
Ibrahima Dansoko	Membre, Comite Foret
Ibrahima Balde	Zone Supervisor, Trainer in Arabic
Sadiouma Bah	Membre, Comite Foret, Champs et Paturage
Hassane Sane	Membre, Comite Foret, Accompagnement et Suivi
Amadou Korka Camara	Membre, Comite Foret, Bois et Bamboo
Mody Sory Dansoko	Membre, Comite Foret, Accompagnement et Suivi
Mamadou Aliou Camara	Membre, Comite Foret, Commission Protection
Mamadou Alpha Diallo	Membre, Comite Foret. Accompagnement et Suivi
Boye Sane	Membre, Comite Foret, Commission Protection

Tougue- Bakoun Reserved Forest

Mamadou Kounbassa Diallo	Chef du Cantonnement Forestier, Kourotongo
Mamadou Alpha Balde	Adjoint Chef du Cantonnement Forestier, Kourotongo
Sabou Camara	Secrétaire, Comite Foret, Dunkita
Sarata Mara	Comite Foret, Communication, Dunkita
Thierno Boubacar Diallo	Comite Foret, Commission Production, Dunkita
Mamadou Conte	Villager, Bama
Aye Koumba Conte	Villager, Bama
Bakary Cissoko	Villager, Baridonde
Kandja Sylla	Villager, Baridonde
Ibrahima Cissoko	Villager, Baridonde
Sabou Camara	Villager, Baridonde
Mamadou Conde	Villager, Baridonde
Karamoko Cissoko	Villager, Baridonde
Mamadou Koroma	Villager, Baridonde
Madi Sire Cissoko	Villager, Baridonde
Fode Lamine Conte	Villager, Bama N'dire
Elhadj Ousmane Conte	Membre, Assemble Villageoise, Balagan
N'namba Diaby	Membre, Comite Foret, Balagan
Sonna Conte	Villager, Balagan
Mamadou Saliou Diallo	President Comite Foret, Bagata
Alpha Saliou Barry	President District, Bagata
Ibrahima Barry	Villager, Bagata
Mamadou Falilou Barry	Membre, Comite Foret, Bagata
Mamadou Miriya Barry	Secrétaire, Comite Foret, Bagata
Mamadou Saliou Bah	Membre, Comite Foret, Bagata
Oumou Diallo	Villager, Bagata
Mamadou Aliou Diallo	Villager, Bagata
Boubacar Bah	Villager, Bagata
Salimatou Barry	Villager, Bagata
Diouma Barry	Villager, Bagata
Boubacar Fili Barry	Villager, Bagata

Mamadou Malal Balde	Villager, Bagata
Mamadou Oury Barry	Villager, Bagata
Hamidou Barry	Villager, Bagata
Mamadou Saidou Barry	Villager, Bagata
Mody Younoussa Barry	Villager, Bagata
Abdoul Diallo	Villager, Bagata
Thierno Mouctar Balde	President, Comite Foret, Lafa Boube
Alpha Oumar Diallo	Membre, Comite Foret, Lafa Boube
Mamadou Saidou Sow	Villager, Lafa Boube
Thierno Amadou Oury Balde	Villager, Lafa Boube
Mody Ibrahima Balde	Villager, Lafa Boube
Mamadou Issaga Sow	Villager, Lafa Boube
Fatoumata Binta Sow	Villager, Lafa Boube
Raby Balde	Villager, Lafa Boube
Mamadou Bailo Balde	Villager, Lafa Boube
Amadou Mouctar Balde	Villager, Lafa Boube
Abdourahamane Diogo Diallo	Villager, Lafa Boube
Thierno Souleymane Sow	Membre AG, Lallabara Ndantari
Alhassane Sow	Villager, Lallabara Ndantari
Thierno Mamadou Hady Sow	Villager, Lallabara Ndantari
Mamadou Billo Sow	Villager, Lallabara Ndantari
Mody Alseny Sow	Villager, Lallabara Ndantari
Mamadou Dioulde Sow	Villager, Lallabara Ndantari

