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**Data Collection and Analysis for Sustainable Forest Management
in ACP Countries
Linking National and International Efforts**

EC-FAO PARTNERSHIP PROGRAMME (1998-2000)
Tropical forestry Budget line B7-6201/97-15/VIII/FOR
PROJECT GCP/INT/679/EC

**PROCEEDINGS OF SUB-REGIONAL WORKSHOP ON
FORESTRY STATISTICS
SADC REGION**

**MUTARE, ZIMBABWE
30 NOVEMBER – 4 DECEMBER 1998**

Acronyms

ACP	African, Caribbean and Pacific
ADG	Assistant Director General
CATIE	Centro Agronomia Tropical de Investigación y de Enseñanza.
CFO	Chief Forestry Officer
CIRAD	Centre de coopéra. internat.en recherche agronomique pour le développement
CNEARC	Centre national d'études agronomiques des régions chaudes
CNRS	Centre national de recherche scientifique
CSIRO	Common Wealth Scientific and Industrial Research Organization
DAO	District Agriculture Officer
DCFL	Director of Conservation, Forestry and Land Use Planning
EHESS	École des hautes études en sciences sociales
ENGREF	École national du génie rural, des eaux et des forêts
FAN	Forest Action Network (Kenya)
FAO	Food and Agricultural Organization of the United Nation
FITC	Forest Industries Training Centre
FOSA	Forestry Outlook Study for Africa
GBZ	Green Belt Zone
GDP	Gross Domestic Product
GOL	Government of Lesotho
I.E.M.P	Lesotho Energy Master Plan
ICRAF	International Centre for Research in Agro-forestry
IGAD	Inter-Governmental Authority on Development
INRA	Institut national de recherche agronomique
IUCN	International Union of Conservation of Nature
MoA	Ministry of Agriculture
NFAP	National Forestry Action Plan
NWFP	Non-wood forest product
ORSTOM	Institut français de recherche scientifique pour le développ. en coopération
RAFO	Regional Office for Africa - Forestry group
RAFR	Regional Office for Africa - Operations
TCP	Technical Co-operation Programme
TOF	Trees outside the forest
UNEP	United Nations Environmental Program
WAICENT	World Agricultural Information Centre

1. INTRODUCTION AND BACKGROUND

The Sub-Regional Workshop for South-African Countries on “*Data Collection and Analysis for Sustainable Forest Management in ACP Countries - Linking National and International Efforts*” was held in Mutare, Zimbabwe, from 30 November to 4 December 1998. The event was organised by FAO with the financial support of the EC through the EC-FAO Partnership Programme (Tropical Forestry Budget Line B7-6201/97-15/VIII/FOR - Project GCP/INT/679/EC).

This report provides the proceedings of the workshop, including an overview of the Project, the workshop objectives and conditions, conclusions and lessons learnt from this exercise, which may be useful during the implementation of future workshops.

2. THE WORKSHOP AT MUTARE (ZIMBABWE)

2.1. The Organisation of the Workshop

The Zimbabwe Workshop on *Data Collection and Analysis for Sustainable Forest Management in ACP Countries* was held in Mutare, Zimbabwe from 30 November - 4 December 1998 under the sponsorship of FAO, and with the support of the EU through the EC-FAO Partnership Programme.

This workshop was the second of a series of five - four of which are taking place in Africa - and focussed geographically on ten selected countries of the SADC sub-regional organisation, namely: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe.

With the exception of Namibia, all the above countries were able to send at least one participant. In the case of Malawi, Mozambique, South Africa and Zambia, two participants from each country came, and the host country, Zimbabwe, had nine participants. There were five FAO staff members present. The private sector and several NGO's were invited but only one participant from an NGO and one from the private sector attended. A list of participants is attached as Appendix I.

The workshop took place in the Forest Industries Training Centre (FITC) by kind invitation of the Zimbabwe Forestry Commission. Despite some difficult logistics at the beginning, it is believed that the choice of Mutare as location for the workshop was good. It has shown the SADC participants the training sawmill, veneer and plywood plant at FITC (an FAO implemented SADC project) and a sample of the fine pine plantation forests and sound tree breeding research done by the Zimbabwe Forestry Commission.

The workshop, which lasted 4½ days, had 2 parallel groups (Forest Resources and Forest Products/Information Technology) for 1½ days. A copy of the agenda is attached as Appendix II. A senior officer of the host country, Mr. Crispen Marunda of the Zimbabwe Forestry Commission, was invited to chair the plenary sessions. The two working groups were chaired by Ms. Sebueng Kelatwang (South Africa) and Mr. Orastes Mandrate Nakala (Mozambique), respectively.

The participating countries were provided with several background documents related to the forestry sector together with the presently available information on the forest resources and products of the region. This information had been sent approximately one month before the workshop, through the FAO Representative, to each country. Various other Secretariat papers were distributed during the meeting (see list of documents provided in Appendix III).

Useful additions to the agenda were:

- ♦ an exhaustive preliminary meeting with the national chairman to review the agenda and decide "who does what";
- ♦ a summary of the main trends (by chair) arising from the country presentations, as a contribution to the parallel sessions;
- ♦ a review of the parallel session reports as a contribution to the final plenary session in which the recommendations were drafted.

2.2. Introductory addresses and highlights

The workshop was officially opened by the Acting General Manager of the Forestry Commission of Zimbabwe, **Mr Phillip Kariwo**, who welcomed the participants to Zimbabwe and to FITC. He expressed his desire for a constructive meeting. He highlighted the importance of forest statistics in decision making and urged all to actively participate in the workshop.

The Deputy Italian Ambassador, **Ms Munzi**, also welcomed the participants to FITC. She spoke of her country's key role in establishing FITC through an FAO's field project. She reviewed current Italian involvement in the forestry and natural resources sector.

Owing to alternative commitments, no Representative of FAO's Country Office in Zimbabwe was able to attend. In his capacity as Senior FAO Officer present, **Mr Jim Ball**, Senior Forest Officer, Forest Resources Division, presented the workshop objectives and gave an overview of FAO Forestry Department's activities in Africa. He stated that forestry information is needed for three main purposes: a) national policy development and planning; b) investment appraisal and decision making, and c) international policy development and negotiation. Most of the information currently compiled by FAO falls broadly into two main areas namely: a) Forest resources information and statistics on the area, stocking, growth, condition and type of forest resources; and b) Forest product information and statistics on production, consumption and trade.

Mr Peter Lowe (Forestry Planning Officer, Regional Office for Africa, FAO), conveyed the cordial greetings of Mr. Pape Kone, FAO's Senior Forest Officer in Africa, and presented a paper entitled the *Forestry Situation in Africa* (see [Appendix III A](#)). This paper reviewed the needs for forest statistics and, in particular, emphasised the importance of regional and sub-regional collaboration among countries to provide policy makers with harmonised data in order that they might develop and adopt common negotiating positions in global discussions of sustainable forest management. The speaker suggested that considerations of the contribution of forests to Food Security provided a powerful theme on which foresters could approach data collection, and he provided various examples. Finally, he highlighted various problems and deficiencies in forestry data collection in Africa which need to be addressed, and in so doing, informed the participants of the proposed Forestry Outlook Study for Africa (FOSA) which FAO was initiating in concert with various partners, including the EU.

Mr Charles Omoluabi, Forestry Officer (Forestry Policy and Planning Division) presented a draft report entitled "*Methodological guidelines for improving Forestry statistics in Africa*", which was commissioned by the FAO Regional Office for Africa at the request of the African Forestry and Wildlife Commission (AFWC) at its 10th Session in South Africa, 1995. Strong emphasis was placed on the need for a sub-regional approach to forestry information collection, focussed on the key areas of forest resources, timber production, wood energy, non-wood forest products, operational costs and the socio-economic-political environment.

All participants were given the chance to introduce themselves. Each participating country presented a paper on the current status of the forest sector. For each presentation, gaps in terms of information were identified and these formed the basis for the recommendations. Generally, it was acknowledged in all country presentations that information on plantation forests is often adequate and up-to-date, but the information on NWFP and non-timber forest products is lacking.

Two working groups one on forest resources and another on forest products were formed and were

given the task of reviewing the set of documents presented by FAO. In the plenary final session the conclusions and recommendations of both working groups have been discussed. See Report of the Forest Resources Team, the report of the Forest Products Team, and a set of general recommendations presented and approved by the audience.

An informal meeting to introduce the concept of pilot studies in the EC-FAO Project and to air some ideas was held over dinner with the Zimbabwean delegates on the final evening (3/12) of the Mutare workshop. The delegation was led by **Mr David Gwaze**, Policy Coordinator, Zimbabwe Forestry Commission.

2.3. Presentation of Country Briefs

The participants from each of the nine countries attending presented in plenary session a country brief according to a format distributed prior to the workshop. The country presentations went on longer than expected but were interesting. However, the majority of the participants did not focus enough on the topic of the workshop: *statistics, their collection, analyses, uses and reporting*. Instead, too much time was spent on generalities.

None of the reports included wildlife aspects to any significant degree, which may be attributed to a lack of emphasis in the standard format, as well as institutional factors in the various countries. See Appendix V for the full Country Reports.

The country report of **Angola** described the socio-economic, political and security context for forest management in the country. Despite the debilitated state of government administration in Angola, the country report contained statistics on forest resources, plantations and forest production, including fuelwood. However, in general, there is not yet any appropriate network of data collection in the forest sector, no forest inventory, and there are few trained foresters - a situation that prevents any formal forest management from being undertaken.

The country report of **Botswana** provided an overview of the forestry sector, highlighting some basic source documents. Of particular interest is the stated area (93%) of natural woodlands and forests in Botswana. This compares with a figure of 24.6% in the Forest Resources Assessment 1990, a discrepancy which underlines the need for common terminology and definitions. Overall, the country report concluded that there is insufficient data relating to the forest sector in Botswana to guide the sustainable management of wood-lands and forests, and that there is a need for a Forest Statistics Unit to take on this challenge.

The country report of **Lesotho** provided extensive information of the general socio-economic background, but is less detailed in regard to the forestry sector. The presentation highlighted some of the difficulties faced by forestry officers in working effectively within the decentralised government administration.

The country report of **Malawi** provided a range of information on natural forest resources, plantations and forest production. It is interesting to note that productivity figures are quoted for natural forests and that, according to national estimates, the deforestation rate is 1.5 - 2.0% annually - one of the highest figures in Africa. In regard to plantations, the report gives annual productivity figures but cautions that these are likely to be much reduced owing to "the destruction of many plantations by fire". The report concludes with an outlook prediction that wood consumption

demand, driven by population growth, will outstrip the sustainable supply levels in the late 1990s.

The country report of **Mozambique** gave a comprehensive picture of the forest sector with up-to-date figures on forest resources, forest production and the processing industry. This availability of data is due to a recent national forest inventory and a forest information collection and management system, which were outputs of a UNDP funded FAO project in the National Forestry and Wildlife Directorate.

Although not present at the workshop, **Namibia** submitted a short report on the status and use of forestry statistics in that country. This dealt with the institutions involved, data collection and report production.

The country report of **South Africa** recognised many shortcomings of the forest policy and data collection priorities inherited from the previous government, which had focussed on the information requirements of the formal industrial forestry sector. Broader based information is now essential for the formulation of criteria and indicators of sustainable management and the development of forest resource accounting and, more specifically, to better manage national water resources. The new Forest Act requires a report on the entire forest sector for 1999.

The country report of **Swaziland** surveyed the relative roles of natural and plantation forests in the kingdom. Recent figures are available for forest resources and forest production, the latter being based mainly on the private sector. The presentation concluded that there is an imbalance between the excellent achievements of the private plantation sector, whilst the government is constrained in the management of natural forests by a lack of qualified personnel.

The country report of **Zambia** gave a useful and detailed overview of the forest sector, based in part on outputs from the Zambia Forestry Action Plan. However, it should be noted that many of the statistics presented are derived from expert estimates and localised inventories. The most recent national forest inventory in Zambia dates from the 1960s. Notably, the report contains information on wood supply from non-forest areas, including Trees Outside the Forest. The report concludes that, owing to a lack of detailed inventory data and inadequate resources, forest management in Zambia is not currently based on sustainable practices. Nevertheless, the report manages to present various supply-demand scenarios through to the year 2016.

The country report of **Zimbabwe** reflected the maturity of the commercial plantation sector and, also, recent innovations in information on indigenous woodlands; for example, on the valuation of forest products and services, including NWFPs. However, coverage of natural forests is still considered inadequate. The presentation revealed that private sector organisations are active and, in some cases, more effective in collecting forest sector data pertaining to commercial sector, but gaps still exist in respect of small tree growers.

2.4. Other Presentations

Forest Sector Technical Cooperation Unit – FSTCU

Responsibility within SADC for the Forest Sector Technical Cooperation Unit (FSTCU) mandated to Malawi by the Council of Ministers in Maseru, Lesotho in 1985. **Mr Sam Kainja** of Malawi presented an overview of the mandate, responsibilities, functions, programme and projects of FSTCU (see [Appendix V A](#)). It was noted that FSTCU has a specific mandate to manage relevant information and data concerning the forest sector within its six programme areas of:

- ◆ Forest Training and Education;
- ◆ Forest Research;
- ◆ Forest Utilisation and Trade;
- ◆ Forest Resource Assessment;
- ◆ Forest Resource management;
- ◆ Forest Industry Development.

It was pointed out that SADC currently has six forestry projects underway, two partially funded and six un-funded. In this last category are two potential projects of particular significance for forest sector information, namely:

- ◆ Regional Vegetation Mapping;
- ◆ Development of Forestry Information Management Network System in SADC Region.

The first of these originates from proposals discussed in the early 1990s for a sub-regional forest inventory project, and has now been broadened to encompass a more general vegetation mapping. It is likely that the project could form part of the Africover vegetation mapping project, but funding has not yet been identified, although the EU has previously expressed some interest.

The second project proposal, for a forest information management network, would provide an ideal means for the collection, harmonisation and exchange of forestry data on a sub-regional basis. At present, no funding source has been identified.

Trees Outside the Forest

An introductory paper on Trees Outside the Forest (TOFs) was presented to the forest resources parallel session (see section 5 below) by **Mr Peter Gondo** of Zimbabwe. This was intended to provide a basis for discussion among participants, many of whom were relatively unfamiliar with this "non-forest" dimension of foresters' domain. Particular attention was given in the presentation to the practical difficulties of measuring and assessing TOFs in comparison forests and woodlands (see [Appendix III D](#)).

Overview of Data Collection Requirements

In view of the high number of data formats distributed by FAO to workshop participants, **Mr Peter Lowe** of FAO provided an Overview of Data Collection Requirements (see [Appendix III. B](#)).

Presentation of the Working groups

The discussion group was introduced by presentations made by the Senior Forestry Officer, FAO HQs, and the Regional Forestry Officer, FAO RAFR. The Forest Resources Working Group was asked to consider the following aspects of forest resource information:

- Review the classification, definition and structure of the core forest resources data (i.e. natural forest area, other wooded land, forest types and ecological zones, volume and biomass, protected areas, wood supply potential and changes over time);
- Review and validate FAO and national statistics on forest resources and document other valuable data sources made available by the participating countries;
- Discuss problems, constraints, and capacity needs in order to improve present methods of data collection, processing, and dissemination;
- Analyse existing data on Plantations, NWFPs, and TOF, and suggest improved methods for data collection, analysis and dissemination.

The discussion group on Forest Products and Information Technology was briefed by the Forestry Officer from FAO headquarters. The Forest Products Working Group was asked to consider the following aspects of forest products:

- Review the classification, definition, and measurement procedures of forest products in participating countries, in order to assess their coverage and socio-economic relevance;
- Review of country data on production, prices, and trade of forest products, including fuelwood and charcoal, and other relevant forest products other than wood (gums, myrrh, incense, etc.); and
- Analyse the problems related to data collection, validation, and dissemination by using conventional methodologies and new information technologies.

3. RESULTS AND CONCLUSIONS OF TECHNICAL SESSIONS

3.1. Forest Resources

The Forest Resources Working Group was introduced by Mr Peter Gondo (Zimbabwe Forestry Commission). Under the Chairmanship of Ms Sebueng Kelatwang (South Africa), who was assisted by Mr. Kasizo Chirambo (Malawi) and Mr Dominick Kwesha (Zimbabwe) as rapporteurs, the group was asked to consider the following aspects of forest resource:

Forest Resources

1. Review the classification, definition and structure of the core forest resources data (natural forest area, other wooded land, forest types & ecological zones, volume & biomass, protected areas, wood supply potential and changes over time);
2. Review and validate FAO and national statistics on forest resources and document other valuable data sources, made available by the participating countries;
3. Discuss problems, constraints, and capacity needs in order to improve present methods of data collection, processing, and dissemination; and
4. Analyse existing data on Plantations, NWFPs, and Trees Outside Forests, and suggest improved methods for data collection, analysis and dissemination.

The working group on Forest Resources reached a number of conclusions and drafted

recommendations. In common with the other working group on Forest Products, some of the conclusions were of a more general nature and those are presented below.

Trees outside Forests (TOFs)

- ◆ The group recognised the environmental and socio-economic importance of TOFs, and called for the assessment of their contribution to the economy in each country;
- ◆ The group noted that definitions of TOFs provided by FAO did not always match country perceptions of TOFs; FAO was urged to reconsider its present definition of TOFs, particularly as regard tree height and crown cover density, and to limit consideration to those trees with a demonstrable economic and social function;
- ◆ The group was concerned about the appropriate assessment methodologies and possible high costs involved, and welcomed FAO's initiatives in regard to Country Briefs and Pilot Studies; all the countries present showed interest in preparing country briefs on TOFs, and also observed that FAO was willing to support both the preparation of the country briefs and the pilot studies on TOFs.

Forest Cover Classification

- ◆ The group recognised the importance of having concrete terms and definitions, and that these should be determined primarily by national needs. It also noted the importance of compatibility and exchange of forest cover information at sub-regional level.
- ◆ The group noted that harmonisation of forest cover classification has already been initiated through SADC, and the meeting reaffirmed the importance of the SADC classification which had been developed during an EC funded project feasibility study. It also noted that SADC member states have already endorsed this classification during a meeting held in 1997, in Pretoria, South Africa, but that follow-up with the SADC Vegetation Mapping Project was still awaiting funding.

Information for monitoring change

- ◆ The group recognised the importance to Sustainable Forest Management (SFM) of recurrent assessment of Permanent Sample Plots (PSPs) for monitoring change in forest productivity, health and condition, and for providing indicators of SFM;
- ◆ Countries should prepare a comprehensive review of the status of their PSPs, which would support the proposed role of FSTCU in compiling PSP information for the region.

Plantations

- ◆ The group observed that there is variation in the amount of plantation data and details collected amongst the participating countries; that such data may often be misleading and unreliable, in particular, data collection from the private sector is difficult to acquire; it was also noted that the questionnaires from FAO, as in many other instances, were too detailed and laborious to complete; in those instances when plantation data is unavailable, participants approved the use of "expert opinion" to make estimates.

Fires and Forest Health

- ◆ The group recognised that fires are severe actual and potential hazards to SFM. Information on fire affecting plantations is well recorded by most countries, but there is little information for natural forest;
- ◆ Participants noted that various studies (e.g. CIDA, 1995) have been carried out in the Region into the economic importance of fires;
- ◆ In general there seemed to be few problems with forest pests and diseases, although elephants and baboons were reported as damaging in two countries.

3.2. Forest Products

Under the Chairmanship of Mr. Orastes Mandrate Nakala, who was assisted by Ms. Anne Chishawa as rapporteur, the Forest Products Working Group was tasked to consider the following aspects of forest products information and information technology:

Forest Products
<ol style="list-style-type: none"> 1. Review the classification, definition, and measurement procedures of forest products in participating countries, in order to assess their coverage and socio-economic relevance in the Region. 2. Review of country data on production, prices, and trade of forest products, including fuelwood and charcoal, and other relevant forest products other than wood (gums, myrrh, incense, etc.). 3. Analyse the problems related to data collection, validation, and dissemination by using conventional methodologies and new information technologies.

The working group on forest products and information technology reached the following principle conclusions and recommendations (see below):

Non-Wood Forest Products (NWFPs).

- ◆ The meeting discussed the format and content of the tables on NWFPs prepared by FAO, and reviewed definitions in relation to the exclusion of small wood (Non-Timber) products, and also noted the apparent exclusion of TOFs. It was agreed that information was generally sparse and inadequate.

Fuelwood

- ◆ The importance of fuelwood and the supply-demand situation in participating countries was reviewed, and data problems were assessed with particular emphasis on timeliness, measurement problems, and on the need for reliable data for national planning purposes.

Informal Wood Production

- ◆ The meeting noted the growth in small-scale wood industries, particularly in the informal sector, and the need to obtain reliable data covering this aspect.

3.3. Institutional Aspects

National Forest Statistics Collection

Both working groups recognised that relevant and reliable information is essential for policy development, updating and revision. But, all participants reported that their data collection capacity was limited by shortage of funds for operational activities to collect, store, and analyse data relevant to sustainable forest management. Many participants also reported difficulties in data collection and analysis due to high staff turnover and lack of continuity. Most countries reported the presence of skilled staff, but some do not, especially in certain fields such as data analysis. Participants drew attention of FAO and other donors to the need for training and institutional support in the field of data collection and analysis for sustainable forest management and appropriate policy development.

The groups also recognised the increasing importance of participatory approaches in SFM. In view of the general trend towards privatisation, several countries expressed concern over the weak co-operation between the public and the private sectors and NGOs. It was felt that Forest Departments and data gathering institutions of member states should liaise closely with the relevant stakeholders, and explore new ways of collecting data from community and other participatory schemes, through partnership with NGOs where appropriate.

Participants drew the attention of FAO and other donors to the need for training and institutional support in the field of data collection and analysis for SFM and appropriate policy Development.

Data Exchange with FAO

- ◆ It was noted that the data sets prepared by FAO had not been received before the meeting by all participants and thus could not be checked by participants. Concern was expressed that FAO data collection forms lacked standardisation and that they were, in parts, irrelevant to specific country conditions. It was felt that these formats could be better designed to permit selectivity in data completion by countries.
- ◆ The meeting noted that forest statistics should serve primarily national needs for SFM, but that countries should make such data available to international institutions and agreements in a timely manner within their capacity and the availability of the data.

3.4. Pilot Study Project for Zimbabwe

The purpose and modalities: Zimbabwe could host a pilot project (financed through the EC-FAO programme) to look deeper into collection and analysis of data on forest products and services from natural forests and trees outside forests. These aspects were brainstormed by a group of Senior Forestry Officers from the Zimbabwean Forestry Commission and that can be included in the study are data requirements to analyse the supply and demand dynamics of fuelwood at the sub-national and national level, analysis of the impact of the tree planting activities in quantitative terms (Rural Afforestation, Tree Growing and Tree Care Competition and the National Tree Planting Day) and analysis of the impact of introducing co-management schemes in gazetted state forests. Generally it was acknowledged that not much information is available on the volumes or quantities of NWFP obtained from natural forests. It is thus impossible to assess whether natural forests are being managed sustainably or not.

The proposed project will aim to develop methodologies of data collection and analysis and to test

the applicability of the methodologies in assessing whether natural forests, or Trees Outside Forests or artificial plantations/woodlots are being managed sustainably. A fuller concept note will be prepared in collaboration with FAO sometime early this year. It was indicated that the pilot study will be financed for a minimum of US\$ 50, 000 for three years until 2002.

Review of Forest Statistics in Zimbabwe: The review is based on the information on Zimbabwe that was provided during the workshop.

Forest Resources Set: The information on Forest Resources was corrected and edited by Dr. D. Gwaze. An edited paper was sent to FAO, Rome.

Forest Products: The information on plantation forest products is available and a number of tables showing the latest figures on forest products are included. Detailed statistics as required by FAO on forms FP1 to FP5 require more time and visits to different timber growers and producers.

Information on non-woody forest products, firewood produced is not available at a national level. The absence of information on such products forms the basis of the pilot study proposed for Zimbabwe under the EC-FAO Partnership programme.

An informal meeting to introduce the concept of pilot studies in the EC-FAO Project and to air some ideas was held over dinner with the Zimbabwean delegates on the final evening (3/12) of the Mutare workshop. The delegation was led by David Gwaze, Policy Coordinator, Zimbabwe Forestry Commission. They identified the following, in order of priority:

- ◆ NWFP, both as resource and as products (items such as carvings and mushrooms); other SADC countries might be included and be tied in with an ICRAF initiative;
- ◆ Evaluation of extension and tree planting programmes (as part of TOFs);
- ◆ Biomass/Fuelwood/Yield studies. Various ideas were put forward, including:
- ◆ Analysis of permanent sample plot: results are collected but not yet computed; this would support the workshop and would involve other neighbouring countries;
- ◆ an investigation of fuelwood dynamics;
- ◆ Plantations, including the development of a management information and modelling system for testing options.

