

Country: **ANGOLA**

Project Title: **National Forestry Resources Assessment**

Project Number: **TCP/ANG/3103 (D)**

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Government Ministry  
responsible for  
project execution: **Ministry of Agriculture and Rural  
Development**

FAO Contribution: **US\$394 000**

Signed: .....

(on behalf of Government)

Signed: .....

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Director-General  
(on behalf of the Food and Agriculture  
Organization of the United Nations - FAO)

Date of Signature: .....

Date of signature: .....

## ABBREVIATIONS

CFI:	Continuous Forest Inventory
DF:	Forestry Department
DNAPF:	Direcção Nacional de Agricultura, Pecuária e Florestas
DNRN:	Direcção Nacional dos Recursos Naturais
DSP:	Department of Studies and Planning
GPS:	Global Positioning system
IDF:	Instituto de Desenvolvimento Florestal
IDR :	Instituto de Desenvolvimento Rural
IGCA:	Instituto de Geografia e Cartografia de Angola
INOT:	Instituto Nacional de Ordenamento do Territorio
MINADER:	Ministrio de Agricultura e Desenvolvimento Rural
MINUA:	Ministrio de Urbanismo e Meio Ambiente
NC:	National Consultant
NFA:	National Forest Assessment
NFAU:	National Forest Assessment Unit
NFP:	National Forest Programme
NGO:	Non-governmental Organization
NPC:	National Project Coordinator
NSFS:	National Strategy for Food Security
PIB:	Produit Intérieur Brut
SC:	Steering Committee
TCDC:	Technical Cooperation between Developing Countries
TCP:	Technical cooperation Programme of FAO

## **I. BACKGROUND AND JUSTIFICATION**

Angola has total land area of about 1.247 million km<sup>2</sup>. It is bordered by the Republic of the Congo and the Democratic Republic of the Congo in the north, Zambia in the east, Namibia in the south and the Atlantic Ocean in the west. It is divided into 18 provinces. The population of Angola was estimated in the region of 13 to 15 million inhabitants. FAOSTAT's estimate is 13 134 000 people in 2000. About 60 percent of the population lives in rural areas. Large segment of it face poverty and food insecurity as the nation rebuilds.

### **Political and Economic developments**

Political – Angola has experienced a long period of war. First for the liberation of the country from the Portuguese from early 1960s to 1974 and civil war which broke immediately after the country gained independence. The civil war lasted about 25 years. About half a century of wars had a mixed consequence on the forestry subsector. Spatially, the forest resources were well conserved in some areas. In others, the degradation reached points of non-return. In terms of resources, there are resources which are affected more than others. Some wildlife species were reported as totally depleted in some parts of the country.

Economic – The long wars had deeply hurt the social conditions and profoundly damaged the economy of the country. But after the hostilities, Angola recorded the fastest growing economy in Africa. The purchasing power of the average Angolan was estimated in 2006 at about US\$2 900. In terms of quality of life of the majority of the population, Angola is unfortunately far behind many countries with comparable high potential in its natural resources and people. 70 percent of the population is below the poverty line<sup>1</sup>.

### **Forestry sector**

Institution – The forestry administration is composed of a set of institutions namely the “Instituto de Desenvolvimento Florestal (IDF)” and the “Direcção Nacional de Agricultura, Pecuária e Florestas (DNAPF)” both of the “Ministério de Agricultura e Desenvolvimento Rural (MINADER)”, the “Direcção Nacional de Recursos Naturais (DNRN)” under the “Ministério do Urbanismo e Ambiente (MINUA)” in charge of the protected areas. Theoretically, DNAPF is responsible for defining policies and IDF as executing agency of the policy. IDF is the major player in the decision making on policy issues and in the development of such policy. IDF is severely under-resourced. The existing staffs is comprised of 11 professional foresters, 180 forestry technicians and 520 forest guards poorly trained and equipped. This level of staffing is insufficient to carry out their responsibilities adequately. DNAPF is even less powered by human resources in the forestry area. The situation with DNRN that takes care of protected areas is even more serious than with IDF.

The executive structures of IDF consist, at central level, of: (a) Office of Studies and Planning; (b) Forestry Department; (c) Wildlife Department; (d) Department of Law Enforcement (Fiscalização); (e) Department of Administration, Management and Budget; (f) Human Resources Sector. At local level, the executive structures of IDF consist of: (a) Regional Centres; and (b) provincial directorates.

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<sup>1</sup> Source: Millennium Development Goals: Angola Progress Report 2005.

IDF is very aware of serious shortage of specialized personnel. In order to improve the situation of the low staffing in the forestry subsector, IDF is leading discussions with the Ministry of Education to create forestry curriculum at the Agronomic Faculty of the Agostinho Neto University. Similar discussions are going on to open two forestry schools for technician levels. There are two major constraints for these initiatives: the lack of funds to create the conditions for these teaching institutions and the scarcity of teaching capacity. There is also an initiative to send student for training at the Eduardo Mondlane University in Maputo. Despite the positive response from the Mozambican side, this initiative did not move for lack of funds o support the students during their studies.

Budget – The national public spending in Angola was given at about US\$23 510 million (I Série – No 119 – of 2 October 2006). The share of the agriculture, fisheries and environment sector is US\$604 million or 2.6 percent of the national spending. The forestry budget is just US\$375 000 or 0.06 percent of the spending of the agriculture, fisheries and environment sector. With the new developments in the forestry and wildlife subsector – new policy, new strategy, new action plan, initiative for national forest inventory – it is expected that the forestry part of the national budget will increase substantially, to implement the policy orientations, enforce the new law and carry out the national forest inventory, but also to have a new start of the subsector development after the national forest inventory will be completed and the extent, quality and importance of the resources will be known.

Developments – Now, Angola is rebuilding itself after 28 years of civil war and more than a decade of liberation war. The battle for the country reconstruction is now at all the fronts affecting all the sectors. The forestry subsector is benefiting from the high level of commitment to sustainable forest management based on clear policy orientations and strategies towards accomplishing the national objectives on forests. A new dynamic is being created at the national level to put the subsector on foot. It is a result of the recognition of the role that forests play in the economy of the country, in the livelihoods of the rural people who largely depend on them, and as an environmental asset that contributes to stabilizing climate change, conserving soil and water and protecting biodiversity. The main initiatives are:

1. The new policy of the forests, wildlife and protected areas which was formulated following a wide public participation of all concerned public and non-public stakeholders at the national and local levels. The new policy is expected to boost the forestry subsector and give it an impetus for its sustainable development.
2. A new legislation is being developed following a similar process of public participation. The finalization of the legislation is well advanced. The legislation will complement the development policy and will constitute the legal tool to guide and coordinate the interventions of the different actors. Together, with the policy, the legislation will be the overarching framework for sustainable forest management in Angola and will draw attention on the importance of the forests in the broader development agenda of the country.
3. An assessment of the state of forests, woodlands and fragile ecosystems in Angola was commissioned by the IDF. The project's main objective is to map the forestry vegetation based on the vegetation types developed by Barbosa in 1970 and to identify the areas changed and which require urgent action as well as fragile ecosystems. Although this work is essentially mapping with limited scope of information, it constitutes a basis for future

actions. The scope of information generated from this work is limited and will have limited impact on the decision-making process.

### **State of the forestry resources**

The country possesses abundant and extensive forestry resources and biodiversity with considerable economic potential. According to the official statistics, Angola has approximately 53 million hectares corresponding to the 43.3 percent of the total land area of the country (Policy, IDF, 2006). There other statistics that give only 23 million hectares (18.5 percent of the country) are covered by forests (Angola Alliance - DHP, 2005). The real size of the forest is not known as the country has never carried out a national forest inventory.

The forestry vegetation is varied. It includes from north to south: (i) the tropical moist forest of high productivity (2 percent of the total forest area) and biodiversity in the North, mostly located in the provinces of Cabinda, Zaire, Bengo e Kwanza-Norte; (ii) open dry forests and Savannah or Miombo woodlands occupy about 80 percent of the forest estate. This formation is considered of medium productivity but valuable resource from the social point of view, owing to the various products (e.g. fuelwood, building material, fodder, food, medicinal plants, etc.) and services they provide to the local population. It is located in the plateaux in the central and eastern parts of the country. The remaining forestry vegetation is found towards the south and is characterized by lower productivity. It is composed by very open tree cover, shrubs and grass but mainly wetlands, prairies, steppes, semi-deserts and deserts.

Mangroves cover an estimated area of 1.25 million hectares. They harbour an important reservoir of marine biodiversity.

The remaining forestry vegetation is composed of isolated or compact tree clusters in urban and peri-urban areas and trees used as windbreaks.

Angola's biological diversity is quite rich. The estimations indicate that there are from 5 000 to 8 000 plant species of which 1 260 are endemic.

The forestry resources are considered a natural capital, available at low-cost investment that can generate economic, social, and environmental benefits to the state and to the people through its exploitation and utilisation on a sustainable manner.

