

USDA Forest Service Forest Resource Assessment Trip Kuando Kubango Province, Angola

**In support of the USAID Southern Africa's Okavango Integrated River Basin
and the Angolan Ministry of Agriculture and Rural Development's National
Institute for Forestry Development and Management Project**

Trip and Assessment Report

Mission Dates: May 16 – June 1, 2006



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MISSION ITINERARY FOR USFS TEAM

May 16-June 2, 2006

Tuesday, May 16

- Glen Juergens departs from United States

Wednesday, May 17

- Michelle Zweede departs from Brazil

Thursday, May 18

- USFS, IRBM and USAID Southern Africa teams arrive in Luanda, Angola
- USAID – Angola entrance briefing
- Hugh Safford departs from Italy

Friday, May 19

- Hugh arrives in Luanda, Angola
- IDF entry briefing with Tomas Caetano, Director and Staff
- Meeting with Vladimir Russo, NBSAP Project Manager at the Ministry of Urbanism and Environment (MINUA)
- Meeting with Armindo Mario Gomes da Silva, National Director for Water Resources, Ministry of Energy & Water, and Director of GABHIC and Isidro Pinheiro, OKACOM Commissioner

Saturday, May 20

- Review Reports and Studies

Sunday, May 21

- Visit Kissama National Park

Monday, May 22

- Meeting with Joaquim Lourenço Manuel, Chief of Natural Resources Dept. and Julieta Condez, Chief Administrative Officer, Ministry of Urbanism and Environment.
- Meeting with Meeting with Director Abias Huongo, Januario Augusto, General Secretary, and Simao Andre dos Santos (Futuro Verde) from Maiombe Network

Tuesday, May 23

- Develop outline for report and discuss recommendations

Wednesday, May 24

- Travel to Menongue
- Meeting with Kuando Kubango Governor and representatives from the NGO, Acadir and IDF.

Thursday, May 25

- Kuando Kubango Overflight

Friday, May 26

- Field trip from Menongue to Caiundo

Saturday, May 27

- Field trip from Menongue to Dumbu
- Side trip to see portable saw mill

Sunday, May 28

- Depart Menongue for Luanda
- Hugh departs Luanda

Monday, May 29

- Meeting with Carlos Mutula, Chief of Department of Forests and Manuel Enock, Chef of the Department of “Pecuaria” in the DNAPF of Ministry of Agriculture

Tuesday, May 30

- Meeting with Sr. Dario Daniel Katata, Vice Minister, Department of Agriculture
- Meeting with Sr. Armindo Gomes da Silva, Director, Department of Water (GABHIC)

Wednesday, May 31

- Exit Briefing with IDF Director and IDF
- Exit Briefing with USAID Angola
- Dinner with IDF Director Caetano

Thursday, June 1

- Michelle, Glen and Brenda Depart Luanda

EXECUTIVE SUMMARY

The Government of Angola invited the US Forest Service (USFS) to provide forestry technical assistance to Angolan government agencies. Prior to the technical visit, a scope of work was developed, which built on a memorandum from the US Forest Service – International Programs to the Ministry of Agriculture and Rural Development’s Institute of Forestry Development (IDF). The visit was supported by the USAID / Southern Africa’s Okavango Integrated River Basin Management Project (IRBM), USFS and IDF. The overall objective of the technical assistance was to complete a preliminary forest assessment of the state of forest resources in the Kuando Kubango Province. Another important objective included initiating a new partnership between the US Forest Service and Angolan Government agencies (IDF and Ministry of Agriculture and Rural Development), OKACOM- Angola, USAID’s Southern Africa office, USAID-Angola, and the Integrated River Basin Management (IRBM) Project, which is funded by USAID and coordinated through the Permanent Okavango River Basin Management Commission (OKACOM).

The forest resource assessment trip to Angola occurred between the 18th of May and the 1st of June 2006. The US Forest Service technical team was joined by members of IDF, and the IRBM Project. Therefore, when we refer to the “technical team” we are referring to the entire team participating in the forest assessment. The technical team was asked to focus efforts on the Province of Kuando Kubango, as this Province includes the Angolan portions of the Okavango River Basin. Three major international efforts related to river basin and management for the Okavango River Basin are ongoing, as well as several that deal specifically with the Okavango Delta in Botswana. The three efforts related to the management of the Okavango River Basin are: 1) Global Environment Facility funded Environmental Protection and Sustainable Management of the Okavango River Basin Project; 2) Swedish funded Every River Has Its People Project; and 3) USAID funded Okavango Integrated River Basin Management Project.

The choice of Kuando Kubango was at the same time fortuitous and unfortunate: fortuitous in that land use pressures in the Province are not yet severe, and opportunities still exist to carry out land use planning largely in anticipation of impacts rather than in response to them; unfortunate in that very little information exists on current conditions in the Province. There is little government presence in the Province, and field visitation to many parts of the Province is difficult due to infrastructure damage and mine fields remaining from a longstanding civil war which ended in 2001.

After gathering publications, attending meetings and field visits, the technical team determined that due to the lack of vegetation information, detailed maps, and recent aerial photo or satellite imagery data in this area, an in-depth forest assessment is not possible at this time. The technical team believes that through training and USFS technical assistance, it will be possible for IDF personnel to increase their capacity for completing their own in-depth forest assessment of the Kuando Kubango province. Therefore, the overall goal of this technical assistance visit is to provide recommendations and develop

an action plan for future technical assistance to the IDF for sustainable multiple-use management of forests and working towards a forest assessment in Kuando Kubango. It is our intention that this technical assistance be integrated as part of the U.S. Government's support to the National Biodiversity Strategy and Action Plan (NBSAP) for Kuando Kubango, as appropriate to the needs of NBSAP, IDF and the Ministry of the Environment and Urban Affairs. Some of the activities recommended in the action plan of this report align with a request that NBSAP made to USAID, for assistance in Kuando Kubango. Partners¹ will incorporate these select activities into a proposed action plan for U.S. Government support to NBSAP in Kuando Kubango, which the IRBM Project will facilitate.

During meetings with IDF, Director Caetano discussed the priorities for the institute and opportunities for technical assistance, which include: forest information and inventory, capacity building, institutional strengthening, and forest policy. These priorities were discussed by the Director of IDF as well as the agency's staff in the Kuando Kubango province. The first priority is the need for forest vegetation identification and inventory to determine the general state of Angola's forests and species diversity in order to complete a forest assessment to be used in the preparation of a land management plan. Secondly, there is a need for capacity building within IDF's main office as well as in the Kuando Kubango province for foresters, inspectors and enforcement officers, as well as in resource staff (soils, ecology, etc.). Thirdly, there is a need for addressing threats to biodiversity and sustainable multiple-use management; these threats include uncontrolled burning for agriculture and hunting and extensive use of trees for firewood and charcoal production.

The USFS team recommends the following activities in order to build IDF's internal capacity for completing a full forest assessment. The forest assessment can be used in developing a land management plan in order to provide sustainable forest use and economic development, and to reduce impacts on biodiversity. The USFS could provide training to IDF personnel in the following areas while expanding opportunities for collaboration with IDF and other Angolan Government Agencies and Non-Governmental Organizations by providing initial funding to support the travel, per diem and salary of 4 experts for the first three activities listed below.

- 1 Tree species identification and growth characteristics
- 2 Geographic Information System utilization and interpretation
- 3 Forest inventory, protocol and methodology
- 4 Forest and Land Management Planning Process
- 5 Fire Prevention and Community Awareness
- 6 Law Enforcement Training

In coordination with the Integrated River Basin Management Project, we envision that activities 1, 3 and 4 will be implemented as part of the NBSAP program for Kuando Kubango. Based on a preliminary visit and investigation, the team believes the list above would provide a preliminary set of skills needed for developing an in-depth forest assessment as well as taking steps towards a larger goal of land use planning. The

¹ Partners include the IRBM Project, USAID and USFS

findings and recommendations developed from the technical visit were discussed with IDF. IDF's Director, Tomas Caetano, agreed with the assessment of needs and recommendations presented by the technical team and is enthusiastic about pursuing these training opportunities.