3.5. Relevance of workshop to technical responsibilities

- ◆ There was a loud and clear message of support from the SADC countries to the EC-FAO initiative;
- ◆ All participants, even those not specialised in statistics, recognised the prime importance of the workshop;
- ◆ For at least six overseas participants, and several of the national Zimbabwean participants the workshop was very relevant and the information useful in the execution of their daily duties on return home;
- ◆ The workshop provided an occasion to identify good candidates for TCDC programmes and for the recruitment of national consultants and focal points for specific subjects (FRA, NWFP, woodfuels, TOF, Yearbook, etc.); The FAO recruitment roster will be updated with some Personal History Forms for African sub-regional and regional Forestry Officers;

4. WORKSHOP RECOMMENDATIONS

4.1. Forest Resources Working Group Recommendations

Trees outside forests

The working group recognised the environmental and socio-economic importance of Trees Outside Forests (TOFs); the working groups acknowledged FAO's initiatives with regards to starting pilot studies on the subject; the following recommendations were made:

- ◆ Reconsider (for FAO) the its present definition of TOFs, particularly as regard tree height and crown cover density, and should also include a clause into the definition limiting TOFs to those with a demonstrable economic and social function.
- ◆ Convene a regional workshop by FSTCU with assistance from FAO or other appropriate institution, which would use as direct inputs the country briefs on TOFs to be prepared through FAO assistance.

Forest cover classification

It was recognised that there is need to have concrete terms and definitions of forests resources, the definitions should reflect national needs and that the information should be compatible and transferable at the sub-regional level. The following recommendations were made:

- ◆ SADC will do what it can to find a donor to support the implementation of the SADC Vegetation mapping and Information Network Projects.
- ◆ Countries should prepare a comprehensive review of the status of their Permanent Sample Plots.

Plantations

The working group observed the inconsistency of data on plantations and detail amongst the SADC countries. It was noted that questionnaires from FAO were too detailed and laborious to complete. Recommendations on plantation data were as follows:

- ◆ institutions responsible for data collection should work closely with growers, producers and users and special attention should be given to the small scale growers and millers.
- ◆ where plantation data is missing, FAO and countries should use "expert opinion" to make estimates.

Fires and forest health

Fires are actual and potential hazards to natural woodlands. It was noted that there is a dearth in information on the effects of fires on the condition and health of natural forests. It was recommended that:

- ◆ countries should, where necessary, adjust forest areas to reflect losses arising from drought, fire and other causes;
- ◆ SADC, with FAO assistance, should follow up studies on the causes and economic importance of fires;
- ◆ Countries should, improve their record keeping in regard to bush-fires and, where possible, distinguish controlled from wildfires;
- ◆ Greater regional co-operation should be sought in the monitoring of bush-fires.

4.2. Forest Products Working Group Recommendations

Non-wood forest products (NWFP)

The current definition of NWFP was considered too sparse and inadequate and the following

recommendations were made:

- ◆ FAO should review existing definitions of NWFPs to ensure inclusion of products from TOFs and of small wood products;
- ◆ The existing reporting formats prepared by FAO should be modified to include data source and target end-user of the report’;
- ◆ FAO should include products from Trees Outside Forests in the definition of NWFP;
- ◆ FSTCU with assistance from FAO should take lead in developing appropriate methodology and assessment criteria for data collection on NWFPs.
- ◆ National reports on NWFPs (including small wood products) should make use of varied formats such as tables, text and maps.

Fuelwood data

Gross fuelwood data does not reflect the supply and demand dynamics in a country. There is need to re-visit the quality of data on fuelwood to reflect supply and demand situations. The following recommendation was made:

- ◆ countries should compile statistics on fuelwood supply, distribution, consumption and trade at national and sub-national levels.

Informal wood production

The working group noted the proliferation of small scale wood industries, particularly the informal sector, and the need to obtain reliable data covering such production scenarios. The following recommendation was made:

- ◆ FSTCU with FAO assistance should develop strategies and methodologies applicable at the regional level, for capturing data on wood production from the informal sector.

4.3. Recommendations on Aspects of Forest Statistics

The following recommendations were made concerning data collection capacity within SADC countries, high staff turnover, lack of continuity, lack of institutions/offices specifically tasked with compilation and analysis of forest data:

- ◆ FAO, among other institutions, should promote technical co-operation in all aspects of data collection, analysis and dissemination between countries within the region and within the framework of the TCDC programme.
- ◆ FAO should support and work with the Forest Sector Technical Cooperation Unit (FSTCU) of SADC in joint initiatives on forest sector information and statistics.
- ◆ Countries should seek collaboration through FSTCU, and with the assistance of FAO and donors, in improving their updating their data collection and analysis for SFM.
- ◆ FSTCU, FAO and countries should endeavour to improve feedback of statistical reports in order to encourage greater participation in data collection and use of results for SFM.
- ◆ Countries should explore new ways to involve stakeholders (communities, NGOs and the private sector) in the primary collection of forestry statistics, and should improve communications with the private sector in this regard.
- ◆ Each country should establish a Forest Statistics Office to be responsible for forest sector statistics, and also designate an FAO Focal Point for contact and information exchange.
- ◆ Countries should examine their own forest sectors to remove constraints arising from organisation structures in order to ensure smooth and free data flow. Promote technical co-

operation in all aspects of data collection, analysis and dissemination between countries within the SADC region.

- ◆ remove constraints arising from institutional structures to ensure smooth and free data and information flow.
- ◆ improve feedback on statistical reports in order to encourage greater participation in data collection and use.

Data exchange with FAO

- ◆ FAO should present country data sets such that countries only need consider sections relevant to their own circumstances;
- ◆ FAO should ensure that data exchange between countries and FAO should be harmonised and made available in electronic formats;
- ◆ Country contact points should review the data sets prepared by FAO for their countries to confirm that they are complete, up-to-date and accurate, and should return them when corrected to FAO as soon as possible.

4.4. Recommendations for future workshops

- ◆ Send the workshop invitation 3 months before the workshop starts so that the appropriate staff can make itself available to attend;
- ◆ Send the documentation for the workshop 2 months ahead of time so that the appointed officers can brief themselves well and prepare their country report well in advance;
- ◆ Screen the country report before the workshop starts so that the relevance (forest statistics and the way it is gathered) is emphasised; timely preparation of the workshop is therefore crucial.

APPENDIX I: WORKSHOP AGENDA

Mutare, Zimbabwe

30 November - 4 December 1998

MONDAY 30 NOVEMBER**Morning**

- ◆ Welcome address by the Zimbabwean Chairman (Mr. Crispen Marunda);
- ◆ Welcome remarks by Mr. Phillip Kariwo, General Manager, PC;
- ◆ Welcome remarks by Ms. Monzi, Italian Embassy;
- ◆ Photo session (Mr. Sibanda);
- ◆ Welcome and introductory address by Co-Chairman (Mr. J. Ball): Objectives and functions of socio-economic and forestry statistical information; Role and activities of FAO Forestry Department; and Objectives of the project and workshop;
- ◆ Review of workshop documents (Mr. Peter Lowe);
- ◆ African Forestry and Wildlife Commission Initiative on Forestry Statistics Development (Mr. Charles Omoluabi);

Welcome Lunch**Afternoon**

- ◆ Presentation by FSTCU Representative – SADC Region overview – Mr. Sam Karnya;
- ◆ The Forestry Situation in Africa by FAO Forestry Officer (Regional Office for Africa);
- ◆ Presentation of FAO's Forest Resources Assessment (FRA 2000) (Mr. Jim Ball);
- ◆ Reports of participants on the status of forestry statistics in their countries and its use in forest policy and planning;
- ◆ presentation – Angola;
- ◆ presentation – Botswana;
- ◆ Visit of FITC sawmill;
- ◆ Evening: Introduction of all participants and welcome party.

TUESDAY 1 DECEMBER**Morning:**

- ◆ Continuation of previous session: Reports of participants on the status of forestry statistics in their countries and their use in policy and planning;
- ◆ Country presentation for Lesotho;
- ◆ Country presentation for Malawi;
- ◆ Country presentation for Mozambique;
- ◆ Country presentation for South Africa;
- ◆ Country presentation for Swaziland;
- ◆ Country presentation for Zambia;
- ◆ Country presentation for Zimbabwe ;
- ◆ General discussion on trends in Southern Africa;

Afternoon:

- ◆ Formation of groups for parallel sessions, terms of reference for the groups, election of Chair

persons and rapporteurs;

- ◆ Parallel sessions on forest products and forest resources (for details see ANNEX).

Evening:

- ◆ Voluntary Session on NWFPs and TOFs.

WEDNESDAY 2 DECEMBER

Morning and afternoon: Continue parallel sessions.

Afternoon: Conclude parallel sessions, including preparation of parallel session reports.

Evening: Presentation of Parallel Sessions Report in plenary.

THURSDAY 3 DECEMBER

Morning:

1. Plenary session to discuss out-come of parallel sessions;
2. Review of the results; and
3. Workshop report and country reports; lead by FAO Forestry Officer (Reg. Office).

Afternoon: Field visit (Field visit to John Meikles Forest Research Station Tree);

Evening: Discussion of Pilot Studies - Zimbabwe Delegates.

FRIDAY 4 DECEMBER 1998

Morning:

1. Closing note by Co-Chairman on the use of forestry sector data and next steps to be implemented. Uses of forestry sector data (national and international uses; and public availability of data);
2. Next steps: Pilot Studies, Outlook Study Country Reports, Regional Outlook Study reports; and capacity building and assistance needs; and
3. Conclusions and recommendations by the Chairman; evaluation of the workshop.

- **Afternoon:** Farewell toast and lunch; and
Departure to Harare.

Items for Review in Parallel Sessions

<u>Forest Resources</u>	<u>Forest Products</u>
<p>Forest Resources Information</p> <ul style="list-style-type: none"> • Methodology (definitions, model, etc.) • Means of dissemination <p>Needed Forest Resource Information</p> <ul style="list-style-type: none"> • Forest area: Type, disturbance, species group, availability for wood supply, ownership and management, eco-floristic zone, protection status, change • Forest Plantations: Area, species, ownership, function, etc. • Volume and biomass: Biomass, growing stock, commercial volume, increment, losses, fellings and removals, change • Forest health, forest fires • Non-wood forest products • Trees outside forests <p>Needed Model data</p> <ul style="list-style-type: none"> • Sub-national units, Population data <p>Classification systems</p> <ul style="list-style-type: none"> • Local, FAO <p>Review of local data availability</p> <ul style="list-style-type: none"> • Country by country <p>Review of constraints</p>	<p>Informal Sector</p> <ul style="list-style-type: none"> • Statistics on Fuelwood • Statistics on non-wood forest products • Survey methods • <i>Working Group</i> <p>Formal Sector</p> <ul style="list-style-type: none"> • Production and trade statistics of industrial roundwood, sawnwood, wood residues, panels, pulp and paper • Yearbook of Forest Products • Capacity & price statistics, conversion factor • <i>Working Group</i> <p>Forestry Statistics and IT today</p> <ul style="list-style-type: none"> • Data structure, classification and definition • Collection, processing and dissemination of forestry statistics • Demonstration: National and international. exchange of forestry statistics and the role of national focal points • <i>Working Group</i> <p>Country by Country data review</p> <ul style="list-style-type: none"> • Hands on use of FAO electronic questionnaires • Historical country data review

APPENDIX II REPORT OF THE PARALLEL WORKING GROUPS

a) FOREST RESOURCES

Composition of the workgroup

Chairperson:	Ms Sebueng Kelatwang	South Africa
Rapporteur #1	Mr Kasizo Z. Chirambo	Malawi
Rapporteur #2	Mr Dominick Kwesha	Zimbabwe

Members:

Mr Afonso Zola	Angola
Mr Kemonnaa K Keapoletswe	Botswana
Mr Elias L. Sekaleli	Lesotho
Ms Carla Cristina Dinis Cuambe	Mozambique
Dr Themba L. Simelane	South Africa
Mr. Cliff S. Dlamani	Swaziland
Mr. Charles Taulo	Zambia
Dr. David Gwaze	Zimbabwe
Mr Lazarus Tawonezvi	Zimbabwe
Mr Peter Gondo	Zimbabwe
Mr. Jim Ball	FAO, HQ, Rome
Ms Saori Hirai	FAO, HQ, Rome
Mr Peter Lowe	FAO, Regional Office, Accra

1. Trees Outside Forests (TOFs)

The working group recognised the environmental and socio-economic importance of Trees Outside Forests (TOFs). It called for the assessment of their contribution to the economy in each country. The group reviewed the definitions supplied by FAO and noted these did not always match country perceptions of TOFs.

In the case of Zimbabwe, for example, the following definition was suggested:

"Trees not covered by present vegetation classification and planted or managed in situ, singly or collectively, in fields, live fences, gardens, streets, homesteads or urban centres, and providing goods and services to the local communities."

The working group noted that all the countries present showed interest in preparing country briefs on TOFs, and also observed that FAO was willing to support both the preparation of the country briefs and the pilot studies on TOFs.

Recommendations

- ◆ that a regional workshop be convened by FAO or another appropriate institution with country briefs used as inputs to the workshop; and that
- ◆ FAO should reconsider its present definition of TOFs, particularly as regard tree height and crown cover density.

2. SADC Classification of Forest Cover

The working group recognised the importance of having concrete terms and definitions, and that

these should be by national needs. It also noted the importance of networking on vegetation mapping to exchange information at regional level. It observed that harmonisation of vegetation classification has already been done through SADC and reaffirmed the importance of the classification. It noted that the member states have already endorsed this classification during a meeting held in 1997 (Pretoria).

Recommendation

- ◆ SADC will do what it can to find a donor to support the implementation of the SADC Vegetation Mapping and Information projects and the establishment of a network

3. Permanent Sample Plots for Monitoring Change

The working group recognised the importance of recurrent assessment of permanent sample plots for monitoring change in forest growth and health condition, and providing indicators of SFM.

Recommendation

- ◆ Member states should prepare a comprehensive review of the status of their PSPs, including the numbers of plots, location by eco-type, frequency of measurement, and date of establishment. This recommendation further supports the proposed role of FSTCU in compiling PSP information for the region (see *Regional Vegetation Project: SADC appraisal mission for mapping*, SCOT Counsel Report of 12/96, section 4.10).

4. Plantations

The working group observed that there is variation in the amount of plantation data and detail collected amongst the different member states, and that the reliability of this data leaves a lot to be desired. In particular, data collection from the private sector is difficult to acquire. It was also noted that the questionnaires from FAO were too detailed and laborious to complete.

Recommendations

- ◆ Data gathering institutions should closely liaise with the relevant stakeholders;
- ◆ FAO data collection forms should be standardised as far as possible;
- ◆ Where data is unavailable expert opinion should be used to make estimates.

5. Relevant Information

The group recognised that relevant and reliable information is essential for policy development, updating and revision. The Working Group identified the following data as being of importance:

- ◆ land uses; vegetation maps using SADC classification; rate of deforestation;
- ◆ NTFPs and NWFPs; TOFs (where significant).

Recommendation

- ◆ FAO should present country data sets such that countries only complete the sections relevant to their own circumstances

6. Institutional Aspects

All participants reported that their data collection capacity was limited by shortage of funds for operational activities to collect, store, and analyse data relevant to sustainable forest management.

Many participants reported difficulties in data collection and analysis due to high staff turnover and lack of continuity. Most countries reported the presence of skilled staff, but some do not, especially in certain fields such as data analysis. In view of the general trend towards privatisation, several countries expressed concern over the weak co-operation between the public and the private sectors and NGOs.

Participants recognised the increasing importance of participatory approaches in SFM. Forest Departments of member states should explore new ways of collecting data from community and other participatory schemes through partnership with NGOs where appropriate. Participants drew attention of FAO and other donors to the need for training and institutional support in the field of data collection and analysis for sustainable forest management and appropriate policy development.

Recommendation:

- ◆ FAO, among other institutions, should promote technical co-operation in all aspects of data collection and analysis between countries within the region, as well as support to the development of regional capability, within the framework of the TCDC programme.

7. Forest Health

The group recognised the consequences for forest health arising from increased human pressure, including the incidence of fires and high grazing intensity, which are severe actual and potential hazards to SFM. Information seems to be well recorded by most countries for fire, especially for forest plantations, although there is little information for natural forest. In general there seemed to be few problems with pests and diseases, although elephants and baboons were reported as damaging in two countries.

Recommendations:

- ◆ Countries should adjust figures on plantation areas where necessary, where necessary, to reflect loss due to drought or fire or other causes.
- ◆ Studies are required into the causes and economic importance of fires.
- ◆ Records should be maintained, distinguishing controlled fires from wildfires.
- ◆ There is a need for regional co-operation in monitoring fire outbreaks and extent.

8. Data Sets

The data sets prepared by FAO had not been received before the meeting by all participants and thus could not be checked by participants. The meeting noted that forest statistics should serve primarily national needs for SFM, but that countries should make such data available to international institutions and agreements in a timely manner within their capacity and the availability of the data.

Recommendations:

- ◆ Country contact points should review the data sets for their countries to see whether they are complete, up to data and accurate, and should return them when corrected to FAO as soon as possible.

b) FOREST PRODUCTS

Composition of the group

M. Naka- Mozambique	-	Chairperson
Anne Chishawa	-	Zimbabwe (Rapporteur)
Crispen Marunda	-	Zimbabwe
D. Mabvurira	-	Zimbabwe
D. Duwa	-	Zimbabwe
Memory Zirobwa	-	Zimbabwe
Walter Mapanda	-	Zimbabwe
J. Mulombwa	-	Zambia
S. Kainja	-	Malawi
Charles Omoluabi	-	FAO
Michel Laverdiere	-	FAO

Recommendations

1. Non-wood forest products (NWFP)

The group discussed about the format of the NWFP tables prepared by FAO. It agreed that there was very useful information to be gathered through that process. Definitions, contents and presentation were revised by the group and the following recommendations were produced.

1. That FAO re-examines the existing definitions of NWFP as the present definition tends to technically exclude NWFP from trees outside forests.
2. The Definition of NW goods should exclude the term “services rendered“ as it is covered under NW services.
3. The NWFP definition excludes woody products such as those used in farm implements, household implements, tooth brushing and cattle sticks. Thus it is recommended that forests statistics should retain the use of NTFPs to cover products which are not covered in the NWFP definition and timber sector definitions
Criteria for defining relative importance of NWFPs are not clear. It is therefore recommended that importance should be based on:
 - widespread use/local consumption; and
 - contribution to national economy.
5. For effective data collection on NWFP, FAO will need to lead in the development of appropriate methodology and measurement/assessment criteria for data collection on each product NWFP
6. It is recommended that statistics on NWFPs and NTFPs should be presented in text, GIS, and numeric formats for effective communication
7. The existing reporting format on NWFPs provided by FAO should include information on source, end users and final destination of product

2. Fuelwood production

The situation of fuelwood in Africa was reviewed. Data problems were also assessed. by the group with particular emphasis on timely update of data, assessment challenges, and product importance.

Recommendation

1. It is recommended that for effective national planning fuelwood statistics collection at national level should provide information on supply, demand, distribution and trade dynamics at regional levels within a country

3. Collection of Wood production Statistics

Participants noted the growth in small-scale wood industries (industries of the informal sector) in Africa resulting from economic depression. For reliable data collection on the forest industrial sector there is need:

1. To design means of capturing forest statistics from the expanding wood/forest based informal sector;
2. To establish a national contact office and to provide a focal point for contacts and coordinate data update;
3. (for FAO) to maintain support to countries with technical advise/training of national forest statistics personnel;
4. to harmonise electronic data transfer between different countries and FAO forest statistics office;
5. (for countries in the SADC region) to examine the forest sector in order to remove constraints that inhibit data flow due to organisational structures.

Feedback Mechanisms

1. Develop an interactive feedback mechanism to monitor use and the changing needs of the end-users

Capacity Building

1. Further support to enable countries to regularly update woodfuel databases;
2. Strengthening of national forestry sector capacity to collect, analyse, disseminate and maintain forestry statistics;
3. Support regional (FSTCU) networking initiatives in the forestry sector information and statistics;
4. Appropriate communication between forest state authorities and the private sector must be maintained and straightened.

APPENDIX III - FAO INPUTS

A) THE FORESTRY SITUATION IN AFRICA

by
Mr. Peter Lowe
Forestry Planning Officer
Regional Office for Africa (Accra, Ghana)
Food and Agriculture Organization
of the United Nations

1. Introduction

Mr Chairman, it is an honour and a pleasure for me to participate on behalf of FAO's Regional Office for Africa in this second workshop on data collection and analysis under the FAO-EC Partnership Programme. At the outset, I should like to convey the cordial greetings of FAO's Senior Forestry Officer in Africa, Mr. Pape Kone, who wishes us a week of hard but fruitful work.

The first workshop was held in Nakuru, Kenya, 12-16 October 1998, and was attended mainly by member countries of IGAD. Two further workshops are planned for next year; in Libreville, Gabon in May, and in Abidjan, Côte d'Ivoire in July.

2. Why Forest Statistics are needed

The needs for information about forestry in Africa, as in other regions, are expected to increase in the future for Africa's own use and for the international community. Broadly speaking, forestry information is used in three main areas:

- national policy development and planning
- investment appraisal and decision making
- international policy development and negotiation.

Without hard facts and analysis, foresters cannot expect to convince political leaders that their forestry concerns should receive more consideration *vis á vis* other sectoral priorities. Thus, it is not enough to assert that forests should be conserved. Whereas, from our perspective, an average annual deforestation rate of 0.7% for Africa may be deplorable, this may seem to others a small price worth paying for expanded agricultural production or cooking of food. Not only do foresters need access to incontestable facts, they need also to ensure that there is full awareness of the likely consequences of policy options.

When it comes to competing for development funding, foresters need to be able to present economic arguments based on quantifiable costs and benefits. Therefore, in addition to facts, there is a need to assess analytically the impacts on beneficiaries. Thus, rather than be content to assert that, during the "hungry season", many rural people depend on the forest to supplement their diets, there is a need to quantify how many families and to what extent.

Following the Rio Summit in 1992, there has been an ongoing discussion by the international community concerning sustainable forest management. The Africa participation in identification of

internationally agreed criteria and indicators was facilitated through an FAO/UNEP Workshop on Criteria and Indicators for Sustainable Forest Management in Dry-Zone Africa held in Nairobi in November 1997, in follow-up to the Expert Meeting held on the same subject in November 1995.

However, Africa's voice has not been heard as clearly as it should, particularly in regard to the conservation and utilisation of its own sovereign forest resources. The major impediment has been the lack of a commonly adopted negotiating position. For this to be achieved, policy makers need harmonised data aggregated on a sub-regional and regional basis, which FAO is mandated to assist.

3. What Forestry Statistics are needed?

Statistics and outlook studies are both central to the mandate of FAO which includes compiling, analysing and disseminating information on all aspects of agriculture and rural development, including forestry, at regional and global levels.

Most of the information about forestry in the Africa region currently compiled by FAO falls broadly into two areas:

Forest Resources:

- * information and statistics on the area, stocking, growth, condition and type of forest resources in countries
- * information on wood/fibre production potential of the forest resource;

Forest Products:

- * including information and statistics on production (including capacity), consumption, and trade.

Yet, in view of the broad scope of criteria and indicators of sustainable forest management, these data series do not fully satisfy the needs. In addition to the forestry statistics, FAO also compiles a wide range of extra-sectoral information relating to land-use, policy, institutional, social, economic and environmental factors and developments that have a strong bearing on the forestry sector.

Undoubtedly, the key development issue for Africa as a whole is Food Security. Food security is defined by FAO as access by all people at all times to the food needed for a healthy and active life. Achieving food security means ensuring that sufficient food is available, that supplies are relatively stable and that those in need of food can obtain it.

Although over the years governments, with support from FAO and other development agencies, have addressed food security and its related elements in many ways, today more than 800 million people in developing countries - about 20 percent of their total population - do not have sufficient food to fulfil their basic nutritional needs, despite worldwide increases in food supplies. In Africa, things are twice as bad, with more than 40% of people unable to enjoy food security and, unlike other regions, the absolute number of Africans affected is projected to worsen by the year 2010.

Studies undertaken by FAO, the World Bank and the International Food Policy Research Institute (IFPRI) all indicate that while global food supplies will be sufficient to meet the growth in global demand, sub-Saharan Africa may buck the trend; that is, the rate of increase in demand for food in this region is expected to outstrip the supply. The solution must be found in the ability of individual countries to pay for imports not covered by food aid. That is why, when we speak of

Food Security, we do not mean Food Sufficiency at the country level, nor on the household level because of the pressure of urbanisation.

Efforts to achieve food security in Africa will have an impact on forests, and will draw increasing attention to the supportive role that forests play in attaining food security. Increased production of food in developing countries is likely to be achieved through both intensifying food production on existing agricultural lands, and increasing the area of land available for agriculture. The conversion to agriculture is unstoppable. Whether this might be a positive contribution to Sustainable Development will hinge on the criteria by which forest lands are selected, their suitability for cultivation and the net economic and social profit over time associated with the new land use.

By adopting Food Security as a thematic approach for data collection, foresters can mount a powerful case for sustainable forest management. Consider, for a moment, the roles of forests, and of forests and trees outside forests, in providing the following benefits:

(i) Forest Protective Functions

Certainly, the most important contribution of forests to food security worldwide is their role in the protection of the resource base needed for agricultural production. Maintaining good forest cover on critical watersheds is essential for safeguarding a reliable and clean water supply for downstream irrigation systems, and for mitigating the effects of peak rainfall. In the past year, countries such as Bangladesh and China are struggling with extensive flooding attributed to deforestation, with consequent agricultural losses. In both Kenya and Uganda, heavy rains have caused severe damage earlier this year.