## **RATIONALE**

### **Weaknesses and Threats**

The successive wars in Angola left the forestry subsector in almost total disarray, despite the efforts of the government to maintain the resources under control. When the country surfaced from the civil war, the forestry subsector emerged with loads of problems:

- the knowledge of the state and changes of the forest and tree resources is not sufficient if not totally lacking as no inventory has been done over the last 30 years. Even logging companies did seem to undertake inventory before timber exploitation. There are no records

in this area. The guess about the state of the forestry resources in country in the size of Angola is nonsense. It is difficult to give an acceptable appreciation of how much forest exists and what had happened over the last decades. Even the commissioned study for the evaluation of forest transformation and fragile ecosystems is biased towards area variables;

- the lack of proper information about what, when and where went wrong or went well with the forestry resources over the years impedes taking right measures at the right time and in the right location in order to reach the best results. Experiences showed that in war time, forests are subjected to different level of stress depending on where the forests are located in relation to warring activities. Often some forests undergo profound degradation due to the reigning security. In other areas, forests may be kept untouched due to inaccessibility for insecurity or for physical reasons (distance, mountain, etc.). This is to be proven in Angola;
- The socio-economic dimensions of the forests, such as the uses and consumption of tree products e.g. medicines, fruits, and other products, are almost totally unknown;
- beside the lack of information, the IDF lacks the capacity to generate, manage, update and use the information. The existing capacity is very low. The IDF needs external assistance to provide the proper training to a core team of foresters in the forest inventory related activities;
- the IDF is under-resourced by forestry staff. The existing personnel is comprised of 17 professional foresters, 12 professionals non-foresters, 67 forestry technicians, 44 other technicians non-foresters and 520 forest guards poorly equipped and trained. It is insufficient to carry out their responsibilities adequately. The situation with DNRN that takes care of protected areas is even more serious than with IDF;
- a system for information management does not exist. The information being used over the last 30 years is scattered and inconsistent. Various figures are being used at the same time to describe the same situation e.g. a forest area reported as 53 million hectares is reported in other documents as 23 millions hectares;
- at the start of peace, the refugees have returned or are expected to return to their areas of origin. This will boost the conversion of the forest land into crop fields and will apply new pressure on the forests for their subsistence or for sale. Where refugees have returned to and how they are relating with the forestry resources is something to know to avoid unwanted situations and to take proper corrective actions on time.
- other problems like:
  - harvesting without management plans. Timber and other products exploitation is based on an annual licence system for a given quantity of given species in a given area. This system is easy to implement system but very harmful to the resources. Exploiting under licence system tends to target and apply pressure on few market-demanded species. It was seen that, in other countries in similar conditions, exploitation under licence exhausted species and led to their extinction from some areas. This needs to be verified in Angola. But the foresters confirm that along the cost some known species have ceased to exist;
  - excessive consumption of fuelwood and charcoal in the urban centres – collection of firewood without management plans has led to indiscriminate and total destruction of the forest cover. Even valuable commercial species like *Chlophora excelsa*, *Acacia welwitshii*, *Pterocarpus Angolensis*, *Dalbergia sp.*, *Erythrophleum africanum*, *Uapaca sp.*, *Afezelia cuanzensis*, etc. in the tropical and humid forest and Miombo woodlands were cut as firewood or transformed into charcoal. There is no reliable information on

the extent of damage due to firewood collection and the speed of encroachment in the forest. When the national foresters were asked on how the forest frontier shifted over time around Luanda, the response was given without hesitation: at present the nearest forest in the direction Huige is at about 120 km from Luanda. Thirty years ago, it was much closer to the capital, say 60 to 70 km. The once flossed forest is now bare land with shrubs here and there. It does not produce even firewood. All tree species, commercial or not, have been brushed away from the area for use as fuelwood. The situation is similar all over the cost;

- the type technology used in tree cutting for fuelwood determines the extent of damage to the forest cover in general and to the forest composition in particular. In Angola, where chainsaws are not usually used by firewood collectors for cost reasons, cutting of trees is done with simple means like axes and slashers. With these means, firewood collectors do not cut trees with diameters larger than 30cm. They opt for selective cutting of every tree with small diameter and high energetic value including those which produce high quality timber. The damage to the regeneration of the forests is considerable;
- bushfires and itinerant agriculture are real threat to the forest cover. On these two threats, there is no information that shows how the extent of forest fires and the damage they cause to natural vegetation. The shifting agriculture is also not well known as to how it advances in forests.
- There are also problems in the area of wildlife and protected areas;
  - as far as wildlife is concerned, Angola was reported the richest country in the continent with 275 species of mammals and 900 species of birds. There are reports stating that the wildlife population are overexploited to the point of depletion in some cases and wildlife poaching has reached alarming proportions during the war time and exacerbated after the war (Eduardo Mansur and Rodrigues Nanga, 2004). There is no clear statement on how much damage was caused on the wildlife population;
  - the protected areas alike are under dire conditions. Besides, they are near total abandon, all the protected areas were invaded by the local population who came from the surrounding areas to establish their homesteads.
- The contribution of the forestry subsector in the national economy is very low compared to the 1970s. Timber exploitation dropped drastically. This is due partially to the low fees and royalties. The removal of other benefits in terms of non-timber forest products is not assessed to estimate the real contribution of the forestry subsector. The indirect contributions in terms of services provided are not easy to measure, but considerable i.e. soil and water conservation, water quality, biodiversity conservation, etc. With the stabilization of the political and economic situations, the share of the forestry subsector is expected to improve. It may reach the level of 4 percent of the PIB.

### **Strengths and Opportunities**

Despite the above-mentioned weaknesses and problems, the forestry sector in Angola has a number of strengths and opportunities summarized hereunder:

- the extent of reconstruction in Angola has taken large proportions since the country had turned the page of the civil war. It is of crucial importance to all the sectors and to the

national economy as a whole. If the reconstruction continues at this pace, it will largely improve the wellbeing of the poor segment of the population;

- within the dynamic of the nation rebuilding, the IDF is called to bring solutions to the numerous problems of the sector. Assistance from outside is highly needed, especially in areas where the country lacks the capacity and also as the staffing of the subsector is very low compared to other countries with similar conditions;
- the political will and the commitment to develop the forestry subsector are confirmed by the different actions and initiatives that were taken since the end of the hostilities. These actions and initiatives include formulating new policy for the subsector; updating the forestry legislation; strengthening the forestry administration including planning and carrying out a national forest assessment and developing an information system;
- the sector has at last a new policy of forests, wildlife and protected areas that is due to be adopted by the parliament. The formulation of the policy was conducted along the participatory approach. The stakeholders in the local, regional and national levels have extensively participated in the definition of the scope and orientations of the policy. As it is a consensual policy, it is expected that it will meet general acceptance of and will be supported by all actors in the subsector;
- the IDF is in the process of updating the forestry legislation following the participatory approach. The finalization of the legislation is already well advanced. Together with the policy, it will be the overarching framework for the sustainable forest management in Angola and will draw attention on the importance of the forests in the broader development agenda of the country. It will constitute an efficient tool to guide and coordinate the interventions of the different actors;
- the IDF is undertaking activities which are intended (i) to enhance the understanding of the environmental, economic and social importance of the forests for the sustainable development of the country; (ii) build the analytical capacity in MINADER to enable incorporating the contributions of forests, wildlife, trees outside forests and protected areas to the various development policies and; (iii) ensure proper harmonization of the new policy and legislation with the strategic planning exercises in Angola, e.g. the country's Poverty Reduction Strategy;
- the IDF is actively acting to strengthen its capacity at national and provincial levels to promote sustainable use and conservation of forests and wildlife resources;
- the IDF commissioned a study for the assessment of the state of forests, woodlands and fragile ecosystems in Angola. The study is implemented by Angola Alliance and partnership with the South African firm Project and Strategy Management with the objective to map the forestry vegetation based on the vegetation types developed by Barbosa in 1970 and to identify the areas changed and which require urgent actions as well as the fragile ecosystems. The study will not bridge the huge information gap at this point of time, but an import start towards building baseline information.

### **NATIONAL FOREST ASSESSMENT**

The forestry subsector must be looked at from an integrated and global perspective requiring holistic programmes and strategies addressing the problems in a systematic way but along a carefully reflected priority order depending on the relation these problems have with each other. But the absence of reliable information of the state, extent, location and quality of the resources, their

management uses and users as well as on the relations of the forestry resources with the other economic sectors hampers taking the right decisions.

The need for a national forest assessment (NFA) was felt since the country accessed to Independence in the mid-1970s. It was highlighted in all reports by the consultants who assisted the IDF in different activities relating to the forestry subsector. Recently, during the national debate on the forestry policy, the question of NFA emerged as the highest country priority. From the point of view of the participating stakeholders in the policy discussions, the national forest assessment is a prerequisite to the success of the implementation of the policy and legislation. It is also the tool to develop the necessary knowledge to contribute to the country rebuilding and to the sustainable management of the forestry resources.

In rural development, the forestry subsector can be considered an important alternative for the support to the National Strategy for Food Security (NSFS) and to the socio-economic development of the country in general including employment and supply of goods and services. The NFA should be designed and implemented with the understanding that the forests and trees are elements of the land use systems and should be treated as such.

In order to maximize the benefits, the NFA should be integrated into the national policy processes, in the forestry subsector, but also beyond. A closer linkage with the national forest programme (NFP) is seen as an efficient strategy since both activities are mutually supportive as is the case of the policy and NFA. They are mutually supporting during the planning and implementation but also to improve and sustain the outcomes.

With respect to capacity building, the NFA should focus not only on the traditional technical aspects like inventory design, but also very much on the general role that information plays in decision processes, on policy processes in general and on communication.

The Government is submitting this project proposal to FAO's Technical Cooperation Programme to request the seed funds needed to help IDF create the conditions for NFA and support its implementation as the forestry subsector and the country in general lack the technical capacity for this highly specialized area. Most of the cost of the project is supported by the Government. But FAO assistance is highly needed as there are activities that require external inputs like very specialized forest inventory equipments, technical assistance in methodology development, organization and implementation of NFA, capacity building, the very knowledge demanding mapping work and scientific support and technical guidance. The TCP assistance will therefore lay the foundations for a lasting NFA programme of Angola for the long-term monitoring of the resources. It complements the Government's effort in critical areas of NFA.

The project is in line with the overall policy orientations of the Government. In the medium to long term, it will contribute to sustainable forestry resources management and utilization through improved, efficient and cost-effective forestry activities and to the sustainable development of the country and improved productivity of the rural livelihood, while at the same time to the alleviation of poverty and involvement of women. It will also lead to translating international processes and principles into an innovative national forest inventory approach following the participatory process.

## **PROJECT STRATEGY**

Implementation an NFA project is divided into four main phases:

- a. assessment of information needs, requirements and definition of inventory objectives;

- b. planning of the field survey, including conceptualizing the sampling design, developing data analysis software, preparing field and mapping manuals, assembling of available information, purchasing equipment and capacity building;
- c. data collection through field survey and satellite images interpretation/analysis of digital imagery, gathering of reference material;
- d. processing and analysis of the collected data and publication of findings.

Each of these steps requires knowledge and cooperation of many experts, not only survey statisticians, computer specialists and mensurationists, but also specialists who provided necessary information in their own fields and cooperated in the programme. Figure 2 below provides a flowchart of the strategy to follow to develop and implement an NFA project. Steps 1, 2, 3 and 4 describe the steps that will be finalized in the first four to six months of the project. Step 5 describes the activities that have to be carried out in the period following the planning phase of the project. Steps 6 and 7 describe the activities that will be carried out after having completed the data collection in the field and from the produced thematic maps.