Kindia–Suti Yanfou Reserved Forest

Morlaye Keita	
Mamadou Kabele Camara	President, Comite Foret, Suti Yanfou
Mamadouba Sylla	Vice-President, Comite Foret
Mamadou Saliou Bah	Commission Economie
Mbalia Camara	Membre, Comite Foret, Protection et Restoration
Mohamed Sanou Sylla	Secetaire Communautaire
Abdoulaye Camara	President APE, Membre AG
Naby Sylla	Notable, Tafari
Sekou Sylla	Villager, Tafari
Kerfalla Sylla	Villager, Tafari
Sekhouna Sylla	Villager, Tafari
Douda Sylla	Membre, APE, Tafari
Moussa Sylla	Villager, Tafari
Abou Sylla	Villager, Tafari
Mama Aissata Camara	Villager, Tafari
Fode Sylla	Notable, Tafari
Daouda Camara	President, District, Yalaya
Arafan Mohamadou Sylla	Membre, District Yalaya
Arafan Soriba Sylla	Membre, District Yalaya et Comite Foret
Mamadou Conde Sylla	Villager, Yalaya
Abdoulaye Sylla	Villager, Yalaya

Fode Mohamadou Sylla	Villager, Yalaya
Fode Salifou Sylla	Villager, Yalaya
Alseny Sylla	Villager, Yalaya
Fode Moussa Mangueta	Villager, Yalaya
Fode Ousmane Sylla	Villager, Yalaya
Ibrahima Barry	Chef Secteur, Lambeya Fulbe
Ismaila Barry	Imam, Lambeya Fulbe
Thierno Amadou Barry	Doyen, Lambeya Fulbe
Mody Amadou Diallo	Conseil, Mosquée, Lambeya Fulbe
Alpha Oumar Diogo Barry	Villager, Lambeya Fulbe
Alpha Boubacar Barry	Villager, Lambeya Fulbe
Ousmane Camara	Villager, Km. 209
Mamadou Saidou Diallo	Villager, Lambeya Fulbe Villager
Mamadou Lamarana Diallo	Villager, Lambeya Fulbe
Abdoulaye Bah	Villager, Lambeya Fulbe
Mody Mamadou Alpha Barry	Villager, Lambeya Fulbe

Dabola–Sincery Oursa and Balayan Souroumba Reserved Forests

Fakassa Kourouma	DPDRE Dabola
Barry Degremou	Maire de Dabola
Justin	IBGRN
Mory Keita	Chef Secteur, Koufa
Moussa Toure	Notable, Koufa
Mamadou Bailo Diallo	Villager, Koufa
Ousmane Sow	Villager, Koufa
Bakary Conde	Villager, Koufa
Sansi Doumbouya	Villager, Koufa
Boubacar Biro Conde	Villager, Koufa
Toumani Keita	Villager, Koufa
Mamadou Samba Keita	Villager, Koufa
Oumar Keita	Villager, Koufa
Moussa Doumbouya	Chef Secteur, Babiliya
Sekou Keita	Villager, Babiliya
Sidy Conde	Villager, Babiliya
Hamidou Camara	Villager, Babiliya
Bakary Diallo	Villager, Babiliya
Alpha Keita	Villager, Babiliya
Dian Doumbouya	Villager, Babiliya
Bangaly Keita	Villager, Babiliya
Sekouba Doumbouya	Villager, Babiliya
Djiba Doumbouya	Villager, Babiliya
Ali Camara	Villager, Babiliya
Amadou Dioulde Balde	Villager, Babiliya
Ousmane Doumbouya	Hunter, Babiliya
Mata Camara	Villager, Babiliya
Thierno Mata Camara	Villager, Babiliya

Bobo Conde
Abdoulaye Keita
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Appendix G

Environmental Planning Checklist for Co-Management of Reserved Forests in Guinea

This Environmental Planning Checklist has been designed and prepared to assist in the environmental review of co-management of reserved forests being funded by USAID/Guinea. The basic premise of this Checklist is that by using it USAID/Guinea will be able to justify the Threshold Determination of Negative with Conditions in their submissions of an IEE related to the activities of the PEGRN.