Trees used as windbreaks offer essential protection for agricultural fields; windbreaks are used the world over where risk of wind erosion, wind damage and desiccation is high.

(ii) Maintenance of Soil Fertility and Structure

Trees are found in intimate association with farming systems throughout the world in a vast array of agroforestry systems, attesting to their economic importance and, ultimately, to their supportive role towards the provision of food security. The oldest agroforestry system of all - shifting cultivation - relies on the regrowth of woody vegetation to restore soil fertility. The support provided by trees to agriculture, or to the welfare of the farm household including to food security, is most critical in subsistence farming or low-income households.

(iii) Forest Foods

A wide range of trees and forest products regularly provide a direct food source for people, or fodder for their livestock. While forests and trees are not the major suppliers of foods in most farming systems, they often provide important supplements and may be critical in places where there are strong seasonal cycles of food availability and scarcity and where risk of crop failure is high. In addition, they often provide 'fallback' foods in times of emergency or during the "hungry season". Tree and forest plant products and bushmeat generally make the greatest contribution to the diets of the rural poor who have limited physical and economic access to other foods. Grazing in open woodland pastures are vital for livestock.

(iv) Fuelwood for Cooking

In most African countries, fuelwood accounts for upwards of 75% of domestic energy requirements, mainly for cooking. This demand constitutes an obvious and major cause of deforestation in many countries, particularly when urbanisation is high. The homestead firewood demands of rural dwellers may not exhaust local wood supply, but the commercial exploitation for urban consumption can reach indiscriminately to the economic limits imposed by transportation costs.

Nevertheless, the sustainable management of forest for the provision of fuelwood constitutes an inescapable challenge associated with the need for food security.

(v) Commercialisation of Forest Products

Forest products are major sources of income for many rural poor in developing countries. Forests contribute to household food security by providing employment and products for sale. As with cattle, tree crops can serve as the household bank. They can be cashed in to pay for special occasions, such as school fees or clinic bills, and also provide families with an insurance against poor annual food harvests. There are, of course, many non-destructive uses of forests, woodlands and trees, such as hunting for bushmeat, honey gathering and gum extraction.

Forest industries and exports of forest products generate income and foreign exchange, thus financing the import of essential foodstuffs. Logging of natural forest therefore contributes to food security in many countries.

4. African Challenges

Many of the forest goods and services listed above are more important regionally, to Africa, than they are globally. Certainly, the underlying driving force of agriculture and the quest for food security are inescapable.

With regard to forest products statistics, it is recognised that in Africa much production, consumption and exchange occurs through informal channels so that the forest products data FAO receives and publishes are valid mostly for the monetised part of the region's economies. This inevitably means under-reporting the full extent to which demands are being exerted upon forests by demand for forest products.

Statistics on non-wood forest products (NWFP) production and trade are very weak. For key products, such as gum arabic, customs statistics can be accessed through the international trade database (COMTRADE) of the UN Statistical Office, but production information is incomplete and is not systematically collected. Due to the wide array of NWFPs and problems of definitions, reporting cycles and units of measurement used for NWFPs in different countries, compilation of international statistics is quite challenging. A general weakness is that FAO does not publish NWFP statistics due to their being relatively insignificant at global level; current thinking is to promote regional statistical publications in which products of regional importance can feature.

The fact that this series of FAO-EC Workshops of forestry data have been organised on a sub-regional basis is based on a recognition of the diversity of Africa. The various sub-regions are characterised by widely differing ecosystems, forest types and richness. Not only do they differ in

natural endowments. Even within sub-regions, the countries may have inherited different administrative systems which overlay a rich diversity of customary practice in regard to land and forest use.

Although the collection of forestry data may be shared with non-governmental entities, it is a primary responsibility of government administration. Generally, statistics may be generated at a local level but the manner of their collation and national reporting is heavily reliant on the degree of decentralisation in government structure, and the flow of revenues associated with primary statistics. But, even disregarding this hierarchical aspect, foresters are may be hampered by the unnatural divisions imposed by the line ministries involved. Thus, wildlife - to which the forest habitat is an integral part of the ecosystem - may commonly be the responsibility of another ministry. Similarly, production and trade statistics may be collected by ministries completely removed from the sector.

No sub-region of Africa has been immune to the disruptions arising from internal strife, natural calamity or collapse of political order. Most countries are relatively poor in world terms and many are struggling with the obligations incurred under Structural Adjustment to reduce administrative capacity. Although most countries in the region have achieved a degree of institutional maturity in their forestry services, the loss of experienced and talented professional and technical staff represents an unaffordable loss in human talent and institutional memory.

Yet, the International Community is engaged in a continual process of increasing complexity involving heavy additional burdens on national governments in terms of data requirements.

5. Future Prospects

Although the realities described above will continue to impede and limit the availability and quality of forestry statistics - particularly at field level - the prospects for regional and sub-regional co-operation have improved beyond recognition with the potential of internet access.

A major improvement in the dissemination of international forestry and related statistics has been the development and updating of forestry statistics databases on the World Agricultural Information Centre (WAICENT) available on the FAO INTERNET site. WAICENT carries information on forest resources as well as forest products; forest products data on WAICENT is now updated four times a year as new or revised data are received from countries.

For the entire range of data from resources to products, the long-term solution to statistical quality lies in capacity building in all countries for data collection techniques but also for equipment and skills in identifying and appraising information needs and in analysing and interpreting it. This workshop will play its part in that process. FAO's Regional Office for Africa has prepared draft *Methodological guidelines for improving Forestry statistics in Africa* which are currently being reviewed; your comments on these during the week would be welcomed.

FAO has identified the need for as Forestry Outlook Study for Africa (FOSA), similar to that for the Asia and Pacific Region which has just been completed. The study would build upon ongoing studies and activities - particularly, the series of data collection and analysis workshops in which we are participating. FOSA would go further, however, to provide an overall prognosis on a regional and sub-regional basis to assess the prospects for sustainable development in the forestry sector to a

horizon year of 2020.

Strong working partnerships are being forged with other international, regional and sub-regional organisations. Already the EU is supporting the key component relating to data collection and analysis. The African Development Bank has expressed its concrete desire to be associated with FOSA, and FAO has recently strengthened its regional presence in Accra and Harare with the out-posting of four Regional Officers.

The proposed outlook study has been welcomed and endorsed and afforded high priority by African Governments at the 11th Session of the African Forestry and Wildlife Commission (AFWC) in Dakar, April 1998. Furthermore, the AFWC commended FAO to work closely with sub-regional organisations, such as SADC, in carrying out FOSA.

b) DOCUMENTATION PROVIDED BY FAO

Forest Resources

- ◆ Forest Resources Background Information,
- ◆ Country Briefs,
- ◆ Note on data collection for the Global Forest Resources Assessment 2000,
- ◆ NWFPs statistics paper,
- ◆ Maps of Protected Areas of each countries, prepared by WCMC,
- ◆ Vegetation map prepared by EROS data Centre,
- ◆ Terms and Definition of FRA2000
- ◆ Guidelines for Assessment in Tropical and Sub-Tropical Countries, FRA2000
- ◆ Working Paper on Trees Outside the Forest.

Forest Products

- ◆ Objective and functions of economic and statistical information for the forestry sector,
- ◆ Organising Forestry Statistics, Collection Processing Dissemination,
- ◆ Using Information Technology for Forest Products Data Processing and Exchange,
- ◆ Forest Products: Production, Consumption, and Trade (1996, Africa)
- ◆ Measurements of Forest Products,
- ◆ Collecting Production Statistics,
- ◆ Collecting Trade statistics,
- ◆ Statistics on Woodfuel, an introduction,
- ◆ A Forestry Statistical Office,
- ◆ Synopsis on Country brief on Forestry Statistics,
- ◆ FAO Yearbook of Forest Product country data, for revision 1961-1996,
- ◆ State of the Art of the information on Woodfuel in East-Africa countries.

FAO Electronic media:

- ◆ FAOSTAT/PC Forest Products (2 floppies + installation manuals),
- ◆ FAOSTAT/CD (1 CD),
- ◆ Yearbook of Forest Products 1992-1996, publication in Acrobat format (1 floppy),
- ◆ Pulp and Paper Capacity Survey 1997-2002, publication in Acrobat format (1 floppy),
- ◆ FAO Yearbook of Forest Product country data, for revision 1961-1996 (1 floppy),
- ◆ FAO Yearbook of Forest Product questionnaire(a prototype in Excel).

FAO Publications:

- ◆ Yearbook of Forest Products 1992-1996,
- ◆ Pulp and Paper Capacity Survey 1997-2002,
- ◆ Pulp and Paper Mill List,
- ◆ Statistics Today for tomorrow, 1945-1994, 2010,
- ◆ State of World's Forests, 1997,
- ◆ Proceedings, FAO Working Group on Forestry Statistics, Rome, 1996,
- ◆ Report of the Internat. Expert Consultation on NWFP, Yogyakarta, 1995.

C) Note on data collection for FRA 2000

This note briefly describes the interrelation between the Global Forest Resources Assessment 2000 and the EC-FAO Programme “Data collection and Analysis for Sustainable Forest Management: Linking National and International Efforts”.

The Global Forest Resources Assessment 2000 (FRA 2000)

The FAO, in cooperation with its member countries, is currently conducting the Global Forest Resources Assessment 2000 for the tropical - and sub-tropical countries. Outputs will include information on forest area (status 2000 and change), ecological aspects of forests and economical potentials of forests. The assessment work depends on collecting, analysing and standardising of existing country data/information on forest resources. Data are collected in close cooperation with the countries, in the following ways:

- ◆ Organization of regional workshops, with participation of country contacts
- ◆ contributions by regional cooperators and consultants, involving country missions.
- ◆ documentation and library search.

The collected or provided country data, adjusted to a common international classification scheme, will be stored in the FAO FORIS (Forest Resources Information System) database. FAO will then estimate country forest area figures for the years 1990 and 2000 by applying enhanced and updated adjustment functions which relate forest area changes to ecological settings and human population developments. Prior to publication, the assessment results will be presented and/or disseminated to the countries for comments and agreement, also through a number of workshops.

Link with EC-FAO project in ACP countries

Currently, a joint EC- FAO Partnership Programme: is being implemented in the ACP-countries (Sub-Saharan Africa and the Caribbean). Data are collected on forest resources and forest products, and the former will to a large extent serve the needs of the FRA 2000 programme. A number of “data collection” workshops will be organised. Prior to the workshops country data on forest resources compiled by FAO (presented in country briefs) are sent to the country participants for review and update, together with guidelines and tables for data collection.

During the workshops, FAO staff and country participants will jointly review and further complete the country data, and discuss follow-up actions on data collection. At the workshop, the Guidelines for Assessment, will be distributed and discussed.

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D) TREES OUTSIDE THE FORESTS (TOF)

by
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Summary of Activities

The Forest Conservation, Research and Education Service (FORC) has assisted Project GCP/INT/679/EC mainly in developing the component *Trees-outside-forests* (hereinafter referred to as "TOF"). In order to set the stage for this topic, a letter of agreement has been signed with ORSTOM (France) to undertake a General Study entitled "Assessment of Trees-outside-forests: Taking Stock". This study aimed to:

- ◆ clarify the definition of TOF, have a better understanding of the resource, its classification, the opportunities and constraints of existing methodologies of assessment and, lessons learned and data from experiences in different regions of the world;
- ◆ initiate an International Consultative Group to orient and support FAO in the implementation of the TOF component of the Project and for the general topic development.

Within this framework ORSTOM has organised in Orléans, France, from 21 to 23 September 1998, a workshop for 40 participants with expertise in developing and developed countries related to management, assessment and inventory of TOF. The majority of the participants came from France (such as CIRAD, CNEARC, CNRS, EHESS, ENGREF, INRA, MNHN, ORSTOM, Université P. Sabatier de Toulouse, Services de l'Inventaire Forestier National), but also from UK (ODI), Netherlands (National Reference Centre for Nature Management) and Cameroon (University of Yaoundé). ORSTOM will present the findings of the study at the end of December 1998.

During the regional workshops in Nakuru (Oct. 1998) and Mutare (Nov. 98), a paper has been distributed entitled "*Trees-outside-forests: Towards a better understanding and assessment of TOF resources - brainstorming points*". The report (see below) introduces the topic and stimulates the discussions around 4 questions:

- ◆ what are trees-outside-forest resources;
- ◆ why to assess(inventory?) TOF and for whom?
- ◆ how to assess TOF resources?
- ◆ who assess TOF resources?

During this meeting, the Forest Action Network - FAN (Kenya) assisted the FAO team in facilitating and reporting on the sessions related to TOF. FAN will pursue its collaboration supporting a specific networking on TOF among the countries in Southern and Eastern Africa.

It is important to mention the other activities funded by FAO Regular Program and by FRA2000 which contribute substantially to the process initiated by the Project. Among these activities are the three Regional Special Studies for Latin America (CATIE), Eastern and Southern Africa (Makarere University), and Asia/Pacific (institution to be identified) entitled: "*Valuation and Evaluation of Trees-Outside-Forests: a first step in contribution to FRA2000 and topic development*". Other

national studies in ACP countries are planned. A similar process will be adopted for the other sub-regions, namely the workshops to be held in Ivory Coast, Gabon, and the Caribbean.

In early 1999 (proposed date March 1999) it is expected that the preliminary results of the Project and of other FAO activities around TOF will be discussed during a Seminar in FAO/HQs in Rome, where the International Consultative Group would meet for the first time. The outcome of the Seminar would provide the basis and recommendations for the activities to be carried out in order to achieve the objectives of the Project (methodology development process and outlook studies related to TOF in the ACP countries). The activities around the pilot countries (Uganda and Zimbabwe) will be based on strong networking within the country and with the other countries, in order for all of them to contribute to the process and benefit directly from it for their national capacity building.

Introducing Trees outside the Forests (TOF)

‘The significance and functions of Tree Resources Outside the Forest (TOF) are very diverse and can locally be very different in nature and importance. Particularly in the tropics TOF play a prominent role, embracing many ecological functions (e.g. conservation of biodiversity, erosion control, carbon sequestration, etc.), but also direct economic functions (e.g. provision of firewood, fodder, fence-posts, living-fence posts, etc.). TOF are present in various land use classes but do not form a land use class on its own. This makes a large area assessment for TOF difficult. Compared to other natural resources little is known about TOF on a large area basis (e.g. floristic composition, spatial distribution, and functions of biomass). The ever-decreasing forest cover and increasing forest fragmentation, however, increase the relative importance of TOF. The need for better data and information is therefore obvious and expressed by many natural resource managers, planning institutions and projects that all want to include TOF into their planning activities. This need for more information is valid for many regions, particularly in regions where forest cover is very low and where tree components in agroforestry systems are intensively promoted’.¹

TOF data is currently not systematically recorded in national forest resources assessment and in the Forest Resource Assessment Programme (FRA) of the FAO but it has been identified to be an essential element for Sustainable Forest Management. Gathering and analysing data on TOF is a difficult task, and data on fuelwood, non-wood forest products, forest plantations and environmental services must be taken into consideration.

The objective of this paper is to:

- ◆ present some elements showing the complexity of the topic;
- ◆ present some on-going or planned initiatives undertaken by FAO and other institutions related to TOF;
- ◆ open a discussion among the participant of ACP countries present to this workshop on “why, for whom and how to assess the TOF- resource”.

It is hoped that at the end of the workshop the subject of TOF has caught the attention and evoked the interest of the participants. It is hoped that there are suggestions made to introduce TOF in the assessment methodology development process, and in particular in the framework of the different components of the DG-VIII project, as for instance through the pilot country studies.

¹ Source: CATIE – ‘Tree resources outside the forest: Development of methods for assessment and monitoring of natural resources to support regional planning, with study areas in Central America- 1999-2002’. Notes on EC-DG XII project.

Trees-Outside Forests: Taking Stock

What are trees-outside-forest (TOF) resources? Why to assess (inventory?) TOF for Whom ? How to assess TOF resources? Who assess TOF resources?

In the framework of the DG-VIII project, FAO is undertaking a study at world-wide level in partnership with ORSTOM (France). This first step aims to review the concept and definition of TOF, review the available information (including assessment and inventory methods, institutional experiences), and propose methodology assessment and data collection framework. To start to answer the questions mentioned above (see box 1) ORSTOM has organised a seminar on Trees-outside-forest in Orleans, France, from 21 to 23 of September 1998. These experts coming from different disciplines and with world-wide practical research and assessment experience on TOF resources looked at these questions. The discussions confirmed that there is no one easy answer.

TOF as defined by the FAO (see definition below) is a ‘non-category’. TOF are found in rural and urban area, on agricultural lands and other than forest and non-wooded-land; they constitute a wide diversity of species and systems, and are under the responsibility of several institutions.

Trees outside forest as defined by KOTKA III: Trees on land not defined as forest and other wooded land.

- ◆ Trees on land that fulfils the requirements of forest and other wooded land except that the area is less than 0.5 ha;
- ◆ trees able to reach a height of at least 5m at maturity *in situ* where stocking level is below 5 %;
- ◆ trees not able to reach a height of 5 m at maturity *in situ* where the stocking level is below 20 %;
- ◆ scattered trees in permanent meadows and pastures;
- ◆ permanent tree crops such as fruit trees and coconuts;
- ◆ trees in parks and gardens, around buildings and in lines along streets, roads, railways, rivers, streams and canals;
- ◆ trees in shelterbelts of less than 20 m width and 0.5 ha area.

Source : KOTKA III, 1996

At the workshop in Orléans, it has been suggested that while defining and classifying TOF, a particular attention should be paid to specific particularities of these resources such as :

- ◆ the notion of multiple use and multi-function;
- ◆ the dynamic of the evolution of the resource: deforestation, degradation, afforestation, spontaneous regeneration;
- ◆ anthropic pressure: to understand the management aspects of TOF, it is essential to introduce the complexity of agricultural and pastoral systems and consequently, to take inventory of practices and use according the cases;
- ◆ the role of TOF in tenure and political issues, namely the relation with deforestation, forest clearing, plantation, access to land and resources;

- ◆ the coherence between the categories of resources distinguished in field visit and those by other methods (such as tele-detection and cartography);
- ◆ the coherence between different scale of needs: sub-national, national and supra-national ; at one end of the spectrum, the poor people depend on TOF for their role in nutritional and food security, farm system conservation and income generation; the other end of the spectrum represent the contribution of TOF to regional and global issues and the commitment of countries to convention such as on biodiversity, desertification and carbon substitution and sequestration.

Why assess TOF and for whom? How to assess TOF resources and Who assesses them?

Why and for whom are definitively un-separatable. A look at the studies on Kenya and India provide insight on the assessment of specific TOF and how it may be useful to users of these data, namely communities, natural resource managers and planers, politicians and decision makers at different levels.

KENYA – FARMLAND RESOURCES ASSESSMENT

In the article 'Not all African Land in being degraded : a recent survey of Trees on farms in Kenya reveals rapidly increasing forest resource' the authors present results from a survey of woody biomass on farmland in Kenya. The survey, which covers 10 million ha where 80% of the country's population lives, revealed a rapid increase of planted woody biomass between years 1986-1992. Its also revealed that wood on farmland can become a major source of raw material for the wood industry, since the standing volume is larger than that found in conventional forests; question some pessimistic opinions on land-use development and fuelwood gap theory and land degradation is not directly related to rapid population growth. Kenyan farmers seem to apply wise and sustainable-management practices, including tree growing. It is suggested that a secure land-tenure system on agricultural land is a significant reason for this recent development.

Source: P. Holmgren, E.J. Masakha and H. Sjöholm. 'Not all African Land in being degraded : a recent survey of Trees on farms in Kenya reveals rapidly increasing forest resource'. The Royal Swedish Academy of Sciences. AMBIO. 1994.

NON-FOREST AREA INVENTORY

In India, a section of the State of Forest Report in 1997 is dedicated to Non-Forest Area. From 1991-92 the Forest Survey of India (FSI) took up inventory of trees growing outside conventional forest areas in the country. The main objective of the inventory is to assess the extent of plantations raised under various social forestry schemes by different agencies. The sampling design, field formats, data processing methodology have been developed at the FSI. Planted trees are classified in eight categories: Farm forestry, Village woodlots, Block plantation, Road, Pond, Rail and Canal side plantations and Other. The inventory of the non-forest area of Haryana has been completed in 1997. The result reveal that farm forestry contributes about 41% of the total standing volume of wood in non forest areas in Haryana, followed by village woodlots (23%), Roadside plantations (13%) and Block plantations (11%).

Sampling Design – Non Forest Area: The sampling design adopted for this inventory is a two stage stratified sampling. Sampling unit in the first stage is a district and in the second stage a village. While taking up the survey of a state, optimum number of villages to be surveyed is determined on the basis of data obtained from a pilot survey. The number of villages to be inventoried in a district is decided according to proportional allocation. Trees standing in the selected villages are enumerated and measured by the field parties. Compilation and data processing is done district-wise.

Source: State of Forest Report 1997. Forest Survey of India (Ministry of Environment and Forests). Dehra Dun, 1997.

Activities in TOF Resource Assessment

As said previously, TOF resource is not subject to any systematic assessment and is not taken into account at its real importance in the decision making process regarding natural resource management. But data on TOF is needed for sustainable development. FRA 2000 will enlarge its assessment to trees-outside-forest and will help the countries to strengthen their national capacity to proceed to these assessments. However, data related to TOF is:

- ◆ scattered;
- ◆ of diverse a nature and quality (e.g. revenue and product flow marketed on international market);
- ◆ gathered for different objectives (e.g. tax perception, fuelwood supply, marketing study);
- ◆ available in different institutions and organisations (e.g. palm oil exported revenue in agriculture department, fodder biomass in agro-forestry research institutions, home-garden and multipurpose tree cover by bilateral projects, wood production by hedgerow plantations) data exist that inter-sectoral and integrated approach will have to consider.

The EC-FAO partnership project propose to the countries of the region and those present to discuss these questions and see how to develop assessment methods including pilot-country studies. It is hoped that during the next months it will proceed to the compilation of conceptual and operational preliminary information on:

- ◆ review of the FAO definition of TOF and provide technical information on terminology and classification (systems and species, distribution, structure; land cover/use) used by FRA and other programme/institutions, of resource and related products in the environmental, economic and social context.
- ◆ review the available information at country, sub-regional and regional level related to TOF: (i) assessment and inventory methods; (ii) data basis (to analyse information such as needs, uses and potential of resources and products, inventory methods).
- ◆ provide various countries of the region the list of institutions involved in different aspects related to TOF (resources and products) assessment such as in national planning, trade statistics, forest and agriculture assessment, environmental impact assessment. Why and where and how these institutions are related? What is the definition used?

It is hoped to discuss the results of these studies during an International Meeting on TOF (probably in Rome, end of February 1999) which would invite institutions and resource person of ACP countries, other regions of the world and different departments of FAO to discuss how to combine our efforts to implement the DG-VIII project, contribute to FRA 2000 report and provide general orientation to the development of the topic. An International Consultative Group would be created to support a better integration of TOF resources into sustainable natural resource management

E) METHODOLOGICAL GUIDELINES FOR IMPROVEMENT OF FORESTRY STATISTICS IN AFRICA

A REPORT ON DEVELOPMENT OF FORESTRY STATISTICS IN AFRICA - BASED ON AFWC-FAO INITIATIVES

By

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Background

While Forestry Statistics is important in the planning of sustainable management of forest resources, its general situation in terms of collection, compilation processing and dissemination in Africa remains unsatisfactory. The poor situation of Forestry Statistics has been identified years ago as the principal factor limiting the quality of National Tropical Forestry Action Plans.

At the 1995 session of the Forestry and Wildlife Commission for Africa (AFWC) which took place on the 27th of November 1995 in South Africa, the deplorable situation of Forestry Statistics in Africa was re-echoed and proposals were made to FAO to work towards strengthening African countries in forestry data collection and analysis.

In response to this problem, the preparation of a methodological guideline for the use of African countries for the collection, processing and dissemination of forestry statistics, including resource base information was proposed as one of the activities needed for the development of Forestry Statistics in Africa.

This conclusion led to the reporting officer's recruitment as a consultant on the subject by the FAO Regional Office for Africa, Accra in September - October 1997 when he was under the employment of the Forestry Management, Evaluation and Coordinating Unit (FORMECU), Nigeria. The opportunity for the consultant to present this report at the FAO workshop in Zimbabwe 1998 was created by the re-engagement of the reporting officer (consultant) on a short-term appointment after an earlier service to FAO in the Sudan.

The objective of the presentation of the report on " Methodological Guidelines for the Improvement of Forestry Statistics in Africa" during the workshop was to generate discussions that could lead to the improvement of the report and strategies for Forestry Statistics Development in Africa. It was also aimed at exposing the workshop participants who are also a core group in African Forestry Statistics Development to the observations and recommendations of the report for their reaction. The need to present the is also justifiable by the fact that the consultant concluded that the report could not be described as a final document as the expert suggested that sub-regional or country guidelines should be the ideal target.