**Figure 1: Flow chart of the activities**

Step	Main tasks	Activities			
Step 1	Alliances building and Analysis of Background Information	Analysis of Information Needs & Requirements	Alliances and Partnerships	Analysis of Means (Infrastructure & Personnel)	Analysis of Existing Information
Step 2	Capacity Building	Definition of Objectives		Training and Institutional Strengthening	Description: Formats, Quality, & Restriction of Data Availability
Step 3	Identify Needs of Information and Develop Approach	Variables, Terms & Definitions, Reference Units and Sampling Frame		National Forest Assessment Unit  General Approach to NFA (Survey Design Alternatives)	
		<ul style="list-style-type: none"> <li>• Sampling design</li> <li>• Plot Configuration</li> <li>• Forest Types/Land use classification</li> <li>• Data collection model</li> <li>• Field forms</li> <li>• Data base/data processing</li> </ul>			
Step 4	Manuals and Guidelines			Satellite Image Interpretation Manual	Field Manual
Step 5	Data collection (Survey and Mapping)			Mapping	Survey
Step 6	Data Processing and Analysis	Processing & Analysis			
Step 7	Publication of Findings	<b>Publication of Results:</b> <ul style="list-style-type: none"> <li>- Maps of landscape sample units</li> <li>- Statistics and analysis</li> <li>- Database</li> <li>- Trained personnel</li> </ul>			

## SCOPE OF THE PROJECT

Over the last three decades, it was repeatedly underscored in Angola that there was no reliable data and information for planning and sustainable management and use of the forest and tree resources. Policy makers recognized the paucity of information and the need to develop adequate knowledge and build the capacity to generate it. For this reason, the Government of the Republic of Angola officially requested the technical support from FAO to formulate a NFA project that will help fill

the huge information gap. Through this project, Angola will be able to produce the most comprehensive and reliable information on the environmental, social and economic functions of the forest and tree outside forest resources and will support properly the processes on decision making for the sustainable forest management and for the socio-economy development of the country. The project will focus on:

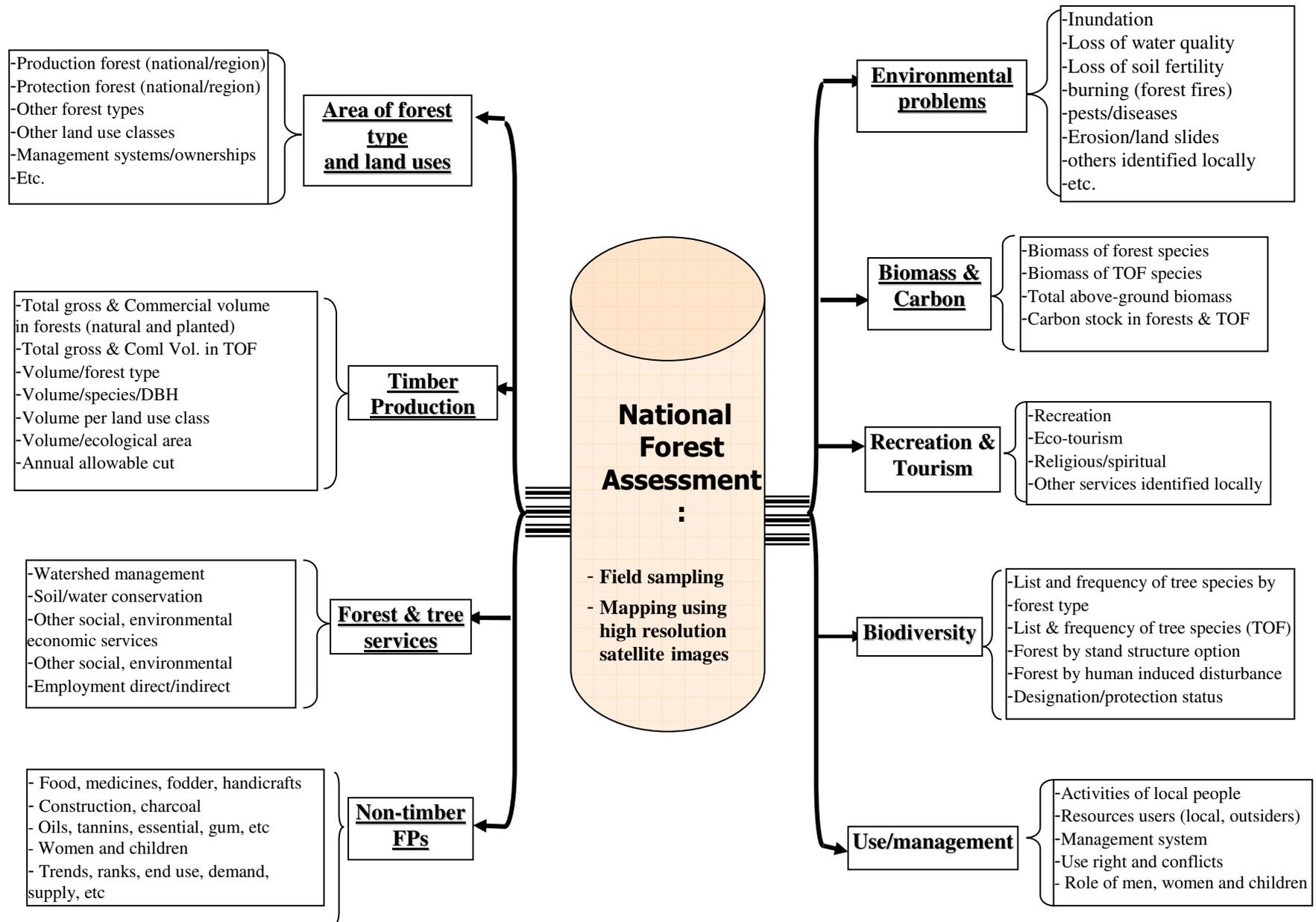
1. Setting up a National Forest Assessment Unit (NFAU) within IDF, properly equipped and staffed. The NFAU should be organically integrated into IDF and institutionalized. It will derive its mission from the demands expressed by both this institution and the users from outside IDF.
2. Strengthening the Capacity of NFAU of IDF in national forest assessments and also having a continued NFA system well into the future while of course maintaining timely flow of quality data and information.
3. Reaching a national consensus about the NFA approach, stable for future assessments of the forestry resources and cost effective. It should enable to critically assess the national information needs by covering wide range of bio-physical and socio-economic variables to meet all national users' needs. The approach will be built on the NFA approach developed by FAO and applied in other countries like Cameroon, Congo, Cameroon, Kenya, Zambia, etc.
4. Harmonization of the information framework including the land use classification system nationally and with the international reporting requirements.
5. Mapping of the forestry resources on the basis of the developed land use classification system.
6. Undertaking a countrywide forest and trees outside forest inventory based on systematic sampling.
7. Developing a national database to store and process the information from the field inventory and mapping.
8. Setting up a long-term monitoring system for the forest and tree resources based on permanent sample network to be materialised during the field forest inventory.

## **II. OBJECTIVES OF THE ASSISTANCE**

The project aims at (i) reaching a mutual consensus among stakeholders about the NFA approach and process in Angola; (ii) strengthening the institutional capacity of IDF at all levels for long-term forestry resources monitoring and assessments; (iii) producing forest/land use maps based on harmonized national information framework, which will generalise the benefits; (iv) planning and undertaking a nationwide survey of the forest and trees resources based on systematic sampling; and (v) defining a long-term monitoring programme of forest resources and updating strategy.

### III. EXPECTED OUTPUTS

<b>Outputs</b>	<b>Indicators</b>
1. Participation of stakeholders, partners and major users of forestry information reinforced	<ul style="list-style-type: none"> <li>- Around 30 representatives of stakeholders e.g. line ministries, research and teaching institutions, NGOs, private sector, communities, etc will be involved.</li> <li>- National seminar.</li> <li>- Seminar report.</li> </ul>
2. National consensus on approach and method to NFA and long-term monitoring of resources established	<ul style="list-style-type: none"> <li>- 40 professionals, scientists representing all stakeholders.</li> <li>- 3 workshops</li> <li>- Reports of NFA methodology, harmonised land use classification and list of forest and tree variables</li> </ul>
3. Set up a National Forest Assessment Unit attached the Planning Department of IDF	<ul style="list-style-type: none"> <li>- NFAU organised, mandated, manned, institutionalised, equipped and operating within IDF.</li> </ul>
4. Capacity of IDF at national and province levels to implement the NFA assessed	<ul style="list-style-type: none"> <li>- Review, analysis and assessment of existing capacity of IDF dealing with knowledge generation, management and information dissemination.</li> </ul>
5. Equipment procured and installed.	<ul style="list-style-type: none"> <li>- Equipment of Annex 1 procured and assigned</li> </ul>
6. National expertise of IDF for NFA reinforced and consolidated.	<ul style="list-style-type: none"> <li>- 50 professionals and technicians will be trained at central and local levels in field data collection, mapping, data processing and database management.</li> </ul>
7. Forest type and land use classification system developed and harmonized.	<ul style="list-style-type: none"> <li>- Forest/land use classification accepted by all stakeholders.</li> <li>- Report describing classification system designed, terms used and forest/land use related definitions harmonized.</li> </ul>
8. Map produced at different scales and for different administrative levels and endorsed by stakeholders, partners and users.	<ul style="list-style-type: none"> <li>- Set of 68 satellite images procured.</li> <li>- 8 professionals and technicians trained in mapping.</li> <li>- Manual for interpretation of satellite images.</li> <li>- Maps of forest and land use at different scales.</li> <li>- Map digitised in GIS.</li> </ul>
9. National information scope and requirements analysed and defined to enable meeting all users' needs.	<ul style="list-style-type: none"> <li>- Around 30 representatives of stakeholders involved in scoping NFA information needs.</li> <li>- National list of biophysical and socio-economic variables in working paper.</li> </ul>
10. Field survey for data collection planned and carried out and a network of permanent sample sites materialised on the ground.	<ul style="list-style-type: none"> <li>- Manual for field forest inventory.</li> <li>- 10 professionals from central and local levels trained.</li> <li>- 30 technicians from local levels trained.</li> <li>- Database.</li> <li>- Network of permanent sample sites materialised on in the field.</li> <li>- Report of NFA results.</li> </ul>
11. Programme for long-term monitoring of the forestry resources and follow-up actions defined in concert with partners and stakeholders and supported by the national authorities.	<ul style="list-style-type: none"> <li>- National strategy of long term monitoring and assessment of forest and tree resources.</li> <li>- Work plan with priority actions for follow up by NFAU defined with representatives of stakeholders.</li> </ul>
12. Policies and strategies of the forestry sector reviewed and priorities redefined.	<ul style="list-style-type: none"> <li>- Diagnosis of the forestry sector and analysis of sectoral policy and strategies.</li> <li>- Priorities of the forestry sector.</li> </ul>



