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CRITERIA & INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT IN NAMIBIA

PROPOSAL FOR TESTING PROCESS

2nd DRAFT

Should there be an annexe where all definitions are included?
Should the table included in the DoF review consultancy (on page 4) included here in chapter 4.2 (Links upwards and downwards; National level)
Did you take into account the data generated through the national resource accounts (DEA/John Barnes, Resource Economics Unit)?

Windhoek
September 22, 2004

CONTENTS

Annexes

ABBREVIATIONS

LIST OF ACRONYMS

C&I	Criteria and Indicators
CBD	Convention on Biological Diversity
CBFM	Community-Based Forest Management
CCD	Convention to Combat Desertification
CITES	Convention on International Trade in Endangered Species
DEA	Directorate of Environmental Affairs
DoF	Directorate of Forestry
DoSS	Directorate of Scientific Services
DRFN	Desert Research Foundation of Namibia
EMIN	Environmental Monitoring and Indicators Network
FAO	Food and Agricultural Organisation
FVM	Forest Vegetation Mapping
GDP	Gross Domestic Product
GNP	Gross National Product
IRDNC	Integrated Rural Development and Nature Conservation
IUCN	The World Conservation Union
MAWRD	Ministry of Agriculture water and Rural Development
MET	Ministry of Environment and Tourism
MIS	Management Information System
MoL	Ministry of Labour
MTI	Ministry of Trade and Industry
NDP	National Development Plan
NFI	National Forest Inventory
NFFP	Namibia Finland Forestry Programme
NGO	Non-Governmental Organisation
NPC	National Planning Commission
NRSC	National Remote Sensing Centre
NTFP	Non-Timber Forest Product
PEMP	Performance and Effectiveness Measures Programme
PSP	Permanent Sample Plot(s)
SADC	Southern Africa Development Community
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. INTRODUCTION

The Directorate of Forestry, with the assistance of the Namibia-Finland Forestry Programme (NFFP) initiated a consultative process to develop national C&I for sustainable forest management in Namibia in October 1999. The Criteria and Indicators for sustainable forest management for SADC countries developed under Dry-Zone Africa Process by UNEP/FAO were used as a framework for the Namibian process. In the first workshop held in October 1999, the original C&I were further developed and aligned to meet the Namibian conditions. Three national groups working on: (a) forest resources management issues, (b) environmental issues and (c) socio-economic issues, comprising all main stakeholders were established to prepare a draft set of C&I for Namibia. ~~which~~ This was presented in the 2nd Workshop of February 2000. Another series of workshops was arranged in 2002, where the C&I were modified further. The final draft of C&I was presented in November 2002. The next step of the process took place in 2004, when DoF decided to test the feasibility of using the proposed C&I for sector monitoring. This document is a report on the first stage of that process.

2. SCOPE OF ASSIGNMENT

The scope of the assignment was to, (i) review and update the draft C&I for both the "hard" indicators[1] as well as descriptive indicators[2], (ii) propose institutional arrangements for implementing the C&I, and (iii) develop a testing programme. The first leg of the assignment, whose output is described in this report, focused on the task considered most urgent; developing a testing program for "hard" C&I indicators. The descriptive indicators were left on hold, because DoF saw a need to merge the implementation of the C&I with several related processes, notably sector reporting at the country level. It was decided that descriptive indicators would be modified during this process (see ch. 9).

3. IDENTIFICATION OF INDICATORS TO BE TESTED

As a first step the "hard" indicators were screened for their suitability for incorporation into the testing process. The main criteria for selection were the availability of basic data and methodologies to collect and process it. The screening process showed that most data will become available from resource inventories, especially remote sensing. Also, a significant amount of data collected in other sectors can be processed further to make it pertinent to forest sector. Indicators that would source their data from DoF's MIS (routine data collection system) were excluded from testing because MIS is not yet functional and its development will be a separate process.

Apart from proposing a list of indicators to be tested, the screening process gave rise to a number of proposals to modify wordings, merge and delete indicators with limited relevance. These proposals were discussed in an internal workshop of DoF held in Windhoek on 16 September 2004 (Annex 3). The participants decided to propose a revised C&I trimmed down to 20 indicators (the original set contained 29 indicators). Of these, 10 were selected for testing (Table 3-1~~Table 3-1~~). All of them are "core" indicators providing information on key aspects of forest sector development in Namibia.

A detailed analysis on all indicators included in the original C&I set from 2002 is presented in Annex 1. It also contains suggestions on how to implement monitoring on indicators that are not included in the testing process. For instance, indicators requiring MIS to supply the necessary information, have been identified.

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[1] These were originally presented in the report "Criteria and Indicators for Sustainable Forest Management in Namibia – Summary Report for the Testing Process".

[2] These were originally presented in the report "Criteria and Indicators for Sustainable Forest Management in Namibia – Descriptive Indicators

Table 3-1 Indicators to be included in the testing process

Criteria and Indicators	Included in testing ~~process~~	Comment
FOREST RESOURCE CRITERIA		
1. Development, maintenance and improvement of forest resources, including their contribution to global carbon cycles		
1.1. Total area of natural forests, plantations and other wooded lands	Yes	
1.2. Woody biomass of natural forests, plantations and other wooded lands	Yes	
1.3. Volume of trees on farms	No	
2. **Maintenance and enhancement of productive functions of forest and other wooded lands**		
2.1 Structure of the growing stock of woody vegetation	No	
2.2. Regeneration of key forest species	Yes	At community level
2.3 Area of forests and other wooded lands with a management plan for sustainable production of wood or non-wood products or environmental services	Yes	Modified wording
2.4 Periodical balance between growth and removal of wood products	No	
ENVIRONMENTAL CRITERIA		
3. Management and maintenance of protective functions of forests and other wooded lands		
3.1. Total area and % of strategic forests with significant catchment or socio-economic functions that fall within legally protected areas or areas with an approved management plan	Yes	Modified wording
4. Conservation and maintenance of biological diversity of forests and other wooded lands		
4.1. Total area and % of strategic forests with high biodiversity values that fall within legally protected areas or areas with an approved management plan	Yes	Modified wording
4.2. Change in the status of species that are sensitive to changes in forest utilization and management	Yes	Modified wording
5. Maintenance of forest ecosystem health, vitality and integrity		
5.1. Total area and % of forest cover affected by various disturbances or ecologically improved through management interventions	Yes	Was this not supposed to be more explicitly Fire only?
SOCIO-ECONOMIC CRITERIA		
6. Maintenance and enhancement of socio-economic benefits of forests and other wooded lands		
6.1 Share of forest sector to GNP	No	Only methodological work
6.2 Forest sector trade balance	No	Same as ~~above~~6.1
6.3 Number of people employed in the forestry sector	Yes	
6.4 Investment in forest enterprises including informal sector	No	Same as ~~above~~6.1
6.5 Value of wood products and non-wood products	No	
6.6 Value from primary and secondary processing	No	Modified wording, only methodological work
6.7 Socio-economic benefits accruing to local communities	Yes	
6.8 Contributions to food security.	No	
6.9 Degree to which social and cultural needs are met	No	

4. LINKS UP AND DOWNWARDS

To be a useful reporting tool, a set of C&I has to be logically linked upwards to reporting needs ~~emanating~~ coming from national-level development plans as well as the international conventions Namibia is signatory to. Also, the linkages down to the forest management unit level, particularly the community forests must be established.