The terms of reference according to the consultant were specific:

- ◆ Analyse in general the situation of Forestry Statistics in Africa using existing documents and by studying the situation in Ghana and Togo.
- ◆ Analyse the legal and institutional organisation of the countries as well as the capacity of their national technical services to collect and manage reliable forestry data.
- ◆ Assess the needs in terms of personnel and logistics for adequate and effective management of data essential to the development of the forestry sector in Africa.
- ◆ Propose the structure and content of a methodological guideline for the improvement of collection, processing and management of Forestry data (including the resource base).
- ◆ Prepare methodological guideline for the use of African Countries, with the view to improving collection, processing and the management of statistics on forest resources and products.

Organization of the Report

The study report was presented in nine chapters. The study background, objective and terms of reference were highlighted in Chapter one. Chapter two presented the status of Forestry statistics in Africa with particular references to the situations in Ghana, Togo and Nigeria.

Highlights of the major groups of databases including major variables that are needed for the improvement of Forestry Statistics in Africa were carefully identified in Chapters 3, 4, 5, 6, 7 and 8.

Chapter 9 provided some useful field guides to facilitate data collection for the establishment and update of the identified databases. Useful past experiences of the specialist in data formats design and in the implementation of surveys were provided in this Chapter.

Finally, proposals for development of Forestry Statistics in Africa were made in Chapter 10 as recommendations of this report.

Scope of the Study

Based on the observations in the countries studied during the assignment, major constraints to the development of forestry statistics in Africa were identified by the consultant. Proposals were made to address these problems and enhance the status of Forestry Statistics in the region

According to the consultant, the major databases including their contents that are required for forestry planning, policy formulation policy analysis and development programmes monitoring for the sustainable management of forests were also identified in this report. The uses to which the identified databases can be put in forestry planning, policy fine-tuning and forest management decision taking processes were fully noted.

The consultant made no attempt in the report to exhaust the list of data required. He noted that the sustainable management of the complex forest ecosystem of Africa and its innumerable resources requires expertise from many disciplines including ecology, silviculture, biometrics, rural sociology, economics, remote sensing, cartography, soil science and engineering. The consultant observed that the growing expertise in these fields in Africa would naturally expand forestry database in Africa in the future.

No attempt was also made to provide field formats for data collection. The design of formats according to the specialist should be the responsibility of individual countries. He observed that data acquisition, processing and storage is expensive and that data interests and emphasis of each country will depend on country potentials. This fact, country socio-political structure, forestry organisation and data collection cost considerations will determine data scope, format structure and final guidelines for data collection. Finally, the following observations and recommendations were made for development of forestry statistics in Africa.

Findings of the Consultant

The consultant observed that available data for sustainable forest management in Africa are currently inadequate and unreliable due to:

- ◆ The methodology of collection and estimation;
- ◆ Poor responses from the field (particularly from industries);
- ◆ The limited scope of data collection programme (wood-based industries data, products consumption data and NTFPs data usually neglected);
- ◆ Data loss due to institutional arrangements and occasional instability arising from survival and competition problems and office relocations;
- ◆ Manpower quality and staff retention problems;
- ◆ Available infrastructure for processing, storage and retrieval (computers);
- ◆ Untimely update of databases;
- ◆ The lack of data development programmes;
- ◆ Absence of compelling legal instruments; and
- ◆ Inadequate funding.

The specialist affirmed that it was clear during the study period that all the countries were in problems with data coordination. For example, he noted that the Forestry Commission of Ghana which assumes the responsibility of forestry statistics coordination in the country was lacking in manpower and infrastructure. Like Ghana, the planning cell of the Federal Department of Forestry responsible for data coordination in Nigeria was equally lacking in manpower and infrastructure.

However, the expert commended the efforts of some field Departments of Ghana, in particular, the Forestry Management Capacity Building Unit based in Kumasi. The Cross River State of Nigeria has equally made some commendable progress in forestry data acquisition and database development.

These success cases which the consultant found in bilateral project units demonstrate the importance of finance in Forestry Statistics Development and the potentials of international support for forestry development in Africa.

Conclusions and Recommendations of the Report

The poor status of forestry statistics in Africa can be associated with institutional weaknesses in general. The indices of forestry sector weaknesses in Africa include the poor structural organisation of forestry units in many countries; inadequate expertise and manpower; poor funding of programmes; and weak support for enacted laws and enunciated policies.

The Forestry Sector in most African countries require internal re-organisation to acquire the needed

capacity to collect adequate and reliable data. While there are no strong barriers to the effective functioning of forestry in this domain, the structural organisation of institutions of the forestry sector in most African countries hinder data flow. Roles and responsibilities with particular reference to forestry statistics should be well defined. International assistance in statistics development should assist countries to organise structurally by proposing units and relationships that are best fitted into their socio-economic circumstance. Established units within the forestry sector should be strengthened to acquire capability in the maintenance of databases relevant to their specialisation.

Communication problems exist within the forestry sector of many African countries. This can be accentuated by country administrative and governance systems; number of forestry sector institutions and ministerial location of units. To improve forestry statistics and information on the forest environment, the communication problems that can be associated with the situations above have to be well managed to reduce the problems of data co-ordination, data validation and duplication of effort in forestry data acquisition, processing, storage and dissemination. Programmes for forestry statistics development in Africa must establish the appropriate infrastructure for improved communication between forestry units and for data flow to the National Forestry Statistics Co-ordinating Unit.

Communication with other national agencies in forestry statistics such as the National Bureaux of statistics, the Central Banks, Export Promotion Boards, the Ministries of Trade, the Ministries of Industry and the Customs Departments should be improved for greater access to forestry information within their domains.

As national infrastructure for telecommunication improves, Forestry Units should be assisted to operate national networks for the promotion of information sharing and dissemination nationally. The overall ambition of the forestry sectors of Africa should be their connection to the rest of the world through Internet.

In identifying the databases in this report, the survival of the growing specialised units in African forestry such as Forest Management Units, Rural Forestry, Marketing and Utilisation, Remote Sensing and Cartography, Planning and Statistics have been assumed. The conclusion here is that a National Forestry System that is well organised and structured with officers that are professionally oriented is important to development of an efficient Forestry Statistics in Africa. These Units require national political and financial support for growth and survival.

While Forestry databases need co-ordinating officers, forestry data collection and processing should remain a major item in the schedule of all field staff. There is a need to re-emphasise the importance of field record keeping systems, such as timber extraction records; records of forest revenues including, revenues accruing to land owners; forest regeneration records including operations costs; summary of forest offences; and records of forest reservation and de-reservation.

Intensive training of officers will be needed for the development of forestry statistics in Africa. For training effectiveness however, training modules must be directed to the immediate functional responsibilities of officers. All forest officers must be made to acquire computer literacy at least in word processing, use of DOS, spreadsheets and data management programmes.

Databases should be processed analysed and published for users. Published hard copies are important in safeguarding data losses that are possible during major computer breakdowns. Forestry

information centres and libraries should be developed as part of statistics development programmes.

NTFPs collection, processing and marketing form part of the crucial economic base of many rural communities in Africa. Due to the lack of data on the contribution of the products to national income, however, the NTFPs sub-sector has not received the needed policy and political support for their sustainable management. Forestry data collection programmes will need to focus a little more attention on the products. The NTFPs sub-sector is critically short of data.

The collection of timely, adequate and reliable data is expensive requiring competent statistics co-ordinators, forestry experts and support staff. Equipment and funds are also involved. For the development of forestry statistics in Africa, forestry statistics projects are necessary to define data collection objectives, data output expected and data delivery time. National budgets for forestry in Africa must therefore provide for forestry data collection annually.

Poor response to requests for data is one of the problems militating against forestry statistics in Africa. For example, industries do not readily release production information (inputs and outputs). The problem of poor response is also common where governance system is highly decentralised such as in strong federalism where states are responsible for the management of their forest resources. To effect behavioural change some compelling legal instruments may be necessary in some countries to enforce data supply to National Statistics Co-ordinating Units. However, this measure should be used only where the avenues opened for consultation within the sector such as National Forestry Development Committees or National Forestry Development Commissions are unable to use their auspices and communication channels to resolve issues of poor responses to forestry statistics.

Linking the Report to Forestry Development Programmes in Africa

The draft report completed by the consultant, according to Michael Martin, Chief, Forestry Planning and Statistics Branch, became part of the conceptual foundation for the EC- FAO Partnership programme on Data Collection and Analysis for Sustainable Forest Management in Africa and the Caribbean.

The project's on-going sub-regional workshops according to the Chief, are designed to support and assist AFWC member countries in underscoring the value of good statistics, highlight data needs and identify opportunities to strengthen their statistical capabilities.

The head of the FAO Forestry Statistics Branch concurs with the consultant's suggestion that sub-regional or country guidelines should be the ideal target.

The AFWC who discussed the report during its inter-sessional meeting of the Commission in Accra, 26-30 October 1998 equally commended the potentials of the report. Extracts from the proceedings of the meeting of the Commission on the report were as follows.

- ◆ "The meeting noted that the case studies featured in this paper were focused geographically on West Africa, although it drew on regional material, including country submissions on the 1997 FAO statistics survey.
- ◆ The Meeting also pointed to some possible areas for improvement in the paper. For example, the author's reference to revenue collection as a motivating factor for data collections in many

countries could be misleading for various reasons. Concern was also raised over the exhaustive scope of data series proposed, which was considered over-ambitious in the context of present capacities in most countries.

- ◆ Overall, the Meeting commended the potentiality of the paper, but suggested that more work was required before finalisation. In particular, that: (i) the author should recommend a minimum database for each country; and (ii) FAO should arrange a workshop to discuss the document, in line with recommendations from AFWC"

APPENDIX IV LIST OF PARTICIPANTS

Summary:

International Country Participants:	12
Zimbabwean Participants:	9
Observers (NGO - Intern. Organisation):	2
FAO Staff and Consultants:	5
TOTAL:	28

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APPENDIX V COUNTRY CONTRIBUTIONS

OVERVIEW OF FSTCU (SADC) PRESENTATION

The SADC Forestry Sector Technical Coordination Unit (FSTCU) mandate, responsibilities and functions are based on the decision of the Council of Ministers that met in Maseru, Lesotho in 1985.

Mandate:

Monitor sector projects;
Facilitate identification of opportunities;
Coordinate policy, research, and training;
Mobilize resources for approved projects;
Organize technical meetings, workshops, and seminars;
Manage relevant information/data; and
Review Forestry Sector Program of action.

Responsibilities:

Consultations with member states and Secretariat;
Liase with co-operating partners; and
Provide leadership and technical services for advancement of SADC programme of action.

Functions:

Organise SADC Sectoral Committees of Ministers & Officials;
Organise sectoral consultative meetings with Cooperating Partners;
Disseminate sectoral meetings outcomes to member states;
Prepare sectoral strategy papers;
Initiate Project Activities;
Assist identification of Project financing;
Mobilise pledges made by Co-operating Partners;
Provide technical back-up on Project funding;
Witness signing of agreements; and
Report on progress of Programme.

SADC-FSTCU Programme:

Forest Training and Education;
Forest Research;
Forest Utilisation and Trade;
Forest Resource Assessment;
Forest Resource Management; and
Forest Industry Development.

Projects:**Funded projects**

Urban Fuelwood Project (AAA.5.3);
SADC Tree Seed Centres Network (AAA.5.5);
S. African Biodiversity Programme (AAA.5.6);
Improvement and Strengthening of Forestry Colleges in SADC Region (AAA.5.9);
Centre for Advanced Practical Forestry Training (-Urban fuelwood Project (TAN.5.16); and
Reforestation and erosion control at Nacala (AAA.5.14).

Partially funded projects

Sustainable Management of Indigenous Forests (AAA.5.20); and
Regional Herbarium and Conservation of Endangered species (AAA.5.20).

Unfunded projects

Regional Vegetation Mapping;
Capacity Building in extension for Community Forestry in the SADC Region (AAA.5.12);
Agroforestry in Arable and Pastoral farming (AAA.5.19);
Formation of SADC Timber Association (AAA.5.22);
Strengthening of forestry and Forest Products Research (AAA.5.23); and
Development of Forestry Information Management Network System in SADC Region (AAA.5.24).

Challenge for FSTCU

Funding

FORESTRY DATA ON ANGOLA

by
 Alfonso Senior Institute of Forestry Luanda - Angola
 Zola Officer Development

PRELIMINARY COUNTRY DATA (ANGOLA)

Total land area (ha)	124,670 000
Natural forest area 1990 (ha) /% of the total land	23,074,000 / 19%
Annual deforestation 1980-1990 (ha) / rate	174,000 / 0.75%
Annual allowable cut (m ³)	320.000
Reported plantation area 1990 (ha)	140,000
Annual reforestaion 1990 (ha)	100
Protected area (ha)	81,060 / 6.5%
Other wooded lands 1990 (ha)	50,700, 000 /40.7%
Population 1996 / annual growth%	12,278,000 / 2.6%
Density per Km ²	9.8
Urban / rural population	46% / 54%
GNP (per capita) 1990 US \$	800
Inflation rate%: annual (1995)	37.05
Accummulated (1995)	824.30

1. CONTEXT**1.1. Background**

Angola has total land area of 1,246,700 km², situated between latitudes 4°41' and 18°02'S and longitudes 11°41' and 24°05'E. The population was estimated at 12,278,000 inhabitants in 1996 and average growth is 2.6% with 9.8 inhabitants per square kilometre density. Reportedly around 60% of the population is living to the urban area. This figure is high compared to other countries in the region. Some of the rural population have abandoned their original land area for security purposes.

The country is administratively divided into 18 provinces, bordered on the north and northeast by The Democratic Republic of Congo, Zambia on the east and Namibia to the south. The country has 1,600 km of coastline along the Atlantic Ocean.

The country consists of plateau generally between 1,000 and 1,200m covering threefold of its territory. The highest mountain is Serra Moco with an altitude of 2,620m.

The climate is generally tropical and moderated by the sea altitude, with more 1,800 mm of rainfall

in the northern part of the country, and 100mm in the southern, mainly in Namibe province, influenced by the Kalahari desert. The rainfall is at about 1,500 mm in the high plateau, especially in the provinces of Uige, Huambo and Lunda.

1.2. Economy and economic policy

The government relies heavily on external support from international institutions like the World Bank, IMF, United Nations, and bilateral agreements on extraction of mineral resources, particularly oil and diamonds. Little or no emphasis is placed on promoting basic production sectors, such as agriculture, fishery and others equally important to Angola's development.

1.3. Political situation

Currently Angola faces a critical political situation. In 1975 the country gained independence from Portugal by the nationalist military. The military led the country into a prolonged civil war. This has affected current and future resource operations in Angola.

The civil war has ended, but the trend to return to war is increasingly likely. The political situation is still fragile and in the extensive interior, government control is not fully implemented and most significantly, the area is dangerous to access for field work due to the extensive presence of land mines. According to UN information sources, 11,000,000 different types of mines were disseminated in the country. Removal operations have not been successful.

1.4. Social and human context for forestry

Despite the low rank of forests in the Angolan economy (due to the immense natural resources of the country, such as oil, diamonds and other important minerals and fisheries) forests and forestry play a very important role for the survival of a significant part of the population. Some reports state that more than 80% of the inhabitants of the country live in the rural area and their dependence on forestry is very high. The forest is an important resource of their lives. They extract almost all their basic products such as wood for energy purposes, poles for construction, plants for medicinal purposes, hunting and trapping, watershed protection, game and wildlife conservation and biodiversity maintenance.

Although the country is rich in mineral and agricultural resources, but it is still far away from satisfying the demands of the population. The government must locate within the economic hierarchy, a place for this very important sector particularly because most of its inhabitants are largely dependent on the forest and forest products.

2. FOREST RESOURCES

2.1. land ownership

After independence the country's constitution stated that all land and forest in Angola belonged to the state. Therefore, the Land Policy defining possession rights and conditions for its use was established. Land as well as forest permits were issued under limited regulations.

The Constitution of 1992 approved the Law 21-C/92: the Law of Concessions, or so-called Land Law. There is a clearly stated principle that local community land rights will be protected (in the

preamble of the Land Law), it recognises different forms of land access, including rights acquired by previous owners. These aspects are positive, however this law is based on old concepts, and reflects old ideas of the Government following central planning principles.

Practically it is not a Land Law, but a law for issuing licences for approved economic activities on specific areas. The Land Law does not define the land rights of different users competing for resources and relationships between them. This law does not cover all national territory. Public domain areas such as National Parks and Forestry reserves, urban areas, airports, coastline, military and other public areas are excluded. The law fails to cover any systems that regulate land access and rights for at least 95% of all land use units in the country.

2.2. Land use

The country possesses immense land and forest resources and conflicts for land use are practically non-existent. Territorial surface is relatively larger compared to total population and during a large period, land and forest were in very few proportion submitted to work production. This tendency does not seem to take long. New policy on Land Law has been formulated and the rights of land concession are completely different, with some relevant constraints.

Conflict between different interest groups is inevitable in the future unless an appropriate framework can be found to accommodate them. Angola is very large, but the best land will quickly disappear as it acquires new value as a productive asset after a secure political settlement.

2.3. Land use potential

Land-use classes	Area, ha	Percentage, %
Arable land	8,000,000	6.4
Forest land	50,700,000	40.7
Permanent pasture land	33,000,000	26.5
Mountain and shrubland	28,000,000	22.5
Others	4,900,000	3.9
TOTAL LAND AREA	24,670,000	100.0

3. NATURAL FOREST RESOURCES

3.1. Area, and change of area volume over time

Angola is divided into 12 biomass classes. The standing biomass of the different vegetation types is slightly less important in this classification than the phenology and productivity. The floristic composition is relatively unimportant. Consequently, some biomass classes incorporate a variety of vegetation types which are related in terms of phenology, productivity and biomass, as distinct from floristic units. These biomass classes are more appropriate for the appraisal of fuelwood resources than the previously defined floristic-mapping units.

Standing biomass reserves are very high over much of the country. Four of the twelve biomass classes identified and described below are dominated by forest and woodland and have high fuelwood and timber potential. They also account for 61.6% of the country. This is substantially higher than 40% closed forest and savannah-woodland cover calculated by Lanly (1981) even if his

deforestation rate of 40,000 ha year is taken into account. One of the discrepancies of this study was the inclusion of the wooded savannahs and cleared areas in the north of the country in the four forest woodland biomass classes. Nevertheless, it is still difficult to arrive at Lanly's estimate and it appears Angola has considerably more forest and woodland than previously suggested. In addition some of the dry-savannah biomass classes have high standing woody biomass as well. Three classes – coastal and desert vegetation and two grassland classes – are characterised by very low reserves (5.61% of the country by area). Biomass classes dominated by savannah vegetation have intermediate fuelwood reserves and they account for 29.5% of the country by area. The wide variation in vegetation types, and therefore fuelwood potential, is due to the fact that much of northern Angola is transitional with the rain forest zone, and the Southwest is in the arid zone. Despite this extreme range of vegetation types, much of the country is covered by Miombo woodland, varying from Dense, High Miombo Woodland to Dry, Open, Deciduous Miombo Savannah. The strongest controls on distribution in Angola appear to be vegetation disturbance, rainfall amount and seasonality, depth of soil, and altitude.

Despite the very healthy national biomass picture, there are a number of areas that have obvious problems with fuelwood supply. The provinces most affected, in terms of the area extent of moderately and highly productive fuelwood sources are Bengo, Namibe and Luanda. These areas have been identified previously. Trees in Bengo and Luanda provinces have been cleared for agriculture, grazing and fuelwood at an increasing rate over the past 15-20 years and the situation in these provinces is now critical. The Namibe province suffers from a natural shortage of productive biomass reserves and the problems of fuelwood supply to the main towns. Estimates have shown that the cutting of vegetation exceeds annual growth in Namibe province. There is evidence that the Dry Deciduous Savannah in Huila province, along the Lubango-Huambo Road and the Lubango-Namibe Railway, is being exploited to meet the fuelwood demands in Namibe. In addition, more localised shortfalls in production can be recognised from the biomass-class maps and productivity data for the following provinces: Benguela – along the coastal and inland as far as Bocoio and Cantangue; Cabinda – along the coastal plain; Cunene – around Ngiva City; Kwanza Norte – in the western half of the district; Kwanza Sul – along the coast and inland as far as Gabela and around Kibala; Moxico – along the Luena Valley; and Zaire – along the coastal plain.

Summary of growing stock and data

Biomass class	Area		Growing stock		MAI	
	100 ha	(% of country)	(mil. ton.)	(% of total)	(mil. ton.)	(% of t.)
Transitional Rain Forest/Miombo Woodland	159,600	13	1,137	24	40	25
Dense High Miombo woodland	111,281	9	793	17	25	17
Dense Medium-Height Miombo/woodland	221,164	18	1,575	33	50	35
Seasonal Miombo, Woodland and Wooded Savannah	306,946	25	609	13	15	10
Dry Deciduous Savannah	229,657	18	386	8	11	8
Dry Coastal Savan. Arid Coastal Thicket	48,484	4	57	1	2	2
Dry Inland Savannah	26,263	2	31	1	1	1
Degrad. Rain Forest, Miombo Woodland	33,220	3	31	1	1	1
Degraded Dry Deciduos Savannah	34,987	9	82	2	3	2
Bushy Arid Shrubland	15,748	1	11	1	1	0
Chanas da Borracha Grassland	37,251	3	0	0	0	0
Montane Grassland	833	0	0	0	0	0
Coastal and Desert Vegetation	21,184	2	0	0	0	0
TOTAL	1,246,698		4,713		141	

3.2. Area of established plantations

Plantations in Angola were established during the colonial era, during 1960 and 1970. Most planted areas are located in the Central plateau of the country, created by the Railway Company of Benguela, CFB and by the Paper Board Company of Alto Catumbela with the purpose of supplying the energy for the train between Lobito Horbord and the extreme part of the eastern country and the supply of raw material to the Paper Board Company.

There are also some public woodlots established for different purposes such as firewood supply and protective purposes. Most of species used are *Eucalyptus* spp. They represent approximately 80%, the *Pinus* spp., the *Cupressus lusitanica* estimated at about 7,400 ha. Since independence these plantations have been abandoned. No management took place on the Paper Board Company plantations for many years. The situation is the same on the other plantations owned by the state and private enterprises.

Areas Of Industrial Plantations (Estimated, 1985)

Province	CFB	CFL	PBC	Ministry	Private	Total
Benguela	3,373	-	53,166	-	-	56,539
Huambo	14,978	-	11,390	25,900	3,234	55,502
Bié	10,948	-	-	400	800	12,148
Moxico	5,027	-	-	-	-	5,027
Malange	-	580	-	-	-	580
Huila	-	-	-	2,504	-	2,504
Outhers	-	-	-	1,105	1,232	2,337
TOTAL	34,326	580	64,556	29,909	5,266	134,637

The planted area in the framework of National Afforestation Programme in the Coastal Zone, from 1993 to 1998 on its first phase.

No	Province	Project	Area, ha	No. of plants	Density/ha	Species
1	Namibe	Tombwa	174	87,100	500	1, 3, 10
		Umpata Catete	45	12,510	278	1, 3
2	Benguela	Baia Farta	42	13,650	325	1, 2, 5, 11
		S. António	6	1,350	225	1, 2, 11
		Aeroporto	27	16,875	625	1, 2, 11
3	Luanda	Benfica	15	3,200	213	1, 2, 4, 5, 9,12
		Ilha de Luanda	23	14,375	625	1, 2
4	Sumbe	Balela	32	26,666	833	1, 2, 4, 5, 9,12
		Dois Morros	28	10,000	357	
		Comunidades	13	10,833	833	
5	Cabinda	Dingo	8	9,720	1164	
		N'Goio	2	2,837	1146	
			5	5,076	1025	
			1	214	305	
	TOTAL		423	215,491		

- | | | |
|--------------------------------|---------------------------------|-----------------------------------|
| 1. <i>Prosopis juliflora</i> ; | 2. <i>Azadirachta indica</i> | 3. <i>Casuarina equisetifolia</i> |
| 4. <i>Trichilia</i> spp | 5. <i>Leucaena leucocephala</i> | 6. <i>Eucaliptus</i> spp. |
| 7. <i>Pinus</i> spp. | 8. <i>Cupressus lusitanica</i> | 9. <i>Euforbiacea</i> |
| 10. <i>Euforbiacea</i> | 11. <i>Acacia rubra</i> | 12. <i>Terminalia catata</i> |

4. FOREST PRODUCTS PRODUCTION, TRADE AND CONSUMPTION

Roundwood, industrial, sawnwood, and other products

	1995		1996		1997	
	Value, NKz		Value, NKz		Value, NKz	
Roundwood, m ³	96,011	46,329,364.00	170,745	2,000,000.00	39,735	36,063,384.00
Sawnwood, m ³	na	na	na	na	117	90,000,000.00
Firewood, st.	85,818	2,013,461.00	125,625	3,987,500.00	35,427	577,958,000.00
Charcoal, ton	43,498	5,562,017.00	15,000	na	21,051	3,082,597.00
Other products		1,783,878.00		25,271,376.00		1,702,761.00

Figures above reflect the weakness of the forestry sector. It has been difficult to ascertain data related to many products largely used in the country. The sector is poorly equipped in means and skilled personnel. Data on trading and consumption of forestry resources is limited. This situation is also extended to other sectors directly or indirectly linked to the forestry sector, whereby others are considered as potential sources of data and information. Data regarding sawnwood is scarce to obtain, the few sawmills operating are resistant to supply data.