#### **IV. PROJECT ACTIVITIES AND WORK PLAN**

##### **For Output 1: Participation of partners and major users of forestry information reinforced.**

- 1.1 Identify partners and allies to co-sponsor and/or implement part of the project activities and to participate in the project implementation.
- 1.2 Set up an inter-sectoral Steering Committee (SC) to oversee and provide guidance to the project team.
- 1.3 Prepare a work plan for the project integrating most modern concepts of forest and trees outside forest resources inventory.
- 1.4 Convene a national seminar involving partners and stakeholders to inform about the project objectives and expected outputs and collect ideas on best ways to implement it in order to meet the expectations of all concerned parties.

##### **For Output 2: National consensus on approach and method to NFA and long-term monitoring of resources established.**

- 2.1 Make a thorough analysis of any existing sampling design in the country and assess its applicability to NFA project and its compatibility with that used by FAO for national forest assessment in other countries.
- 2.2 Building on the FAO NFA method, prepare a proposal for the sampling design to be followed by the project.
- 2.3 Define an integrated approach for the implementation of the project activities. It must be built on the approach of FAO to NFAs and should cover forest inventory, long-term monitoring, capacity building, mapping, information system development, data processing and information management and dissemination. It should also be cost effective and generate information for national decision-making on forestry issues covering all benefits from all forest types, other wooded lands and other lands.
- 2.4 Prepare a draft document on the approach to NFA based on the contributions by national and international experts.
- 2.5 Define and discuss with partners a suitable system for quality control of the field data.
- 2.6 Assist IDF in harmonizing the forest-related terms and definition taking into account of the globally agreed definitions.
- 2.7 Convene a national workshop involving professionals from the sector and scientists to review and finalize the approach including the sampling design, system of field data quality control and harmonized forest-related terms and definitions.

##### **For Output 3: Set up a National Forest Assessment Unit attached the Planning Department of IDF.**

- 3.1 Set up a National Forest Assessment Unit (NFAU) with defined structure, mandate (updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc.) and the needed personnel in the required skills.
- 3.2 Work with IDF authority to organically institutionalize NFAU within IDF.
- 3.3 Define its programme of action when the project expires and the needed financial resources for its normal functioning.

**For Output 4: Capacity of IDF at national and province levels to implement NFA assessed.**

- 4.1 Assess the national experiences in the area of forest inventory and information management e.g. trained personnel, organization of the IDF for national forest inventory projects, partnerships and alliances for NFA, etc.
- 4.2 Define the required personnel for the office and fieldwork activities of the project.
- 4.3 Define the needs of training and capacity building in mapping, field data collection, processing and analysis, and information management.
- 4.4 Recruit the national and international consultants/experts according to the final work plan and schedule of interventions.

**For Output 5: Equipment specified and procured.**

- 5.1 Define the needs of equipment for the field and office activities of the project including for the database and information system.
- 5.2 Procure needed equipment for field survey and, data entry, storage and processing. This includes procuring a set of recent satellite images for the mapping work of the project.

**For Output 6: National expertise of IDF for NFA reinforced and consolidated**

- 6.1 Plan and carry out training of the national personnel in mapping using remote sensing techniques based on the harmonised land cover and land use classification system.
- 6.2 Plan and carry out in-service training to the national team in field data collection.
- 6.3 Plan and carry out training of the national team in data processing and analysis, information management and dissemination.
- 6.4 Organize a study tour to a team for two professional foresters to a country where similar and successful FAO supported National Forest Assessment project is taking place.

**For Output 7: Forest type and land use classification system developed and harmonized.**

- 7.1 Assist in harmonizing of the classification system of the forestry vegetation and land uses. In developing this, consideration must be taken of the classification systems existing in the country and at the international level such as the one used by FAO for global FRA, etc.
- 7.2 Ensure wide dissemination and review of the harmonized classification system by professionals, scientists and the SC members.
- 7.3 Finalize the national classification system on the basis of comments and inputs received from reviewers.

**For Output 8: Map produced at different scales and for different administrative levels and endorsed by partners and users.**

- 8.1 Prepare a manual for the interpretation of the satellite images and production of the maps.
- 8.2 Support in the design of the national forest/land use map based on the harmonized legend.
- 8.3 Carry out digital interpretation of the satellite images and prepare the final maps.

**For Output 9: National information scope and requirements analysed and defined to enable meeting all users' needs.**

- 9.1 Carry out a thorough review of the scope of the information needed and prepare a list of biophysical and socio-economic variables of the resources and their corresponding codes and definitions. The list should include products and services of forest and trees outside forests.
- 9.2: Convene a national workshop involving representatives from partners and stakeholders to present, discuss and finalise the national list of variables.

**For Output 4.2: Field survey for data collection planned and carried out and a network of permanent sample sites materialised on the ground.**

- 10.1 Prepare a manual to field teams describing the approach and the techniques of data collection and the lay out of the sample plots in the field.

- 10.2 Design the field forms for data collection from measurements, observations and interviews. The field forms should be based on those developed by NFA programme of FAO.
- 10.3 Plan and carry out representative field sampling throughout the country to collect data as defined in the national list of variables.
- 10.4 Set up the monitoring system including registering the permanently established sample sites for periodic data collection on state and changes of the resources.
- 10.5 Assist in encoding and processing of the collected field data, link it to the mapping data and ensure its compatibility with historical data.
- 10.6 Convene a national workshop for professionals from the forestry subsector, scientists and representatives of partners and stakeholders to review and assess the project results. This workshop is combined with the workshops on the programme of long-term monitoring and the one on policy review (activities 11.2 and 12.4)
- 10.7 Define and put in place a system to disseminate information to all users using all possible media.

**For Output 11: Programme for long-term monitoring of the forestry resources and follow up actions defined in concert with partners and stakeholders and supported by the national authorities**

- 11.1 Define a concerted long-term monitoring programme of the forestry resources that foresees stable institutional framework and skills and continuous government financial commitment.
- 11.2 Convene a national workshop involving wide range of professionals to review, discuss and finalize the proposed monitoring programme (activity 10.6).

**For Output 12: Policies and strategies of the forestry sector reviewed and priorities redefined**

- 12.1 Based on the project findings, undertake a SWOT (strengths, weaknesses, opportunities and threats) analysis of the forestry subsector in relation with other economic sectors, the state of the resources and their role in the socio-economic development and food security.
- 12.2 Prepare recommendations to improve policies, strategies, and programmes in connection with the forestry subsector, environment and family sector development in the rural areas.
- 12.3 In view of the project findings, identify the priorities of the forestry subsector for: (i) sustainable management of the resources; (ii) protection of environment; (iii) effective participation of local populations in resources management and conservation; (iv) improved contribution of the forestry subsector in the national economy; etc.
- 12.4 Convene a national workshop for professionals from the forestry sector, scientists and representatives of partners and stakeholders to review and validate the SWOT analysis and the defined priorities of the sector (see Activity 10.6).

**Fieldwork activities**

IDF will use the personnel in the Provinces to carry out data collection in the field and take care of the maintenance of the network of the permanent plots. This work in the field will be assigned to the Provinces where the personnel for data collection will be adequately trained and supervised in their activities of data collection by the international and national experts. 18 field crews will be created. Each will have a senior technician as team leader, one technician assistant and two workers locally recruited. The cost will cover the salaries to be supported entirely by the Government as part of its contribution and the daily subsistence allowance (perdiem).

The travel of the supervision personnel (national and international consultants/experts) requires a budget to be born by the Government.

The fieldwork cost will also include the expenses to cover the operation of the 18 four-wheel-drive vehicles during ten months' field activities and the supporting transport cost for the supervision as well as other incidental costs (see section General Operating Expenses below).

## **Mapping**

Mapping is to be done within the National Forest Assessment Unit created by the project and by its personnel. A national consultant in mapping will be provided to: (i) assist in defining the specifications of the satellite images and help procure them; (ii) participate in defining the harmonized land use classification; (iii) plan and organize satellite image interpretation including its field checking and validation; (iv) supervise the entire image interpretation activities including finalization and production of maps in digital format and hard copy. The cost of the mapping is estimated at US\$102 000 to be shared by the TCP (US\$56 200) and the Government (US\$45 800).

For the purpose of mapping, the project may use the Landsat 7 data of 180 km x 180 km scenes or ASTER of 60 km x 60 km. Preference is for ASTER, but in the beginning of the project, the project team will make the necessary consultations to find out what information is available and at what cost.

The interpretation will be preceded by a field reconnaissance to prepare an interpretation manual and develop an interpretation key using photographs and description of the vegetation and land uses according to the developed classification system in selected sites on the ground. The interpretation is to be followed by an interpretation checking by air following selected transects all over the country.

The Instituto de Geografia e Cartografia (IGC) will participate actively in the project steering committee and will make sure that the mapping component is implemented to benefit best all map users from the forestry and other sectors dealing with the land use systems.