SCOPE OF THE TECHNICAL ASSISTANCE

Background

The Scope of Work for the Technical Assistance and Forest Resource Assessment of the Kuando Kubango Province built on several preliminary developments, including: 1) a request by OKACOM/Angola that the IRBM project facilitate a forest assessment for Kuando Kubango, as follow up to the National Biodiversity Strategy and Action Plan workshop for the Province held in September 2005. At this workshop, residents of the province strongly suggested that forest extraction along the southern border of the province, as well as forest fires, are of significant concern, 2) a memorandum dated October 23, 2005 from US Forest Service International Programs (USFS) to the Angolan Government and 3) a meeting Mr. Tomas Caetano, Director of the IDF, Ministry of Agriculture and Rural Development had with USAID on March 7, 2006. The mission was the first of a series of two visits to be supported by USFS and USAID/Southern Africa through the Okavango Integrated River Basin Management Project. It was implemented from May 16 – June 1, 2006, by a team consisting of eight individuals from USFS, IDF and USAID's IRBM Project.

The USFS team included the following individuals:

- Michelle Zweede, USFS International Programs, Latin American Program Specialist.
- Hugh Safford, USFS Region 5, Regional Ecologist.
- Glen Juergens, USFS Monongahela NF, Forest Silviculturist.

Joining the USFS team was Brenda Bergman and David Kawika from USAID's Integrated River Basin Management Project. Brenda, Biodiversity and Hydrology Coordinator of the IRBM Project, provided guidance and knowledge of the region, and issues and helped with arranging meetings and field visitations; her support was fundamental to the success of the technical visit. David, a member of a local NGO in Menongue working on the IRBM Project, joined the team during the field visits to Kuando Kubango. David provided a unique knowledge of the communities visited as well as fluency in local languages, English and Portuguese. Through IRBM, Jose Pilartes of the University of Agostino Neto assisted with logistics.

Three forestry engineers from IDF also joined the USFS/IRBM Team during the visit to Kuando Kubango. Mr. Rosario and Mr. Zissala met with the team on multiple occasions in Luanda, and joined the Team for the field visit to Kuando Kubango Province. Mr. Alfonso Douala, IDF provincial director, joined the team in Menongue. The IDF team provided critical support and information to the USFS technical team.

Objectives and Approach

The full Scope of Work for this mission is attached in Appendix I. Objectives of this first USFS mission to Angola included the following:

1. To initiate a partnership between the Angolan Government (represented by IDF, the Ministry of Agriculture and Rural Development, and regional authorities in Kuando Kubango province), OKACOM-Angola, USAID Southern Africa, USAID-Angola, the IRBM Project, and the US Forest Service.
2. To develop a plan for the execution of the forest resource assessment,
3. To commence the assessment via a trip to the field to view status of forest resources and review of existing data, and
4. To explore with the Angolan government and USAID opportunities to expand this partnership as requested by Mr. Caetano.

To realize these objectives, the team engaged in a series of meetings, information review, and preliminary field research activities, including:

- Review of Existing Information,
- Planning sessions with technical specialists in Luanda,
- Fly over of key areas of the Kuando Kubango province,
- Meetings with stakeholders in Kuando Kubango who live with and use forest resources in Kuando Kubango Province,
- Meetings with key stakeholders in Luanda and in Kuando Kubango Province to develop a forest resource assessment framework and work plan, including specific tasks for local counterparts to implement between USFS visits, and
- Review of findings and recommendations with the Government of Angola and USAID.

Appendix IV includes detailed notes on the meetings as well as the field visits.

This report serves as the deliverable from this first mission, which includes a summary of findings and an action plan delineating the steps for completing a full assessment.

KUANDO KUBANGO's OVERVIEW

Angola was a colony of Portugal for nearly five hundred years. During this time the Kuando Kubango watershed remained a remote and sparsely inhabited area. In 1975, after 14 years of armed struggle, Angola gained independence. Thereafter, several influential groups were not able to reconcile differences and a 27 year civil war ensued. Some of the most intense fighting occurred in the Kuando Kubango Province, the home base of the opposition group UNITA. This extended period of war, culminating in a peace agreement that was signed in 2001, took a great toll in this area. It continues to influence Kuando Kubango today in the form of destroyed infrastructure, displaced people and returning refugees, economic hardship, and land mines that remain scattered across many parts of the landscape.

FINDINGS

Overview

The team found that at the level of the Province itself, there is surprisingly little sign of obvious human impact on the landscape. As one would expect, human impact increases considerably as one nears centers of population, but from the air these areas of impact appear to be no more than 5 or maybe 10 km broad. Human impacts are also obvious along the road system. Our overwhelming impression from the over flight was that previous signs of human-caused alterations to forest cover are in the process of recovering, due to decades of war and the subsequent depopulation of much of the Province. Another strong impression was that, in the area of our over flight – which admittedly did not cross Luiana, and area purported to have growing populations of elephants and ungulates, etc. – there is very little in the way of wildlife. Again, our assumption is that this is a reflection of the impacts of war in the area. The time for landscape-scale land management planning is now, as we have in southeastern Angola the rare opportunity to *prepare* for anticipated impacts rather than *respond* to them after they have already occurred.

Existing Forest Conditions

Kuando Kubango Province is located in the southeast section of Angola, adjacent to Zambia and Namibia. Forest cover types are dominated by "miombo" woodlands, and composed primarily of trees of the legume family (Fabaceae). These include dense *Brachystegia*-dominated woodland in the north, *Burkea-Brachystegia* woodland in the central portion of the province, and *Burkea*-dominated woodland in the south. There are also riparian forests, especially in the south, and riparian grasslands, primarily in the north and center. Both the amount of annual precipitation and density of tree cover decrease as one travels from north to south.

The primary method of observing existing forest conditions in this assessment was through an overflight, taken over much of the province (excluding the far Eastern side of the province, over Luiana park) on May 25. During this overflight, we observed forest crown cover varying from approximately 50 to 80% in the north (between Menongue and Caiundo), 30 to 60% in the center, and 20 to 40% in the south (approaching the Okavango River along the Namibian border). Open, grassy areas are found scattered throughout all cover types, mainly adjacent to roads and streams; shrub-dominated vegetation ("mopane") becomes more common to the south. In some of the more remote areas (where recent human intervention was not readily apparent) we noticed distinct encroachment of forest species into previous clearings. Where active human settlements are located, recent tree cutting has occurred in patches of (usually) 1-5 hectares, either due to forest conversion to agriculture or to activities of *carvoeiros* (charcoal producers). These areas are primarily found within a few kilometers of communities or roads, and do not yet appear to have had a significant effect on the overall forest area. Between Mavinga and Rundu, a large expanse of forest exists with little evidence of recent human intervention. This begins about 10 kilometers south of Mavinga, and continues for a distance of approximately 200-220 kilometers until approximately 20 kilometers north of

the Angola/Namibia border.

A few dozen fires were observed during the overflight, mostly north of Mavinga near the border of Kuando Kubango and Moxico Provinces. We observed significantly more burning north of Mavinga as we turned westward towards Menongue. As we crossed the Rio Cuito heading west to Menongue we began to be able to pick out distinct stands of even-aged canopy trees, characterized by more or less equal height. These patches ranged from tens to hundreds of hectares in size. This mosaic of age-classes appears to be a vestige of past fires. We also noted many areas where recent fires had burned through the understory without having much (visible) effect on the overstory, except perhaps to slightly reduce overstory canopy. Grasses and shrubs were mostly absent in the recently burned areas, and bare soil was common.

Thus far tree harvesting appears to have been limited to 7 or 8 common species utilized for lumber, furniture, house construction, crafts, charcoal and firewood. The majority of tree species have not been utilized because they have no historic or traditional use. If this continues it could lead to a high-graded forest where the most valuable trees have been cut, leaving only the unknown or undesirable tree species.

Potential for intensive timber management exists in Kuando Kubango province, especially in the dense *Brachystegia*-dominated woodland in the northern 1/3 of the province. Generally, an area is considered to have potential for commercial timber harvests if there is at least 2,500 board feet per acre (International 1/4" scale) or about 22 cubic meters per hectare. Of course this also depends on the value, size, and quality of the species present and potential markets. Several species found in the province such as *Azelia cuanzensis*, *Baikiaea plurijuga*, *Brachystegia spiciformis*, *Guibourtia coleosperma*, and *Pterocarpus angolensis* are considered to be valuable tropical hardwoods. However, an added complication in Kuando Kubango is the presence of land mines. An area may have commercial value but if it has extensive land mines then the cost of removal of the land mines may exceed the value of removing the timber. Also, since we do not have a forest vegetation inventory of the area we do not know how much timber volume is present. So we will have to use forest cover as a general estimate as to whether an area has the potential for intensive timber management. As an absolute minimum there should be at least 40% crown cover before considering commercial timber management as an option. This would leave out the *Burkea* woodland forest type (about the southern 1/3 of the Kuando Kubango province) and about 1/4 to 1/2 of the *Brachystegia-Burkea* woodland forest type. Of course these areas could still be managed for timber but not intensively and not with heavy mechanized equipment and probably not profitably (depending on the tree quality and species present) nor sustainably for the long-term. These less densely forested areas may be managed sustainably with less intensive management on an individual or community use only basis. It is important that any forest management not focus on the removal of just one or two tree species and that regeneration is ensured after removal either through coppicing, seed germination, or planting.