It is the same when it comes to information on firewood and charcoal. Forest products are largely used to satisfy the basic population demands. The data above are the results of permits issued by the forestry sector. It has been impossible to account for these products in the rural areas due to sector weakness and inability to set control in those areas.

Other product aspects are not quantified because it includes a range of products and is the same as previous cases, control is only possible around the main cities. The Paper and Paperboard Company closed in 1985 due to military confrontations in the area.

5. OTHER FORESTRY PRODUCTS AND ROLES

5.1. Woodfuels and wood energy

Firewood and charcoal are and will remain the most important secondary product to satisfy the basic needs of a large number of the inhabitants in Angola, except a in the main cities. The figures for commercial production of firewood and charcoal, however, are expected to be much higher than those quoted. Those figures are derived from royalties collected on the two commodities.

The estimated firewood and charcoal production in 1997 was 35,427 steres and 21,051 tons respectively. Very far from the 6,000,000 m³ required annually for energy purposes. Logging for charcoal production is done by private agents usually directed to areas set for agricultural clearing. but in many cases also to zones inside forest reserves. Licences are also issued by the Institute of Forestry Development for firewood production purposes.

Production in the northern region is relatively satisfactory due to the abundance of forest resources, but the situation in the central and southern region is different due to the climate.

Energy Statistics

CONSUMPTION ENERGY FOR DOMESTIC PURPOSES

Firewood: 61%

Charcoal: 31.6%

Others (electricity, GLP, Kerosene and diesel): 7.4%

FIREWOOD CONSUMPTION

7% for industrial and 93% for domestic purposes

CONSUMPTION OF CHARCOAL

100% of domestic purposes

ENERGY CONSUMPTION PER CAPITA

Oil products: 4484 MJ (very less comparing to Botswana, Namibe and Swaziland)

Electricity: 301 MJ

Charcoal and firewood: 6345 MJ

Energy Balance

	Firewood & charcoal	GLP	Oil	Hydro- electricity	Electricity	By-oil	Total
Total production	87	143	590	7	-	-	826
Available offer*	87	136	62.6	7	-	-	292
Real offer	49	-	-	-	2	48	99
Final consumption	49	-	-	-	2	37	88
%	56*	-	-	-	2	42	100

*this figure is currently estimated at about 60%

Source: SADC National Survey activities

5.2. Wood supplies from non-forest areas

Angola has vast forest resources, but their distribution is unequal. The scarcity of forest products is acute in the major concentration of the population, as is in Luanda and other main cities, mainly in the coastal zone where the majority of population lives.

Forest products in these areas are supplied by other areas classified as forestry productive zones, especially roundwood, industrial wood, and fuelwood as well.

5.3. Non-wood forest products

Non-wood forest products play a role of paramount importance for the basic needs of the

population, particularly in the rural area, where industrialisation is almost non-existent.

These non-forest products are well known, unfortunately it has been very difficult for the responsible sector to quantify and include them in their statistics.

5.4. Recreation and tourism

Recreational and touristic areas are under the Ministry of Tourism, and these are located in free and protected areas. The six protected areas have been established for 30 years. In 1970 campaigns began sensitising the population for the protection of wildlife. This process was interrupted by the civil war.

After independence the parks and game reserves were practically abandoned and according to information and data from the sector, there are actually 13 protected areas in the country, representing a total area of 8,106,000 ha, i.e. 6.5% of the total land area.

Protected Areas

Protected area	Province	Biome	Category	Area, ha
Iona	Namibe	Karoo-Namib	National Park	1,592,000
Kameia	Moxico	Zambeziaco	National Park	1,400,000
Kisama	Bengo	Karoo-Namib	National Park	996,000
Bicuari	Huila	Karoo-Namib	National Park	790000
Mupa	Cunene	Karoo-Namib	National Park	660,000
Kangandala	Malange	Zambeziaco	National Park	60,000
Luando	Malange	Zambeziaco	Game reserve	828,000
Namibe	Namibe	Karoo-Namib	Game reserve	468,000
Chimalavela	Namibe	Karoo-Namib	Regional Park	16,000
Other reserves (4)			Game reserve	1,296,000
TOTAL				8,106,000

6. FORESTRY POLICIES, LEGISLATION, AND INSTITUTIONS

6.1. Forest management law and policy

Private and public sectors

Forest access and management is essentially a socio-economic issue, regulated by a legal framework reflecting the relations between different socio-economic groups in the society, and between these and the State. Although good forest management in a country is a *sine qua non* for a prosperous agricultural economy, forest access and management are not simply a forest issue, to be managed by the MoA.

Attention given to land issues should be the same for forestry resources since there is a strong interaction between land and forest, therefore, other institutions and agencies have an important role to play within the MoA, if forest management is understood in its administrative sense. The involvement of all these sectors, political parties, wider civil society and local community representatives and different levels of Government is mandatory for an effective solution. Only then

will the legal-administrative framework genuinely reflect social reality, and have the support of interest groups seeking forest resources for the future.

The administration of forest resources is under the MoA, the Institute of Forest Development is the implementing agent, while the Directorate of Agriculture and Forest acts as a policy planner.

Despite the 6.5% of the protected area, there is not a management plan the areas. The lack of forest policy in the country is one of the negative aspects for the development of the Forestry sector as a whole. There is still in use the colonial Forestry regulations of 1962 and the National Park Regulations of 1972. Both have already been submitted to revision but, some aspects such as management, silvicultural treatments and training, were disregarded.

6.2. Investments in forestry and forest products

During the past 15 years the state was the only investor in all sectors, due to the socialist orientation of the economic and political system. At the beginning of 1990 the state decided to change this policy and economic system to a free-market system. The interest shown by domestic and foreign investors rose dramatically. However, the government must assure peace in Angola and review investment policy.

6.3. Institutional strengthening and capacity building

The forestry sector has a good structure, but it is inflexible. The sector is represented in the 18 provinces of the country, but weakly equipped in terms of skilled personnel. Very few foresters have formal degrees. A number of institutions are interested in becoming involved in the management of the environment. These institutions will play key roles in the sustainable development of natural resources if strong links among the institutions are established. Enlargement and integration among social groups and NGOs is needed so Angola can have strong institutional capacity building.

6.4. Sustainable forest management

As mentioned above, there is no forest management in the country, however, this need has been identified within the framework of several forestry sector programmes. In order to improve the management of forest and natural resources in Angola, attention should be paid to the following aspects:

- Management of production and distribution of firewood and charcoal;
- Management of forest resources in pasture areas;
- Management of productive forests and plantations;
- Management of protected areas; and
- Forest and natural resource planning.

6.5. Biodiversity and ecosystem sustainability

Angola has great biodiversity. Its immense territory and variability of physioclimatic zones offer the country a large variety of plants and wildlife spp. According to IUCN estimates there are 8,000 plant spp., of which 1,260 are classified as endemic; 275 mammals of which 20 are endemic and 900 birds.

To ensure Ecosystem sustainability of Angola's biodiversity the following strategic actions could be implemented:

Conservation of biodiversity & protection of habitats in critical ecological areas;
Conservation of endangered phylogenetic resources;
Control of exploitation of forest resources and degradation of forestry areas;
Management of soil fertility and erosion control;
Roundwood and wood energy supply; and
Decreasing of environmental impacts in fragile ecologic zones.

Based on an IUCN Study in 1992, there is a need to enlarge Angola's protected area by creating 10 integrated forest reserves, 6 regional parks and 10 natural monuments.

It is interesting to note that only Biome of Karoo-Namibe and Zambezi are represented as protected areas, while the Guinea-Congolese representing the Rain forest in the northern part of the country, where large mammals are predominant, such as gorillas, retain non-protected areas status.

6.6. Soil and water conservation

Information on soil and water conservation and the level of degradation is scarce. However, there are indications of the level of degradation of soil in the central zone because the area has high agriculture potential. Intensive soil use, wild fire for clearing and growing crop, pasture and other activities contribute to high soil erosion in the region. These problems are also becoming common in the eastern part of the country, where hundreds of hectares are being degraded, as well in the coastal zone of the country, according to an 1992 IUCN Report. There are no efficient measures being taken to minimise the problem, however, to guarantee soil productivities, farmers are constructing terraces. Water degradation is high and no management plan to reverse the water resource situation exists.

6.7. Taxation

The Government has created a national taxation system for almost all resources, but its implementation is still in review. Many agents exercising different kinds of activities can escape taxation easily and corruption is another negative contributing.

Inflation is very high due to the Government's inability update its taxation system on a timely basis. This involves other institutions, including Parliament, for approval. These procedures require a lot of time and the Government moves slowly in solving issues related to taxation.

6.8. Indigenous people's issues

Currently there are a range of problems presented by the society as a whole, and the capacity of addressing to these problems is a very serious limitation of the Government, considering the political state of the country.

Indeed, the Government should prioritise the basic needs of the majority of the population of country, mainly those who are living in the rural areas, where enormous problems related to their survival continue without solutions.

The problems indigenous people face are as follow:

Threatened food security, once production shortfalls are translated into shortages in consumption;
 Shortage of fuelwood supply, since most families in certain rural areas cannot have three basic daily meals;
 Shortage of wood for multiple use;
 Land scarcity for growing crops, associated with the lack of fertilizer especially in the Central part of the country.
 Lack of incentives;
 Weak support from Government institutions responsible for addressing indigenous people issues;
 After highly destructive civil war, rural smallholders are now in a situation of decapitalisation;
 Displacement and resettlement of most rural people; and
 The political instability affecting the larger part of the population.

7. THE OUTLOOK FOR FOREST RESOURCES

7.1. Projected demand

The forestry sector is operating under its capacity and this is due to many factors, i.e. the lack of skilled personnel at all levels, enabling the planning of forest resources to assess the real quantity of forest products consumed, and lack forest inventory. Projected demand can be made based on available data considered as standard for the country having similarities in terms of forest resources like Angola, such as Zambia and probably The Democratic Republic of Congo.

7.2. Projected supply under various scenarios and assumptions

This aspect is linked to the previous in that the results expected from the sector are possible only by conducting an assessment study. A study was done in this context, almost ten years ago. It is evident that the situation at that particular time was very different and it has not been possible to conduct a field study to have a clear picture of projected demand and supply.

Some Indicators Forest Data (projections)

Province	WP M ³	AAC M ³	Consump. M ³	C. p.cap. M ³	Ind. PC. M ³	Excedent M ³	Deficit M ³
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Bengo	10,250	10,411	4,275	0.04	17	5,975	
Benguela	750	846	23,145	0.04	3		22,395
Bié	3,000	3,113	23,410	0.03	12		20,410
Cabinda	112,250	112,309	32,620	0.05	429	79,730	
Cunene	4,000	4,102	3,905	0.03	16		3,166
Huambo	0	638	331,800	0.03	0		31,800
Huíla	3,250	3,497	22,135	0.03	13		18,885
Kuando Kubango	5,250	5,416	4,175	0.03	21	1,075	
Kwanza Norte	26,750	26,964	15,480	0.04	86	11,270	
Kwanza Sul	8,000	8,133	23,540	0.04	32		15,540
Luanda	0	0	57,785	0.05	110		57,785
Lunda Norte	31,750	31,909	7,415	0.05	127	24,385	
Lunda Sul	10,250	16,090	8,900	0.04	41	1,350	
Malange	12,000	12,149	20,595	0.03	48		8,595
Moxico	16,000	3,113	9,240	0.04	64	6,780	
Namibe	0	431	2,535	0.03	0		2,585
Uíge	70,250	70,112	19,680	0.04	227	50,570	
Zaire	12,250	12,346	1,930	0.04	28	10,320	
TOTAL	326,000	329,128	312,565	0.044	1,304	191,380	177,947

WP: Roundwood production, AAC: Annual Allowable Cut, C.p.cap: Consumption per capita, Ind. P.C: Industry ProcessingCapacity

8. CONCLUSIONS

Angola is one of the countries in Africa, perhaps the only country, where a forest policy is not established. The sector has been operating with colonial forestry and wildlife regulations in various government domains. Even in some updated cases, like forestry, the country's real needs are not reflected in policy establishment because relevant aspects are not taken into consideration. The lack of participation of other sectors related to forestry and natural resources is another crucial aspect of the lacking forest policy of Angola.

The national forestry sector is still weak in terms of resources of all types to develop. The fact that a large sector like forestry is under the MoA and is always in last position of ranking within the institution in terms of priorities makes it evident that the government does not consider forestry an important sector for sustainable development.

There is no possible development in Angola when there is no planning and no planning is possible when the sector cannot quantify the forest resources. The lack of forest inventory, associated with the lack of resources, mainly the skilled personnel in management and administration of forest resources to conduct relevant studies in collection, processing, storage and dissemination of data is and will remain the primary cause of the problem.

The sector has not developed an appropriate network of data collection within the forestry sector itself and in the country. The mechanisms used are very weak and inconsistent. As a result, data availability continues to be a major constraint.

Another fact is that there are no operational links between the sector and other institutions, i.e. government, private, NGOs and the society, direct or indirectly considered as potential users of forest resources and data.

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FORESTRY DATA ON BOTSWANA

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1. INTRODUCTION

1.1. Description of the country

Botswana is a landlocked country situated in southern Africa, sharing common borders with Zambia, Zimbabwe, South Africa and Namibia. The total land area of the country is 581,730 km². A flat terrain with little surface water characterises. Kalahari sands cover about 84% of the country. The average altitude is 950 m above sea level. The climate is tropical in the north and sub-tropical in the south. Rain falls in summer between October and April. Mean annual rainfall is about 450 mm, with the highest level of 650 mm occurring in the extreme north-eastern tip of the country and the lowest of about 200-mm in south western tip. The average temperature is 24⁰c, but during the summer it can rise to over 40⁰C and winter temperature can fall below freezing point at night. Long periods of below average rainfall interspersed with periods of above average rainfall in an approximate 20-year cycle.

The country's population is estimated at 1.3 million (1991 census) with a 3.5% growth rate. Botswana has a diverse range of natural resources, which include minerals such as diamonds, copper, nickel, manganese, some gold, coal, soda ash and semi- precious stones and other minerals. The vegetation type is open savannah woodland capable of supporting large numbers of wild and domestic animals. Major surface water is found in the north within the Okavango Delta system and Chobe. Main exports are diamonds, copper-nickel, beef, soda ash, textiles and vehicles.

1.2. Economy and economic policy

Botswana has a free market economy and it is one of the fastest growing economies in Africa. The discovery of diamonds after independence drastically changed the country's picture from one of the poorest in Africa to one of the most progressive. Other major sources of foreign revenues are beef, copper-nickel, vehicles and recently tourism. Careful spending, creation of attractive conditions to foreign investors, diversification, sustainable management of natural resources, and human resource development were recognised as the basis for the good economy by the government's 8th National Development Plan. Much has been done to improve social services everywhere and infrastructure development. The problem of unemployment in both urban and rural areas still persists.

1.3. Political situation

Politically the country is considered to be one of the most stable in Africa. Botswana has about 10 political parties, with general elections every 5 years. The ruling party, Botswana Democratic Party has been in power since independence in 1966.

2. SOCIAL AND HUMAN CONTEXT FOR FORESTRY

Trees and forests in Botswana are considered an important national resource because of the numerous products and services they provide. In this semi-arid country natural woodlands are vital to the lives of the urban and rural population since there are no major man-made plantations that could support them. These woodlands are major sources of building materials, fencing poles for arable lands, ranches, kraals, compounds, fuelwood, food and medicines. The woodlands support a wide range of biological diversity of flora and fauna, and are important for environmental protection.

As the population increases, the demand of various woodland products also increases. This trend causes localised shortages of forest resources, deforestation as well as degradation of land around settlements. These problems are clearly recognised by the government, hence the need for sustainable management of forest resources. Sustainable forest management is the management and the use of forests and wooded lands in a way, and at a rate, that maintain their bio-diversity and potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, without causing any damage to other ecosystems (EC Council Regulations).

Traditional methods of attempting to manage these resources in a sustainable manner existed in the past in many parts of the country. Traditional chiefs protected many species threatened by extinction and some local beliefs also prevented over exploitation of some species. Tribal chiefs in villages regulated harvesting of forest resources. The traditional methods of managing resources collapsed after independence when landlords were established and empowered to control land. Currently some communities are beginning to realise the long-term impact of excessive harvesting of forest resources in their respective villages or districts.

Recently Tati District villages banned any form of cutting trees without permission from relevant local authorities. People from outside the district are prohibited to collect fuelwood or poles. Kgatleng District also imposed a complete ban on fuelwood collection by Government Departments, while Kweneng District is collecting levies on fuelwood traders. In Chobe local communities agreed to the exploitation of timber in the local reserves on conditions that 50% of the royalty fees paid by companies exploiting timber is spent on local development activities.

These restrictions on exploitation of forest resources declared by local communities may reduce depletion of these resources while promoting the use of substitutes. It also indicates that local communities can play a very important role in managing their resources without much support from government institutions.

Where initiatives by local people who have a sense of ownership and responsibility of their resources show willingness to conserve and manage resources carefully, institutional support does not interfere with their plans. Participation of stake-holders in management of forest resources is to be encouraged.

3. FOREST RESOURCES

3.1. Land ownership

There are basically three types of land tenure in Botswana:

Freehold: land owned by individuals or group who have exclusive rights or control over its use and the land can be transferred from one owner to another without obtaining permission from the state. It is 5% of the total land area of Botswana.

Tribal: different tribes throughout the country own land and its administration is through the Tribal Land Board under the authority of the Land Act. This land covers 71% of the country.

State: this type constitutes 24% of Botswana and it is owned by the state and is used at present in a number of ways.

Communal grazing for certain areas;

National needs such as National parks and Forests; and

Leasehold rights are given to individuals or groups over certain fenced areas.

3.2. Land use

Land in Botswana is extensively used in enterprises such as cattle and large scale arable farming. Besides agriculture, land is needed for uses such as industries and wildlife. The following are the main needs for the land:

National needs: public transport system, roads, railways and airports; urban areas and the development of new towns; industrial uses such as mining and areas concerned with the national heritage. Land for these needs is 1% of the country.

Agricultural needs: these are arable lands used for growing crops to sustain the population as well as grazing areas for the livestock industry. They cover about 79% of total land area.

Conservation needs: about 20% of Botswana are specified as areas for protection of natural resources of flora and fauna.

3.3. Natural forest resources

Natural woodlands and forests in Botswana account for about 93% of the total land area of 581,730 km². However, it is only about 0.5% of the total area that is reserved for forest management. There are 6 forest reserves with a total area of 455,000 ha. in Chobe District. The reserves consist predominantly of Miombo woodlands, in which Mukusi (*Baikiaea Plurijuga*) and Mukwa (*Pterocarpus Angolensis*) dominate.

Chobe Forest Reserves are the only areas in Botswana where forest resource inventories have been undertaken through a project funded by NORAD between 1991 and 1992. The main objective of this inventory is to provide a management plan for sustained industrial timber production and exploitation as well as providing information on the multipurpose utilisation to satisfy local needs of forest products, protection and conservation of wildlife and flora.

The results of the inventory estimated the standing volume of all species to a minimum diameter of 5 cm at 10.4 million m³ in the 6 reserves. Total volume of primary commercial species *Pterocarpus Angolensis* and *Baikiaea Pluriguga* were 8% and 46% respectively. The project recommended monitoring of these reserves to assess their status in the future by measuring permanent sample plots after every 5 years. Very few of these plots were measured in 1996, but the results indicated a negative growth rate. The poor growth rate is attributed to wild fires and the increase of elephant population. Initial inventory results showed that elephants destroyed 18% of Mukwa in all reserves.

3.4. Planted forest resources

Total plantation area is estimated at about 1,200 ha. in the country. This comprises government and private woodlots, which are 85% and 15% respectively, the above-mentioned area. Woodlots were planted mainly with Eucalyptus species of unknown provenance. Data on production levels of these woodlots is lacking; hence it is impossible to reveal their status. Tietema (1986) estimated the yields of one of largest woodlots in Molepolole at 1.46 t/ha/year. It was concluded that this production is similar to that of unattended savannah woodland. It has been suggested that some indigenous species, which are more drought tolerant, could be more productive than exotic species such as Eucalyptus.

4. FOREST PRODUCTS PRODUCTION, TRADE & CONSUMPTION

Exports of forest products in Botswana have not been recorded for many years. Since the suspension of timber exploitation in 1990 around Chobe and Nata State Land, where companies there were harvesting timber from a couple of timber concession areas and forest reserves and exporting round logs and sawn timber to Zimbabwe and South Africa, there has never been any formal export of forest products. Botswana relies on imports for nearly all-industrial forest products, and these are imported from the neighbouring states and overseas countries.

4.1. Woodfuels and wood energy

In Botswana fuelwood is a major source of energy for many households. Kronen (1989) revealed that 68% of the urban population uses woodfuels and in rural areas almost 100% of the dwellers rely on them, hence wood energy is considered an important resource in the energy sector of this country. Botswana Energy Master Plan (1986) estimated the annual consumption of firewood at 484,000 tons per annum. The importance of fuelwood as a source of energy for both urban and major settlements has promoted the trade of the resource between these centres and rural dwellers (Kgathi 1984). The trade is considered to be a source of income for many poor rural communities and it is used to supplement low agricultural productivity.

4.2. Wood supplies from non-forest areas

Wood supply sources are natural woodlands outside forest reserves and man-made plantations. Information on other supply sources is lacking, as there are insignificant tree planting activities going on in villages around the country.

4.3. Non-wood forest products (NWFP)

The country's non-wood forest products are essential for the well being of a majority of the population and vital to local economies and environment. These resources support rural families because they have direct access to them. Common NWFPs include food plants; forage that support livestock industry; handicrafts; medicinal plants; fibres and wildlife species. The basketry industry around Okavango Delta in Ngamiland and harvesting of mopane worms in north-east and Central Districts generate income for many families. The products attract both local and international markets.

4.4. Recreation and tourism

Botswana is becoming one of the most attractive destinations to tourists coming to southern Africa because of its diverse and abundant wildlife resources which are primarily supported by the natural forests. Forests in northern Botswana are a home of more than 90,000 elephants.

4.5. Recycling and other re-use of fibre

Recycling facilities for any waste forest products have not yet been set up in Botswana. There is also lack of data of available regarding waste materials that could be recycled.

5. FOREST POLICIES, LEGISLATION AND INSTITUTIONS

The country does not have a national forest policy, the existing legislation is enshrined in the forest act of 1968 which was designed for protection and administration of the forest reserves in the Chobe District. Botswana is now in the process of formulating a new national forest policy that will be coherent with policy, legal and institutional framework.

5.1. Forest management law and policy

The new proposed forest policy will cover the whole country and its objectives clearly stipulate conservation and development of forest resources by taking into account other policies which have an impact on forestry. It also emphasises involvement of public and private sectors in the development of forestry.

5.2. Institutional strengthening and capacity building

The new policy defines the roles and mandate the administrative and functional structures of all stakeholders in forestry. Stakeholders include Government and non-governmental institutions; private sectors; and local or traditional institutions. The Government already recognises the role of NGOs in the development of the forestry sector. NGO's involved in forestry related research activities and training are receiving financial support from the Government. There are programs and schemes that have been designed to assist individuals or groups with materials and financial resources who venture into forestry businesses, the most common being the Financial Assistance Program.

Efforts to strengthen the capacity of the forestry sector started nearly 10 years ago when the Department of Crop Production and Forestry gave manpower development. Training of locals at various levels was undertaken by sending serving officers for advanced training and a local forestry training institution was established hence the manpower level increased several times from 14 trained staff to about 60 this year.

5.3. Environmental ISSUES

Botswana is addressing critical and diverse environmental issues as reflected by ratifying international conventions such as the Convention on Desertification, the Convention on Biological Diversity, the Convention on Wetlands. Sustainable forest management issues are clearly reflected in the proposed new forest policy.

5.4. The outlook for forest resources

Forestry inventories for the country's forest resources have been conducted in isolated areas and on an irregular basis, leading to a situation where little is known about the present uses of resources hence making it difficult for projection of demand and supply of most resources.

6. CONCLUSION

It is quite evident that the forestry sector in Botswana does not have any data that could guide the management in planning various forestry activities especially management of natural woodlands resources as well as in the few established woodlots. There is a need for the forestry sector to strengthen its capacity in collection and analysis of forestry data. It is impossible for any form of forest management to take place without knowledge of the quantity and quality of these resources. Despite the fact that Chobe Forestry Inventory Project provided useful information in an area that is about 0.5% of the total land area of Botswana, it will not be easy to produce forest management plans for the rest of the country. If areas already covered by the last inventory project are not properly monitored it will be difficult to know of any changes taking place in the Chobe Forest Reserves.

There is visual evidence of fast depletion of forest resource in many highly populated areas of Botswana although very little is known about the quantity and quality lost annually.

It is possible for the forestry sector in Botswana to establish a permanent unit, which will be responsible for data collection and analysis of forest resources. To set up this unit services of consultants who will train local technical and professional are recommended. Facilities for training purposes are already available within the MoA.

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FORESTRY DATA ON LESOTHO

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1. INTRODUCTION

1.1. Geography and climate

Lesotho is a landlocked country entirely surrounded by the Republic of South Africa. The total land area is 30,355 km² and the country is predominantly mountainous with approximately 73% of land over 2,000 m altitude. Four broad geographic zones are distinguished (see table) and the landform soil. Climatic and vegetation characteristics of these zones largely determine their land use.