## **Guiding Principles of FAO-supported NFA project**

The NFA project will be implemented based on the following principles:

- **APPROACH:** The project is designed to cover the entire country and make distinction of the major national ecological zones e.g.: tropical moist forest; miombo woodlands (dry forest ecosystems); steppes; semi-deserts and deserts.
- **PROJECT DURATION:** The project will be implemented over a period of 18 months, divided into three phases of six months each. Phase 1 will focus on planning, training, setting up the organization of the project, review and adjustment of the NFA approach, identification of information needs and general other project related preparatory activities including setting up a database and mapping. Phase 2 will include setting up the project organisation in the field and implementation of the field activities for data collection. Phase 3 includes continuing developing database, data processing/analysis and reporting.
- **PROJECT FOCUS:** the project focuses on developing the means and tools that will enable IDF in Angola to finalize the NFA approach. The NFA must produce the knowledge that will help formulate the adequate policies, design focused national forest programmes and ultimately help achieve sustainable management of all types of forest and trees outside forest.

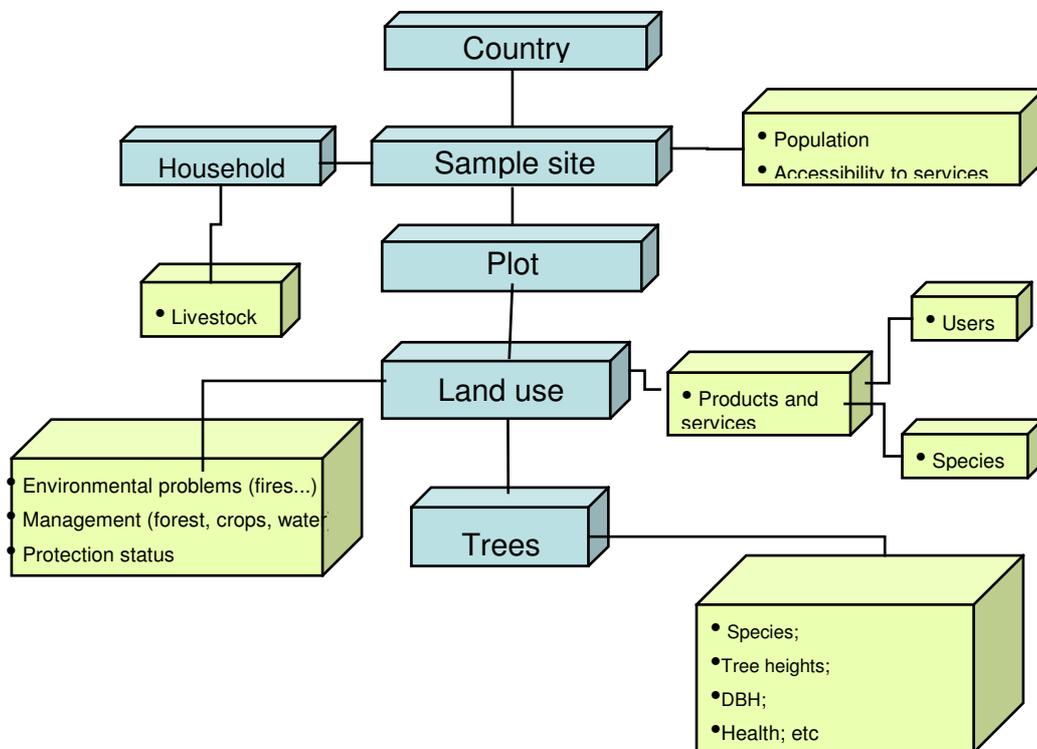
- **NATIONAL EXECUTION:** The project will be implemented by the Directorate of Forests (DF) in IDF. The regional services of IDF in the provinces will participate in the project by providing the personnel for the field data collection.
- **PARTICIPATORY APPROACH:** Stakeholders and partners will be kept involved in the process during the entire period of project to: (i) establish basis for consensus on the approach to resources inventory and monitoring; (ii) help identify the information needs and reporting formats; (iii) harmonize the vegetation classification systems and related terms and definitions. Participation will include all concerned national institutions, NGOs, research institutions and universities. To maximize the benefits, the NFA implementation should take advantage of the experiences gained from the national policy dialogue. The same stakeholders and others will be involved in the project.

### Implementation Method

The systematic sampling will be followed in this project. It is based on the sampling design described in the FAO Approach which itself is based on systematic distribution of the sample sites. A sample site is a cluster of four plots of 5 000 m<sup>2</sup> each. The plots are designed to allow monitoring the dynamic of the land use systems and the changes of woody vegetation cover in the country. It is a one-phase sampling for continuous forest inventory (CFI).

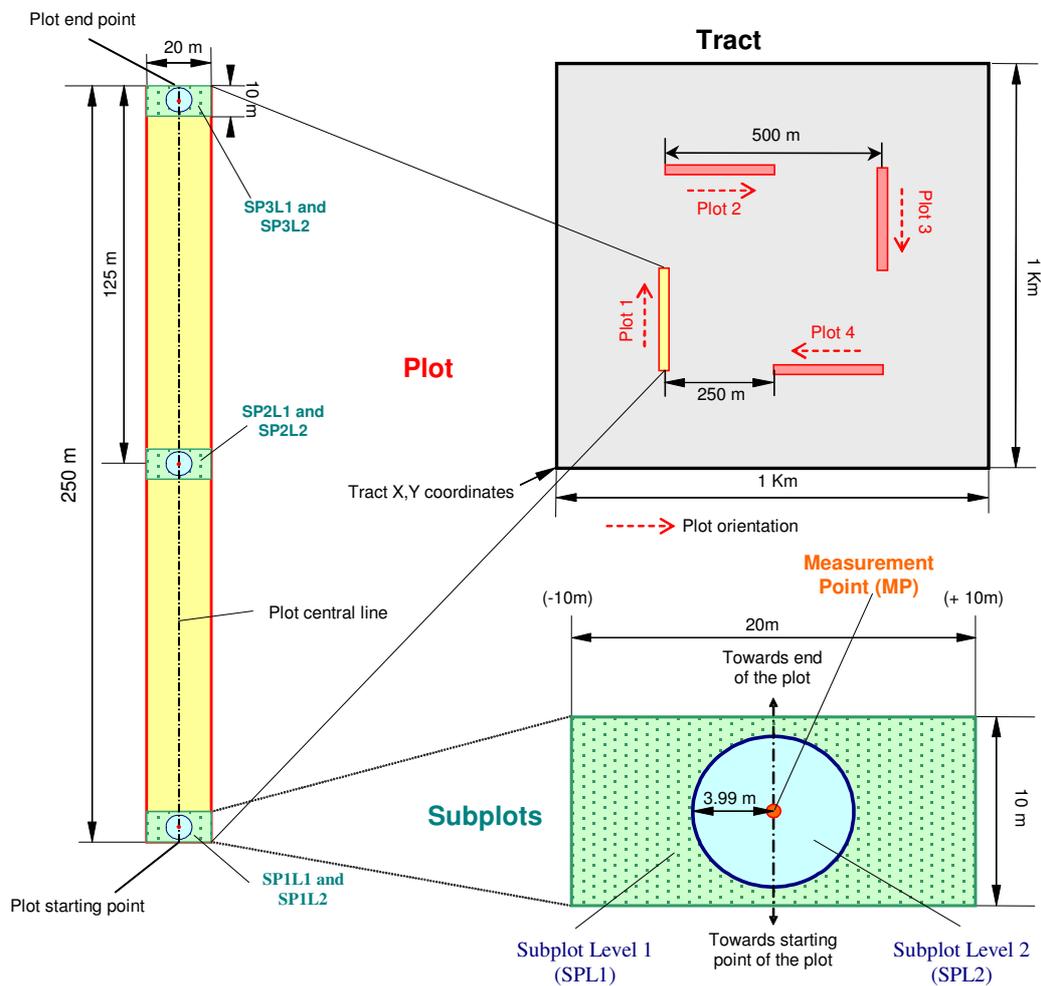
The design is adaptable to different situations from tropical moist forest to tropical dry forest to subtropical vegetation. The data collection follows the following model:

**Figure 2: Data collection model**



In the above model, there are three levels of data collection. The first set of data on local population, their activities and accessibility to products and services is done at tract (1 km<sup>2</sup>) level.

The second dataset is collected within the land use section and tied to it. The third level is on trees which are attached to the land use section where they are found (see Figure 3: Cluster and plot configuration).



## Duration and Implementation Phases

The project will last 18 months, and the lead agency will be the “Instituto de Desenvolvimento Florestal”. It will be implemented in three phases:

### Phase I: Preparation, training and mapping

This phase includes all the preliminary arrangements and preparatory work for the project: training of the national inventory supervisors and field crews members; adjusting and adapting the NFA methodology, development of harmonized classification system and list of variables according to national requirements; acquisition of equipment and satellite images; and recruitment of national and international personnel.

The project is a major capacity building exercise for the IDF. The national team will be familiarized with the techniques and methods of integrated NFA, the forest and land use classification system and identification of forest, tree and land use attributes. The sampling design and data collection model in the FAO approach to national forest assessment will be reviewed and adjusted when

necessary. The list of biophysical and management/use variables thoroughly analysed and finalized to include all parameters of national interest. The environmental, social and economic functions of the forests and trees will be properly addressed by the NFA.

As part of training, two officers from the IDF, associated with the project, will participate in a study tour to a country where a successful national forest assessment is underway. Among these countries, the following may be considered: the Congo, Kenya and Zambia.

The training will be assured through workshops, courses and the indicated study tour to professionals/representatives from the national institutions involved in land use resources management.

The mapping work of the project will be carried out by the technical personnel assigned by IDF to the NFAU. It will be done through field reconnaissance, interpretation and checking by air of the preliminary results of the interpretation. Four technicians will carry out the work over a period of 12 months.

#### Phase II: Field survey and mapping

This phase includes data collection from measurements of forest attributes, observations of forest/site attributes, and interviews with local people/target groups, materialization of the permanent sample plots in their field location, and data entry/storage.

In this project, fieldwork is a crucial activity. The planned outputs will largely depend on it. Permanent sample plots will be established for long-term monitoring of forest and tree resources all over the country and in all land use classes. GPS is a key instrument in locating plots with the help of latitude/longitude coordinates defined in advance. The starting point of each plot will be marked with a metal pole driven in the ground. Reference points around the starting points of the plot will be identified, for which distance to and compass reading from the starting point of the plot will be taken and recorded to facilitate relocating plots in future surveys. Photographs will be taken as support documents for future plot location.