4.1 International level

At the international level, the commitments most relevant to the forest sector are those related to the United National Framework Convention for Climate Change (UNFCCC), Convention on Biological Diversity (CBD) and United Nations Convention to Combat Desertification (UNCCD). In most cases, reporting under these conventions is done in a broad, descriptive form. However, the following needs for quantitative data were identified:

UNFCCC
- Change in forest cover;
- Change in forest biomass; and
- Abandonment of management (what does it mean? how is this measured?) of forest areas.

CBD
- meeting the 10 % threshold for protected area (of total land area).

All these information needs are covered by the current draft of C&I.

4.2 National level

The Second National Development Plan (NDP2) defines the following mission statement and sector objectives.

Mission statement:
- The mission of the Directorate of Forestry is to practice and promote the sustainable and participatory management of forest resources and woody vegetation to enhance socio-economic development and environmental stability.

Revised goals and overall sector~~al~~ objectives
- Contribution towards meeting the needs of the rural poor through the provision of basic needs in firewood, poles, posts and food; and the generation of rural incomes, and stimulation of the growth of productive off-farm activities in the rural areas;~~,~~
- Maintenance of the protective functions of forests with respect to soil, water and biodiversity vital for the welfare of the present and future generations; and~~,~~
- Strengthening of forestry institutions to improve their competence.

The proposed C&I incorporates indicators to measure achievements in all aspects referred to in the mission statement and sector objectives with the exception of institutional development. The reason is that the C&I "hard" indicators monitor mostly the impacts of forest policy, i.e. achievement of objectives at the highest level (e.g. maintenance of the asset base, environmental status of forests, and socio-economic benefits yielded by the sector). ~~While i~~Institutional development is necessary to achieve these high-level goals but~~,~~ it is only a means to an end. However, if the concept to merge the C&I and the monitoring of DoF's annual work plan proves practical, institutional development will also be covered by the system (see ch. 9).

The Government's Performance and Effectiveness Measures Programme (PEMP) have a similar relationship to C&I. The "PEMP indicators" are those put forward in NDP2 and "hard" indicators measure mostly the achievement of physical targets (e.g. kilometers of firelines established). As most of them are only indirect measures of success in meeting the ultimate sector objectives, they are not directly related to impact indicators of the C&I set. As above, merging of C&I with DoF's annual monitoring and reporting procedures would establish a direct link between C&I indicators and PEMP indicators.

The C&I feed directly into the Environmental Monitoring and Indicators Network (EMIN) established by the Directorate of Environmental Affairs (DEA) at the Ministry of Environment and Tourism (MET). The proposed C&I will supply EMIN with data on two key indicators, namely, change in forest cover and biomass.

4.3 FMU level

The C&I must also be linked downwards to processes generating monitoring data at field level. The link to MIS is essential and has to be secured when the development of MIS moves forward. The review of C&I took note of these links by highlighting the inputs that MIS is expected to provide to C&I (see annex 1). The community-based monitoring system, which is assumed to become a part of MIS, has direct links to C&I. In fact, it is expected to provide much of the data on socio-economic indicators.

5. ORGANIZATION

The testing process will be managed by the National Remote Sensing Centre ~~er~~ (NRSC) at DoF. The NRSC will be responsible for:

- Ssupervision and coordination;
- Cearrying out part of the tests; and
- Oerganizing collaboration with other ministries and institutions such as National Planning Commission, Ministry of Environment and Tourism and Ministry of Labour.

The Inventory and Mapping Section (NFI) will:

- eCollect inventory data for NRSC to assist in developing assessment methodologies.

The Community-Based Forest~~ry~~ Management (CBFM) Programme will:

- Ddevelop methodologies and procedures for community-based monitoring programme; and
- Cearry out a field test in 1-2 communities

6. TIME SCHEDULE

Testing will be carried out between September 2004 and April 2005. In most cases, it will entail the development or fine-tuning of the assessment methodology, applying it to a test case, and reporting on the adequacy and feasibility of the tested methodology. Also, the baseline data generated through the test will be made available and presented in the form of a national C&I report (restricted to hard indicator data).

The timing of various activities is presented in Table 6-1~~Table 6-1~~.

Table 6-1 Scheduling of testing process

Activity	Metho-dology avai-lable	Implement-ing organizatio n	Estimated ~~No of DoF~~ staff ~~x~~ input[1] ~~per staff~~	Se	Oc	No	De	Ja	Fe	M a	A p
Indicator 1.1 (forest cover)	Yes										
Finalization of methodology		NRSC	1 x 1 ~~month~~								
Ground truthing		NRSC	3 x 0,25 ~~month~~								
Assessment		NRSC	1 x 4 ~~month~~								
Indicator 1.2 (biomass)	Partiall y										
Development of methodology		NRSC	2 x 1 ~~month~~								
Collection of field data for methodological development		NFI	4 x 1 ~~month~~								
Assessment		NRSC	1 x 4 ~~month~~								
Indicator 2.2. (regeneration)											
Community level	No										
(integrated into monitoring system for indicator 6.7, see below)											
Indicator 2.3 (management plans)	Yes										
Data collection and assessment		NRSC	1 x 1 ~~day~~								
Indicator 3.1. (forests with catchment and socio-economic functions)	Yes										
Assessment		NRSC	1 x 1 ~~day~~								
Indicator 4.1 (ecosystem biodiversity)	Yes										
- assessment		NRSC	1 x 1 ~~day~~								
Indicator 4.2. (species biodiversity)											
National level	Yes										
Assessment		NRSC & DEA	1 x 1 ~~day~~								
Community level	No										
(integrated into monitoring system for indicator 6.7, see below)											
Indicator 5.1. (disturbances)	Yes										
Forest fires		NRSC	1 x 1 ~~month~~								
Indicators 6.1, 6.2, 6.4, & 6.6 (economic data)	No										
Development of methodologies		NRSC & NPC	1 x 1 ~~month~~								
Indicator 6.3 (employment)	Yes										
Transfer of data		NRSC & MoL	-								
Indicator 6.7 (socio-economic benefits)											
National level	No										
Extraction of data from employment and household income surveys		NRSC & CBFMP~~om mForProg~~ & NPC & MoL	1 x 1 ~~month~~								
Community Level	No										
Development of methodology for community-based monitoring		~~CommForPr og~~ CBFMP & IRDNC	2 x 2 ~~months~~								
Testing		~~CommForPr og~~CBFMP	2 x 2 ~~months~~								