This Checklist is based on the findings and recommendations described in the Programmatic Environmental Assessment (PEA) of Co-Management of Reserved Forests carried out in January to March 2001. It should be noted that this Checklist is not intended to enable those concerned with co-management activities to give scores or rankings or to compare one proposed co-management site with another. It is further assumed that the provisions for supervision, inspection and monitoring procedures related to the typical mitigation needs of co-management of reserved forests will be in place.

This Checklist is intended as a guided approach to ensuring that the issues related to the environmental soundness of co-management of reserved forests are addressed iteratively as one proceeds through the planning, design and eventually, the implementation steps. **Although the list of questions and inquiries that follow may appear long and detailed, the information should already be readily available and have been considered by those preparing the co-management plans.** Doing so will facilitate the preparation of the IEE (or amended IEE). It may also be possible and desirable to append the completed Checklist to the IEE itself and deal in a more summerial fashion with the usual categories of information required by an IEE.

Those preparing the response to the Checklist are encouraged to add any other information or categories of data that emerge as important in the preparation of the plan for the development of the forest in question, and for the purposes of further upgrading or simplifying the utility of the Checklist itself. Accordingly, it is not expected that the responses to the Checklist should contain all the design information and/or precautionary measures associated with the array of issues related to the feasibility of co-management at each site.

It should be further noted that in order to successfully use this Checklist, it is presumed that many of the basic studies, measurements and community consultation regarding the feasibility and design of the proposed forest site will have already been carried out. The designers of this Checklist believe that it will also serve as a tool for structuring the needed consultation with the community and the forest committee and its organizations about the basic design of co-management, the potential for adverse environmental impacts and how to deal with them, and the roles, rights and responsibilities of the different parties (DNEF, Forest Committee, NGOs, and PEGRN staff) in addressing these impacts, and the agreements to be achieved among all parties to ensure the continuing sustainability of the activity/investment.

*Environmental Planning Checklist for
Co-Management of Reserved Forests in Guinea*

1. Reserved Forest Site Identification and Characteristics

(The questions in this section lend themselves to filling in the blanks but it is not necessary to use this format as long as all the information required is provided.)

Date Activity Planning

Began: _____

Expected Implementation Date: _____

Present Status: _____

Name of the Reserved

Forest: _____

Location (Region, Prefecture, Sous-Prefecture): _____

Altitudinal Range: _____ (masl)

Agro-Ecological Zone: _____

Date of Classement: _____

Amendments to

Classement: _____

Classement Documents exist (yes/no & where kept):

Area at Classement: _____

Enclave Villages (name and area

occupied): _____

Pertinent Historical Information since

Classement: _____

Partner Organizations

Involved: _____

Accessibility (Note and describe the access routes to this forest and the villages/areas surrounding it): _____

Brief History of Co-Management (proposed by whom or how identified): _____

Existing Social Conflicts, Issues or Problems: _____

Previous Development and/or Infrastructure Activities on this Forest: _____

Dates, Composition and Observations of Reconnaissance Team: _____

Criteria which justified the choice of this reserved forest for co-management: _____

Present Uses and Users of the Forest (sanctioned or otherwise): _____

Co-Management Approach Endorsed by Community, and if so, how obtained: _____

Forest Committee Established: _____
Date: _____

How Established: _____

Members of the Forest Committee (names and titles): _____

Internal Organizational Structure Proposed for Forest Committee: _____

Villages To Be Included in the Co-Management Scheme (name, estimated population of each, usage rights accorded in the Arrete de Classement, male/female ratio): this data can be presented in a separate table such as the following:

Name	Estimated Pop.	Male/Female Ratio	Pertinent Observations
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Possible Interest or User Groups among the villagers (sawyers, fuelwood harvesters, hunters, non-wood forest products collection, agroforestry farmers, beekeepers, bas-fonds cultivators, etc): Also to be presented as an indicative table subject to confirmation during planning and organization of the co-management scheme.