Measurements of forest and tree characteristics will be done in all land use classes (forest and non-forest lands). Observations of vegetation structure, health and spatial arrangements, and human activities will be recorded. The variables will be defined for this purpose in a workshop during the first phase of the project. Interviews of key informants from the local population, NGOs, and entrepreneurs, etc. will be conducted in every sample site to identify major users of the resources (men, women, children and other groups), the products and services provided by forests and trees, the way these are managed and used.

On-the-job training will be continued throughout the project implementation on planning, mapping, survey, database construction, data processing/analysis and information management. The field crews will be trained adequately and supervised to carry out the data collection and be prepared for future surveys and to maintain the established network of permanent sample plots.

For the purpose of estimating the project cost, the following assumptions are made:

- the country is divided in 18 administrative units (provinces). For this project, it proposed to create one field crew (fc) per province. This makes the total of 18 field crews. Each crew

will be composed of one team leader (senior technician), one assistant (technician) and two workers recruited locally;

- each field crew surveys one cluster per week;
- the working period in the field is about 10 months;
- the total men/months of senior technician (team leader): 10 months x 18 fc = 180 m/m;
- The total men/months of technician (assistant): 10 months x 18 fc = 180 m/m
- The total men/months of local workers: 10 months x 18 fc x 2 persons= 360 m/m

The project will produce a forest type/land use map based on that harmonized classification. The work will be carried out in the field for reconnaissance and to design an interpretation key; in the office to interpret the satellite images in computer screen and in the field and by air to check and validate the preliminary interpretation results. The final map will be produced after having corrected all inconsistencies found during the field verification.

### Phase III: Data processing and reporting

The third phase includes the development of the database with maps and field data, training of the national staff in charge of the system, data processing and analysis, reporting of project findings. A national workshop will be organized to review the project findings and recommend on the follow-up actions.

The project will produce considerable amount of data at national level. A functional database will be set up to store, process and manage the collected data.

## **Implementation Arrangements**

### Implementing Agency

The implementing agency will be the IDF in collaboration with its partners, mainly the DNAPF and the DNRN. It will designate a National Project Coordinator (NPF) who will be fully dedicated to the project, have the overall responsibility for planning, management, coordination and supervision of the project activities. The IDF will also have the responsibility for setting up the NFAU and strengthening it with means and tools to execute its mission, particularly, under this project, planning of the activities; training of the national personnel including the field teams and oversight of project activities.

For the purpose of sustainability of the findings, the project will be hosted by the IDF and attached to the two structures namely IDF the Forestry Department (DF) for field and mapping activities and to the Department of Studies and Planning (DSP) where the project database will be located and information is management for project reporting and long-term monitoring. The IDF through the DF will lead the planning and implementation of the project activities and coordinate the interventions of the national stakeholders and partners when required. It will work to make available all the needed personnel and the adequate office space and field equipment necessary to implement the project and guarantee the sustainability of results for the long-term monitoring of the resources.

Under this project and with the help of international assistance from FAO, IDF will work to develop the approach for NFA and monitoring. IDF will work to set up a lasting programme of resources monitoring and information management on the basis of the nationally accepted cost-

effective approach and using the developed capacity. The IDF will ensure that the trained core personnel of the NFAU will remain under the programme and will continue to receive the necessary technical and financial support from the Government.

#### Project Steering Committee

A project Steering Committee (SC) will be formed to oversee the project implementation and administration. The IDF will set up such SC composed of professionals whose responsibility will be to monitor the implementation of the project and facilitate inputs to it in all phases and ensure wider dissemination of the results. The SC will be composed of representatives from the IDF, DNAPF, Instituto de Desenvolvimento Rural (IDR), MINUA, Instituto de Geografia e Cartografia de Angola (IGCA), Instituto Nacional de Ordenamento do Território (INOT), DNRN, Ministry of Finance, funding agencies and the FAO Representative. Under the co-chairmanship of Head of the IDF and the FAO Representative, the SC will meet periodically every three months and more frequently if needed to review the progress of the project, assess the achievements against the planned activities, analyse the work plan for the next periods and recommend actions to take in case of constraints. The meetings of the SC will be called by the Head of the IDF. The meetings will be held at the offices of FAO. The Project Steering Committee may not amend the development or immediate objectives.

#### National Project Coordinator

A full-time NPC will be selected and nominated to manage the project, including the project office. The IDF will nominate qualified and experienced person for the position. Selection of the NPC will be made following consultation with FAO. The NPC will be responsible for undertaking all project planning, directing and supervising its implementation, ensuring cooperation among the personnel and involvement of wide range of stakeholders. He is the responsible person for reporting the progress of work to the Project Steering Committee, seeking appropriate assistance when required and promoting liaison and cooperation with other projects.

### **V. INPUTS TO BE PROVIDED BY FAO**

The FAO Representative in Angola will be operationally responsible of the project and the Forest Resources Development Service (FOMR) will, through the Programme of Support to National Forest Resources Assessment (NFA), be responsible for coordinating the technical inputs, with other technical units as required, e.g. the Forest Conservation Service (FORC), the Forest Policy and Institutions Service (FONP) and the Forestry Department Group of the Regional Office for Africa (RAFO). The project will be anchored within the Instituto de Desenvolvimento Florestal. The national counterpart in Angola will be the Instituto de Desenvolvimento Florestal of the Ministry of Agriculture and Rural development.

**Personnel Services**<sup>2</sup>

<b>Activities supported</b>		<b>months</b>
Training and Supervision	TCDC-1 Forest Assessment (2 missions)	7
<b>TCDC Consultants</b>		<b>7</b>
Forest Inventory	NC-1 Forest Inventory	10
Mapping	NC-2 Remote Sensing (Forestry)	8
Data Processing	NC-4 Biometrician and Data Processing (WAE)	3
Policy Analysis	NC-5 Policy Analyst	1
<b>National Consultants</b>		<b>22</b>
<b>Technical Support</b>	(FORM) 4 missions	<b>2</b>

**Materials, Supplies and Equipment (see Annex 1)**

This budget will cover the procurement of specialized forest assessment and basic equipment, satellite imagery, office equipment and supplies to set up the NFAU and create a national functional database on forests and trees within IDF where all the inventory data will be stored and processed.

**Training**

This budget provision is made for in-country training, workshops, meetings and a study tour:

- national seminar for representatives of partners and stakeholders to inform about the project and exchange ideas on the best ways to implement it in order to meet the expectations of all concerned. At least 40 participants from the forestry and other sectors will participate;
- workshop involving the personnel from IDF, other professionals and scientists from the sector to review and improve the NFA approach including the sampling design, system of field data quality control and harmonized land use classification system and related terms and definitions. At least 40 Scientists and professionals from the forestry and other sectors will participate;
- workshop on needs of information on the forests and trees and the required set of biophysical and management/use variables to be covered by the NFA with options of each variable and definitions. At least 40 scientists and professionals from the forestry and other sectors will participate;
- workshop on project findings, long-term strategy for resources monitoring and policy review. At least 40 Scientists and professionals from the forestry and other economic sector will participate;
- two courses of one week each to provide theoretical and practical training in forest assessment to the national team from the IDF;
- one-week introductory course to the field crew members focussing on the classification system, terms and definitions used, sampling design and field forms. This training will be assured by the national assessment team from of IDF already trained on the subject with assistance from the international and national consultants;

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<sup>2</sup> Terms of Reference in Annex 3.

- two-week practical training course to the field crew members in forest assessment. This training will be assured by the national assessment team from IDF already trained on the subject with assistance from the international and national consultants;
- one study tour to two professionals.

The objectives of this work are: (i) to train the national personnel in national forest inventory, data collection with emphasis on understanding the classification system, reporting on land use classes and their biophysical and socio-economic attributes, etc; (ii) to collect data as defined by the users of information at the onset of the project; and (iii) to set up a monitoring system of the forests and trees across the country. The activity will train personnel in cluster and plot localization on the ground and lay out, data collection and provide field data on the biophysical and socio-economic properties of the forests and trees collected from a network of sample plots all over the country. These field data will constitute the major information component of the national database on forests.

### **Contract**

A contract will be made in order to facilitate assessment/countercheck by air (transect) of the forest mapping.

### **Travel**

This budget will cover in country travel, TCDC and TSS DSA and travels, in-field verification (non- staff travel) for mapping activities and study tours travels costs (US\$4 000).

### **General and Direct Operating Expenses**

This budget will cover project related expenses (monitoring follow-up, etc.) in the field and at FAO headquarters.

## **VI. REPORTING**

The National Project Coordinator will provide FAO and the relevant technical services through the FAO Representative in Angola a Quarterly Project Implementation Report summarizing the activities performed, the progress made and outcomes of the project and a revised work plan for the next period as appropriate.

Each consultant (international and national) will present at the end of each mission a technical report containing the main results, conclusions and recommendations of his/her missions.

The NPC, under the supervision of IDF, will also prepare the draft terminal statement of the project according to the TCP procedures. After finalization by the responsible Lead Technical Unit at FAO headquarters (FOMR), the terminal statement will be submitted to the Government of the Republic of Angola.

The terminal report will include a technical synthesis of the various consultants reports and summarize the main results and conclusions of the project. In addition, it will contain FAO's

recommendations to the Government and set indicators for a follow-up impact assessment one year after the project's NTE.

The FAO Lead Technical Unit (FOMR), in coordination with RAFO will be responsible for ensuring that the technical reports of consultants are submitted in a timely manner, are technically sound and will distribute them to other FAO units participating in the project. At the end of every mission, the FAO officers providing supervisory and advisory technical services will prepare a technical report with results, conclusions and recommendations and conduct briefings with other FAO staff as necessary.

## **VII. GOVERNMENT CONTRIBUTION AND SUPPORTING ARRANGEMENTS**

The Instituto de Desenvolvimento Florestal will provide all physical facilities (offices for staff and for the forest inventory database, training space, local transportation for the experts/consultants, communication means, etc.) and the needed national counterpart staff at secretariat and professional levels. The IDF will provide to the project the national personnel for data collection on the field, data entry and processing and will identify, when needed, the partners that will provide support personnel for the field activities.