Data analysis		~~CommForPr~~ ~~og~~CBFMP	1 x 1 ~~month~~								
Drafting a national C&I report	No	NRSC	1 x 1 ~~month~~								

[1] No. of DoF staff x input in days (d) or months (m)

7. STAFF INPUTS

Implementation of the testing programme is estimated to require the following staff inputs:

The staff inputs to be provided by NRSC:
- 2 staff for development of methodologies for remote sensing (2 x 2 ~~p~~-months in September-October);
- 2 staff for conducting various assessments applying remote sensing (2 x 4 ~~p~~-months in November-February);
- 1 staff to collaborate with NPC in developing methodology for generating economic data (1 x 0,25 ~~p~~-month in September-November); and
- 1 staff to support ~~Community Forestry Programme~~CBFMP in developing a system for monitoring socio-economic indicators (1 x 1 ~~p~~-month in September-November).

The staff inputs to be provided by NFI
- 4 staff for collection of field data to development of assessment methodology by NRSC (4 x 1 ~~p~~-month in October).

The staff inputs to be provided by ~~Community Forestry Programme~~CBFMP:
- 2 staff for development of methodology, testing and data analysis (2 x 5 ~~p~~-months in October-February).

8. INCREMENTAL COST

The incremental cost of the proposed testing programme is modest. No outsourcing or hiring of external consultants requiring funding from DoF is foreseen. Nearly all proposed activities can be implemented within DoF's the current programme of work, or with the support from NFFP.~~.~~

In the past, the main cost item in conjunction with monitoring has been the acquisition of satellite imagery from commercial sources. However, the Satellite Application Center based in Pretoria in South Africa will provide these images free of charge upon request from DoF.

The main incremental costs, which cannot be accommodated under routine work programmes are:

- Sending an NRSC field team to do ground truthing in support of remote sensing at an estimated cost of N$ 10 000 (3 staff for 1week);~~.~~
- Ssending an NFI inventory team to collect field data to enable development of remote sensing methodologies at an estimated cost of N$ 40 000 (4 staff for 1 month); and
- P~~p~~rocessing of data collected by Ministry of Labour and NPC according to specifications provided by DoF may incur extra expenses;~~.~~ Whether DoF will be charged for requesting these services could not be confirmed, but in any case the maximum cost is expected not to be more than a few thousand Namibian dollars.

Limited support from international consultants may be necessary but the cost can be covered from the NFFP budget.

9. NEXT STEPS

The proposed testing programme was approved in the workshop held on 16 ~~October~~ September 2004 in Windhoek. The implementation of the proposed activities is expected to commence shortly. Since most of the methodologies for remote sensing are available, the development effort will be reasonable and the staff can soon proceed to practical testing and generation of data. The development of a community-based monitoring system is a major effort but the experience gained elsewhere of similar systems will facilitate the task. In particular, collaboration with DEA and IRDNC is expected to accelerate the development process.

Parallel to testing of "hard" indicators, there will be conceptual development to merge the C&I with the annual reporting system of DoF. A draft proposal has been formulated in collaboration with the process reviewing the programmes and organisational structure ~~looking at the institutional arrangements~~ within DoF. The proposal will be discussed in an internal workshop in the nearest future. The aim is to develop one, coherent planning, monitoring and evaluation system which C&I are an integral part of, not a detached component requiring separate reporting and analysis.

The system would benefit greatly, if the MIS system monitoring DoF's routine activities were functional and able to supply data. While C&I is focused on impact indicators i.e. the ultimate results of forest policy implementation, MIS provides information on outputs and inputs. Ideally, with the two systems combined, the C&I report would also serve as the annual report of DoF.

Annex 1

ASSESSMENT OF SUITABILITY THE OF INDIVIDUAL INDICATORS FOR INCORPORATION INTO TESTING PROCESS

Criterion 1. Development, maintenance and improvement of forest resources, including their contribution to global carbon cycles	
Indicator	1.1 Total area of natural forests, plantations and other wooded lands.
Purpose: Why are we interested in measuring this indicator?	Area of forests and other wooded lands[3] is the basic determinant for the supply of various forest-based goods and services.
Measurement	
Verifier	- Area (ha) and % of natural forest, plantations and other wooded land. Estimates will be provided by region**, vegetation type*** and land management category****. Changes in areas with and without management plans and in strategic forest areas will be assessed separately. Visual presentation on maps with identification of hotspot areas subject to rapid change.
Description of method	Methodology available. Change detection techniques using remote sensing combined with the necessary ground truthing. The forest area will be covered with approximately 25 Landsat images; with other wooded land included, the number of images rises to about 60.
Timing: How often and how?	First assessment covering the entire country in 2005; thereafter annual assessments with partial coverage (20% of total area) so that total area subject to assessment would be covered over a five-year period.
Data sources	Landsat 5 images for year 2004 (Landsat 7 is defunct) supplied by Satellite Application Center based in Pretoria in South Africa (free of charge).
Implementing agency	DoF/NRSC.

[3] FAO's definition of forest will be applied. It comprises land with tree crown cover (or equivalent stocking level) of more than 10% and minimum tree height of 5 m. Other wooded land is defined by FAO as land with a crown cover (or equivalent stocking level) of 5-10%.

* Based on the FAO (1998) definitions of forest and other wooded land presented in Annexe ?.

** Administrative Regions

*** Based on the classification in Atlas of Namibia (Mendelsohn *et al.* 2002) presented in Annexe ?.

**** Based on land management categories presented in Annexe ?

Testing Process	**Activity**	**Timing**
	Acquisition of imagery, finalization of methodology, ground truthing.	September-October
	Assessment.	November-February
	Presentation of results.	End of February 2005 (Is this perhaps a little optimistic? Perhaps March - April?