Social Infrastructure (schools, clinics, potable water supply) within the Neighboring Villages: _____

Protection Needs for Forest Conservation: discuss the grazing, fire and hunting situation on the forest: _____

2. Analyzing the Base Parameters

(Prepare a brief narrative response to all of the headings that apply to this forest.)

Land Capability and Land-Use Mapping Methods and Results

- Is there an **original map** of the forest prepared as part of the Classement procedure available?
- What **remote sensing products** (satellite imagery or aerial photography) are available, and from what dates, as the basis for an up-to-date GIS record of this forest?
- What **map products** (topo sheets, soils maps, other maps) cover this forest?
- What **datum or benchmarks** will be used to geo-reference the GIS record?
- Has a **GIS-based record system** and archive been established for this forest and what institution and personnel are responsible for using and maintaining it? Is there a common mapping symbols key available and are the symbols sufficiently clear?
- Summarize the efforts to re-establish and mark the **forest boundary**. How were any discrepancies with the original boundary as defined in the records reconciled? What is the calculated total area of the forest after re-establishment of the boundary? Has there been any unexpected and major changes to the size or limits of the forest, and if so, why have these occurred? How has the boundary been marked?
- Has a **base map of the forest** been prepared and if so, at what scale and including what features (roads, water courses, enclave villages, water points, fixed topographical features unlikely to change, e.g., rock outcroppings or summits) and with what data and information? Have easily identifiable features been geo-referenced with the GPS and marked to facilitate use of this map? Does this map include contour intervals and if so, at what scale? Does it include a quadrant system for ease of reference to different areas?
- What kind of **soils data and information** are available for the forest and how is it being used for land capability or operational mapping?
- Has an **actual land-use map** been prepared and if so, at what scale and minimum size polygon, and using what classification system? Provide a summary actual land-use table.
- Is there **older land-use data available**, from what year and what are the changes and trends?
- Has a **land capability map** been prepared, and if so, at what scale and minimum size polygon. What are the different land capability categories used for stratifying this map and the criteria for determining each of them? Provide a summary table of land capability in hectares and percentages.
- Have all these maps undergone a **field verification process** and how was it accomplished? If GPS units are being used as part of this process, have they been properly calibrated and geo-referenced to a known datum or benchmark?

Forest Inventory Procedures and Outcomes

- What methodology has been used for carrying out any **forest inventory** considered necessary on this forest: personnel and level of effort, sample size, full, partial or staggered inventory, plot size and location, data recording methods and forms, logistics and scheduling, tools and instruments used?

- Describe the **summary forest inventory work plan**. Has it been possible to combine forest inventory data collection with other baseline studies that will be important for the co-management of this forest, and if so, briefly describe these efforts?
- To what degree have **members of the surrounding communities** and/or the Forest Committee been able to participate in the Forest Inventory activities? What special local knowledge or know-how about forest resources has been included in the inventory outcome?
- Provide a summary table of the **forest attributes data** resulting from the forest inventory on mapped potential production areas or concentrations of harvestable stands as possible, using a format similar to the following:

Area No.	Total Area	Species Present	Age Class	Height Class	Stocking Class	Site Class	Crown Closure	Site Notes
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- **Site Notes** mentioned above could include information, both qualitative and quantitative on the soils, topography, human influences, known past history, site accessibility and access routes, and special features within the area being inventoried.
- Have each of these potential production sites been measured through field verification, using a GPS, and **recorded on the operational map**?
- Indicate **how annual allowable cut has been calculated** for any and all forest harvesting operations (including timber, fuelwood and bamboo).
- Complete the *Fiche de Marquage et Cubage des Arbres* for each plot on which forest harvesting is expected to take place in the near term.
- Discuss the plans for the establishment of **studies to determine growth and yield** characteristics, the location and establishment of permanent sample plots, those carrying out these studies, as and where appropriate.