Geographic Zones

Zone	Area (km)	Area (%)	Attitude (m)
Mountains	19,730	65	2200-3500
Foothills	2,430	8	1800-2200
Lowlands	5,760	19	1400-1800
Senqu Valley	2,430	8	1400-1800

Source: Lesotho National forestry Action Programme (after May, 1994)²

The main agricultural land-uses are maize, sorghum, beans, peas and wheat (in the lowlands) and grazing (in the mountains and the foothills). The range-land accounts for over 60% of the country's land use while the cropland covers only 25% of the land.

The mountains ranges have a general north-south orientation and consist of rolling to hilly terrain often exceeding 3,000m altitude, dissected by the deep valleys of the Senqu river and its tributaries. The western edge of the zone is characterised by a steep escarpment cut by deep valleys. The basalt derived soils of the plateaux and slopes are dark coloured and relatively well structured and fertile. Sheetwash and erosion is common, particularly on overgrazed range and cultivated land.

The foothills are a transitional zone of land with dominantly moderate slopes, and outlying hills. Yellowish red soils derived from sand-stones are dominant. with some black, basaltic, soils.

The lowlands comprise dominantly gently sloping plains interrupted by raised sandstone plateaux bounded by steep sandstone escarpments. The soils, which are derived from sand-stones and shales,

² The areas quoted here differ from those in the Sectoral Round Table Discussion Paper (MoA, March 1996). Neither report has a map showing area boundaries which would enable an area check to be carried out. As the figures in NFAP have defined altitudinal limits, they are regarded as being more reliable.

are variable but are generally of low chemical fertility and poor structure (NFAP GOL, 1996). The lowland area is particularly prone to erosion which is exacerbated by long term inappropriate land use, Gullies or 'dongas' which are a prominent feature of the landscape.

The Senqu valley is characterised by a gently sloping alluvial plain and steep side-slopes.

Lesotho has a cool sub-tropical climate with summer rainfall (at least 75% of rainfalls between October and March for most stations). Temperature is mainly determined by altitude. The mean annual minima vary from 11°C at 1,750 m to 4°C at 3,000 m (Berding 1984). Extreme minima are as low as 20°C in the mountains. Mean annual precipitation varies from 600 mm in the far western lowlands to more than 1,100 mm in the eastern highlands. Although the Senqu Valley lays in the rain-shadow of the Maluti mountains it is significantly drier with an annual total of 500-600 mm.

1.2. Economic background

Preliminary estimates indicate that the economic activity has finally resumed its long-run rate of growth following three years of economic boom. Real GDP which grew by 12.7 percent in 1996, has slowed down to 3.5 percent.

Employment and Wages: Comprehensive data on employment which was last collected in 1985 / 86 through a Labour Force Survey and 1986 Population Census continue to be the basis for estimates of the current labour market statistics. A recent population census was conducted in 1996 but the results are yet published. Available data on the employment situation in Lesotho is mainly for the formal sector and this makes it impossible to estimate the rate of unemployment or under employment. The Government remains the largest employer in the formal sector in Lesotho (9%). At the end of 1997, the number of people employed by the government was 34 880. This was an increase of 3.9 percent compared to the 1996 figure of 33 485. This comprises the civil servants, teachers daily paid workers and armed forces. The Lesotho National Development Co-operation (INDC) is the second employer in the formal sector. In 1996, employment generated by LNDC assisted firms was estimated at 17 023. 15% of the workforce works as migrant workers in South Africa. The rest of the labour force either is unemployed or engaged in subsistence agriculture. About half of the population lives below the poverty line

Tax Collection: As a percentage of GNP, total receipts are projected to increase from 39.7 percent in the previous fiscal year to 42.2 percent during the review period. This trend emanates from the Government's on-going policy of improving revenue collection.

Prices: Price movements in Lesotho are greatly influenced by price developments in South Africa. Annual inflation rate in South Africa ended the year at 6.1% and given the almost parallel movement of prices in the two countries. Lesotho's inflation rate is expected to remain in the single digit in 1998. Also, if the good rains experienced during early January and mid-February continue in subsequent months, then the inflation rate is expected to decline even further as food prices are expected to drop. Food indices were affected by the rise in prices of staple food (maize meal, sorghum, jungle oats).

Economic Policy: The policy of the Government of Lesotho through actions consistent with other policies and development goals is to ensure that optimal conditions are created so that the following are adequately addressed:

sustainable human development with a focus on poverty reduction,
appropriate roles for the public and private sectors,
public participation in development
gender issues,
regional economic co-operation,
public finance, and
development of the financial sector and disaster management.

1.3. Social and human context for forestry

This report is putting the Lesotho Forestry Division's position into perspective. It cannot be over emphasised that there is usually a very great difference in how the "need" for trees is perceived by individuals living in rural Lesotho, and how this "need" is perceived by officials and Donor Agency Representatives.

Among officials, perceptions on forestry have ranged from:

"Lesotho is virtually treeless and it is obvious that rural Lesotho needs very large numbers of trees for cooking food, constructing houses and keeping warm in winter"; to:
"Lesotho has always been virtually treeless and, as a result it has developed traditional lifestyles which do not involve a major need for trees".

Those officials who have advanced the second case have asserted the fact that Lesotho has never had significant numbers of wild, indigenous trees and that its overall environment is simply not suitable for growing trees successfully.

The extent to which additional trees are required for produce is not only determined by the numbers, accessibility, rates of growth and sustainability of existing trees but also by the perceptions of the effort and costs involved in growing the additional trees and of the attractiveness of alternatives. In this regard, it has to be kept in mind that no determination has ever been made of the number, accessibility, rates of growth and sustainability of existing trees and shrubs nation-wide or in any area in Lesotho.

The policy statement of the Department of Conservation forestry and Land use Planning (DCFL) stresses that the role of Government is to support local people in beneficially managing their own natural resources. DCFL's policy expands to the concept of food security to include food and fuel which covers the following specific needs:

conserve productive land,
rehabilitate degraded land and conserve water resources,
use land appropriately, and plan its use. and
increase the contribution of trees to livelihood security and environmental protection.

The MoA policy objective of food security can be expanded to include fuel security. The fuelwood deficit at the household level is particularly serious in the mountains, which have the lowest tree cover and which currently achieve much less forestry extension support than the lowland areas. With commitment to strengthen research and extension in the mountains there is an opportunity to make a significant contribution to this policy goal. Women will particularly benefit from improved access to fuelwood as the burden of carrying wood over long distances will be reduced.

People may be willing to plant trees, but often lack the resources to manage them efficiently and profitably. Through enhanced training and extension efforts by the Forestry division and NGOs, and a reliable supply of seedlings, either from GOL or private nurseries, this opportunity may be exploited.

Similarly with the recognition that tree and livestock production are not necessarily incompatible, opportunities exist for the development of silvi-pastoral systems with controlled grazing and exclusion at key periods, such as when seedlings are becoming established.

2. FORESTRY ACTIVITIES

The Forestry Division is currently engaged in activities in the fields of social forestry research, and utilisation and development.

The main thrust of the social forestry programme is directed through a GTZ supported project which is active in the Districts of Maseru and Mafeteng. The programme supports farmers in tree planting through training provision of tools (through credit loans) and apply of seedlings (free, within certain limits). The project also supports selected farmers in the establishment of micro nurseries providing a subsidy covering 75% of the costs of the inputs (up to Makoti 2.500). This subsidy is regarded as a measure to launch the enterprise which should later be economically self supporting.

The main activity under forest research is the monitoring of permanent sample plots (IPSPs) which are located in every woodlot in the country. The purpose is to monitor the performance of different tree species at different sites. Information can be used to update recommendations on suitable tree species for different areas and to construct tariff tables based on wood volume. Silvicultural trials are being conducted and the Division maintains a national tree seed centre. The National Tree Seed Centre, which also falls within the Research Section and the district nurseries are important sources of planting material.

Forest utilisation activities will be scaled down with the proposed privatisation of woodlots). An inventory of standing timber stocks in each of the reserves has been completed already Gol has established a National Tree Planting day to promote awareness of the value of trees as sources of fuel fruit and possible income, and for environmental protection. While this is a valuable initiative, the timing of the day in March is inappropriate as it may coincide with the onset of frosts, particularly in the mountain areas.

3. FOREST RESOURCES

3.1. Land ownership

Lesotho's traditional system of Land tenure is formerly defined within the laws of Lerotholi. The laws of Lerotholi are partly codified customary laws and partly regulations made by or at the direction of the colonial government by Basutoland National Council from 1905 to 1959. The Lerotholi laws continue to be widely followed in the rural areas though most of them have been superseded by modern legislation.

Traditionally all land and associated rights to land use are voted: every Lesotho citizen is entitled to three fields suitable for farming. If possible one of the fields would be of a better quality than the

other. Once allocated the fields are retained by the farmer for as long as he wishes. If however he fails to either cultivate them properly or completely fails to cultivate them for a period of two years then in theory the fields can be repossessed and reallocated.

The system worked well as long as there was enough land to satisfy the demand. With population increase the system comes under pressure (Scnckane 1990). The first and the notable change was the introduction of the land Husbandry Act of 1969. In which the Minister of Agriculture receives the power to make regulations for improving the use of agricultural land and water resources. It attempted to deal with a number of issues relating to the management of land. This act provided for the delegation of power to the chiefs to enforce the regulations proclaimed by the Minister.

Forestry activities and the status of tree ownership are governed by the laws of Lerotholi and Forest Act of 1978. The latter however, was enacted mainly to support the development of woodlots of Forest Reserves and does not cater for ownership of trees by communities or individuals. A new Forest Act was drafted in 1996 in response to the policy changes proposed in response to the policy changes proposed in the National Forestry Action Programme of 1996.

The draft forestry was discussed and agreed upon at a forestry workshop in Mohale's Hock in July - August 1996, but it has yet to be enacted by parliament. It places tree ownership in the lands of the individual or group who planted the tree. It also empowers the Ministry of Agriculture through the Chief Forestry Officer (CFO) to transfer ownership trees forest plantations or indigenous forest to groups or individuals for a specified period and subject to certain terms and conditions.

3.2. Natural vegetation

The natural vegetation of Lesotho is dominated by grassland and by indigenous shrubs in some mountain areas. Although the present vegetation is regarded as a sub-climax resulting from human interference and modification, it is unlikely that large areas of Lesotho were ever covered by forest or woodland in the recent past. However, some pockets of closed evergreen forest in inaccessible parts of the lowlands and foothills suggests that forest cover was previously more extensive than at present (NFAP; GOL 1996).

3.3. Planted forest resources

Much of the present woody biomass stocks in the country result from planted trees. In the inventory that was carried out in 1993/94 there were still 10,362 ha of wood standing. In 1996/97 inventory however, this area had been reduced to 8,173 ha which means that within a period of 4 years an area of about 4,189 ha had been cut and not replanted. The purpose of the inventory was to estimate the area still cover.

This substantial forest resource is targeted for privatisation which is expected to generate revenue for communities and provide the opportunity for the woodlots to be managed in a more efficient and sustainable manner. The current distribution of woodlots by district is given below:

Distribution of Woodlots (SFRs)

District	Stocked area (1995/96) (ha)	No. woodlots 0-20 ha	No. woodlots 21-50 ha	No. woodlots >50 ha	Total woodlots

Maseru	1619	89	22	3	114
Berea	827	63	3	2	68
Leribe	1799	55	14	7	76
Butha-Buthe	513	15	4	1	20
Mokhotlong	17	13	0	0	13
Thaba-Tseka	50	15	0	0	15
Qacha's Nek	174	21	0	00	21
Quthing	427	71	1	00	72
Mohale's Hoek	290	40	10	1	51
Mafeeteng	457	31	6	0	37
Total	6173	413	60	14	487

Source Woodlot inventory carried out in 1995-96 by Forestry Division

4. FOREST PRODUCTS PRODUCTION, TRADE AND CONSUMPTION

At present wood is produced primarily for both fencing posts and fuelwood purposes. The annual production of posts is and fuel wood is sold through the following systems:

Wood Wholesaling: Here a forester measures and marks areas which are due for felling. The retailers would then come in and buy the wood (standing) at the wholesale price. These retailers can either be local individuals, communities or a business man who may not be a local person. This happens mainly in big woodlots which are far from villages.

Retail System: In this approach a forester sells wood in small quantities i.e. head loads, van loads, ox drawn carts or single logs pulled by either oxen, a horse or a group of men). This is common mainly in small woodlots adjacent to the villages.

Government Sales Yards: Here the sales yards managers buy wood from the foresters in charge which they later haul to the sales yard where it is processed (either for the production of treated posts or fuel wood).

Non Wood Forest Products (NWFP): The NWFP commonly found in Lesotho are thatching grass and medical plants which is done at specific times of the year. All medicinal plants growing in the forest reserves are by law protected and may not be gathered at any time.

5. FORESTRY POLICIES, LEGISLATION AND INSTITUTIONS

5.1 Forest management and policy

Until recently, Lesotho had never had a formally approved policy for its forestry sectors. Despite the absence of a legal policy document the government had always assumed the leading role in the development and maintenance of forest resources since 1876. This continues to be the case..

The official National Forestry Policy was approved in 1997 and that marked a radical shift in direction by putting a strong emphasis on the role of communities in forestry management. In this policy the government has firmly committed itself to local ownership of forest resource and to maximise the resource through actions consistent with other policies and development goals. The strategy adopted to approach these objectives is to focus support primarily at the village level through supply of planting materials and appropriate extension and training in tree planting and

husbandry techniques.

The contributions forestry can make to the alleviation of poverty, livelihood security and environmental protection in Lesotho are the following:

- Production and employment
- Promotion and extension
- Environment protection and bio-diversity conservation
- Forest protection, management and people's participation
- Public awareness education and trainers
- Forest research
- Gender issues in Forestry development

5.2. Guiding principles of the government

Commit to supporting the efforts and initiatives of local people to undertake tree and forestry related activities to provide for their own needs and benefits.

facilitate the tree planting and forestry endeavours of local people through:

establishment of legal environment including security of land and tree tenure;

provision of appropriate government services (research and extension).

Primary responsibility for the sustainable and beneficial management of Natural resources and the environment lies with individual and communities.

committed to the principle of free enterprise reflecting by permitting and supporting private sector development in all forestry activities.

Committing to local ownership of forest reserves, including the existing areas of state forest reserves as gazetted under the 1978 Forest Act; In consultation with communities the government will return the forest areas along with responsibility for their management and their benefits to the communities.

commits to co-operation with NGO initiatives in forestry activities.

5.3. Legal frame work

Land in Lesotho traditionally belongs to the people as a whole. The King as Head of State is vested with the responsibility of allocating land on behalf of the nation.

The Land Act of 1979 grants village development councils (NDCs) the authority to administer allocation of arable lands to individuals by issuing a permit known as "Form C". In so doing, it guarantees exclusive rights licenses falling short of an officially registered title. The land regulations of 1992 enable a 90 year lease to be taken out on land but this option is rarely applied to agricultural holdings.

Forestry activities and the status of tree ownership are governed by the laws of Lerotholi and the Forest Act of 1978. The latter, however, was enacted mainly to support the development of woodlots for ownership of tree by communities or individuals. A new Forestry Act was drafted in 1996 in response to the policy changes prepared in the NFAP of 1996. This draft has already been submitted to the parliament for approved. It is hoped that by the end of December this bill would have been enacted so that the prepared programmes may be implemented.

5.4. Investments in forestry and forest products

The 1978 Forest Act was not making it possible for companies to invest in Forestry because it was meant to support the development of woodlots or forest Reserves by either communities individuals or private organization. The present draft however paves way for the private sector to actively involved.

5.5. Institutional strengthening

The Forestry Division is one of three divisions (Department of Conservation, Forestry, and Land Use Planning) within in the Ministry of Agriculture, Co-operatives and Land reclamation.

The Division has recently been restructured to reflect the major role of social forestry in the divisional policy. There are four technical sections supported by units dealing with management and cartography.

The forestry Division has a complement of 11 technical professional posts (grade 6 and above), six of which are vacant and three of which have been transferred, three senior administrative staff (grade 7-10 and 71 support personnel. The Division is headed by a Chief Forestry Officer who reports to the Director of DCFL. The Principal Forestry Officer is currently acting in the Chief's position.

Superimposed on this structure are the three regional teams. These teams are organised at departmental level to coordinate delivery of technical backstopping and advisory services to the district agricultural offices. Each professional forester is assigned to a regional team. A forester heads the southern team. The other foresters are assigned between the central and northern teams.

The Division has a close functional linkage with the Soil Water and Nature Conservation Division who use tree planting as a method for donga and gully rehabilitation. Tree planting activities also feature in the community land use planning (CLUP) carried out by the Land Use Planning Division.

5.6. Environmental issues

The management of forest is to date not sustainable. In the case of established woodlots there has been continuously illegal felling over a period of 10 year since the woodlots were handed over to the Government. One of the many reasons for decline is that the government does not have the capacity in terms of personnel and capital to manage these forests. The reason why this is the case is that although the total area is only 12, 900 ha it comprises many woodlots (about 487 in number) scattered over a wide area. In most cases there are no roads leading to some of these woodlots. The proposed programme of handing over the management of these woodlots offers some hope for the sustainable management of these forests.

In the case of the individually and communally established forests the land tenure system, the laws of Lerotholi and the Forest Act of 1978 were making it impossible for the local communities and indeed even private companies to establish and manage forests sustainably. The new- Act has however paved the way for the private organisations and local communities to establish their own forests without any fear of using them at the later stage.

6. THE OUTLOOK FOR FOREST RESOURCES

6.1. Projected demand

The requirements for energy are expected to increase by around 74% in 20 years (from 28,700 terajoules in 1990 to 50,125 terajoules in 2010). The most important sources of energy are firewood and dung (LEMP, 1991). If present rates of fuel consumption remain constant, potential rural biomass energy use will have risen to almost two million tons by 2010 which is 0.5 million tons above the estimates for sustainable supply. In order to close this energy gap it would be necessary to plant approximately 120 000 hectares of additional woodlots up to 2010.

These targets have, however, not been realised in the last 10 years. Instead, the indigenous shrubland and present woodlots have been over used which has led to increasing the energy gap.

The above analysis does not include any provision for tree planting to replace dung as fuel. In 2010 it is estimated that 510,000 t of dung would be needed as combustibles (LEMP). To replace this amount of dung with firewood 305,000 t of wood are necessary. To meet this wood requirement an additional 64,000 hectares of forest must be estimated.

6.2. Projected supply

In order to address the above projected demand the Forestry Division in its position paper has proposed the introduction of a BONUS system as indicated below: The two options are indicative. The districts of Maseru and Mafeteng have been used in the sampling because they are the only ones with complete raw data available. Three important aspects are to be considered:

The extension service currently costs as much as the seedling production.

Half of the cost (wages) are covered by the Government of Lesotho.

The target group carries 18% of the costs, which are the costs for their work.

It is striking that the reduction of the costs in one section has only a small impact on the total amount of expenditure e.g. Lowering the production costs by 50% (M 1,00 / seedling) reduces the total amount by 18%.

The survival rate is of overriding importance. It is a mathematical factor which has a serious impact on the costs: 50% losses doubles the total expenditure.

Bonus System: An alternative can be considered if the GoL is prepared to cover almost the entire production and planting costs. The following assumption serves as a basis:

The planting material of M0.80 seedling and transport costs of M0.30 / seedling are paid by the GoL.

A bonus would be paid one year after tree planting if the survival rate of the plants is good. This amount, (incl. Seedlings, transport. bonus of M².00/ seedling) would be paid to the farmer in parallel with the present seedling production costs in the government tree nurseries.

The price seedlings (M0.80) is 60% higher than the present level set by government for seedlings in private nurseries (M0.50).

The price of M0.80 could highly stimulate the establishment of private tree nurseries. Under such framework conditions the major seedling production will be undertaken by privately owned tree nurseries.

7. CONCLUSION

A lot of official studies and reports put a strong emphasis on the need to address the environmental problems and the energy requirements facing this country. Afforestation for environmental protection and fuel wood supply appear high in the list of strategies for addressing these problems.

The area which needs a lot of attention and official support is that of data collection and reporting. It is very difficult to make sound management decisions if there is not enough data available. It is very unfortunately that it has been very difficult to get reports from field foresters. Because of this short-coming it has not been possible to update FAO and other organisations' records pertaining to forestry developments.

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STATUS AND USE OF FORESTRY STATISTICS IN MALAWI

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1. ECONOMY AND ECONOMIC POLICY

Malawi is a landlocked country with an area of 118,580 km². The population of the country is estimated to be 10 million with a growth rate of 3.2% per annum. More than 85% of the population live in the rural areas practising subsistence farming.

Malawi remains one of the poorest countries in the world with a per capita GDP of US \$ 230 in 1991 and over 60% of the population is living below the poverty line.

The economy of the country is heavily dependent on smallholder rain fed agriculture, which is highly susceptible to the vagaries of weather. The structure of the economy has not changed much over the years since the 1970s. Agriculture still dominates the economy with over 40% of the Gross Domestic Product (GDP), providing employment and subsistence for over 80% of the population, contributing 85% of export earnings. The industrial sector accounts for an average of 20%. The services sector accounts for 41%.

Malawi became a pluralistic state in 1993 after a referendum. The first multiparty presidential and parliamentary elections were held in 1994 with the United Democratic Front (UDF) emerging victorious. The main opposition parties are the Malawi Congress Party (MCP) and the Alliance for Democracy (AFORD).

2. SOCIAL AND HUMAN CONTEXT FOR FORESTRY

In Malawi, forests and trees meet the nation's requirements for fuelwood and poles and for most of the timber required for construction, joinery and board manufacture. Additionally, the existing plantations have the potential to meet the nation's pulp and paper needs. The rural residents, who make the majority of the population, rely to a large extent on forests for fuelwood, poles and medicinal plants.

About 90% of the nation's energy requirements are satisfied by woodfuels derived from natural and planted forests and trees on farm. The 1993 estimate of per capita city-residents fuelwood consumption was 2.0 m³ while 1.1m³ was the average per capita rural fuelwood consumption. The population growth rate is 3.2% resulting in increased pressure to cultivate forests and meet growing energy requirements.

3. FOREST RESOURCES

3.1. Land ownership

Land ownership in Malawi can be classified into four categories.

Public land is basically owned by government and used for protection as well as agricultural schemes. This land is set aside under the country's Land Act for use by the government.

Private/ Estate land is owned by individuals and companies after being leased from government.

Private land is held as leasehold or freehold. This land is mostly used for growing tobacco and tea.

Traditional authorities (chiefs) control customary land. The chiefs allocate land according to traditional customs. It is normally passed from generation to generation.

Urban land belongs to the city and municipal councils. The legal system governs the activities on these lands.

The bulk of the land is used for agriculture followed by protection for wildlife and forests.

3.2. Natural forest resources

The natural forests are composed of protected areas such as Forest and Wildlife Reserves. Most of the natural forests are found in hilly areas. The hilly areas constitute the protected areas that represent half the remaining stocks of forest resources in Malawi. At the same time these areas make up almost 20% of the country's land area - land area which, regardless of suitability, has not been converted to agriculture. This is a result of the hilly areas being unsuitable for cultivation.

Forests on customary (flat) land are continuously being converted to agricultural land as a result of population increase. The forests are disappearing at the rate of 1.5 - 2% per annum. This is mainly due to increased poverty and dependence on woodfuel for energy and expansion for agriculture.

3.3. Planted forest resources

Pine plantations dominate the planted forests. The pine plantations are mainly used for supply of logs for timber sawing. The Eucalyptus plantations are used for the supply of firewood and poles for construction. Although the MAI has been estimated, in reality this estimation is not true due to the destruction of the majority of the plantations by forest fires.

4. FOREST PRODUCTS PRODUCTION, TRADE AND CONSUMPTION

In Malawi, the timber industry's present production of sawn timber is only around 45,000 m³ against an installed capacity of some 70,000 m³ (ignoring the pit-sawyers). Plywood production is around 7,000 m³ with a similar production level for blockboard and around 6,500 m³ of other wood based products – including gluelam.

Of the sawn timber, 65% is sold to the construction industry, 20% to the furniture and the rest is mainly used for packaging. Recent projections to the year 2010 have put the potential local market at 80,000m³ with respect to sawn timber and 40 - 45,000m³ for timber panels.

According to the Forestry Department's 1995 Wood Consumption figures, the formal industry consumes 1,200,000 m³ of industrial roundwood or poles. The country does not produce paper or paperboard. Malawi is having some success with exports of timber products, plywood, boards and gluelam. These products are exported to the Republic of South Africa in particular.

5. OTHER FORESTRY PRODUCTS AND ROLES

5.1 Woodfuel and wood energy

Fuelwood is primarily produced to meet national consumption needs. About 90% of the country's energy requirements are derived from both natural and plantation forests. To this end, the government established 23,239 ha of eucalyptus plantations for the production of fuelwood and poles. The bulk of the wood is obtained from common property resources on customary land forests in addition to the wood from the fuelwood plantations. It was estimated in 1995 that about 11.7 million m³ are consumed as woodfuel in the form of wood and charcoal for both domestic and industrial purposes.