Markets for timber grown in Kuando Kubango are not well known at this time. There are no wood processing facilities in the province with the exception of a few portable sawmills. Therefore, any large scale commercial harvesting would require to transport

the logs to mills outside the province or the country for processing.

Threats to Biodiversity and Forests

The technical team relied on a few sources of information to gain a better understanding of the threats to Angola's biological diversity and tropical forests. The principle source used regarding identification of threats to biodiversity was USAID's Angola's FAA 118-119 Analysis of Conservation of Tropical Forests and Biological Diversity. We felt it was important not to repeat what has already been described in this report and other documents, but to summarize the threats we observed during our visit to Kuando Kubango.

It was noted during interviews and field visits that key threats to biodiversity in Kuando Kubango province are uncontrolled burning, charcoal production and, in the longer term, slash-and-burn agriculture. Although Angola's forests in the Kuando Kubango Province are fire adapted savanna-type ecosystems with thousand of years of human impact, there is an increasing use of fire during the dry season, which will have an impact on biodiversity.

Charcoal production is on the rise, as demand for fuel grows within and beyond Kuando Kubango. The team visited a charcoal producing village called Dumbo, which underlined some of the key issues at the local scale. Many people simply do not have the resources or skills to do anything else for a living. Charcoal production requires relatively little training, little in the way of equipment, and the income is relatively good. Demand is likely to remain high for some time, at least until other sources of fuel can be made available to common people. Many of Dumbo's residents are demobilized soldiers, somewhat disaffected with the government's inability to provide concrete economic help. Many of the people we talked to were implicitly aware that their activities were not sustainable in the long run, but they did not feel that they had any choice, given their precarious economic conditions. Government and NGO help in developing alternative economic activities, agricultural self-sufficiency, and lessening ecological impacts would go a long way to solving multiple problems in places like Dumbo.

Key Issues for Forest Management

Communications with representatives of government agencies, cooperating organizations, and communities revealed several key issues in order to promote long-term forest management. These include:

- The need for a land management plan, at the provincial or watershed scale, that would allow for community and economic development, while providing for the preservation of biodiversity. Community involvement is critical to the success of the land management plan by giving community members a sense of responsibility and ownership that will contribute to accomplishing the plan's goals and objectives.
- The lack of information on the existing condition over much of the province.
- The growing rate of slash and burn agriculture and extensive tree cutting for charcoal.

Angolan forest policy and laws largely date back to colonial days. More recent laws passed in 1998 have not been widely publicized. Enforcement of the newly passed laws has been deficient due to the lack of trained personnel. Land ownership and property rights are determined by the Land Law (Lei das Terras), which reserves all permanent rights to land tenure to the State. People may lease land for 30 to 60 years and renewal is dependent upon the occupation and use of the land but documentation of the leased property boundaries is not consistent.

RECOMMENDATIONS

Future technical assistance for this collaboration will consist primarily of capacity building between USFS technical experts with IDF personnel through training sessions to provide the skills necessary for IDF personnel to prepare an in-depth forest assessment and a land management plan. We hope that these trainings will also include other government agencies, community members and NGOs.

Due to the lack of current data, the vegetation identification and growth characteristics, forest inventory, and GIS training sessions should ideally occur within the first year. The USFS proposes to provide funding for 4 experts to travel to Angola to provide technical assistance and training in forest inventory methodology and implementation, an introduction to GIS, species identification and possibly fire prevention training. In addition, Mr. Safford and Mr. Jurgens will develop a compendium of 20-30 species characteristics and uses. The long-term GIS training for IDF personnel will be supported by the institute itself.

The USAID/IRBM project and the USFS propose to continue their collaborative efforts by implementing the first two activities together, as well as the training in participatory land management planning, as part of the U.S Government's support to the National Biodiversity Strategy and Action Plan for Kuando Kubango. Fire prevention and suppression training can be done at any time, although there is a critical need to address the current problem of uncontrolled burning in certain parts of the Province.

Based on our visits to Caiundo and Dumbo, we believe that there is an acute need to introduce basic concepts of economic and ecological sustainability at the local level. Field interviews revealed a low level of awareness among the populace regarding environmental law, the uncertain (and often impromptu) nature of government-public interaction, and the basic lack of knowledge about the identity and nature of forest resources. Most of the important land management decisions being made outside of the urban areas are being made by village elders.

A summary of recommendations for key issues identified thus follows.

Issue 1: Vegetation Identification and Growth Characteristics.

Background

Although most of the IDF personnel seem to know the most common tree species that are

being utilized, there is little knowledge of the associated tree species. Additionally, there is a critical lack of information on the basic ecology and silvicultural growth requirements of all tree species. Meetings with some representatives indicated that groups like the Koi-San/bush people may have significantly more information about the historic and non-commodity uses of forest tree species.

Recommendations

Forest vegetation identification should be the first course focusing mainly on common tree species found within the Kuando Kubango Province. The course should include information on the silvicultural growth requirements and ecological characteristics of each species as well as non-timber utilization potential. Hugh Safford and Glen Juergens will provide a compendium of available information on those tree species that are most common in the province prior to the initiation of the course.

The team recommends that at least 1 fully educated and trained professional forester should eventually be assigned by IDF to each province.

Issue 2: Forest inventory data collection

The scope of work developed by GoA and the US partners in preparation for this technical assistance trip identified a need to develop a plan for the identification of data needs, and the initiation of a forest resource assessment.

Background

Presently there are no forest vegetation inventory data available for the Kuando Kubango Province. There is a need to implement a simplified inventory methodology in order to complete a forest resource assessment prior to initiating management planning.

Recommendations

An intensive, thorough forest vegetation inventory is not practical at this point in time due to timing, budget, qualified personnel constraints, and safety concerns due to land mines. However, a 4 to 5 day participatory and simplified inventory training session is recommended. The training should include IDF personnel and tribal members knowledgeable in tree identification and utilization (for both commercial and non-commercial purposes). Ideally, satellite imagery or orthophotos should be available as a prerequisite for the course. Since a primary interest of the government, partner organizations, and communities is protection of the forest resource combined with the low impact utilization of forest products, a 10-meter grid sampling method may be the preferred choice. Director Caetano suggested that the 10-meter grid method is the most appropriate because it is the easiest to use and does not require a prism or calculations to determine if a tree is in or out of the plot. This system will give IDF the basic information they need to begin a forest assessment. There is still the problem of locating the plots where there are no land mines. Director Caetano suggested that some permanent inventory plots be located for future training purposes. Ultimately, the methodology and protocol must be agreed on (prior to the training session) by the people doing the training with input from Director Caetano and his staff.

An essential feature of the chosen sampling method should be to determine the minimum

information that must be collected to make decisions in the land management planning process. It should be noted that the data collected in this simplified process may not meet normal statistical precision protocol. The usefulness of the data would be limited to answering specific questions for the land management planning process. At some point in the future the forest vegetation inventory may be expanded to more quantitatively assess vegetation status and diversity (etc.) in the area. When that time comes, a more elaborate inventory process may be developed to address that need. Regardless of the inventory method used, IDF personnel should be consulted early in the process since they will be completing the forest resource assessment and land management plans. Agreements should include the minimum inventory needs for immediate and near future utilization of commercial and non-commercial forest products. A field guide should be developed prior to the training session to standardize the protocol and methodology for data collection procedures. The USDA Forest Service International Programs has the resources and individual contacts of USFS experts capable of providing this training.

Issue 3: GIS data and satellite imagery utilization and interpretation

Background

There are currently no employees of the IDF with any GIS analysis skills. We recommend that a training program be developed (probably at least two one-week sessions) to begin the process of growing a small cadre of GIS-proficient staff. Based on our discussions with Domingos Nazaré, it appears that a number of IDF employees are currently scheduled to attend a basic GIS training later this year in Mozambique.