Hydrological Resources

- Briefly describe the **methodology for collecting Data and Information** on hydrological resources within the forest.
- Provide a **synopsis table of the hydrological resources** of the forest (including water courses—rivers and streams, springs, wetlands), using the following format:

Type	Name	Location	Perennial or Seasonal	Condition of Catchment or Watershed	Present Uses & Users	Notes
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- Has the location of the most important of these **Hydrological Assets Been Verified** in the field using the GPS and duly recorded on the base map?
- Has a basic **meteorological station(s)** been established within the forest or in the area and who will operate them? **Stream gauging stations**?
- Are there **problems related to water resources**: springs drying up, flooding or streams drying up, erosion or watershed degradation; describe?
- Has the local community had experience with **soil and water conservation technologies**, and if so, with what effect? Do they remain interested in these technologies?

Biodiversity Conservation Assets

- Briefly describe the **methodology for collecting data and information** on biodiversity resources within the forest.
- Provide a **synopsis of the wildlife resources** of the forest, presented in a tabular format as follows:

Local Name	Latin Name	How Observed	Status	Preferred Habitat	Resident or Migrant	Hunted	Notes
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- Are there **floral components of the ecosystem** that should be considered in the plans to conserve biodiversity assets?
- What do local people, in particular hunters, report about **the presence of wildlife on the forest** in recent years, and how it was before? Any notable species losses and if so, why have these occurred?
- Discuss the **issue of hunting** on the forest and how game meat resources are used by local people? Are there “outsiders” currently using the forest for hunting purposes? How important is game meat provided protein in the local diet?
- Is **crop raiding by wildlife or livestock predation** by carnivores an issue on this forest, and if so, provide a brief description of the situation.
- Identify any **endangered species** which occur on this forest, and characterize the condition of the habitat for these species and in general. Has this habitat been mapped on the operational map?
- Discuss this forest and its biodiversity assets in terms of its relationship with the larger **landscape-level biodiversity conservation situation** in Guinea..
- Identify the biodiversity conservation related **protection needs** within the forest and the status, if any, of migration corridors for transient wildlife that use the area.
- Discuss the likely **overall socioeconomic impact of efforts to promote biodiversity conservation** on this forest and in particular, its implications for local people. Will there have to be production trade-offs to achieve conservation goals?

Socioeconomic Survey Methods and Results

- What **socioeconomic survey or assessment methodology** was used to ensure that the wishes and expectations of all the stakeholders have been accounted for in the preparation of the co-management plan? Provide a brief description of the method and an account of how it was applied in this forest.
- Examine **the degree to which local people are dependent** on the resources of the forest; make a rough estimate (both qualitative and quantitative) of how the local population uses the forest and its resources on average to meet household food security and income needs. How important is the forest compared with off-forest activities?
- Has the community had a chance to **rank their development needs and opportunities**; list their priorities and briefly describe the process for establishing them.
- What **other development programs and projects** are operating in the area of the forest and how will they affect the co-management activities?

3. Assessing the Soundness of the Co-Management Plan

- Provide a **synopsis of the general objectives** of the co-management plan and a brief description of how they will be achieved.
- Provide a **more detailed analysis** of how the co-management objectives will be achieved during the first five year administrative period (*Plan de Gestion*), to be presented in a tabular format, as follows:

Development Objective	Proposed Activities	Anticipated Results	Operational Assumptions
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- Provide an **estimate of the costs and benefits** associated with each activity, to be presented in a tabular format as follows:

Activity	Operational Actors	Cost Elements	Estimated Amount	Financing Means	Benefit Elements	Estimated Amounts	Method of Distribution	Balance Sheet
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- Provide a **clear budget breakdown** for the full set of activities and interventions and indicate the source of finance for each. Estimate the unit cost per hectare brought under co-management.
- Provide a **projection of estimated net returns to the typical village/villager** participating in co-management, under various use (timber, fuelwood or bamboo harvest, agroforestry, non-wood forest products and grazing) models.
- Briefly discuss the means by which **general community consensus and approval** of the co-management plans have been achieved. Are there any dissenters and if so, why do they disagree and what impact will there be on the plan?
- Briefly describe the general mechanisms that are in place to ensure that all of the co-management actors (DNEF, Forest Committee and its sub-groups, NGOs and PEGRN staff) understand their **rights, roles and responsibilities** for the implementation of the various elements and activities of the plan.
- How have the **training needs for sustainable co-management** identified in the training needs assessment been met and what indications are there for growing institutional capabilities among the various institutional actors of co-management?
- Briefly **outline the protection or conservation needs** for the forest and the strategy being employed to address them. Will the participating villagers have to absorb production trade-offs to meet these needs, have they agreed to them and what will be the estimated costs and near-term returns.
- Although **present projections of off-take** for fuelwood, *bois d'œuvre* and bamboo are decidedly modest and conservation oriented, what indications/assurances are there that they will be sustainable and how? How were these choices made and quantified regarding harvesting of forest products?
- Describe the **harvesting techniques for the different forest exploitation practices** foreseen under the co-management plan. What guarantees are there that these will not lead to adverse environmental impacts? Will the extraction or logging activities have an impact (soil erosion or compaction) on the environment (roads, skid trails and collection points)? Will there be any impact of extraction on water quality of streams and rivers within the forest or beyond?

- What is known about the **silviculture of the species or forest types** intended to be used as *bois d'œuvre*, fuelwood and bamboo to be harvested and how will this information be used and/or enhanced? Is there a need or opportunity for timber stand improvement activities and investments?
- The program of activities envisages assisting the local communities to **develop micro-enterprises related to the improved collection and processing of non-wood forest products** (e.g., bush honey, *Nere* and *Karite*). How will timber, fuelwood and bamboo harvesting affect these traditional enterprises and their supplies? Are there other non-wood forest products, given their importance to local communities as sources of medicinal plants, fiber, food, and building materials, that must be accounted for in management planning and implementation?
- The program of activities includes **agroforestry and agriculture in the bas-fonds**; what steps have been taken to assure that these will be sustainable? Is the use of agrochemicals foreseen or likely to be induced and if so, what steps have been taken to ensure that their use complies with USAID guidance on the use of these products?
- Early studies have corroborated the **presence of endangered species** on many of Guinea's reserved forests. Briefly describe the methodology for addressing this issue on the forest in question and if and how it could be applied to other biodiversity assets of importance within this forest.
- Does the co-management plan include **measures to allow and/or control hunting**? Briefly describe them. Similarly, are there issues of crop raiding or danger to humans and livestock from wildlife, and if so, how will they be addressed?

4. Mitigation and Monitoring Measures

- What **indicators will be monitored** to ensure that the co-management activities or interventions are not leading to unforeseen adverse environmental impacts? Use a tabular format to respond to this question, along the following lines:

Impact/Issue	Indicator	Period	Who Monitors	Monitoring Mechanisms	Prerequisites/Notes
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- Of the planned **mitigative measures**, which will require further **specific monitoring** to be sure they are effective and how will this be done?
- How will the **linkages of environmental to performance monitoring** so as to avoid needless duplication of efforts and reporting requirements?
- **Identify the specific adverse environmental impacts** foreseen during the planning of co-management on this forest and describe the mitigative measures for each.
- How have the **costs of these measures** been factored into the feasibility considerations for the co-management plan in question?
- Will there be **resources available for additional mitigation measures** if required, once implementation gets underway and if so, who will provide for them?