5.2. Non-wood forest products

Forests are a source of many non-wood forest products. These products include edible fungi (mushrooms), grass for thatching, medicinal plants, game, fruits, honey, insects, vegetables and other foods. Forests are also a habitat for a variety of fauna and flora.

5.3. Recreation and tourism

Apart from the supply of fuelwood and poles, forests play a vital indirect role in recreation and tourism. The forest reserves in Malawi provide high potential for recreation and tourism. To this end some tourism facilities such as guesthouses have been erected in some forest reserves such as Dzalayama and Ntchisi in the central region, Zomba in the Southern region and South Viphya in the northern region. According to the findings of PLUS 1998, forest reserves have the potential to attract 2,434 tourist per year with a potential revenue of US \$ 145,635 per year (using Malawi multiplier US \$ 60 per tourist).

6. FORESTRY POLICIES, LEGISLATION AND INSTITUTIONS

6.1 Forest management law and policy

The Malawi Forest Act was approved by Parliament in April 1997. The Act provides for participatory forestry, forest management, forestry research, forestry education, forest industries, protection and rehabilitation of environmentally fragile areas and international co-operation. The Act also proposes the establishment of a Forest Development and Management Fund to be used by the villagers to undertake forestry management activities.

However, the Act contains stiffer penalties for people who contravene the provisions of the Act. The punishments range from paying fines of MK 2,000 to MK20000 depending upon the seriousness of the offence. In the event that the culprit fails to pay the fines, penalties of about 1 to about 5 years imprisonment are meted out.

The Malawi Forestry Policy which was approved by the Cabinet in 1996 advocates participatory community forestry. The goal of the policy is to sustain the national forest resources in order to increase the quality of life of the people in the country through conservation the forest resources.

Both the Forest Act and Forest Policy calls for the involvement of the private and public sectors in the management of the forest resources.

6.2. Investments in forestry and forestry products

The only investors in forestry are the tobacco and tea estates. These estates grow trees especially Eucalyptus for curing their tobacco and tea. However, the noticeable investors in forest products manufacture VIPLY, Wood Industries Corporation (WICO) and International Timbers Limited (ITL). VIPLY is a state owned company manufacturing blockboards, plywood and sawn timber for export and domestic consumption. WICO is a private company that produces both sawn timber and furniture for export and local consumption. ITL is also a private company that makes gluelam, plywood and blockboards for export and domestic use.

6.3. Institutional strengthening and capacity building

The successful implementation of the new Policy and Law requires a cadre of well-trained staff equipped with many new skills. However, the Forestry Department (FD) does not have adequate staff. Consequently, a massive effort has to be undertaken to reorient existing staff in participatory approaches and extension skills. The department needs to create additional extension capacity by bringing in NGOs.

Staff needs to be trained in technical aspects of forestry. Furthermore, the FD staffs need to improve their competence in the preparation of forest inventories and forest management plans from the national level down to the village level.

Due to insufficient financial resources the FD is unable to conduct training for its staff. Training is done by the FD and is solely dependent upon donor willingness to fund the department staff.

6.4. Environmental issues

The National Environmental Action Plan (NEAP) was adopted after a participatory process in December 1994. The NEAP identified the critical environmental issues facing Malawi and the actions to take to address the resource degradation. Among the issues identified was Degradation of forest resources, degradation of water resources, and climate change.

In February 1996, the National Environmental Policy (NEP) was developed. The policy seeks among other things to:

Promote the efficient utilisation and management of natural resources; and
Promote cooperation between the government and local communities, women's groups, NGOs and the private sector in the management of the environment.

The Environmental Management Act passed by parliament in June 1996 establishes the institutional and legal framework for environmental management in Malawi.

6.5. Sustainable forest management

In an effort to manage the countries forests sustainably, the FD has embarked on empowering the communities to manage the forests and retaining part of the revenue realised from sale of the forest products. The communities capacity to manage the forests is built through training in different aspects of forest management. The FD is also encouraging formation of Village Natural Resources

Committees (VNRCs) and creation of Village Forest Areas (VFAs).

Furthermore, the FD is reorienting its staff from the policing role to an extension & advisory role. The FD develops a comprehensive forestry extension service to promote and support large-scale community forestry and joint management with the local communities and NGOs.

6.6. Biodiversity and ecosystem sustainability

Malawi's biological diversity is very varied, in both terrestrial and aquatic habitats. Sixty-nine endemic plant species and an estimated 1000 endemic fish species have been identified (State of the Environment Report 1997). However, due to the pressures on all natural resources in the country, biological diversity is seriously threatened. Outside protected areas, the pressures from expansion of agriculture production and unsustainable harvesting have already resulted in the extinction of many species and loss of inhabitants.

A number of measures are already in place to address the threats to biodiversity. These include public awareness programs. As a party to a number of international conventions some of which promote conservation of biodiversity, Malawi has a political obligation to formulate policies protecting its biological diversity and in particular the many endemic species.

In order to protect and manage Malawi's rich biodiversity in a sustainable manner, the government is promoting more viable income generating activities, in particular sustainable wildlife-based enterprises, for communities neighbouring protected wildlife areas. Development and implementation of policies and legislation that efficiently support effective land use planning in order to promote the conservation and sustainable utilisation of biological diversity is being done.

6.7. Soil and water conservation

Soil erosion and declining land productivity continue to be the greatest environmental problem in Malawi. This is especially pronounced in densely populated areas which are heavily cultivated and where landlessness is a common socio-economic feature.

The government and its partner organisations have initiated several responses designed to meet the problems. These include community based natural resources management initiatives and the development of innovative soil conservation technologies suitable for the country.

Malawi is rich in water resources that are stocked in its lakes, rivers and aquifers. All the water is replenished by rainfall falling in catchment areas, on the surface of the water bodies and in recharge areas for groundwater resources. In order to meet the demand for quality water in particular and enhance sustainability of the water resources in general, the government is addressing the major problems of unsuitable agricultural practices. It is also emphasising community awareness on the importance of catchment protection to enhance the availability of water in the country's rivers.

6.8. Indigenous people's issues

Unlike other countries there are no indigenous people. The major problem facing the people is the need for more land there by calling for the de-gazetment of some of the protected areas. This has been exacerbated by the rapid population growth.

6.9. Outlook for forest resources

According to PLUS 1998, based on the official estimates of wood consumption from the FD, the demand is increasing at the rate of 9.25% per year. The figure below shows the results of the analysis of sustainable supply and demand evaluated over time with the assumption that the changes year to year correspond to the rates available. The figure shows that sustainable supply will be exceeded by demand within the next three years. The pace of decline in sustainable supply from forests exceeds that of the national supply due in part to clearing for cultivation. The national supply is supplemented by the effect of fast-growing exotic trees on agricultural land and on government plantations. It is generally assumed that forest decline could reach a point that would dramatically impact the annual yields of trees on agricultural land as alternative wood sources become scarce (PLUS 1998) The bulk of the demand is related to fuelwood.

7. CONCLUSION

Malawi's forest resources play an important role in the lives of the people. They provide energy for cooking and heating and timber for construction. The forest resources are also a source of edible fungi, thatch and medicinal products. They also provide protection for catchments.

Protected areas represent over half the remaining stocks of forest resources in Malawi. At the same time these areas make up almost 20% of the country's land area. However, these protected areas face pressure from the people. There is increasing demand for land and the continuing demand for resources from the land. The demand for land is currently being assessed by the Land Policy Reform Programme. The people are calling for de-gazettment of some of the protected areas.

The demand for wood resources is increasing as a result of the population increase. It is predicted that demand for forest resources will exceed sustainable supply within the next three years.

FORESTRY DATA ON MOZAMBIQUE

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1. INTRODUCTION

1.2. Country profile

The Republic of Mozambique lies on the Southeast African coast and has a surface area of 799.380 Km² (Saket, 1994). It shares borders with six countries - Tanzania, Zambia, Malawi, Zimbabwe, Swaziland and South Africa.

The country is divided into 10 provinces, 128 districts, 387 administrative posts, and nearly 100 towns, 23 of which are classified as cities. The eastern side of Mozambique is about 2,500 Kilometres of Indian Ocean and many islands (Christie, 1996). The north and Northwest plateaux reach a height of 1,800 m. and the country's highest mountain, Mt. Binga is 1,436 meters.

1.1. Macro-economic indicators

Mozambique, with over 16.5 million people (estimated in 1997), of which 7.8 million are men and 8.7 million are women, and with a virtually untapped agricultural, mineral, forestry, tourism and energy resources, has the potential to be among the world's richest countries (INE, 97). The annual interest rates to be paid for deposit accounts are around 40%.

A structural adjustment program was launched in 1987, since then the country has moved from a centrally planned economy to one that is based on a free market. The government has adopted the Economic and Social Recovery Program for renewed economic growth and development by:

- Prioritising the rehabilitation of vital economic sectors and infrastructures;
- Restoring output particularly for exports;
- Cutting governmental deficits and re-establishing financial equilibrium;
- Reducing direct state involvement in non-strategic areas of economic activity and production;
- Promoting efficiency in state enterprises and revising the private sector;
- Promoting re-establishment of commercial network and market distribution channels;
- Encouraging both national and foreign investment to play a larger role in economic development country.

Mozambique's economy has been growing continuously, in real terms, since 1993 and long-term economic prospects are good. The country's annual GNP per capita, estimated in 1993 was US \$ 90,

but by mid-1996 the World Bank believed that GNP per capita had risen to between US\$ 120 and US\$ 150 (Christie, 1996).

The economy grew 4.1% in 1995, 6% in 1996, and 6.1% in 1997. There was a sharp decrease in inflation: 54% in 1995, 16.6% in 1996 and 4.1% in 1997 (CPI; 1998). The exchange rate in July 1997 was 1 USD = 11.500 MT (Meticais), while in November 1998 was 1 USD = 12.100 MT.

Table 1. The Gross Domestic Product (GDP) by sector, is as follows:

sector	GDP%
Tourism and services	52.2% (1995)
Agriculture	22.8% (1997)
Industry	8.6% (1997)
Others	13.4% (1985)

Source: Christie, 1998

1.2. Forestry contribution to the GNP

In Mozambique, natural forests have a huge potential for social and economical development and contribute to a large extent in providing goods and services.

Rural communities depend strongly on the forestry resources for their livelihood. The national economy receives direct contribution from the forestry sector for about 18% (estimate) annually of the GNP. Indirect contributions amount to around 80% of the country's needs for energy in substitution of millions of tons of fuel oil that should be imported, something equivalent for house building and various other products of very high financial values (Saket et. al, 1995).

Forestry's contribution to the country's national income or the value-added generated within the sector in 1981 was estimated at 5.299 million MT. The figure is an estimate based on available information as well as on several assumptions, and therefore should be regarded as a rough indication of the sector's role in the economy.

Subsistence production accounts for nearly 75% of the total value-added. There are no complete statistics on the country's national income. For this reason, no attempt has been made to determine the magnitude of the contribution of the forestry sector to the GNP.

In 1983, the forestry's contribution was estimated at about 7% of GNP, and from 1980 to 1986, excluding fuelwood, the wood industry contribution has represented an average of 21% of the agro-industrial Gross Production (Strategy for development of the forestry sector, 1991), which has amounted to 28% in subsequent years (1986-1988).

In 1977, the forestry sector contribution to the income generated from exports was US \$ 5 million, which has decreased to US\$1 million from 1989 to 1990 due to various economical barriers. At the beginning of 1973 the exports income generation amounted to over US\$ 7 million for 120,000 m³ of processed wood, against the 2,400 m³ registered in 1990 (round timber included).

2. FOREST RESOURCES

The land is a key issue in the national social context. Under the 1990 Constitution, all property in

land is vested to the State. Land may not be sold or mortgaged but, the State grants titles for the use of land and long lease is available. Direct users and producers get priority.

In granting titles for the use of land the State protects rights acquired through inheritance or occupation, unless there is a legal reservation. The constitution of the Republic makes it clear that environmental considerations are important.

2.1. Forest land area

The natural forest extends over an area of 618,274 Km², which accounts for 77.79% of the total land of the country, including the inland bodies. The forest with timber production capacity covers an area of 197,354 Km² or 24.43% of the total land of the country. The actual size of mangrove vegetation is defined at 396, 080 ha. (Saket et al; 1995).

Natural forest cover has been classified according to five major vegetation type as following:

High Forest: usually with 3 differentiated strata; dominant stratum has an average height of more than 18 m.; co-dominant stratum of 12-15 m and understorey of 4 to 7 m.

Low Forest

Thicket: frequently the result of a degradation process following burning, over exploitation or overgrazing of high or low forests.

Grassland: The dominant component is the grassy herbaceous stratum. Scattered trees and scrubs can be present.

Mangrove communities: All mangrove communities are grouped under this unit.

Vegetation on dunes: All littoral dune formations are grouped under this unit.

Table 2. Land use distribution and land cover types

Land Use type	Area (ha) 1980	Area (ha) 1990
Natural forest (productive)	19,129,480	19,735,400
Forest plantations	42,000	42,000
Thicket	19,880,998	26,278,471
Grassland	31,952,950	20,114,357
Mangroves	455,500	396,080
Dunes	98,250	78,867
Agriculture	5,496,200	11,843,910
Water bodies	1,029,948	1,029,948
Not classified area	1,280,000	1,280,000
TOTAL	80,799,033	80,799,033
Annual deforestation (1980-1990)%		0.26
Annual re-afforestation (1990)%		1,400

Source: Saket, 1994

The forest types having timber capacity production has a growing stock estimated at 503 million cubic meters, in which 68 million cubic meters of timber with commercial values of diameter categories of 25 cm and higher. The total standing timber of economically valuable species of diameter categories of 40 cm and more is estimated at about 22 million cubic meters (Saket; 1994).

Regarding yield rates, it has been estimated that total timber can produce 8.828 million cubic meters

per year and the total commercial timber is able to generate 1.195 million cubic meters a year.

2.2. State protected area

State protected area	Total (ha)
Forest reserves	4,471
National Parks	16,070
Wildlife reserves	18,600
Coastline reserves	1,050
Hunting area	59,704

3. FOREST PRODUCTS

3.1. Wood products and industries

The forestry sector's review carried out in 1995 shows that the majority of wood produced in Mozambique is utilised by the rural sector as fuelwood and building material. Only a small portion of the total wood production comprises industrial wood.

Despite a declining trend in industrial wood production in the country since the mid '70's the total wood removal from the forests has shown a regular increase due to a steady growth of subsistence population whose consumption pattern and wood usage remained the same.

The structure of wood production in Mozambique comprises:

Subsistence wood production;
Market fuel wood production;
Industrial roundwood; and
Processed wood production

Table 3. Registered Forest Industries in 1997

Province	Sawmills	Plywood	Particle Board	Veneer	Parquet	Posts	Total
C. Delgado	10						10
Zambezia	5						5
Nampula	14						14
Inhambane	13				1		14
Gaza	7						7
Tete	6						6
Sofala	11	1		1	1	1	15
Maputo	19						19
Manica	10		1			1	12
Niassa	6						6
TOTAL	101	1	1	1	2	2	108

Source: DEP/DNFFB, Annual Report, 1997

In the decade 1980, when Mozambique civil war, the majority of management, maintenance, operational and administrative staff of the industry suddenly immigrated; the industrial production began to decline. There has been some progress in industry since 1994, when the armed conflict ended.

Forest industry production for selected years is given in the table below:

Table 4. Forest Industries Production (1988-1997) (cubic metres)

Year	Sawnwood	Plywood	Particle Board	Veneer	Parquet
1988	19,456	173	3,270	6	57
1989	20,778	65	3,286	0	35
1990	25,661	2	4,007	0	46
1991	16,403	33	2,399	282	100
1992	15,665	100	1,218	751	208
1993	29,939	128	1,217	589	317
1994	29,526	-	800	1,441	2,314
1995	41,252	79	630	1,386	1,042
1996	42,972	697	0	1,824	3,709
1997	9,407	307	0	771	

Source: DEP/DNFFB: Annual Report, 1997.

The recent change in government the Government policy prioritising the wood companies privatisation, will greatly encourage the private sector in the increase of wood production. The table below shows the number of the privatised companies:

Table 5. Privatisation of Forest Industry

province	privatised	in process
Maputo	3	0
Inhambane	5	11
Sofala	2	1
Manica	0	1
Tete	0	0
Zambezia	1	0
Nampula	3	0
Cabo Delgado	1	0
Niassa	0	0
Total	15	13

Source: DEP/DNFFB, Annual report, 1997

3.2. Fuelwood production

On the basis of the FAO's estimate of per capita fuelwood consumption of 0.665 cubic metres for Africa as well as on estimated population of the country, it was concluded that the total household fuelwood consumption in 1969 was 4.7 million cubic metres. The Forest Sector review has provided the 1992 per capita consumption in order of 1.0 to 1.7 m³.

Pole consumption for building and fencing in the rural areas is estimated at 0.03 cubic metres/person/ year, which corresponds to a total of 317 thousand cubic metres. So far there is no new study carried out which could update the previous one.

Annual consumption of fuelwood and small construction poles (3 to 12 cm) in 1996 was estimated at 16.0 million cubic metres (DNFFB; 1997).

The low recorded information with the new system excluding the subsistence fuelwood production figures, shows that the consumption of wood for fuel, charcoal and poles is around 160,000 stacked cubic metres (steres), see table below.

Table 6. Wood Requirement in 1997

woodfuel	wood for charcoal	wood for poles
1,166 ^a	785 ^a	144 ^a
497,815 ^b	1,081,243 ^b	21,113 ^b
131,763.8 ^c	158,131.7 ^c	44,834 ^c

Source: DEP/DNFFB: Annual Report, 1997

Number of issued licences^a; The authorised wood quantity (s.c.m.)^b; Wood removal/under licence^c

With regards to the market fuelwood, production, consumed by part of the urban population and by some industries, and according to the last survey in 1977, in Maputo, the average charcoal consumption is assumed to be 160 Kg/ person/ year.

3.3. Roundwood production

Estimated log intake capacity of all operating units is 310,000 cubic metres, which corresponds to the following annual outputs:

Sawtimber	=	32,550.2 m ³
Plywood	=	959,0 m ³
Blockboard	=	2,454.0 m ³
Veneer	=	1,200,000 m ³
Parquet	=	9,448.0 m ³

Source: DEP/DNFFB: Annual report, 1997

Of this log intake capacity, 202,500 cubic metres/year, corresponds to the logging capacity in natural forest, mostly located in the northern and central regions of the private sector holds the greater part of the logging capacity (Saket, 1995).

Table 7. Logging Capacity in Natural Forest (cubic metre/year)

province	public	private	mixed	total
Cabo Delgado	27,500	17,000	2,500	47,000
Niassa	7,500	2,500	-	10,000
Nampula	21,000	15,000	-	36,000
Zambezia	2,500	22,000	5,000	30,000

Tete	2,500	-	-	2,500
Sofala	7,500	45,000	-	52,500
Manica	7,500	-	-	7,500
Inhambane	15,000	-	-	15,000
Gaza	2,000	-	-	2,000
TOTAL	93,000	102,000	7,500	202,500

Source: Ribeiro, 1991

As has happened in other production fields, industrial roundwood output showed a marked drop in some years and steady decline along the last two decades (see table below):

Table 8. Roundwood production (000 cubic metres)

year	roundwood production
1960	400.0
1981	260.0
1986	14.5
1987	16.1
1988	15.5
1989	9.4
1990	47.4
1991	50.2
1992	17.3

Source: DEP/DNFFB, Annual Report, 1997

4. INSTITUTION INVOLVEMENT AND LINKAGE

With regards to the Forestry National Statistics Network (FNSN), the Directorate of Agrarian Economy (DEA) through its statistics department, constitutes a major link between Forestry Directorate and the National Commission of Plan (CNP) to whom the exclusive right for the national statistics publication was empowered.

The Forestry Directorate, represented by the Economics and Planning Department (DEP) have been sharing forestry product export statistics with the Ministry of Trade, before they submitted their annual reports to the National Commission of Plan.

One of the main constraints within the National Statistics Network (NSN) is the discrepancy of the recorded and delivered figures. This incident could be explained by:

Differences in report formats designed by the involved institutions;
Differences in the sources of information; and
Shortage of competent staff.

The lack of co-operation within the national forestry statistical network allows the delay or even gaps on monthly summary to be compiled and circulated, in the way of feedback to the data information sources.

5. FOREST AND WILDLIFE SECTOR INFORMATION SYSTEM

5.1. Background

A shortage of systematically collected statistics from the forest sector in Mozambique has been a constraint on the utilisation of the wildland resources on a sustainable basis and planning future needs and policy implementation.

In the past few years, statistics of the Forest Sector have been kept on an ad-hoc basis with industrial export data being maintained on a systematic basis.

It was characterised by the (a) weakness on the relationship between forest industries and Forest Provincial Services (b) weakness on the content of the forms (c) diversity of the data and information sources (d) use of Lotus 123 worksheets accessed through macros to capture, verify and price data and (e) lack of reliance on the existing information sources.

Very useful series were recorded and have lately been incorporated into the present and use of Lotus 123 worksheets was abandoned in favour of Microsoft Excel and Word worksheets.

Major gaps, within the previous forest data base were completed from the last forest industry survey carried out in 1986, with involvement of all forest enterprises (logging and wood processing companies), carpentry shops equipped with log sawing facilities and any other primary wood industry.

The new forestry information management system was introduced in January 1992 as a result of the improvement of the existing system. It is intended to provide comprehensive coverage of all forestry and wildlife activities in the provinces within a standardised format, and based mainly inclusion of various report forms.

5.2. New reporting system and data base presentation

The new reporting system plays an important role on the resources, use and planning at short, medium and long terms. It should not be interpreted as more than simply statistics demanded by the National Directorate of Forestry and Wildlife (DNFFB). It is an enhancement of the authority of the Forestry and Wildlife Provincial Services (SPFFB) to be better informed on all forest sector activities in each of the 10 provinces. The DNFFB has chosen the SPFFB as the appropriate source of data information within the province.

These provincial authorities should collect forest sector data and information from several sources in their own provinces and check it for authenticity. The figures reported should be reviewed critically against local knowledge of actuality and, report forms should be scrutinised for completeness before their submission to the National Directorate.

The actual forestry database comprises:

A system of information gathering through a monthly reporting system based on the provincial forest service (SPFFB),

Data capture and verification on computers at the Economics and Planning Department (DEP) in Maputo,

Analysis and preparation of standard report by DEP to be submitted to the National Directorate,

Feedback and dissemination of these to the provincial level.

5.3. Coverage and data base areas

The data base coverage will expand in the future in scope to include all activities such as:

Control of forestry resources: Issue of felling licenses; License royalty fees; Primary forest products; and Penalties for transgressions;

Industrial production: Register of wood consuming industries; Supply of logs; Secondary forest production; and Price of forest products;

Exports;

Afforestation: Register of nurseries; Nursery production and sales; Register of commercial plantation areas; and Register of non-commercial plantation areas;

Wildlife: Observation of animals; Hunting and culling; and Control of resources;

Beekeeping activities;

World Food Program activities;

Human resources;

Financial control;

Forest projects Registration; and

Projects Budget Control.

There are four main ways of making the forestry national statistics network more dynamic and operational namely (a) creating a close relationship between the information sources and users (periodic visits to the main information sources), (b) feedback system implementation, (c) short training courses and workshops and (d) periodic forestry inquiries.

The Forest Resource Database includes:

Forest Regeneration, which plays a main role in the forest management. The total area regenerated after fire destruction and forestry species regenerated should help in the forest harvesting programming and fires protection planning. It would also be useful for stock growing prediction.

Wildlife Resources Management (Survey, Protection and Utilisation).

Survey: Area surveyed, animal species occurrence, species under the risk of disappearance.

Protection: Area under protection, species under protection, revenues from royalties, penalties for transgression.

Utilisation: Revenue from royalties, penalties for transgression and penalties for the illegal transit with wildlife products.

Sales in the local market and for exports.

5.4. Brief aspects of menu operations

The information management system for forestry sector in Mozambique uses three main Microsoft packages described as follows:

Microsoft Excel (Improvement previous form; Design of the new forms; Forms record);

Microsoft Word (Elaboration of instructions for the forms); and

Data Entry, Management and Maintenance (Updating and sorting of the data).

Each of the above mentioned data base areas is suitable for whatever the option. Once a certain database area is selected, an operation menu appears with:

- Select province.
- Select year.
- Browse data.
- Edit data.
- Add new data.
- Delete and pack.
- Reindex data.
- Exit for choice

5.5. Statistical information sources

The main sources of statistics have been:

Forestry and wildlife provincial office (SPFFB) which submits statistics directly to the National Directorate of Forestry and Wildlife (DNFFB), through the Economics and Planning Department (DEP), covering such matters as license revenues, control activities;

Industrial enterprise report, which submits forestry product utilisation, forms to the SPFFB, the only statistical information source for the central level (DNFFB). These reports cover aspects of the forest production and state enterprises; and,

Public investment projects, which submit reports directly to the relevant department covering operational, personal and financial aspects of forest projects.

Within the National Directorate for Forestry and Wildlife (DNFFB), the Economics and Planning Department (DEP) has assumed the responsibility of designing and implementing an information database for the forest sector. This is intended to overcome the major differences from each SPFFB. A monthly report concerning information on (i) provincial level activities (ii) forest project activities (iii) industrial enterprises production, is elaborated and sent to the National Directorate.