Recommendations

The following data layers should be acquired as soon as possible. To start with, we simply advocate that existing maps be turned into GIS-ready data layers (currently many of these layers exist as electronic scans, and have not been georeferenced or digitized). For the most part, these are very broad-scale maps and will only be useful at Province-wide or even nationwide scales. Angola Alliance, a group of South African GIS and remote sensing contractors, has apparently developed many of these layers for a number of provinces north and west of Kuando-Kubango. It may be most cost- and time-efficient to work with the same group in developing GIS data layers for Kuando-Kubango.

- ✓ LANDSAT (or, if available and affordable, higher resolution imagery)
- ✓ Soils
- ✓ Infrastructure (roads, urban perimeters, etc.)
- ✓ Hydrology (including streams and watershed boundaries)
- ✓ Bedrock and surficial geology
- ✓ Phytogeography (potential vegetation)
- ✓ DEM (digital elevation model; the 10-m DEM may be necessary due to the very subdued topography of much of the Province)

Additional information on GIS layers and/or satellite imagery may be available from IGCA (Angolan Government's Institute of Geology and Cartography), the Harry Oppenheimer Okavango Research Centre (HOORC), and ABSAT (a Brazilian company with offices in Luanda). The Mendelsohn and Oliveira (2005) paper provides an excellent summary of potentially available data layers. During one of our meetings with

Armindo Gomes da Silva, Director, Department of Water (GABHIC), discussed a United Nations funded project, which is being developed to collect images from portions of Angola. They will be using an orthophoto mapper to collect these images. The work will be contracted out with a company outside of Angola. Mr. Gomes suggested that we share our findings and recommendations with him in case there are some possibilities of collaboration. Perhaps, there might be a potential for inter-agency collaboration as this project develops.

When the GIS data layers and imagery are available, a capacity building training session should occur. The training session may involve 3 to 5 IDF personnel traveling to the U.S., Namibia, or Mozambique where the technology is more readily available and dependable.

Issue 4: Participatory land management planning methodology

The scope of work drawn-up in preparation for this technical assistance trip identified a need to develop a participatory process for developing a forest management plan.

Background

A land management plan is needed to describe goals and objectives for specified management areas and actions, in order to preserve biodiversity in Kuando Kubango Province while allowing for sustainable forest commodity production and economic development within local communities.

Recommendations

Provide a 3 to 4 day training session for IDF and MINUA personnel outlining a process to develop land management plans. A basic, simplified process described in the Senegal Report (Kendrick, Krueger, and Pierson 2004) can be modified, as a training aid, to facilitate the development of land management plans. The Senegal Report provides an excellent example of the steps needed to make conscious, well-informed, and reasonable decisions to implement activities at the landscape level by dividing the process into manageable pieces. However, the following modifications are suggested to streamline the 7-step process, which were described in a previous report written by USFS:

- 1) Delineate Management Areas by dividing the land into separate, distinct sections. Each MA would be managed for specific purposes/uses depending on the existing and desired conditions. Ideally, these areas should have natural boundaries that can be readily distinguished such as stream channels, ridges, etc. Permanent, man-made boundaries, such as paved roads, may also be used.
- 2) Describe the Existing Condition of each MA by documenting recent quantitative and qualitative information/data to provide an accurate description of the state of the resources within each MA. This information/data can come from recent vegetation inventories, field reviews, discussions with local villagers, aerial photos or satellite imagery, etc.
- 3) Describe the Desired Condition of each MA by defining goals and objectives that will meet the needs for the specific uses allowed. These goals and objectives should be sustainable over the long-term while limiting or avoiding significant adverse direct, indirect, and cumulative impacts on the human, floral, faunal, and physical environments.

- 4) Identify the Actions that may be allowed in each MA to achieve the desired condition. Consider the costs, benefits, and effects of the allowable actions for each action item that may be implemented. For site-specific projects within each MA, develop alternatives that may reduce costs, increase benefits, and/or minimize or avoid potential adverse effects of the actions to be implemented. For each site-specific project, it is especially crucial to include local communities that may be impacted by the project in the participative process.
- 5) Monitor the effects of implemented projects. It should be noted that an implemented project does not need to immediately meet a desired condition. In most cases each action will merely move towards meeting one or more desired conditions. Answer the following questions when monitoring the effects of projects:
 - Did the project move the area towards the desired condition?
 - How did the existing condition change?
 - What (if any) additional actions are needed to move towards the desired condition?
 - Were there any significant adverse impacts to the human, floral, faunal, or physical environment?
 - How can future actions/projects be improved to limit or avoid adverse impacts?

In concluding the discussion for this issue, it is important that the land management plan should be designed to be a “living” document, one that can be amended over time as conditions or needs change. An interdisciplinary and participatory (at the national, provincial, and community levels) process is critical to ensure the various physical, biological, economic, and social aspects are considered to determine the short- and long-term goals and objectives. It is also important to note that the GIS data layers and skills referred to in Issue 3 (above) are critical to the development of the land management plans.

Local communities need to be involved to ascertain their needs and priorities. Consensus among the various communities is necessary to provide them with a sense of ownership and responsibility to ensure the goals and objectives of the plan are accomplished. Community members are encouraged to be actively involved in project implementation and monitoring by providing comments and suggestions for improvement. It is also important to note that the GIS data layers and skills referred to in Issue 3 (above) are critical to the development of the land management plans. The USDA Forest Service International Programs has the resources and individual contacts of USFS experts capable of providing this training.

Issue 5: Fire prevention and community awareness

Uncontrolled burning for subsistence agriculture and for hunting occurs across much of Angola, as it does in the Tropics and Subtropics worldwide. There is great concern within Angola that burning is damaging the forest resource.

Background

Fire is a ubiquitous factor in seasonally dry tropical and subtropical landscapes. Fires have always occurred in Kuando Kubango, whether due to lightning or human ignition,

and most evidence is that the miombo woodland is adapted to frequent, low- and mixed-severity fire. We should not forget that man and his ancestors have been a constant and integral part of the miombo ecosystem for hundreds-of-thousands of years.

We have two principle concerns relating to fire: (1) We have very little hard information on the cultural or economic uses of fire in Kuando-Kubango, on the ecosystem impacts of fire in the area, or on the mechanics of fire in the respective vegetation types. (2) According to our sources, fires are increasingly being set in the middle of the dry season, when vegetation is extremely flammable and when occurrence of lightning is at its annual ebb. Fires are thus becoming extremely large and uncontrollable, and significant levels and areas of tree canopy mortality are resulting. Furthermore, the numbers of fires being set appears to be on the rise, and will likely increase further as populations displaced by the war continue to return to their homes.

Based on our overflight and field visits, and on our discussions with various people within Angola, uncontrolled fire does not yet seem to be a major problem within the core of Kuando Kubango Province, but we can anticipate that it may become a problem - especially around populated areas - if recent events in neighboring Provinces like Moxico are any indication. Fires in the seasonally dry woodland and savanna systems that characterize much of Kuando Kubango are not likely to cause the sorts of severe and "unnatural" damage that they cause in tropical wet forest (e.g. Cabinda), but IDF clearly needs to develop a rationale for ecological management of fire, and an infrastructure for preventing and suppressing unwanted fires when and where they occur.

Recommendations

1. A literature review should be conducted of the fire ecology of miombo forest and woodland systems, and translated into Portuguese. Much research has already been conducted elsewhere in Africa and this information needs to be made accessible to the Angolan public and government.
2. An effort should be made to collect information on the cultural/economic uses of fire in Kuando Kubango. Of particular interest is the use of fire for hunting. This seems to be widespread, and it is critical that we understand the rationale for this use, the ecological effects it has on surrounding ecosystems, and whether there might be alternatives (if they are indeed necessary). Another important issue is the use of fire to clear and fertilize agricultural lands. Currently there is no widely-accepted alternative to periodic burning in order to release plant-available nutrients (other than application of petrochemical-based fertilizers, which bring their own problems), but there has been much research done on this subject as well. This research should be reviewed and provided to the public through government extension (assuming extension agents exist, or will exist in the future) or NGO-contacts.
3. Provide training for fire prevention and awareness at the community level. Local populations should especially be made aware of the risks associated with burning in the middle of the dry season. Alternatives to burning for agricultural and hunting purposes, if available, should be taught. This step requires that relevant information be collected and reviewed first (steps 1 and 2), and that an institutional framework exists for disseminating this information. It is advisable that NGOs be involved in the public education aspects of

this work.