Criterion 1. Development, maintenance and improvement of forest resources, including their contribution to global carbon cycles	
Indicator	1.2 Woody biomass of natural forests, plantations and other wooded lands.
Purpose: Why are we interested in measuring this indicator?	Change in woody biomass illustrates change in forestry conditions. Increase of shrub (bush) biomass at the expense of tree biomass may indicate degradation of forest resources, especially in rangelands where bush encroachment is a major problem. On the other hand, in areas where fuelwood supply is limited increase of shrub in otherwise bare areas may be considered positive development.
Measurement	
Verifiers	*At national level* - Forest and shrub biomass within forest and other wooded land in airdry tonnes; ~~.~~ - Forest and shrub cover within forest and other wooded land in ha; and~~.~~ - Average biomass per ha of forest and shrub in forest and other wooded land in air dry tonnes per ha. Estimates will be provided by region, vegetation type and land management category. Changes in areas with and without management plans and in strategic forest areas will be assessed separately. Visual presentation on maps with identification of hotspot areas subject to rapid change. *At community level(tentative)* - Density class of key forest areas (visual assessment).~~;~~
Description of method	*At national level* Methodology available for forest area. For other wooded land methodology needs to be developed (effort requires data collection in the field). Remote sensing techniques for change detection combined with ground truthing. *At community level* Methodology to be developed. Possibly, the density class will be assessed through visual observations using reference photos (method applied by Desert Research Foundation of Namibia for classifying grazing areas). The aim is to establish trends rather than to obtain precise data. The assessment will be integrated into the community-based monitoring system (see indicator 6.7.).
Timing:	*At national level*

How often and how?	First assessment covering the entire country in 2005; thereafter annual assessments with partial coverage (20% of total area) enabling full coverage over a five-year period. *At community level* See indicator 6.7.	
Data sources	*At national level* Landsat 5 images for year 2004 (Landsat 7 is defunct) supplied by Satellite Application Center in South Africa (free of charge). *At community level* See indicator 6.7.	
Implementing agency	*At national level:* DoF/NRSC~~National Remote Sensing Centre~~ *At community level* See indicator 6.7.	
Testing Process	**Activity**	**Timing**
	At national level:	
	Development of methodologies, gathering of inventory data.	September-October
	Assessment.	November-Feburary
	Presentation of results.	End of February 2005 (Same as in 1.1)
	At community level:	
	See indicator 6.7.	

Criterion 1. Development, maintenance and improvement of forest resources, including their contribution to global carbon cycles	
Indicator	Proposed wording: 1.3. Volume of trees on farms. Original wording: 1.3 Change in the area of established agroforestry systems and trees on farms.
Purpose: Why are we interested in measuring this indicator?	Trees outside forest and other wooded land (e.g. shelterbelts, windbreaks, small groups of trees) constitute a non-negligible source of wood supply. Also, promoting tree planting on farms is a major activity for DoF.
Measurement	
Verifier	- Volume (m3) of trees outside forests by region and land category.
Description of method	Methodology to be developed.
Time interval: How often and how?	To be defined.
Implementing agency	To be defined.
Testing Process	Excluded from testing process because development of appropriate assessment methodology is not feasible considering the timeframe and available resources.

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands	
Indicator	2.1 Structure of the growing stock of woody vegetation.
Purpose: Why are we interested in measuring this indicator?	In sustainably managed forests all age/size class are represented in a balanced manner at national, regional and local levels. In natural forest tree species distribution should be close to their natural distribution.
Measurement	
Verifiers	- Area of various size classes of total forest area in hectares; and - Volume (m3) of various tree species of total stand volume. Estimates will be presented by region and land management category.
Description of method	Methodology unavailable. Size classes could be used as a proxy for age classes in accordance with the method used in forest inventories~~NFI~~. A clear correlation usually exists between the size and age of a given species. Detailed assessment of change over time would be possible only by establishment of network of permanent sample plots (PSP). The number of PSPs required for monitoring developments in northern Namibia is roughly estimated at 1,000. Given the current budget constraints in DoF, the cost of establishing such a network is prohibitive. Regarding species distribution, detailed assessment is also possible through a network of permanent sample plots. Some crude assessment may be possible applying remote sensing. Vegetation types will be classified based on the approach applied in Atlas of Namibia ~~Tree Atlas~~ (see Aannex 2).
Time interval: How often?	To be defined.
Implementing Agency	DoF/NRSC in collaboration with NFI.
Testing Process	Excluded from testing process because development of appropriate assessment methodology is not feasible considering the timeframe and available resources.

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands	
Indicator	2.2 (6.2) Regeneration of key forest species.
Purpose: Why are we interested in measuring this indicator?	The indicator provides a measure of key species population dynamics in relation to potential disturbances and management practices. It also provides a proxy to measure the progress towards sustainable forest management.
Measurement	
Indicator	To be defined.
Description of method	Methodology to be developed. <u>National level</u> National ~~f~~Forest ~~i~~nventory or a network of ~~p~~permanent ~~s~~sample ~~p~~plots would be necessary to provide the necessary information, because remote sensing data is unable to capture changes in regeneration. <u>Community level</u> Visual assessment of changes could possibly be integrated with the community-based monitoring system (see indicator 6.7).
Time interval: How often?	To be defined.
Implementing agency	DoF/NFI.
Testing process	<u>National level</u> Excluded from testing process as establishment of p~~P~~ermanent ~~s~~sample ~~p~~plots is not feasible in the near future (see explanation under indicator 2.1). <u>Community level</u> Integrated with development of community-based monitoring system (see indicator 6.7.).

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands		
Indicator	Proposed wording: 2.3 Area of forests and other wooded lands with a management plan for sustainable production of wood or non-wood products or environmental services. Original wording: 2.2. Area of forests and other wooded lands managed according to management plans for the production of wood-based products.	
Purpose: Why are we interested in measuring this indicator?	Preparation and implementation of forest management plans based on sustainable management principles has significant potential to enhance the quality of forest management. The availability plan does not guarantee sustainability of forest management, but it facilitates and encourages sustainable practices.	
Measurement		
Verifiers	- Number of management plans (n~~N~~o); and - Forest area covered by forest management plans (ha and %) by region, vegetation type and land management category.~~:~~ Visual presentation on maps. These are already mentioned in 1.1. Either make reference and include in separate Annexes or maybe a definitions Annexe where all definitions are made. ~~Vegetation types presented in annex 2.~~ ~~Land management categories include the following:~~ ~~1.Communal lands~~ ~~2.Community forests~~ ~~3.Conservancies (communal, commercial)~~ ~~4.State forests~~ ~~5.State protected areas~~ ~~6.Private conservation areas (communal, commercial)~~ ~~7.Commercial farms~~	
Description of method	Methodology available. Data on forest management plans available in DoF.	
Time interval: How often?	First update in 2005; thereafter annual updates.	
Implementing Agency	DoF/NRSC.	
Testing Process	**Activity**	**Timing**
	Data collection and compilation of relevant statistics.	March
	Presentation of results.	End of March 2005