The Government will contribute an estimated US\$710 000 to the project to cover about 46 percent of the cost of the equipment and supplies, meetings of the SC, near 45 percent of the cost of the mapping work, the salary of the National Project Coordinator (NPC), 100 percent of the in-country travel costs and salary of the field staff, 97 percent of the GOE and the staff for the database.

The IDF will have the overall coordinating role of the project, including the training of the national personnel, the design and planning of the project. IDF will act to set up and institutionalize the NFAU and build its capacity for future updating of the NFA and information management.

IDF will appoint a National Project Coordinator and will also arrange for a quick clearance of experts, custom clearance of equipment, tax-free local purchase of project equipment and supplies. The NPC shall:

- i) coordinate interventions of the national institutions and individuals involved in the project;
- ii) plan and facilitate the training of field crew members;
- iii) oversee the fieldwork activities and secure timely deployment of logistical support to the field crews;
- iv) participate in the design and development of the forest database, processing the field data, analysing the findings and reporting of project findings;
- v) ensure smooth implementation of the project activities;
- vi) report to the SC on the progress of the project activities and relay the recommendations of the SC to the project team ; and
- vii) plan the meetings of the SC and serve as its Secretariat.

Under the supervision of the Director of IDF, the NPC will oversee the work of the international experts and national consultants, follow their progress and performance to ensure timely implementation of the mapping and fieldwork, making use of the services provided by the partners for field data collection.

**PROJECT BUDGET**  
(in US\$)

FAO contribution is estimated as per table below while Government contribution is presented in Annex 2.

<b>Comp.</b>	<b>Component Description</b>	<b>Sub Comps.</b>	<b>Main Comp.</b>
<b>5013</b>	<b>Consultants</b>		<b>74 030</b>
5543	Consultants - National	44 000	
5544	Consultants - TCDC/TCCT	30 030	
<b>5014</b>	<b>Contracts</b>		<b>15 000</b>
5650	Contracts Budget	15 000	
<b>5021</b>	<b>Travel</b>		<b>92 750</b>
5686	Consultants - TCDC/TCCT	61 230	
5694	Travel - Training	4 000	
5692	Travel TSS	22 520	
5698	Travel - Non staff (e.g. counterparts)	5 000	
<b>5023</b>	<b>Training</b>		<b>61 000</b>
5920	Training Budget	61 000	
<b>5024</b>	<b>Expendable Equipment</b>		<b>38 000</b>
6000	Expendable Equipment	38 000	
<b>5025</b>	<b>Non Expendable Equipment</b>		<b>46 000</b>
6100	Non Expendable Equipment Budget	46 000	
<b>5027</b>	<b>Technical Support Services</b>		<b>26 789</b>
6111	Report Costs	1 950	
6120	Honorarium TSS	24 839	
<b>5028</b>	<b>General Operating Expenses</b>		<b>14 655</b>
6300	General Operating Expenses Budget	14 655	
<b>5029</b>	<b>Support Cost</b>		<b>25 776</b>
6118	Direct Operating Costs	25 776	
	<b>Grand Total</b>		<b>394 000</b>

**LIST OF EQUIPMENT**

<b>Items</b>	<b>Units</b>	<b>Quantity</b>
<b>1. Equipment and Supplies</b>		<b>US\$46 000</b>
* Desktop computer	Unit	4
* Workstation: (Hard disk with big storage capacity(above 150 GB), extra hard disk for back-up with equal capacity, 21" large monitor and CD and DVD writer	Unit	1
* Printer	Unit	1
* Satellite image interpretation, GIS and Database software	Lump sum	1
* Colour Plotter A0 format	Unit	1
* Various supplies and consumables	Lump sum	
<b>2. Forest Inventory Equipment</b>		<b>US\$10 000</b>
* Dendrometers Blume leiss	Unit	19
* Callipers	Unit	19
* Measuring tapes 60 m	Unit	19
* Measuring tapes 10 m	Unit	19
* Compasses	Unit	19
* Pack-bag	Unit	19
* GPS Garmin ETREX (Vista)	Unit	19
* Cameras	Unit	19
* Flagging tags (rolls)	Rolls	100
* Uniforms	Unit	48
* Boots	Unit	24
* Galvanised iron poles	Unit	100
* Phone cells and pre-paid cards	Unit	19
* Binoculars	Unit	19
* Slashers	Unit	20
* Sets of hard copies of topographic maps 1:250 000	set	20
* Sets of digital topographic maps 1:250 000	set	1
* Field manuals, forms and stationary, etc.	set	6
* Camping equipments (tents, cooking, repellents, illumination, etc)	Set	6
<b>3. Satellite imagery</b>		<b>US\$28 000</b>

**PROJECT BUDGET – GOVERNMENT CONTRIBUTION****Project Budget - Angola**

Items	Units	Quantity	Unit cost(US\$)	Government Contribution (US\$)			
				Total	2008	2009	2010
<b>1. Equipment and Supplies</b>							
* Inventory Equipment	LS						
* Camping Equipment	LS			10,000	10,000		
* Computer equipment	LS			15,000	15,000		
* Consumable	LS			5,000	2,000	2,000	1,000
<b>Sub-Total Equipment and supplies</b>				<b>30,000</b>	<b>27,000</b>	<b>2,000</b>	<b>1,000</b>
<b>2. Training of local Staff</b>							
<b>2.1. In-country Training</b>							
* Training courses to NFA	Unit	4	8,000	16,000	16,000		
<b>Sub-Total Training of local Staff</b>				<b>16,000</b>	<b>16,000</b>		
<b>3. Seminars, Workshops and Meetings</b>							
3.1 Seminars	Unit	1	2,000				
3.2 Workshops	Unit	3	4,000	3,000	2,000		1,000
3.3 Meetings	Unit	9	1,000	4,500	4,500		
3.4 Study tour	Unit	2	4,000				
<b>Total Seminars, Workshops and Meetings</b>				<b>7,500</b>	<b>6,500</b>	<b>0</b>	<b>1,000</b>
<b>5. Mapping</b>							
* Procurement of satellites images	Unit	68	400				
* Field reconnaissance prior to interpretation	LS			5,000	5,000		
* Equipment and supplies	LS			4,000	4,000		
* Interpretation satellite images (4 technicians x 12 months)	MM	48	600	28,800	4,800	24,000	
* air checking of interpretation (30 hours)	Hours	30	500				
* Map production	LS						
<b>Sub-Total mapping</b>				<b>37,800</b>	<b>13,800</b>	<b>24,000</b>	
<b>6. Technical Assistance</b>							
* TCDC Expert	W/M	8	8,000				
* Travel TCDC (air tickets)	Unit	3	4,000				
* FAO Backstopping missions	Mission	4	7,000				
<b>Sub-Total Technical Assistance</b>							
<b>7. Local Consultants</b>							
* National Project Coordinator	W/M	18	2,500	45,000	15,000	30,000	
* NFI Consultant	W/M	10	2,000				
* Remote Sensing Consultant	W/M	10	2,000				
* Data processing Consultant (Biometrician)	W/M	5	2,000				
* Policy Analyst	W/M	2	2,000				
<b>Sub-Total Local Consultants</b>				<b>45,000</b>	<b>15,000</b>	<b>30,000</b>	<b>0</b>
<b>8. Travel Cost</b>							
* In-country	LS			60,000	10,000	40,000	10,000
<b>Sub-Total Travel Cost</b>				<b>60,000</b>	<b>10,000</b>	<b>40,000</b>	<b>10,000</b>
<b>9. Fieldwork Costs</b>							
<b>* Salaries</b>							
- Senior technicians	W/M	180	600	108,000	10,800	97,200	
- Technicians	W/M	180	500	90,000	9,000	81,000	
- Field workers (2 per team x 10 months x 10 teams)	W/M	360	100	36,000	3,600	32,400	
<b>Sub-Total Fieldwork Cost</b>				<b>234,000</b>	<b>23,400</b>	<b>210,600</b>	
<b>10. Perdiem</b>							
- Senior technicians	W/D	4320	20	57,600	5,760	51,840	
- Technicians	W/D	4320	15	43,200	4,320	38,880	
- Field workers (2 per team x 10 months x 10 teams)	W/D	8640		0	0	0	
<b>Sub-Total Contracts</b>				<b>100,800</b>	<b>10,080</b>	<b>90,720</b>	
<b>10. General Operating Expenses</b>							
- Operation Cost of transport means (18 vehicles x 10	Units	180	800	144,000	14,400	129,600	
- Other project related General Operating Cost	LS			25,000	2,500	17,500	5,000
<b>Sub-Total Transport</b>				<b>169,000</b>	<b>16,900</b>	<b>147,100</b>	<b>5,000</b>
<b>12. Direct Operating Cost</b>	LS			<b>10,000</b>	<b>2,000</b>	<b>6,000</b>	<b>2,000</b>
<b>13. Reporting</b>	LS						
<b>TOTAL Project</b>				<b>710,100</b>	<b>140,680</b>	<b>550,420</b>	<b>19,000</b>



## TERMS OF REFERENCE

### **Forest Assessment Consultant (TCDC-1)**

Under the direct supervision of the FAO Representative in Angola as budget holder and guidance provided by the Lead Technical Officer (LTO) at FAO headquarters, the TCDC (Technical Cooperation between Countries in Development) consultant will provide the technical assistance and support to the Instituto de Desenvolvimento Florestal (IDF) within the Ministério de Agricultura e Desenvolvimento Rural (MINADER) in the areas of planning of NFA, capacity building, institutional strengthening and lands use mapping. The main tasks of the consultant will be to:

- work with the national team from IDF and related National Forest Assessment (NFA) institutions to set up the national forest assessment unit for which the mandate, organization and needs and requirements will be defined. The mandate of the National Forest Assessment Unit (NFAU) includes wide range of tasks e.g. updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms, and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc;
- work with the national team from IDF and related NFA institutions to contribute in the review and adjustment of the inventory methodology, land use classification, and definition of the biophysical and socio-economic variables;
- work closely with mapping national consultant in supervising interpretation of satellite imagery using the harmonized land use classification and the production of the maps;
- prepare, in collaboration with the national consultants and backstopping experts from FAO, a training programme for the national personnel involved in the project and assist IDF in implementing it;
- participate in implementing the training programme to the national team in the NFAU;
- participate in implementing the training programme to the field crews, mapping and database personnel through the planned workshops and courses;
- assist IDF in purchasing, installing and using the equipment and supplies planned for the project;
- in close collaboration with the national consultants, prepare a plan of the project activities and identify timely inputs from the project and the Government;
- provide supervision to the field crews during the survey and provide technical guidance as to homogenize data collection and best interpretation of variables and definitions through frequent visits to all crews during the assignment of the expert;
- work closely with the national inventory national consultant and the backstopping expert from FAO headquarters to develop and set up the project database;
- assist in encoding, validating and storing the field data; prepare functions for data processing and initiate data processing together with the Biometrician;
- assist in data analysis, reporting of findings and elaboration of the project terminal statement.