4. It is important to work with communities and provide education on fire behavior and prevention, but at this stage, we need to acquire further information about the characteristics of forests in Angola in order to assess extent to which fire is a real threat. As the population grows, the potential for unsustainable use of forest products will increase. These threats should be addressed at the community level with participatory planning, community forestry activities, and environmental education.

5. The USFS is the world's premier fire-fighting entity. USFS could potentially provide training of various kinds to IDF (and/or other appropriate agencies) with respect to fire prevention and fire awareness.

Issue 6: Law enforcement training

Background

The USAID /Angola report mentions Angola's Environment Law passed in 1998. This law provides Angolan citizens the right to live in a "healthy and non-polluted environment" and requires environmental protection by the government. The intent of this law is to provide a core set of principles, rights, and obligations that will guide the formation of future legislation and regulations. The technical team met with Vladimir Russo of the Ministry of Urbanism and Environment (MINUA). Sr. Russo revealed the 1998 Environment Law helped to create MINUA and several other more recent environmental regulations. However, the majority of the population does not have access to these recently passed laws. Due to the literacy rate of just over 40% (2002 estimate) it is difficult to get the word out to the general population concerning recently passed legislation. Additionally, numerous colonial laws relating to wildlife, reserves, and parks remain in effect. Presently there is little capacity for enforcement of these laws and the judicial system has not been effective in processing cases (USAID Analysis on Conservation of Tropical Forests and Biological Diversity 2006).

Recommendations

The first step in enforcing laws is to ensure the population is aware of what the laws require. The 1998 Environment Law recognizes the Government of Angola (GoA) is responsible for providing environmental education to its citizens. Sr. Russo acknowledged they are in the process of providing this information through community meetings. This should be an ongoing process by GoA to ensure the public is fully informed. Keith Kline and Brenda Bergman, in their 2005 Angola Trip Report suggested the following recommendations with concurrence by the technical team:

- Establish provincial libraries of environmental information, including national legislation and regulations. Other natural resource information specific to each province could also be made available.
- Educate staff of relevant government departments. We recommend the education be extended to all government employees, community leaders, and teachers through a series of workshops at the local, provincial, and national levels.
- Involve youth in raising awareness of environmental concerns.
- Communicate recent legislation by radio in both Portuguese and local languages.

- This would be an effective tool in reaching those who cannot read.
- Adopt legislation that incurs penalties for dumping of solid waste and other hazardous materials into stream courses. Educate the communities concerning this legislation and then enforce it.

Once the public is aware of the laws, it is the responsibility of GoA to enforce the laws by providing an effective judicial system. Providing an effective judicial system for Angola is beyond the scope of this project. However, a 3 to 4 day training session is needed to provide basic law enforcement skills in the subjects of contract law relating to timber sales and general enforcement of environmental laws. The USFS has the ability, skills, and knowledge to train provincial IDF and MINUA employees and local community members, who have been given law enforcement authority.

Action Plan

In order to provide partnership continuity and improve capacity building between the USFS, IDF and other organizations it is important to implement a technical assistance visit in one of the recommended training sessions as soon as possible. The training sessions that could be implemented soon include the vegetation identification course or the fire prevention & awareness course. Either course could be held in late July or August. The fire prevention & awareness course would be timely since most of the fires in Angola occur in August and September. The other training sessions are dependent on the completion of prerequisite courses. The forest inventory training session should not be implemented until the tree identification course has been completed and GIS/Imagery data are available. It was also decided, in the last meeting with IDF, that they would choose a location for implementing a forest inventory and training course. The land management planning course may be implemented while the data from the forest inventory are being collected and the GIS layers developed.

According to the recommendations above, there are many opportunities for expanding forestry related technical assistance to IDF and other organizations. In this section of the report we will provide descriptions of potential courses and technical assistance needed to work towards expanding the collaboration as well as creating capacity within IDF for completing an in-depth forestry assessment of the Kuando Kubango province and other provinces in Angola.

In support of the vegetation and identification course Glen Juergens and Hugh Safford have offered to put together a compendium of 20-30 key species, which exist in Angola. This compendium will include physical descriptions, growth characteristics and any other information that is found through the process of information gathering. The compendium could be used for capacity building and as a resource for Angolan government agencies.

The following provides a brief description of the course work needed and lists the courses in order that they should occur with the exception of the Fire Prevention & Awareness and the Law Enforcement courses which may occur at any time.

1. Vegetation identification, silvicultural requirements, and ecological characteristics of

common trees species found in Kuando Kubango Province - this course should focus on the identification of common tree species and learning the scientific names to allow IDF employees access to available literature and research. Learning the scientific names of the common trees is critical in order to effectively communicate with forest managers throughout the world. The course should also include historic, traditional, and non-traditional uses of tree species, silvicultural growth and seed germination requirements, as well as the ecological function and characteristics.

2. Utilization and interpretation of GIS data and satellite imagery – this need is most profound at the national level, and is a prerequisite for planning at national and regional levels. This should begin with a one-week short-course for selected IDF employees, which covers the basics of GIS. We were told by IDF that an introductory GIS course is being offered in Mozambique later this year, and that a small group of IDF employees was being chosen to attend. In order to use the skills obtained in such a workshop, IDF will have to invest in a number of GIS-capable computers. After basic GIS skills are obtained, a second course covering GIS analysis and use of remotely sensed data should be arranged. This could be done onsite or at a foreign location. The USFS could provide GIS training, or this training could be accomplished via other means. Finally, a course in basic mgt planning using GIS should be attended. This is an obvious place for USFS involvement. Perhaps, a USFS GIS expert could work with IDF and GEF Okavango River Management Project to provide an introductory GIS course. In addition the USFS expert could work with GEF project partners, HOORC and IDF to develop a training and data layer gathering action plan. Note that IDF and other Angolan government agencies have recently begun contracting to South African firms for GIS-type analyses and planning for some of the Provinces. This is likely the way that planning will be accomplished for Kuando-Kubango as well, but a planning staff with basic GIS skills is necessary within IDF no matter the extent to which preliminary planning analyses are “farmed out”.

3. Collection of forest vegetation data – this course should be on the protocols and methodology of sampling forest vegetation. Currently there is no standardized process for on-the-ground resource data collection in Angola. The inventory method should be determined by the density and species diversity/homogeneity within the area to be sampled. However, IDF indicated a preference for the 10 meter grid sampling method. We recommend that a training/meeting be arranged with FIA staff and/or other personnel skilled in forest tree measurements and resource data collection from the USFS to develop an efficient methodology for (forest) resource inventory. Recent USFS-IP work in Senegal and Madagascar can serve as a model for this effort.

4. Participatory land and resource management planning methodology – this course can use the process described in the Senegal Report with the modifications mentioned in the Recommendations section above. A scoping process to involve and seek input from other national and provincial government agencies, NGOs, and communities should be included in this training. It may be beneficial to include both IDF and MINUA personnel in this training session to improve communications and establish links between these agencies that are responsible for the management of Angola’s resources.

5. Fire Prevention and Awareness – this course should provide training for fire

prevention and awareness at the community level. Local community residents as well as IDF staff should especially be made aware of the risks associated with burning in the middle of the dry season. Alternatives to burning for agricultural and hunting purposes, if available, should be taught. This step requires that relevant information be collected and reviewed first and that an institutional framework exists for disseminating this information. It is advisable that NGOs be involved in the public education aspects of this work.

6. Law Enforcement – this course should include basic skills needed for IDF and MINUA personnel to effectively:

- Inspect concessions involving commodity resource extraction
- Enforce the terms and specifications of the concessions
- Educate communities of existing and new environmental laws
- Enforce environmental laws

Some other courses needed to support institutional strengthening and capacity building for IDF as they take steps towards an in-depth forest assessment:

Next Steps

As mentioned above it will be important to provide training as soon as possible to IDF and their partners including community members as we work towards the goals of institutional capacity building and strengthening. As agreed upon with Director Caetano and amongst the technical staff, the following lists of activities are priorities for the next six months.

1. July 2006: The trip report and needs assessment will be provided in Portuguese to IDF and other partners.
2. 2006-2007: The USAID/IRBM project can serve as support to facilitating some of the future discussions and follow up activities. This includes communication with IDF and MINUA to refine a proposal for implementation of the U.S. Government's support to NBSAP in Kuando Kubango, outlining the role of USFS and IDF.
3. October 2006: A tree species compendium will be developed for 20-30 tree species found in Angola by USFS technical experts.
4. October 2006: IDF will select an area for vegetation identification and forest inventory training.
5. 2006-2007: IDF will continue to pursue basic GIS analysis and utilization training in Mozambique for 2-3 members of their staff.
6. 2006 – 2007: Through the GEF Okavango project, there are opportunities for IDF, USAID/IRBM and USFS to pursue opportunities for gathering available GIS data.