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands	
Indicator	2.4. (2.3) Periodical balance between growth and removal of wood products.
Purpose: Why are we interested in measuring this indicator?	One of the proxy indicators for sustainable forest management is that removals of timber do not exceed forest growth.
Measurement	
Verifiers	- Total annual forest growth (m3) and growth (m3) by key species; and - Total volume (m3) of annual removals and growth (m3) by assortment and by key species.
Description of method	Methodology for growth assessment to be developed. Estimates for removals could be derived from data on wood consumption and extraction permits. However, growth information cannot be derived until PSPs have been established and re-measured. Removals include harvesting of forest products for a variety of uses as well as natural mortality of trees and forest loss caused by forest fires. The volume of removals could be assessed by deriving an estimate from periodic wood consumption surveys (see indicator 6.5.), research data on tree mortality and damage caused by forest fires. Another approach to assess harvesting volumes is to extract data from the permit system database (see indicator 6.7.).
Time interval: How often?	Forest growth: To be defined. Removals: see indicators 6.5 and 6.7.
Implementing Agency	Forest growth: DoF/NFI. Removals: see indicators 6.5 and 6.7.
Testing process	Forest growth: excluded from testing process. Removals: see indicators 6.5 and 6.7.

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands	
Indicator	2.4 Total amount and annual changes in the extraction of non-wood forest products.

Comment: Indicator proposed for deletion because reliable data on yield and extraction cannot be obtained at a reasonable cost. Past attempts to measure extraction were either unreliable (assessment by local people of their consumption) or excessively costly (accurate assessment of non-wood consumption in two villages required several months of expert inputs). The same applies to yield data.

The following indirect indicators were considered but rejected

- Annual amount of non-wood forest products passing through veterinarian cordons (provides estimates on domestic trade); and
- Annual amount of non-wood forest products exported (assessed based on permit data).

At the moment control measurements at the veterinarian cordons are not applied to any products and it is unlikely that they could be established solely for non-wood products. Reliable data on export permits is currently available only for Devil's Claw. The permits for other non-wood products are issued either by the Ministry of Environment and Tourism or the Ministry of Trade and Industries, and the current practice is somewhat inconsistent making statistics unreliable. Even though with some effort the quality of statistics could be improved, the exported amounts are likely to be quite small in relation to total extraction. Thus, the usefulness of this data for decision-making would remain limited.

Criterion 2. Maintenance and enhancement of productive functions of forest and other wooded lands	
Indicator	2.5 Annual consumption of wood biomass and products.

Comment: Merged with indicator 6.5.

Criterion 3. Maintenance and Enhancement of woodland contribution to sustainable range management	
Indicator ~~number and name~~	3.1 Area of wooded rangelands managed according to management plans.
Indicator ~~number and name~~	3.2 Woody vegetation to grass ratio in wooded rangelands.

Comment: Indicator, proposed for deletion. Indicator 3.1 is irrelevant since no formal management plans for rangelands exist.

Regarding indicator 3.2., proper interpretation of woody vegetation/grass ratio would require information on the management objectives of the farm. However, such information is not readily available. Also, assessment results becoming available at 5-year intervals have reduced value for rangeland managers. From the standpoint of DoF the data is of little value because DoF has no mandate to guide or intervene in the management of grass vegetation; changes in woody vegetation will in any case be covered under indicator 1.2.

CRITERIA & INDICATORS ON ENVIRONMENTAL ISSUES

Criterion 3 (previously 4). **Proposed wording: Management and maintenance of protective functions of forests and other wooded lands** **Original wording: Assessment and maintenance of environmental values and functions of forests and other wooded lands**	
Indicator ~~number and name~~	Proposed wording: 3.1. Total area and % of strategic forests with significant catchment or socio-economic functions that fall within legally protected areas or areas with an approved management plan. Original wording: 4.1. Total area and % of forests in terms of national strategic forests categories.
Purpose: Why are we interested in measuring this indicator?	The strategic forests are forests and other wooded lands providing significant national scale environmental and socio-economic services, and where maintaining a tree cover is vital for sustaining these services.~~a national priority for DoF and the National Forestry Strategic Plan (1996). Strategic forests will be established to enable biodiversity conservation, watershed management, and socio-economic development.~~
Measurement	
Indicator	- Area (ha) of strategic forests with significant catchment, or socio-economic function that fall within legally protected areas or other areas with an approved management plan. Note: Since all areas with a management plan will contribute to protection of environmental values, it is suggested that in this context a reference will be made to indicator 2.3. Further, it is suggested that when estimating values for indicators 3.1. and 4.1, the following indicators concerning all strategic forests would also be estimated: - Proportion (%) of strategic forests with forest cover of total area of strategic forests[4]; and - Area (ha) of strategic forests with forest cover of total forest cover.
Description of method	Methodology available. To get a more complete picture on the status of strategic forest, the area information will be combined with data on change in forest cover, forest biomass and forest disturbance provided by indicators 1.1, 2.1, and 5.1. The functions of strategic forests were evaluated by Hines et al. (2003) according to a classification where each function was assigned a value from 1 to 3 based on its significance. It is proposed that strategic forests

[4] Strategic forests are a term for a geographic area delineated on a map, where forest may be mixed with other wooded land, agricultural land or bare areas.

	with "significant catchment or socio-economic functions" are those to with the highest value assigned to them i.e. "3 stars". However, these areas should be "formally demarcated" and the area (ha) of each should be determined or checked. Legally protected areas are those that are protected under the Conservation Ordinance ~~Forest Act~~ or Forest Act. ~~Conservation Ordinance~~ Other areas with an approved management plan include ~~or have a legal status as~~ "classified forest" according to the Forest Act (State Forest Reserves, Regional Forest Reserves, Community Forests, Forest Management Areas) and ~~. Other areas with an approved management plan include~~ e.g. conservancies. LET US NOT MIX THE PAs (IUCN CATEGORIES) WITH OTHER LAND MANAGEMENT CATEGORIES. "Approved" in this context means that the plans has been examined and endorsed by relevant authorities.
Time interval: How often?	First assessment in 2004; thereafter continuous (?) annual updating as changes emerge.
Implementing Agency	DoF/NRSC

Testing Process	**Activity**	**Timing**
	Classification of strategic forests.	March
	Assessment.	March
	Presentation of results.	End of March 2005

Criterion 3 (previously 4). Assessment and maintenance of environmental values and functions of forests and other wooded lands *A. Ecosystem indicators*	
Indicator	4.2. Total area and % under different land management categories.

Comment: Indicator, proposed for deletion because the information that is relevant from the standpoint of environmental protection, is provided by indicator 3.1.

Criterion 4 (previously 5). Conservation and maintenance of biological diversity of forests and other wooded lands *A. Ecosystem indicators*	
Indicator	5.1. Total area of different vegetation types (prioritised in terms of forest biodiversity) under different land management categories.