Duration: seven months.

Duty Station: Luanda, Angola with frequent field trips.

Qualifications: The consultant should have a strong background in remote sensing, forest inventory design and planning. The consultant must be competent in forest information system development and information management and have confirmed experience in capacity building and project implementation.

Languages: French and/or English. Portuguese preferred.

## **TERMS OF REFERENCE**

### **National Forest Assessment/Inventory Consultant (NC-1)**

Under the direct supervision of the FAO Representative in Angola as budget holder and guidance provided by the Lead Technical Officer (LTO) at FAO headquarters, the NC-1 will provide the technical assistance and support to the Instituto de Desenvolvimento Florestal (IDF) within the Ministério de Agricultura e Desenvolvimento Rural (MINADER) in the areas of planning of National Forest Assessment (NFA), capacity building, institutional strengthening. The main tasks of the consultant will be to:

- prepare an inception report and submit it to IDF and FAO for comments;
- work with the national team from IDF and TCDC (Technical Cooperation between Developing Countries) to set up the national forest assessment unit for which the mandate, organization and needs and requirements will be defined. The mandate of the National Forest Assessment Unit (NFAU) includes wide range of tasks e.g. updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms, and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc.;
- work closely with the NPC and the TCDC expert to prepare a work plan for implementation of the project activities following the participatory approach where professionals, scientists, and stakeholders from the different sectors involved must be represented;
- work closely with the national personnel and international consultants and provide inputs for the elaboration of the training programme to be given to the national staff involved in the project and assist IDF in implementing it;
- participate in implementing the training programme to the field crews and database personnel through the planned workshops and courses;
- assist IDF in planning and servicing the workshops throughout the project and securing wide participation of stakeholders from different sectors;
- work with the professionals from the different sectors and scientists, and in close collaboration with the TCDC consultant, to reach a consensus on the NFA approach and long term monitoring;
- assist in coordinating the efforts of IDF to define the information needs and harmonize the land use classification;
- assist IDF in purchasing, installing and using the equipment and supplies foreseen for the project;
- in close collaboration with the international consultant/experts, prepare a plan of the project activities and identify timely inputs from the project and the Government;
- organize the fieldwork including composition of the field crews, their assignment to their sampling areas with the transport, field equipment, field forms, etc, and provide the necessary logistical support;
- provide supervision to the field crews during the ten-month survey and provide technical guidance as to homogenize data collection and best interpretation of variables and definitions. All teams should be closely followed during the start of the fieldwork;
- assist in organizing and filing field crew outputs;

- in close collaboration with the TCDC consultant, assist in developing the national forest database, entering/storing the field data, preparing functions for data processing and be part of the data processing together with the biometrician;
- assist in data analysis and reporting of findings;
- participate in preparing the project progress reports, the final report and the terminal statement.

Duration: ten months.

Duty Station: Luanda, Angola with frequent travels inside the country.

Qualification: The Consultant should have at least M.Sc. Natural Resources Management or equivalent with more than ten years' working experience and a background in forest resources assessment design, planning and competence in information system management and have experience in capacity building and project implementation.

Languages: French and/or English and Portuguese required.

## **TERMS OF REFERENCE**

### **National Remote Sensing and Mapping Consultant (NC-2)**

Under the direct supervision of the FAO Representative in Angola as budget holder and guidance provided by the Lead Technical Unit i.e. the Forest Resources Development Service (FOMR), the NC-1 will provide the technical assistance and support to the Instituto de Desenvolvimento Florestal (IDF) within the Ministério de Agricultura e Desenvolvimento Rural (MINADER) in the areas of planning of National Forest Assessment (NFA), capacity building and institutional strengthening. The main tasks of the consultant will be to:

- prepare an inception report and submit it to NFA and FAO for comments;
- examine the existing thematic maps on forestry, and other land uses and assess their quality in terms of thematic details, dates of production, methods of production, and precision;
- work with IDF personnel to harmonize the land use classification with the internationally known classifications, terms and definitions for the land use mapping based on new set of Landsat images;
- define the specifications of the land use maps to be produced and define the mapping method;
- provide training to the national team in charge of mapping;
- oversee the interpretation of satellite images in the office and its checking in the field;
- validate the interpretation results, produce the final maps based on the harmonized legend and generate the statistical results on areas of the different map units;
- in close collaboration with FAO expert, the national forest assessment consultant, and the TCDC (Technical Cooperation between Developing Countries) consultant, prepare a mapping storage system;
- work with the national team from IDF and TCDC to set up the national forest assessment unit for which the mandate, organization and needs and requirements will be defined. The Mandate of the National Forest Assessment Unit (NFAU) includes a wide range of tasks e.g. updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc;
- prepare and submit the final consultancy report describing the planned activities, the method followed for the land use mapping, the training programme and the beneficiaries and the results of the mapping work.

Duration: eight months.

Duty Station: Luanda, Angola with frequent travel inside the country.

Qualifications: The consultant should have at least M.Sc. in forest mapping using remote sensing techniques. The consultant should have at least 10 years' experience in mapping-related activities. He should be conversant with the knowledge of forest inventory, GIS, mapping and remote sensing.

Language: French and/or English and Portuguese required.

## **TERMS OF REFERENCE**

### **National Biometrician and data processing Consultant (NC-3)**

Under the direct supervision of the FAO Representative in Angola as budget holder and guidance provided by the Lead Technical Unit i.e. the Forest Resources Development Service (FOMR), the NC-1 will provide the technical assistance and support to the Instituto de Desenvolvimento Florestal (IDF) within the Ministério de Agricultura e Desenvolvimento Rural (MINADER) in the areas of planning of National Forest Assessment (NFA), capacity building and institutional strengthening. The main tasks of the consultant will be to:

- prepare an inception report and submit to IDF and FAO for comments;
- review with the TCDC (Technical Cooperation between Developing Countries) and FAO backstopping experts the database structure and provide inputs to adapt it to the data collection model;
- work closely with the inventory consultant to review the existing volume tables and other functions for computations in the database;
- assist in encoding and validating the field data;
- provide training to the national team in data processing and analysis;
- assist the national personnel in field data processing and analysis;
- work with the national team from IDF and TCDC to set up the national forest assessment unit for which the mandate, organization and needs and requirements will be defined. The mandate of the NFAU includes a wide range of tasks e.g. updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms, and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc;
- prepare and submit final consultancy report

Duration: three months

Duty station: Luanda, Angola.

Qualifications: The consultant should have at least an M.Sc. degree in biometrics with minimum ten years' experience in forest inventory data processing and analysis.

Languages: French and/or English and Portuguese required.

## TERMS OF REFERENCE

### **Policy Analyst Consultant (NC-4)**

Under the direct supervision of the FAO Representative in Angola as budget holder and guidance provided by the Lead Technical Unit i.e. the Forest Resources Development Service (FOMR), the NC-1 will provide the technical assistance and support to the Instituto de Desenvolvimento Florestal (IDF) within the Ministério de Agricultura e Desenvolvimento Rural (MINADER) in the areas of policy analysis, capacity building and institutional strengthening. The main tasks of the consultant will be to:

- undertake review of policies dealing with forestry and environment (wildlife, protected areas, etc) sectors;
- carry out analysis of the natural resources sectors in terms of strengths, weaknesses, opportunities and threats. Said analysis to be carried out based on the project findings, and existing literature;
- prepare recommendations to improve the policy of the forestry subsector and to engage inter-sectoral dialogue among national institutions to harmonize the policy framework;
- in close collaboration with the National Project Coordinator (NPC), the FOMR expert, the NC-1, and TCDC (Technical Cooperation between Developing Countries) consultant, convene a two-day workshop to present and discuss results of the review of the different land use management policies, the forestry policy analysis and the recommendations for harmonization among the economic sectors. The workshop to be co-organized to discuss the project findings in general;
- prepare a report of the workshop that should define areas of harmonization between policies, and follow-up actions to consolidate the national dialogue on policy harmonization;
- work with the national team from IDF and TCDC to set up the national forest assessment unit for which the mandate, organization and needs and requirements will be defined. The Mandate of the NFAU includes a wide range of tasks e.g. updating information, initiating NFAs, disseminating information to users, training national staff, defining inventory norms, and methods, helping in defining government policy in information generation, resources monitoring, knowledge management, etc;
- prepare and submit final consultancy report.

Duration: one month.

Duty station: Luanda, Angola.

Qualifications: The consultant should have at least a M.Sc. degree in policy and planning with minimum 10 years' experience in activities related to policy and planning.

Language: French and/or English and Portuguese required.

## **TERMS OF REFERENCE**

### **FAO BACKSTOPPING**

#### **Four missions for a total of 8 weeks from the Forest Resources Development Service (FOMR)**

Under the supervision and technical direction of the Forest Resources Development Service (FOMR) and in collaboration with the national authorities, the backstopping officers from FOMR will undertake periodic missions to provide support to the project as foreseen in the work plan. The backstopping officers will also provide technical assistance and guidance on aspects of:

- National Forest Assessment methodology adaptation including sampling design, classification system harmonisation and variables;
- land use mapping;
- training of the national personnel in the areas of forest and trees inventory and information management where required;
- field survey for data collection on forest and tree resources;
- data processing, database development and reporting;
- supervise and interact with national and international consultants on the training courses;
- contribute for the finalization of the NFRA approach based on the findings of the project;
- overall technical supervision of project implementation and delivery at the national level;
- technical editing and clearance of project reports including the terminal statement.

Duration: four missions for a total of eight weeks.