- Ongoing: To start with, existing maps should be turned into GIS-ready data layers (currently many of these layers exist as electronic scans, and have not been georeferenced or digitized). Nazare will follow up to find out if any additional information on GIS layers and/or satellite imagery may be available from IGCA (Angolan Government's Institute of Geology and Cartography).
 - Ongoing: Angola Alliance, a group of South African GIS and remote sensing contractors, has apparently developed many of these layers for a number of provinces north and west of Kuando Kubango. It may be more cost- and time-efficient to work with the same group in developing GIS data layers for Kuando Kubango.
 - In September 2006, USFS could provide technical assistance on preliminary GIS training as well as provide support as the Okavango project compile GIS layers.
7. November/December 2006: Vegetation identification, silvicultural requirements, and ecological characteristics of common trees species found in Kuando Kubango Province course. The course can be developed with through collaboration between USAD/IRBM project, IDF, USFS and possible local universities. It will be important to contact both Elizabeth Mattos (Luanda) and Gilberto Cardoso (Lisbon, Portugal) for their assistance. Gilberto is one of the only individuals whom know well the different species of trees in Angola. This course depends on the availability of biologists and botanists as well as a location identified where the species id and inventory course can take place.
 8. November/December 2006: Following the vegetation identification course, will be the forest inventory course. It is important that the two courses be held back to back in order to take advantage of forest vegetation knowledge. The course will be developed with the assistance of IDF, USAID-IRBM and USFS. USFS could provide technical experts from the Forest Inventory and Analysis staff on forest inventory protocols and methodology.
 9. Ongoing: USFS, IDF and USAID-IRBM Project will continue to discuss new opportunities for collaboration and capacity building for the GoA. USFS, USAID and IDF will need to explore funding opportunities to provide additional USFS technical assistance. These are discussions that can happen as each technical assistance visit occurs. USFS is responsible for costs of technical experts providing technical assistance, but all parties will have to contribute resources towards the opportunities listed in this report.
 10. 2006-2007: During the technical visit, the team discussed an opportunity for a community forestry project around the community of Dumbo. As

the above steps are taking place this community forestry project, which is listed in the appendix, could be developed.

Budget and Timeline

The budget is based on the costs for four USFS experts participating in the three courses. These costs do not include the actual course costs nor do they include costs for the participants. This budget also represents available USFS funding for direct costs for support to IDF / IRBM / OKACOM for FY06 (\$10,000) and FY07 (\$32,000). If USAID RCSA, USAID Angola, or IRBM can cover additional direct costs (travel, lodging), then additional USFS technical assistance can be made available.

USFS Assistance Topic	Proposed Dates	USFS Direct Cost	USFS Salary Cost
GIS Introductory Course (1.5 weeks; 1 USFS GIS Specialist)	September 2006	\$10,000	\$6,750
Species Compendium (1 week)	October 2006	\$8,000	\$4,500
Vegetation Identification Course (1 week; 1 USFS forester)	November 2006	\$8,000	\$4,500
Forest Inventory Course (2 weeks; 2 USFS foresters)	November 2006	\$16,000	\$9,000
TOTAL		\$42,000	\$24,750

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Appendix I

Scope of Work

Technical support to Angolan Ministry of Agriculture and Rural Development's National Institute for Forestry Development and USAID Regional Center for Southern Africa's Okavango Integrated River Basin Management Project

Forest Resource Assessment of the Kuando Kubango Province

Summary

This Scope of Work provides detailed information about the proposed forest resource assessment in the Kuando Kubango Province of Angola, to be carried out jointly by the US Forest Service, the National Institute for Forestry Development (IDF) and the USAID Regional Center for Southern Africa's Okavango Integrated River Basin Management Project. The overall objective of this activity, scheduled from around May 18 to June 1 2006, is to complete an in-depth assessment of the state of forest resources in the Kuando Kubango Province with the goal of providing recommendations and technical assistance to the IDF for multiple-use management of these forests. *Please note that this Scope of Work is a draft, and we seek suggestions, comments, and ultimately approval from the Angolan Government.*

Background

This Scope of Work builds on a memorandum dated October 23, 2005 from US Forest Service International Programs (USFS/IP) to the Angolan Government and a meeting Mr. Tomas Caetano, Director of the IDF, Ministry of Agriculture and Rural Development had with USAID on March 7, 2006. The proposed assessment will be supported by USFS/IP and USAID (primarily through the Regional Center for Southern Africa, USAID/RCSA) under the Okavango Integrated River Basin Management Project. USFS/IP and USAID will consult with the government of Angola and other donors to ensure coordinated efforts and will work to identify additional partners for ongoing work if required and requested by Angola. Activities proposed at this stage focus on the Cubango basin. They will be carried out under the direction and guidance of the designated Angolan government counterparts and in consultation with OKACOM-Angola (Ministry of Energy and Water) and USAID.

Overall Objectives

The proposed objectives for the overall forest resources assessment, which will be carried out in phases over the next 12 months, are to:

1. Use best available information on the current status of forest areas in Kuando Kubango to determine how ongoing forest use activities are impacting the resource and to illustrate forest cover change trends in the Province (some of this information is with HOORC in Maun, Botswana).

2. Assess current forest resource utilization activities for timber and non-timber forest products to determine species utilized, levels of extraction, possibilities for regeneration and sustainable production, impacts to soil and water systems, socio-economic importance, who the forest users are, and if there are conflicts in use
3. Document the financial incentives driving forest exploitation including the market incentives and disincentives that influence the harvesting of principle forest products in the region and typical chains of custody for both formal and informal markets
 - a. identifying institutional arrangements that underlie the incentive structures, including limited to control access to forest resources, and structures supporting exploitation of resources and investment in forest resources
 - b. Identifying incentives for larger scale logging activities as well as incentives for community based forest management, including necessary governance arrangements that management plans will depend upon
4. Support the Institute for Forestry Development to develop recommendations for how forests in Southeastern Angola can be managed in a multiple-use fashion to balance the contribution of forest products to economic development with needs to maintain watershed health, biodiversity habitat, and sustainability of forest production
5. Provide information that will support Angolan land and water management authorities at the provincial and municipal levels with efforts to develop regional and/or local forest management, biodiversity conservation, and watershed management plans
6. Help identify potential biodiversity hotspots and biologically important areas, especially in terms of flora and socio-economic value of the forest resources

Specific Objectives for this initial Technical Assistance Mission (May 18-June 1)

1. Initiate partnership between the Angolan Government (represented by IDF, the Ministry of Agriculture and Rural Development, and regional authorities in Kuando Kubango province), OKACOM-Angola, USAID-RCSA, USAID-Angola, the IRBM Project, and the US Forest Service.
2. Commence the assessment via a trip to the field to view status of forest resources and review of existing data (maps, remote sensing, harvesting figures, etc.).
3. Develop a plan for the execution of the forest resource assessment, including necessary USFS support, data needs, timing, and budget, a participatory process for developing the forest management plan, and tasks for all actors for each step of the assessment. The budget should detail what can be achieved with existing resources and what additional resources will be needed.
4. Explore with the Angolan government and USAID opportunities to expand this partnership as requested by Mr. Caetano.

Activities

- Meetings with key stakeholders in Luanda and in Kuando Kubango Province to develop an forest resource assessment framework and work plan, including specific tasks for local counterparts to implement in between USFS visits

- Review of Existing Information
- Field Trip for Forest Resource Assessment
- Planning sessions with technical folks in Luanda
- Meet with NBSAP Stakeholders in Menongue who are concerned about deforestation in Kuando Kubango Province
- Final Debriefing with GoA and USAID

Composition of USFS Team

The USFS team is comprised of three individuals all who have extensive international experience and bring a diverse set of skills to the table.

1. Team Leader: Michelle Zweede, Latin America Program Specialist, USFS/IP
2. Tropical Forest Ecologist: Hugh Safford, Regional Ecologist, Pacific Southwest Region, USFS
3. Forest Management Expert / Silviculturist: Glen Juergens, Monongahela NF

Ms. Zweede and Mr. Safford are both fluent Portuguese speakers. Mr Juergens speaks Spanish fluently. Their CVs (in English) are available upon request. USFS/IP will perform a literature review to help the USFS team prepare for this mission. Therefore, we seek any available documents about the status of forest resources in the Kuando Kubango Province, existing licenses, concessions, and production data if available, documents on forest and watershed policy in Angola, and the structure of the Angolan Government agencies responsible for forest land management and concessions.