Comment: Merged with indicator 4.1.

Criterion 4 (previously 5). Conservation and maintenance of biological diversity of forests and other wooded lands *A. Ecosystem indicators*	
Indicator	4.1. Proposed wording: Total area and % of strategic forests with high biodiversity values that fall within legally protected areas or areas with an approved management plan. Original wording: 5.2. Total area and % of forest biodiversity types under different land management categories (4.2) within protected areas network or under direct management.
Purpose: Why are we interested in measuring this indicator?	The strategic forests are forests and other wooded lands providing significant national scale environmental and socio-economic services, and where maintaining a tree cover is vital for sustaining these services~~The strategic forests are a national priority for DoF and the National Forestry Strategic Plan (1996). Strategic forests will be established to enable biodiversity conservation, watershed management, and socio-economic development.~~
Measurement	
Verifiers	- Area (ha) of strategic forests with high biodiversity values that fall within legally protected areas or other areas with an approved management plan. Note: Since all areas with a management plan will contribute to protection of environmental values, it is suggested that in this context a reference will be made to indicator 2.3. Further, it is suggested that when estimating values for indicators 3.1. and 4.1, the following indicators concerning all strategic forests would also be estimated: - Proportion of strategic forests with forest cover of total area of strategic forests[5]; and - Area (ha) of strategic forests with forest cover of total forest cover.
Description of method	Methodology available. To get a more complete picture on the status of strategic forest, the area information will be combined with data on change in forest cover, forest biomass and forest disturbance provided by indicators 1.1, 2.1, and 5.1. The functions of strategic forests were evaluated by Hines et al. (2003) according to a classification where each function was assigned a value from 1 to 3 based on its significance. It is proposed that strategic forests with "significant catchment or socio-economic functions" are those to

[5] Strategic forests are a term for a geographic area delineated on a map, where forest may be mixed with other wooded land, agricultural land or bare areas.

	with the highest value assigned to them i.e. "3 stars". However, these areas should be "formally demarcated" and the area (ha) of each should be determined or checked. Legally protected areas are those that are protected under the Conservation Ordinance or Forest Act. Other areas with an approved management plan include "classified forest" according to the Forest Act (State Forest Reserves, Regional Forest Reserves, Community Forests, Forest Management Areas) and e.g. conservancies. LET US NOT MIX THE PAs (IUCN CATEGORIES) WITH OTHER LAND MANAGEMENT CATEGORIES. "Approved" in this context means that the plans has been examined and endorsed by relevant authorities.~~Methodology available. To get a more complete picture on the status of strategic forest, the area information will be combined with data on change in forest cover, forest biomass and forest disturbance provided by indicators 1.1, 2.1, and 5.1.~~ ~~The functions of strategic forests were evaluated by Hines et al. (2003) according to a classification where each function was assigned a value from 1 to 3 based on its significance. It is proposed that strategic forests with "high biodiversity values" are those to with the highest value assigned to them i.e. "3 stars".~~ ~~Legally protected areas are those that are protected under the Forest Act or Conservation Ordinance or have a legal status as "classified forest" according to the Forest Act (State Forest Reserves, Regional Forest Reserves, Community Forests, Forest Management Areas). Other areas with an approved management plan include e.g. conservancies. "Approved" in this context means that the plans has been examined and endorsed by relevant authorities.~~	
Time interval: How often?	First assessment in 2004; thereafter annual updating.	
Implementing agency	DoF/NRSC.	
Testing Process	**Activity**	**Timing**
	Data collection and processing.	March
	Presentation of results.	End of March 2005

Criterion 4 (previously 5). Conservation and maintenance of biological diversity of forests and other wooded lands *B. Species indicators*	
Indicator	4.3 Proposed wording: Change in the status of species that are sensitive to changes in forest utilization and management. Note: when selecting indicator species endemic or red-listed ~~national or~~ IUCN (CITES REFERS TO TRADE NOT ABUNDANCE, OCCURRENCE OR RANGE)~~/CITES~~ category species are prioritized. Original wording: 5.3. Change in the forest related indicator species per forest biodiversity type in each land management category.
Purpose: Why are we interested in measuring this indicator?	Change in the occurrence and range of indicator species provides a proxy for estimating the success or failure of various management interventions with respect to forest biodiversity conservation. However, it should be noted that in most cases other factors than forest management also affect the status of indicator species.
Measurement	
Verifiers	*Fauna:* - Total species range in square kilometres; and - Number of individuals per square kilometre by region. *Flora:* - Number of key tree species per square kilometer (by region?).
Description of method	*Fauna:* Methodology is available and implemented for one species, R~~r~~oan a~~A~~ntilope (*Hippotragus equinus)*, which is found in the north-eastern part of Namibia (Caprivi, Kavango).~~ the country.~~ Surveys of R~~r~~oan a~~A~~ntilope are carried out by MET on a regular basis. The available data can be transferred directly to DoF and presented in tabular form and visually. *Flora:* Methodology to be developed. The assessment will be integrated as part of community-based monitoring system (see indicator 6.7). The data on occurrence of trees with high biodiversity values could be collected e.g. through transect walks focusing on species which – besides their biodiversity value - also have high value for local community.
Time interval: How often?	*Fauna:* Every two years.

	Flora: See indicator 6.7	
Implementing Agency	*Fauna*: DoF/NRSC in collaboration with ~~DEA~~DSS *Flora:* See indicator 6.7.	
Testing Process	**Activity**	**Timing**
	Fauna: Transfer of data and visual presentation.	March 2005
	Flora: see indicator 6.7.	

Criterion 4 (previously 5). Conservation and maintenance of biological diversity of forests and other wooded lands (original criterion number) *B. Species indicators*	
Indicator	5.4 Change in the status of forest-related red-listed national or IUCN/CITES category species.

Comment: Merged with indicator 4.3.

Criterion 4 (previously 5). Conservation and maintenance of biological diversity of forests and other wooded lands *C. Genetic indicators*	
Indicator	5.5 Change in the status of IUCN/CITES forest related genotypes of conservation importance.

Comment: Indicator proposed for deletion because cost of data collection would be prohibitive considering the current availability of resources and the limited available knowledge.