Deliverables

1. Summary report describing issues, findings and recommendations related to the objectives listed above, based on this initial visit. This will include an action plan laying out the steps for completing the full assessment based on inputs from GoA and other counterparts, and defining the roles and responsibilities of each party. As mentioned, the action plan should also include a budget defining what can be achieved with existing funds, and what additional resources will be necessary.
2. Any additional information regarding the GoA–USFS partnership and next steps that need to be documented

Timing: This mission will start on or around May 17, 2006. It will run for approximately 2 weeks, with the team departing from Angola around June 1, 2006.

Funding

USFS will cover all salary, lodging, per diem, and international airfare costs of the three USFS employees on this mission. USAID-RCSA through the IRBM activity will provide in-country transportation if required. USFS currently has funding for one follow-on mission in FY06, and potentially funding for additional work in FY07. However, for any additional costs beyond USFS technical assistance missions (map analysis, training, long-term activities, etc.), funding will need to be identified from other sources.

Logistics and In-Country Support (*comments welcome; draft ideas presented here*)

USFS requests the following in-country support from the USAID IRBM project and/or the Government of Angola (GoA):

- Development of Trip Itinerary, including scheduling of meetings with key personnel in Luanda and in Kuando Kubango Province (GoA)
- In-country transport for the entire mission (USAID/IRBM and GoA)
- Hotel Reservations for the entire mission (USFS detailers will pay for their rooms)
- Expeditors at airport upon arrival and departure of USFS team (USAID)
- Designation of GoA and IRBM counterparts who will accompany the USFS team, especially during the field portion of the trip (USAID/IRBM and GoA)
- Designation of GoA counterparts who would continue with activities to be defined and agreed in the assessment plan, during the period between visits of the USFS team
- Provide any available maps, forest cover and utilization information on the Kuando Kubango Province (including maps from HOORC via IRBM)
- Information regarding the status of landmine clearing efforts in areas to be visited (GoA, or IRBM via UNDP)
- Support for translation or reproduction of key documents (if necessary, IRBM)

Appendix II

Memorandum

Date: October 23, 2005

To: Tomas Caetano , Director of the National Institute for Forestry Development (IDF), Ministry of Agriculture and Rural Development

Gomez da Silva, National Director for Water Resources, Ministry of Energy & Water

Copy: Domingos Nazare, Deputy Director, IDF
Rodriguez Nanda, Chief of the Department of Forestry, IDF
Keith Kline, USAID Southern Africa and Scott McCormick, Okavango IRBM Project
Diana Swain, Mission Director, USAID Angola

From: Oliver Pierson, Africa Program Coordinator, USDA Forest Service International Programs (USFS/IP)

Re: USFS / IP Support to Forest Sector Diagnostic in Kuando Kubango Province, Angola

Summary

The USDA Forest Service International Programs (USFS/IP) Office formally offers their support to assist the government of Angola with the implementation of a study to analyze the current status of forest resources in the Kuando Kubango Province of Angola. USFS/IP proposes to implement this study in collaboration with the Angolan Ministry of Agriculture and Rural Development's National Institute for Forestry Development as a primary counterpart.

Background

This effort is initiated in response to issues identified in the National Biodiversity Strategic Action Planning Workshop held in Menongue, Kuando Kubango in September, 2005 and the recommendation of Angola OKACOM representatives. The proposed work will be supported by USFS/IP and USAID Southern Africa (USAID-SA) under the Okavango Integrated River Basin Management Project. USAID-SA will consult with the government of Angola and other donors to ensure coordinated efforts and will work to identify additional partners for ongoing work if required and requested by Angola. All activities will be carried out under the direction and guidance of the Angolan government counterparts listed below and in consultation with OKACOM-Angola (Ministry of Energy and Water) and USAID/Luanda.

Purpose

The proposed objectives of this study are to:

7. Use best available information on the current status of forest areas in Kuando Kubango to determine how ongoing forest use activities are impacting the resource and to illustrate forest cover change trends in the Province
8. Assess current forest resource utilization activities for timber and non-timber forest products to determine species utilized, levels of extraction, possibilities for regeneration and sustainable production, and impacts to soil and water systems
9. Document the financial incentives driving forest exploitation including the market incentives and disincentives that influence the harvesting of principle forest products in the region and typical chains of custody for both formal and informal markets
10. Support the Institute for Forestry Development to develop recommendations for how forests in Southeastern Angola can be managed in a multiple-use fashion to balance the contribution of forest products to economic development with needs to maintain watershed health, biodiversity habitat, and sustainability of forest production
11. Provide information that will support Angolan land and water management authorities at the provincial and municipal levels with efforts to develop regional and/or local forest management, biodiversity conservation, and watershed management plans

Approach

Given the challenges associated with this task, USFS/IP and USAID-SA propose that the work associated with these objectives be carried out in a series of two technical assistance missions, and with some clearly-defined work performed by in-country actors / counterparts between missions. This approach, which has worked well at the onset of other such partnerships, allows all actors to develop an adequate understanding of resources, assessment techniques, and the overall approach to the diagnostic, and will create opportunities for capacity building as well as promote ownership of the work by the Angolan Counterparts. USFS/IP currently has funding reserved for two missions, each for 2-3 weeks and with 2-3 experts. The final composition of the team will be based on a more detailed scope of work for this activity.

USFS/IP Team

With 100 years of forest and watershed management experience on over 80 million hectares of land, the USFS is well-placed to undertake such a diagnostic analysis in collaboration with Angolan authorities, and to assist with the development of recommendations for multiple-use strategies that present sustainable, “win-win” options for the use of forest resources and conservation of biodiversity. USFS proposes to assemble a team to implement this study comprised of a tropical forest ecologist and a forest management expert/silviculturalist as core members, and a GIS/forest monitoring specialist and forest products/marketing expert as supporting members.

Next Steps

The USFS core team can prepare to travel to Angola to complete this assessment in collaboration with the aforementioned partners, subject to Angolan review and approval of the proposed activity description, confirmation of the availability of local counterparts

to participate as Angolan team members, and country clearance by the US Embassy. The USFS can provide the services of its experts for a 2-3 week period and can cover all costs for its team during the implementation of this activity. To properly prepare for this activity, USFS would appreciate having at least 8 weeks advance notice for scheduling the travel of its team.

The USFS would appreciate confirmation from Angola that local counterparts will be available to work with the USFS team. The local counterparts would guide and advise the USFS team, provide available data on the state of forest resources, and accompany the team to the field. The USFS understands that there are travel restrictions in Southern Angola due to the presence of land mines and would work with USAID and competent authorities to determine where travel is permitted.

Once we receive your agreement to the statement of work, we would appreciate your suggestions on the best timing for visits by the USFS team to Luanda and Kuando Kubango, to carry out this activity, taking into consideration rainy season road conditions and the availability of Angolan counterparts.

The USFS looks forward to this opportunity to work in partnership with Angolan authorities. We view this mission as the potential first step of a broader partnership focused on capacity building and sustainable forest and watershed management between our respective agencies. Please feel free to contact Oliver Pierson with any questions or suggestions to improve this initial statement of work. He may be reached by email at opierson@fs.fed.us or through the offices of Joaquim Boavida (interim IRBM liaison) in Luanda, 923-505-694.

Note:

Based on the meeting of Mssrs. Kline and Caetano on October 20, 2005, we understand that counterparts proposed for this activity may include:

- Domingos Nazare, Deputy Director of the Institute for Forestry Development (IDF) Phone: 912-213-801 or email: nazaredomingos@hotmail.com
- Rodriguez Nanda, Chief of the Dept of Forestry, IDF
- Jorge David, Chief, Department of Hydrology

Appendix III

Acknowledgements

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IDF General Director

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IDF Deputy Director

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Staff Forester
IDF Luanda

Rossario Texeira
Staff Forester
IDF Luanda

Alfonso Duala,
IDF Provincial Director
Kuando-Kubango

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Africa Program Specialist
International Programs

Oliver Pierson
Africa Program Coordinator
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IRBM Team
Brenda Bergman
Scott McCormick

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IRBM Project

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IRBM Project

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Finally, we would like to express our sincere gratitude and appreciation for Brenda Bergman's enthusiasm, critical guidance and feedback, great ideas, and positive support for our team all around.

Appendix IV

Action Plan for the Community of Dumbu, Kuando Kubango Province, Angola

Submitted by Glen Juergens

A community action plan is needed to meet the short- and long-term needs for the people living in Dumbu. This is a specific work agenda for local community members to develop and improve their economic growth in a sustainable multiple-use manner. It is important that an action plan has consensus among community members in order to give them a sense of ownership by identifying their priorities, goals, and objectives.

A meeting with community leaders on May 27, 2006 revealed a need to improve economic growth in a sustainable manner. Presently there are approximately 250 persons in the community producing charcoal for sale in Menongue, Bie, and Huambo. The main tree species they use are Mussamba (*Brachystegia spp.*) and Munyumbé (*Funtumia latifolia*). When they first started harvesting these trees for charcoal production they needed to walk only 30 minutes to find the trees. Today they need to walk about 2 hours. They also noticed that they were no longer able to find honey near the village. The trees they are cutting for charcoal are the same trees that produce the flowers the honey bees use.

Capacity building meetings should be held to allow the community to discuss these items and for them to provide their own ideas for improving their economy. It is critical that community members have ownership of the projects they want to implement. If the community has not already done so, they should request from 1,000 to 10,000 hectares for community use. The following action items are recommended to provide the community of Dumbu some ideas to improve sustainable economic growth and community health.

- Construct a tree nursery to reforest the areas that have been cut over for charcoal production. Species to consider for reforestation and diversification include: Mussamba (*Brachystegia spp.*) and Munyumbé (*Funtumia latifolia*) for honey production, firewood, and charcoal; and Musivi (*Guibourtia coleosperma*) for lumber, edible nuts, and wood for carving. Omanda (*Julbernardia paniculata*), Mone' (*Isoberlina angolensis*), and Manda (*Brachystegia spiciformis*) can also be planted for honey production (Fischer 1993). The community may decide to plant additional species for fruit/nuts such as Mongongo (*Ricinodendron rautanenii*), medicines, shade, etc. It is recommended they use only native species in the tree nursery and plant several different species in the same area to maintain diversity and avoid monocultures.
- Form a cooperative to market honey production to external sources.
- Utilize fuel-efficient stoves to reduce firewood consumption and improve health of community. Numerous types of stoves can be built with native materials.

These fuel-efficient stoves allow the community to use less firewood and improve the health of families by emitting less smoke. A diagram for a solar kitchen can be found in the “Gaviotas” book by Weisman (1993). However, this system can be expensive to construct and maintain.

- Raise cattle and/or goats in areas set aside for this purpose. Utilize the animals to provide milk, cheese, and meat for the community. Ensure the grazing is sustainable.
- Raise crops in community garden plots and form a cooperative to market the produce. Provide instructions for making compost so the gardens can be permanent and productive. Utilize the waste products from the cattle and/or goats for composting material.
- Construct water purification systems to provide potable water in order to improve the health of the community. A diagram to construct a “solar kettle” can be found in the “Gaviotas” book by Weisman (1993) or a simple chlorine drip system can be constructed to provide potable water.
- Construct latrines to reduce contamination of the local streams and improve the health of community members.

The following references may be available to give the community additional ideas to improve community health and sanitation conditions and increase supplementary economic growth potential. It may be possible to obtain funding for some of these projects through the numerous NGOs in Angola and the Petroleum Industry.

Community Development Counseling Services, Inc. 1964. Remote Areas Development. Arlington, VA 584 pp.

Department of State, USAID, Communications Resources Division. 1963. *Village Technology Handbook*. 169 pp.

Fischer, Franz U. 1993. Beekeeping in the Subsistence Economy of the Miombo Savannah Woodlands of South-Central Africa. Rural Forestry Development Network. 8pp.

Volunteers in Technical Assistance. 1975. Village Technology Handbook.

Weisman, Allan. 1998. Gaviotas: A Village to Reinvent the World. Chelsea Green Publishing Company, White River Junction, VT. 231 pp www.chelseagreen.com

www.amazon.com Village Technology Handbook

Appendix V

Kuando Kubango Tree Species List and Uses

Common Name	Scientific Name
Musongue/Mutontola/Mungondo	<i>Acacia cieberana</i> (<i>sieberana</i> ?)
	<i>Acacia erioloba</i>
	<i>Acacia giraffe</i>
	<i>Acacia mellifera</i>
	<i>Acacia tortilis</i>
Uvala/Doussie'	<i>Azelia cuanzensis</i>
Nukasa	<i>Albizia adianthifolia</i>
Muiumba/Muhaha/Umpapa (firewood, fire susceptible)	<i>Baikiaea plurijuga</i>
Manda/Panda	<i>Brachystegia speciformis</i>
Samba/Musamba	<i>Brachystegia spp.</i>
Musese (fire resistant)	<i>Burkea africana</i>
Mupane/Mutiati/Mopaani	<i>Colophospermum mopane</i>
Mungondue	<i>Combretum spp.</i>
Onkue/Mugandu/Omukuku	<i>Combretum imberbe</i>
	<i>Combretum zeyheri</i>
	<i>Combretum psidioides</i>
Musese/Muhala/Muhaiu	<i>Crossopteryx febrifuga</i>
	<i>Croton spp.</i>
	<i>Cryptosepalum pseudotaxus</i>
Musala	<i>Dialium engleranum</i>
	<i>Diplorhynchus condylocarpon</i>
Mukoso	<i>Erythrophleum africanumpe</i>
	<i>Ficus gnaphalocarpa</i>
Munyumba	<i>Funtumia latifolia</i>
	<i>Grewia spp.</i>
Musibi(Musivi?)/Copalier (nuts,carving,lumber)	<i>Guibourtia coleosperma</i>
Mone'	<i>Isobertina angolens</i>
Omanda/Mumue'	<i>Julbernardia paniculata</i>
Muvuka	<i>Marquesia macroura</i>
Saba	<i>Otenolophon engleranus</i>
	<i>Peltophorum africanum</i>
Maku	<i>Pericopsis angolensis</i>
	<i>Philenoptera nelsii</i>
	<i>Pseudolachnostylis maprouneifolia</i>

	<i>Ptelopsis anisoptera</i>
Girassonde (fire resistant/dependent)	<i>Pterocarpus angolensis</i>
Mongongo (nuts)	<i>Ricinodendron rautanenii</i>
Mangetti (nuts, carving)	<i>Schinziophyton rautanenii</i>
Musisi	<i>Sterculia tragacantha</i>
	<i>Strychnos spp.</i>
Mukombe/Mutete (Mgoso-Tanzania)	<i>Swartzia madagascariensis</i>
Mueia/Mukongolo/Mungolo/Mubeba	<i>Terminalia sericea</i>
Muvambo/Muambo/Pao Ferro	

Angolan Tree Species Uses

Acacia erioloba (also *A. giraffe*) – wood

Acacia mellifera

Acacia sieberana – forage, medicine, wood

Acacia tortilis – food, drink, forage, medicine

Afzelia cuanzensis (also *quanzensis*) (Mahogany Bean, Rhodesian Mahogany) –toxins, wood

Albizia adianthifolia (also *A. gummifera* and *A. sassa*) - wood

Baikiaea plurijuga (Rhodesia Teak, Zambezi Redwood) - chemical products, medicine, wood

Brachystegia spiciformis – fiber, medicine, wood, honey

Burkea africana – chemical products, medicine (a protected tree in Namibia, susceptible to fire, coppices)

Colophospermum mopane (Turpentine Tree, Butterfly Tree) – forage, medicine, wood

Cryptosepalum pseudotaxus (also *C.exfoliatum* or *C.arboretum*) – medicine

Dialium englerianum (also *D.lacourtianum* and *D.simsii*) – food, drink, medicine

Erythrophleum africanum – medicine, toxins, wood

Guibourtia coleosperma (also *Copaifera coleosperma*)(Rhodesian Mahogany) – chemical products, food, drink, medicine, wood

Isoberlina angolensis (also *I.densiflora*, *I.niambaensis* and *I.tomentosa*) honey

Julbernardia paniculata (also *Isoberlinia paniculata* and *Pseudoberlinia paniculata*) – medicine, wood, honey

Peltophorum africanum (African Wattle, Weeping Wattle) – medicine, wood

Pericopsis angolensis (also *P. schliebenii* and *Afrormosia angolensis*) – medicine, wood

Pterocarpus angolensis (African Teak, Bloodwood) – chemical products, medicine, wood