Criterion 5 (previously 6). **Proposed criterion:** **Maintenance of forest ecosystem health, vitality and integrity** **Original criterion:** **Maintenance and enhancement of environmental functions and ecosystem health of forests and other wooded lands**		
Indicator	5.1. (6.1) Total area and % of forest cover affected by ~~various disturbances~~ forest and veldt fire~~s~~ (?) and ecologically improved through management interventions. WOULD IT NOT BE BETTER TO JUST FOCUS ON FIRE	
Purpose: Why are we interested in measuring this indicator?	To enable assessment effectiveness of policy ~~effectiveness~~, it is important to identify threats to sustainability of forest management as well as record achievements in mitigating or reversing negatives effects.	
Measurement		
Verifiers	- Area of fire damage (ha) and fire frequency (times per year per site) with parallel presentation of rainfall data (millimetres per month and year); and - Length of fire lines established and maintained (km). Estimates will be provided by region, vegetation type and land management category. Changes in areas with and without management plans and in strategic forest areas will be assessed separately. Visual presentation on maps with identification of hotspot areas.	
Description of method Time interval: How often?	*Fire damage* Methodology available. Remote sensing and ground truthing with Landsat 5 is the recommended approach. *Fire lines* Data to be supplied by MIS (not functional yet). Annual updates.	
Implementing agency	DoF/NRSC.	
Testing Process	**Activity**	**Timing**
	Fire damage	
	Processing of data.	February
	Presentation of results.	End of February 2005
	Fire lines	
	Excluded from C&I testing but included in development of MIS.	

Criterion 5 (previously 6). Maintenance and enhancement of environmental functions and ecosystem health of forests and other wooded lands	
Indicator	6.2 Changes in regeneration of key species.

Comment: Moved under criterion 2, new indicator number 2.2.

Criterion 5 (previously 6). Maintenance and enhancement of environmental functions and ecosystem health of forests and other wooded lands	
Indicator	6.3 Total area of forest actively managed to reverse the effects of disturbances.

Comment: Proposed for deletion ~~owing~~ due to difficulty to identify relevant areas.

CRITERIA & INDICATORS ON SOCIO-ECONOMIC ISSUES

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands		
Indicator	6.1 Share of forest sector to GNP / GDP.	
~~Definition: Full sentence~~	~~The indicator illustrates the proportion of the contribution of forest sector to GNP.~~	
Purpose: Why are we interested in measuring this indicator?	The indicator illustrates the total economic value derived from the forest sector and therefore the total economic contribution of the forest sector to GNP. It provides a partial measure for the relative importance of the sector for the national economy (excluding the value of environmental and social functions). Lack of adequate information may lead to underestimation of the sector's importance and, consequently, reduced resource allocation in Government budget.	
Measurement		
Verifier	Annual monetary value of forest sector GDP (N$)	
Description of method Time interval: How often?	Methodology to be developed; effort combined with development of methodology for indicators 6.2, 6.4, and 6.6. National Planning Commission (NPC) is interested to collaborate with DoF (MeET) to develop assessment method. The first step proposed by NPC is to establish a working group to coordinate the activities (contact person Government Statistician, Mr. F. Huangwi, at NPC). NPC may be able to adjust their data collection methods to provide some of the data needed to estimate this indicator. On the other hand, DoF would have to supply them with some basic data. To be defined.	
Implementing Agency	DoF/NRSMC in collaboration with NPC.	
Testing Process	**Activity**	**Timing**
	Establishment of working group together with MeET and NPC.	September
	Development of scheme for collaboration.	September-November
	Presentation of scheme.	November 2005

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.2 Forest sector trade balance.
Purpose: Why are we interested in measuring this indicator?	The indicator provides information on the forest sector's ability to supply forest products from domestic sources and to improve the national trade balance.
Measurement	
Verifier	Volume (m3) or weight (kg) of imported and exported forest products and ~~and~~ their monetary value (N$).
Description of method Time interval: How often?	Methodology available. NPC collects export/import statistics on a regular basis. The accuracy of import statistics is adequate but the volume and value of exports is only a rough estimate. However, at this stage no further improvement is feasible. Annual updates.
Implementing Agency	DoF/NRSMC in collaboration with NPC.
Testing Process	Combined with development work concerning indicator 6.1. (see above).

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands		
Indicator	6.3 (7.3.) Number of people employed in the forestry sector.	
Purpose: Why are we interested in measuring this indicator?	Job creation ranks among the principal objectives ~~set for~~of the Government development policies (Vision 2030, NDP2)~~ for the forest sector~~.	
Measurement		
Verifier	Number of people employed in forest-related activities on a temporary or permanent basis by region.	
Description of method Time interval: How often?	Methodology available. The Ministry of Labor conducts employment surveys on a regular basis. For the first time, the 2003/04 survey provides a separate assessment on employment in forest-related activities. First assessment 2004; thereafter every three years.	
Implementing Agency	DoF/NRS~~M~~C in collaboration with Ministry of Labor.	
Testing Process	**Activity**	**Timing**
	Transfer of data from Ministry of Labor and data processing.	March
	Presentation of results.	End of March 2005

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.4 (7.4) Investment in forest and forest industries including informal sector.
Purpose: Why are we interested in measuring this indicator?	Investments in forest and forest industries are a pre-condition for their sustained use and enhancement of socio-economic benefits.
Measurement	
(Tentative) verifiers	- Amount invested in forestry by (land management category) REALLY? and in forest industries by type of industry (sawmilling, secondary processing, furniture making, non-wood processing), N$/year; and - No. of businesses established by type of industry.
Description of method Time interval: How often?	Methodology to be developed; effort combined with development of methodology for indicator 6.1 In part the information would become available through the MIS of DoF ~~MIS~~ (investments in forestry), and in part NPC may be able to supply the necessary data if their data collection methods are adjusted. To be defined.
Implementing Agency	DoF/NRS~~M~~C in collaboration with NPC.
Testing Process	Combined with development work concerning indicator 6.1. (see above).

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.5 (7.5) Value of wood and non-wood products.
Purpose: WHICH ONE? Why are we interested in measuring this indicator?	WHICH ONE? The value of wood and non-wood production is one of the indicators for the relative importance of the forest sector in the national economy.
Purpose: WHICH ONE? Why are we interested in measuring this indicator?	WHICH ONE? The indicator provides an indirect estimate on removals and enables rough assessment on the sustainability of timber production.
Measurement	
Verifiers	Annual consumption of wood products including: - Firewood (m3); - Charcoal (m3); - Timber (m3); - Construction and fencing poles (m3); - Carvings (tonnes); and - Mopane roots (tonnes). (HOW WILL THIS BE MONITORED?) Annual consumption of non-wood products - relevant products and units of measurement to be defined locally
Description of method	Methodology for national or regional surveys of consumption of wood products available. Methodology to estimate consumption of wood or non-wood products through harvesting data extracted from the permit system to be developed. Wood consumption survey will follow the model set by a national survey carried out by Klaeboe and Omwami (1997). Surveys include an assessment of the market and subsistence value of consumed forest products. Estimate on harvesting volumes of wood or non-wood products through the permit system will be developed in conjunction with community-based monitoring (see indicator 6.7).
Time interval: How often?	Follow-up wood consumption survey: to be defined . Development of permit system: see indicator 6.7.
Implementing Agency	Wood consumption surveys: DoF/NRSC under sub-contracting arrangement. Permit-based monitoring: see indicator 6.7.
Testing process	Wood consumption survey: excluded from testing process. Permit based monitoring: see indicator 6.7.

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.6. (7.6) Proposed indicator: Value of production of primary and secondary forest industries. Original indicator: Value of production of secondary forest industries.
Purpose: Why are we interested in measuring this indicator?	The value of production of primary and secondary forest industries is an indirect indicator for the relative importance of the forest sector in the national economy.
Measurement	
Verifiers	To be defined.
Description of method Time interval: How often ?	Methodology to be developed; effort combined with development of methodology for indicator 6.1. NPC may be able to supply the necessary data if their data collection methods are adjusted. Non-wood processing industries may be too, small, diversified and scattered to enable systematic data collection. To be defined.
Implementing Agency	DoF/NRSMC in collaboration with NPC.
Testing Process	Combined with development work concerning indicator 6.1. (see above).

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	7.7 Value of wood-based biomass energy.

Comment: Merged with indicator 6.5.

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	7.8 Economic value of ecotourism.

Comment: Proposed for deletion because of difficulty to obtain relevant data.

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.7 (7.9) Socio-economic benefits accruing to local communities.
Purpose: Why are we interested in measuring this indicator?	Enhancement of socio-economic benefits is one of the main objectives set for Government policies in the forestry sector. Community forests are the focal programme area.
Measurement	
(Tentative) verifiers:	*At national level* - Total number of people employed in forest-related activities on temporary and full-time bases in community forest areas and forest areas outside community forests; and - Total annual amount (N$) and amount (N$) per capita of forest-based income in community forest areas and forest areas outside community forests. The data will be disaggregated by gender. *At community level* - Total and per capita amount of timber, fuelwood and non-wood consumption; - Total number of people employed in forest-related activities on temporary and full-time bases; and - Total annual amount (N$) and amount (N$) per capita of forest-based income. Data will be disaggregated by gender. The basic set above may be complemented with additional community-specific indicators. Data will be aggregated to provide statistical information at regional and national levels.
Description of method	Methodologies to be developed. *At national level* The employment and income data will be extracted from surveys conducted on a regular basis by Ministry of Labor and NPC, respectively. The available data will be processed so that indicator values for community forest areas and other areas are presented separately to enable comparative analysis (subject to technical feasibility). *At community level* The information will be extracted from a community-based monitoring system to be developed by DoF. The data on employment, income, and consumption will be collected from community records (modeled after monitoring systems in conservancies and pilot rural development project run by IRDNC in Caprivi) and the permit system database.
Time interval: How often?	*At national level* - Labor survey carried out in 2004; thereafter every three years; and - Household income survey carried out in 2003-2004; thereafter every

	five years (plan). *Community-based monitoring* - Data on ~~on~~ employment, income, consumption, training and participation will be collected monthly from community records.	
Implementing Agency	DoF/NRS~~M~~C in collaboration with Ministry of Labor and NPC (for indicators at national level). DoF/CBFM~~ommunity Forestry~~ (for indicators at community level).	
Testing Process	**Activity**	**Timing**
	National l~~L~~evel / employment data	
	Agreement with Ministry of Labour on procedure to be applied.	January
	Development of methodology and processing.	February
	Presentation of results.	End of March 2005
	National level / income data	
	Establishment of working group with participation of M~~o~~ET and NPC to work out collaboration scheme.	September
	Development of methodology and processing.	October
	Presentation of results.	End of March 2005
	Community-based data	
	Development of methodology.	October-November
	Testing in 1-2 communities including baseline surveys and training of community people.	December-January
	Data analysis.	February
	Presentation of results.	End of February 2005

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.8 (7.10) Contribution of forest use to food security.
Purpose: Why are we interested in measuring this indicator?	The indicator provides information on the importance of forest resources for local livelihood strategies in general, and for the resource poorest sections of rural communities in particular.
Measurement	
Verifiers	To be defined.
Description of method Time interval: How often ?	Methodology to be developed. Direct contribution refers to actual consumption of forest foods, while indirect contribution refers to enhancement of the agricultural production through trees providing nutrients and supply of fodder for animals. To be defined.
Implementing Agency	To be defined.
Testing process	Excluded from testing process as development of adequate methodology is unfeasible considering the available timeframe and resources.

Criterion 6 (previously 7). Maintenance and enhancement of socio-economic benefits of forests and other wooded lands	
Indicator	6.9. (7.11) Degree to which social and cultural needs are met.
Purpose: Why are we interested in measuring this indicator?	Forests provide a number of non-material benefits, which may be of high importance for local people. Changes in the supply of these benefits affect their social and spiritual well being and may lead to positive/negative changes in their attitude towards forest protection and management.
Measurement	
Verifiers	To be defined.
Description of method Time interval: How often-?	Methodology to be defined. To be defined.
Implementing Agency	To be defined.
Testing process	Excluded from testing process as development of adequate methodology is unfeasible considering the available timeframe and resources.

VEGETATION TYPES IN NAMIBIA

Namibia Desert
- Central Desert
- Northern Desert
- Southern Desert

Succulent Karoo
- Succulent Steppe

Lakes and Salt Pans
- Pans

Nama Karoo
- Western-central Escarpment and Inselbergs
- Desert-Dwarf Shrub Transition
- Dwarf Shrub Savanna
- Dwarf Shrub – Southern Kalahari Transition
- Etosha Grass and Dwarf Shrubland
- Karas Dwarf Shrubland
- North-western Escarpment and Inselbergs

Acacia Tree-and Shrub-Savanna
- Central Kalahari
- Cuvelai Drainage
- Highland Shrubland
- Kursiveld
- Mopane Shrubland
- Southern Kalahari
- Thornbush Shrubland
- Western Kalahari
- Western Highlands

Broadleaved Tree-and-Shrub Savanna
- Caprivi Floodplains
- Caprivi Mopane Woodland
- Eastern Drainage
- North-eastern Kalahari Woodland
- Northern Kalahari
- Okavango Valley
- Omautako Drainage
- Riverine Woodlands and Islandes

Source: Atlas of Namibia ~~Tree Atlas~~ (Mendelsohn *et al.* 2002)

Annex 3

PARTICIPANTS AT DOF'S INTERNAL C&I WORKSHOP IN WINDHOEK ON 16 SEPTEMBER 2004

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Ms. Sofia Swiegers, Chief Forester, South-Central Region
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Mr. Esa Puustjärvi, consultant on Reviewing and Testing C&I ~~testing~~