5.6. Structure of the forms

In accordance with their destination and use, the forms are classified into four main groups, presented as follows:

Group A - Forms to be filled in and kept by companies.

(1-a) Logs entrance register

(1-f) Logs outlet/logs transit register

Group B - Forms to be filled in by the companies and submitted to the forestry provincial offices their checking.

(2-b) Logs supply to the sawmills/mills

(2-c) Wood processed production

Group C - Forms to be filled in and kept in the forestry provincial offices

(1-a) Control of the Licences

(1-b) List of the issue Licences

(1-c) Flown off production/balance

Group D - Forms to be filled in by the forestry provincial office and submitted to the National

Directorate of Forestry and Wildlife in Maputo.

(1-d) Penalties for transgressions and their revenues

(2-a) Enterprises register

(2-d) Forestry products price survey

(3-a) Exports undertaken within the provinces

(4-a) Reforestation; List of the nurseries

(4-c) List of commercial plantations

(5-b) Hunting products/production

(5-c) Wildlife resources use inspection

(8-a) Human resources registration and its updating

The timing for form submission can be (a) monthly, (b) quarterly and (c) annually.

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STATUS AND USE OF FORESTRY STATISTICS IN NAMIBIA

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1. BACKGROUND

The Directorate of Forestry in Namibia was established in 1990. At present it is still in its early developmental stages. The Directorate produced the first Forestry Strategic plan for Namibia in 1996. In August 1997 the Directorate began implementation of the Strategic Plan of the Namibia-Finland Forestry Programme. The Strategic Plan is based on ecological, environmental, cultural, and socio-economic considerations and it considers 'Production, Protection and Participation' as the three important issues of forestry development in Namibia.

New forest legislation was completed in 1997 and is awaiting approval by Parliament. At present the national forest policy of Namibia is under review.

The main challenges being faced by the directorate are manpower development, infrastructure development and forest resource data collection. Several forestry staff are in colleges and universities to obtain Forestry Diplomas and BS Degrees. The infrastructural development is almost complete. Forestry data collection, compilation, analysis and dissemination is in progress.

2. INSTITUTIONS DEALING WITH FORESTRY DATA COLLECTION

2.1. Directorate of forestry

The Directorate of Forestry is the main institution dealing with Forestry data collection in Namibia. These activities are handled by the Directorate's three Divisions, namely, Management, Research and Training & Extension (Planning and Extension). Under the Management Division there are three Regions (North East, North-West and South-Central) which are managed by Forestry District Officers. The District Forest Officers are key personnel in direct contact with local communities.

2.2 Namibia Finland forestry programme

The Directorate of Forestry is implementing sub-components of a Namibia-Finland Forestry Programme in cooperation with the Government of Finland. The overall programme objective is to ensure an increased role of forestry in the socio-economic development of Namibia through continuous implementation and development of sustainable forest management practices.

The Programme has four components: Public Sector Forestry Capacity Building, Community Forestry, Integrated Fire Management and Environmental Forestry. The Public Sector Forestry Capacity Building Component has three sub-components: Institutional Development, Training at

Ogongo Agricultural College and National Forest Inventory.

2.3 National remote sensing centre

The national Remote Sensing Centre is involved in the development of GIS applications. The centre produces a variety of maps for different clients including presentation of forest statistics in map form for the Directorate of Forestry.

2.4 Other institutions

Other institutions dealing indirectly with forestry data collection are: the National Botanical Research Institute (herbarium), Directorate of Environmental Affairs (environmental Impact Assessments), Ministry of Trade and Industry (forest products import and exports).

3. IN-COUNTRY CAPACITY

The main weakness of the Directorate of Forestry is the shortage of qualified local forestry staff. Out of the 123 positions of professional and technical staff 65 (or 52.8%) are filled and 57 are vacant. The Directorate of Forestry, as the major institution directly involved in forestry data collection is in the process of developing its human resource capacity to be able to deal with data collection, compilation, analysis and dissemination. This is particularly essential in the area of forest research to increase the human resource capacity to manage and perform scientific research to produce data and information to support the various forest management activities of the Directorate.

4. FREQUENCY OF DATA COLLECTION

For routine operations such as nursery operations, issuing wood harvesting and export permits etc. data is collected daily. In the case of forest inventory, data collection will be repeated after 15-20 years while for local areas requiring forest management information, the data will be gathered when appropriate. For other components such as Community Forestry, Environmental Forestry, Integrated Forest Fire Management the data is collected when appropriate.

5. THE CONDITION OF DATA-DISSEMINATION

The forestry statistics information is mainly disseminated through the Directorate's monthly, quarterly and annual progress reporting system. The routine statistics, inter alia, include Number of: Plants raised, Plants sold, Permits issued, Plants for Own use/donated; Revenue (N\$) generated from: Plant sales, Wood harvest permits, Fines, Timber contracts, exports of forest products etc.

The data from the Forestry Inventory, Community Forestry, Environmental Forestry, Integrated Forest Fire Management is disseminated through the various reports produced by the respective components. The Forest Inventory Sub-component has so far produced 4 forest inventory reports, (West Tsumkwe in Otjozondjupa region; Nkurenkuru Concession in Kavango Region; Otjinene/Okakarara districts in Omaheke region; and Ongandjera Community Forest in Oshana Region). This Sub-component is in the process of preparing a report for Caprivi where 861 tree plots were measured in both East and West Caprivi between September-December 1997.

6. USE OF INFORMATION

The information developed is used by the Directorate of Forestry and other institutions for planning various forestry and natural resource management activities in order to develop the forestry sector in Namibia.

SOUTH AFRICA FOREST REPORT

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1. BACKGROUND

South Africa (SA) is a large, diverse country at the foot of the African continent. It is flanked in the north by Namibia, Botswana, and Zimbabwe and in the Northeast by Mozambique and Swaziland. The country has a total land surface area of 122.3 million km². Of this, 42 million ha is open savannah of which as little as half remains as natural area, 400,000 ha is closed canopy forest, of which 300,000 ha are in protected areas, i.e. 58% in state forest and 42% in other legally protected areas and about 1.48 million hectares is industrial plantations managed for sustainable production. Most of the plantations are located where climatic conditions are suitable for afforestation, i.e. 41% in Mpumalanga; 37% KwaZulu-Natal; 11% Eastern Cape; 6% Western Cape and 5% in the Northern Cape. Afforestation is occurring at a rate of around 10,000 ha per year.

Prior to 1994, South Africa's forest policy focus was mainly on industrial timber plantations and timber production and as such we collected commercial timber statistics only. Forest information in South Africa is characterised by:

- Fragmentary nature;
- Partiality, i.e. it does not cover all forest types or issues;
- Resource waste;
- Duplication of efforts;
- Existence of information gaps;
- Lack of a system to pull information together; and
- High costs of collecting information.

Following the launch of the NFAP in 1996, forest policy changed to focus on all forest sectors. The new forest policy and National Forests Bill necessitate the need to develop a forest resource information service that will address forest information problems. Essential and correct information should reflect the needs of preparing a report on the State of South Africa's forest resources, the development of a system of criteria and indicators for SFM and the development of a Forest Resource Accounting System. The system should have the following outputs:

- Information on forest resources of all types (ecological, economic and social);
- Information on demands on the forests;
- Resource implications of forest;
- Important influences on the forest sector; and
- Forest Resource Accounting.

2. SOUTH AFRICA'S MACRO-ECONOMIC POLICY FRAMEWORK

2.1. Proposed policy framework

A collaborative network approach to develop a system of Forest Resource Accounting will be a prerequisite for success. The proposed policy framework includes the following target areas:

The deficit in the budget will be reduced more rapidly i.e. 3% of GDP by the year 2000, inter alia eliminating the government dissaving by 2.5% GDP. In other words free more capital for investment purpose;

Import tariff reduction will be accelerated to contain imported inputs prices, facilitate industrial restructuring and enhance international competitiveness of the economy;

Maintain a stable real effective Rand Exchange rate;

Providing tax incentives to stimulate new investment in labour intensive project;

Restructuring of state assets which will attract foreign investment, expertise and technology.

2.2. Achievements

overall macro-economic balance was restored to an important extent;

the budget deficit of the national government was reduced faster than most observers had anticipated;

the deficit on the current account of bop was reduced in terms of absolute value and as a ratio of gdp;

inflation fell and inflation expectation diminished considerably;

productivity improved in the formal sector of the economy; and

fixed investment in the productive business sector of the economy has increased in recent years.

2.3. Drawbacks

South Africa has experienced a period of slowdown in economic activity and consolidation since the third quarter of 1996. Economic growth has been weak and the current indicator of employment in the formal sector of the economy has declined to its lowest level in 20 years. The main factors that have adversely affected the economy are:

Financial turbulence in Asia: the domestic financial market came under intense pressure in May 1998 and monetary conditions tightened considerably;

Economic growth as measured by year to year change in real Gross Domestic Product decelerated from 1996 to 1997, reflecting the consolidation of real GDP and a decline in agricultural production;

Declining employment and slow growth in private household disposable income were manifested in slow growth in the real value by trade sectors. The slowdown in the economic growth brought in its wake a further decline in total employment in the non-agricultural sectors of the economy;

The turbulence in emerging markets during the second quarter of 1998 and a sharp decline in the surplus on the external capital account brought downward pressure to bear on the exchange rate of the Rand. The normal effective exchange rate of the Rand as such fell by about 20% in seven months of 1998. This event delayed the anticipated recovery in overall real economic activity.

3. POLITICAL SITUATION

The new South Africa is moving into its 5th year in 1999 and the second elections are to be held between May and July 1999. The current ruling party is the African National Congress. The

National Party is the official opposition party.

4. SOCIAL AND HUMAN CONTEXT OF FORESTRY

The current relationship between forest owners and the neighbouring communities can be grouped into three main categories:

Access to land and other resources;
Economic opportunities; and
Access to social service and infrastructure.

Access to land: Statistics of families occupying forestland is estimated at 100,000 family members of employees alone. These families do not have any legal status and are vulnerable to evictions. The insecurity of tenure status of these families is sometimes a cause for instability and conflict. This problem is not confined to forest land only but, it is common to state and privately owned land throughout South Africa both in rural and urban areas. The land reform programme is therefore very important in addressing these problems. Communities living in forest land require some livestock grazing and cropping to supplement or sustain their livelihood. In some cases the forest industry allows communities to graze their cattle on forest land and allow them to collect firewood and other non-timber forest products.

Economic opportunities: Companies such as Mondi and Sappi also outsource some timber from communities using out-grower schemes.

5. FOREST RESOURCES

5.1. Land ownership

Of the total surface land area, 84% is farm land, 10% is nature conservation, 1% and 4.8% other land (DBSA 1994);

Of the total farmland and nature conservation, 23% is natural forest and woodlands and only 7% of this resource is conserved in national parks and nature reserves;

White owned farmland accounts 87% of the total land area and the remaining 13% is black-owned subsistence farmland in the former homelands.

5.2. Forest land ownership

Forestland is estimated at 1.48 million ha (1.1% of the total land area). Of this land:

46% is forest industry companies;
24% is private individuals;
17.2% is SAFCOL; and
12.8% is public.

6. LAND USE

6.1. Comparison of land use

Of the total land area:

Sugar cane	411,000 ha
Wheat	1.4 million ha
Forestry	1.5 million ha
Maize	3.9 million ha

Plantation area by species

Species	Private (ha)	Public (ha)	Total
Softwood	432,992	364,618	799,610
E. Grandis	386,295	55,099	441,394
Other gum	134,507	22,063	156,570
Wattle	104,000	8,029	112,029
Other	4,803	5,732	10,535
Total	1,062, 597	455,541	1,518,138

Source : DWAf 1996/97

7. NEW AFFORESTATION OVER THE LAST SEVEN YEARS

Years	Softwood	Hardwood	Total	Softwood	Hardwood
1990/91	24.804	20.619	45.423	55%	45%
1991/92	15.959	12.282	28.241	57%	44%
1992/93	9.925	6.653	16.578	60%	40%
1993/94	10.366	8.283	18.649	56%	44%
1994/95	6.705	6.435	13.14	51%	49%
1995/96	4.761	7.186	11.947	40%	60%
1996/97	4.239	6.95	11.189	38%	62%
Total	76.759	68.408	145.167	53%	47%

8. FOREST PRODUCTS PRODUCTION, TRADE, And CONSUMPTION

8.1. Sales at processing plants by volume

Product	Units	Volume
Sawn Timber	M ³	1.32
Pulp	Tons	2.92
Mining Timber	Tons	565
Poles	M ³	134
Charcoal	Tons	27
Chips / Mill Residues	Tons	1.155
Firewood	Tons	3

8.2. Export of forest products 1997

Product	Production (RSA)	Exports (RSA)	Imports	Apparent Consumption

Graphic papers				
Uncoated Paper	279,000	16,000	73,000	336,000
Coated Paper	63,000	1,000	110,000	172,000
Newsprint	332,000	182,000	4,000	154,000
SC Mechanicals	81,000	35,000	2,000	48,000
Packaging papers				
Linerboard	613,000	186,000	1,000	428,000
Fluting	248,000	4,000	2,000	246,000
Other Kraft	149,000	22,000	41,000	168,000
Paper- & fibreboard	137,000	4,000	91,000	224,000
Tissue	145,000	10,000	2,000	137,000
Total paper & board	2,047,000	460,000	326,000	1,913,000
Pulp				
Paper Pulp	1,780,000	210,000	80,000	1,650,000
Dissolving Pulp	520,000	520,000	0	0
Total pulp	2,300,000	730,000	80,000	1,650,000

9. OTHER FORESTRY PRODUCTS AND ROLES

9.1. Fuelwood consumption

Biomass accounts for almost 10% of the net national energy consumption and amounts to 11 million tonnes per annum. The major proportion of this biomass based energy is utilised by rural households and 6.6 tons/annum is consumed by semi-rural households in the homelands with the remainder being used by farm workers (3.5 million tons), other rural households (less than 0.5 million tons) and urban households (0.7 million tons).

9.2. Fuelwood supply

Source	Volume
Former homeland areas	Average 5.8 million tons per annum
Woodlots from former homelands	100 000 tons
Commercial forestry	Between 2 and 4 million tons of plantation residue
Invasive alien	2.5 million tons on commercial farms

9.3. Forest management law and policy

The purpose of the New Forest policy is to promote the forest sector so that it is able to provide forest goods and services now and in future. It extends to any resource that provides forest goods and services and any other activity that relates to tree based resources. The new forest act as such provides for effective protection, management and utilization of all types of forest resources in order to promote the sustainable development of the forest including ecosystem and ecological resources they contain for the benefit of all the people in South Africa.

Estimated capital in the forest products industry (at current market prices)

Industry	Percentages
Pulp and paper mills	80.0%
Sawmills	17.6%
Other mills	1.9%
Mining timber mills	0.5%
Total investment	R 18.5 billion

9.5. Institutional strengthening and capacity

A strategy of human development is now being developed. This strategy needs to address the following key areas:

Training standards and learning outcome to enable trainees to gain skills and knowledge;
 Career paths in forestry and related fields;
 Enhance the overall productive capacity and competitive capability of the forest sector.

9.6. Sustainable forest management

The development of the forest sector comes with environmental and social costs and benefits. This development must be directed by the appropriate and effective environmental management systems, procedures and regulations. This will ensure conformity with the South African environmental policy and best practice internationally.

The development of criteria and indicators will improve resource use planning, to access the outcome of forest management, provide a basis for continuous improvement and assist communicating the state of South African forest resources.

The new water act endeavour to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in the following ways:

meet the basic human needs of present and future generation;
 promote equitable access to water;
 protect aquatic and associated ecosystems and their biological diversity;
 promote beneficial use of water in the public interest;
 redress the results of past racial and future discrimination; and
 manage floods and droughts.

9.7. Outlook and future

Outlook of the consumption of industrial roundwood in S.A ('000m³) in 1995/96 and projection to year 2020 in various products categories based on a scenario of GDP growth of 25% (LHA)

Product category	Volume of roundwood sold from plantations 95/96	Projected consumption for the domestic market and exports 2020
Lumber (sawn timber)	4,745	7,870
Pulpwood and chip exports	10,920	24,130
Mining timber	2,560	2,560

Other	1,070	2,585
Total	19,295	37,145

The forest sector is exposed to globalisation and as such it is a part of many of the activities taking place internationally. These include:

The Forest Resource Assessment 2000; and
The development of criteria and indicators for sustainable forest management.

In South Africa the following activities are taking place:

The Chief Directorate: Forest will produce every three years South Africa's "State of the Forest" report;
All the state forest are currently being restructured;
The new water and forest have been promulgated;
There is a national initiative to develop a Natural Resource Accounting system; and
The "State of the Environment" report is in current production.

12. CONCLUSION

South Africa is in a transitional period. New policies and acts are being developed in the interest of all South Africans. The slowdown of economic growth, due to unforeseen circumstances has resulted in high unemployment associated with high crime rates. Over the past few years the forest sector has developed 3 important policy documents: the White Paper on sustainable management, the NFAP document a policy framework that directs the implementation of the White Paper and the Forest act. A crucial activity of the next millennium is the implementation of establishing the Forest Resource Information System. In this process care must be taken to ensure that the format of the information is compatible with other national, regional and international bodies.

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THE STATUS OF FORESTRY STATISTICS IN SWAZILAND

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1. INTRODUCTION

Swaziland is a small land-locked country in South-East Africa surrounded by Mozambique to the east, with South Africa surrounding its other borders. The country lies between latitudes of 31° and 32° south and longitudes 25.5° east. It covers only 17,364 km² and can be divided into four broad ecological zones, parallel to each other from north to south. There are Highveld, Lowveld and Lubombo. The population is 960,000 according to the 1995 census.

Generally, Swazi economy developed alongside and fashioned after South Africa. Owing to history and proximity the imports and exports manifest 80% and 60% interactions respectively, (SACU and Common Monetary Area).

Commercial forestry accounts for diversity of produce that earns foreign revenue for Swaziland. The major forestry products are:

unbleached kraft-pulp,
sawn timber,
furniture from pine (*Pinus patula*, *Pinus elliotti*, *Pinus taeda* and *Pinus kesiya*),
mining timber for South Africa's mines (*eucalyptus grandis* and *eucalyptus saligna*),
poles for fencing, construction and transmission lines, and
sawn wood for furniture making.

A small market South African for bark from black wattle has existed for a long time. A home market is situated at Matsapha Industrial Site to allow production, packing and export of tannin directly from Swaziland to Europe. Wattle is the main tree of rural communities which provides firewood, fencing and building material, bark (cash crop) and charcoal. Consequently, black wattle helps reducing the rate of deforestation of indigenous species.

Indigenous forests are intermediate between grassland and bush cover. The trees are mostly less than 10 meters in height and with diameters of 10-15 centimetres. This is clearly an indication of savannah vegetation commonly found in lower, drier parts of the Middle and Lowveld. Degradation and deforestation of indigenous forests is occurring at serious but largely unmeasured rate. Exploitation of these forests is mainly for fuel wood, woodcarving and furniture by local people.

2. FOREST RESOURCES

Land Ownership: Land tenure arrangements play an essential role in the management of land and the environment. The issue of land tenure in Swaziland is complicated. There are three main groups

of land tenure:

Swazi National Land (SNL) = 75%

Crown Land (CL) = 1%

Private Freehold or Title Deed Land (TDL) = 24%

The SNL is land held in trust by the King for the Swazi nation. Crown land is land owned by Government and the TDL is privately owned. SNL is subdivided into two sub-groups:

SNL Senu Stricto, SNL at independence and

SNL purchased, all free hold land purchased after independence

Land use

	Km ²	%
Small scale subsistence crop agriculture (Rainfed annual field cropping)	2,140	12.3
Large scale commercial crop agriculture (Irrigated and rain-fed field/tree cropping)	1,040	6.0
Extensive Communal grazing	8,670	50.0
Ranching	3,320	19.1
Plantation Forestry	1,400	8.1
Parks, Wildlife management	670	3.9
Residential, industry and recreation	80	0.5
Water reservoirs	40	0.2
TOTAL	17 360	100

Source: (Rammelzwaal & Dlamini, 1994 cited in SEAP of 1997).

Natural Forestry Resources: There is a total forest area of 624,000 hectares which is 36% of total land area, reported by the National Forestry Inventory of 1990. Out of this, there are 464,000 hectares of indigenous forest and woodlands. These are classified into:

	Ha
Montane and Highland (> 1,000 m)	11,930
Riparian	2,344
Moister Savannah	112,720
Acacia Savannah	150,590
Dryer Acacia Savannah	34,024
Bushveld	151,890

Source: (National Indigenous Forest Inventory of 1990)

Planted Forest Resources: Out of the 624,000 ha of forest areas, there are 135,000 ha of commercial forest plantation and 25,000 ha of wattle forest. Commercial forest plantation comprises:

Coniferous (pines)

Saligna/grandis

Other gums

Wattle

Other non-coniferous.

The plantations are owned by five companies, namely:

Usutu Pulp Company, 65, 000 hectares,
Mondi Forest Company, 26 000 hectares,
Shiselweni Forestry Company, 11 000 hectares,
Swaziland Mantantens Company, 4 000 hectares, and
Tonkwane with 2 000 hectares.

They are concentrated on the Highveld whose conditions are favourable for tree growth (National Forest Research Plan 1992). The Forest Sector accounts for 16-18% of Swaziland's formal work force.

3. FOREST PRODUCTS PRODUCTION, TRADE AND CONSUMPTION

Total annual industrial production is about:

174 000 tons wood pulp,
102 000 m³ sawn timber,
70 000 m³ mining timber and panels,
420 tons of dry wattle bark for tannin.

Over 75% of the population in rural areas use firewood for cooking and warming houses.
in million m³

	Timber	Fuel	Others	Total
Indigenous forests	3.93*	3.19	1.47	8.59
Wattle forests	0.98	0.66	0.01	1.65
TOTAL	4.91	3.85	1.48	10.24

Source: (Natural Forest Research Plan, 1993, 2003)

Non-wood forest products may include:

Foliage
Medicinal
Honey
Edible fruits and nuts
Mushrooms
Mopane worms etc.

Despite the already considerable income from forest products, there is a great potential to increase this revenue by exploiting the non-wood forest products and to expand the tree species use for different purposes.

Tourism and Recreation: Since the change of the political system in South Africa, the Tourism Industry in Swaziland is only just surviving. The tourism sector has to take renewed interest in the

environment to attract tourists.

4. FOREST POLICIES LEGISLATION AND INSTITUTIONS

The revised mandate for Government with respect to forestry is to formulate and implement sound forest policies, plans and programmes towards sustainable development, management and utilisation of all forest resources in the country. Presently, the review of the Swaziland Forest Policy and Legislation is in progress with financial assistance from Denmark through the DANCED Project (1998-2001) - see project document for more details.

Forest policy objectives may be summarised as follows:

To achieve efficient, profitable and sustainable exploitation of forest resources.

To increase the role that forestry plays in environmental protection, conservation of plant and animal genetic resources and rehabilitation of degraded lands.

Institutional Strengthening: Institutional strengthening and capacity building of the Forestry Section is still weak with limited professional and technical staff. The restructuring programme to upgrade the Section into a department by the year 2000 is in progress and highly considered by the Ministry's restructuring process.

Sustainable Forest Management: Environmental issues related to sustainable forest management include: deforestation, inadequate management, habitat destruction and alien spp encroachment, loss of water resources due to excessive evaporation in commercial plantations (which exceed the rate of replacement of ground water), bush fires, and legislation.

Biodiversity: Environmental issues related to biodiversity and ecosystem sustainability: Ignorance about the value of conservation, conflicts with local communities, lack of resources, support from government, alien plant control, indigenous knowledge systems, pollution, resource inventories, ex-situ inventories, levels of protection and outdated, conflicting and fragmented legislation. A lead consultant from the University of Swaziland with the assistance of the National Steering Committee of the Biodiversity Strategy and Action plan is working hard towards the establishment and implementation of an action plan for the conservation of biodiversity in Swaziland.

Environmental issues relates to soil and water conservation: Land degradation, including deforestation, soil depletion, loss of habitat, declining biodiversity, watershed and range degradation, unsuitable land use and land management, loss of arable land to settlements, industry and infrastructure, pollution, water management and water quality (SEAP 1992).

Taxation: Presently there is no system through which users of forest products outside plantation forests and protected areas can be taxed.

4. CONCLUSION

Without an up-to-date National Forest Inventory and a study on the rate of deforestation and utilisation of forest products, it is difficult to make any projections for demand and supply of forestry products.

The forest section in Swaziland is highly imbalanced: there are excellent silviculture and management facilities available in Swaziland, including advanced research operations in the private sector, while, at the same time, there is a serious lack of trained personnel in silviculture and management in the government forestry section. There is therefore a serious need to embark on a recruitment campaign for professional officers, and to define a clear forestry management programme. The new forest policy will hopefully be in place by year 2001-2002.

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REPORT ON THE ZAMBIAN FORESTRY STATISTICS

by
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1. INTRODUCTION

1.1. The country

Zambia is a landlocked Central African country lying between latitudes 8°S and 18°S, and between longitudes 22°E and 34°E. It shares borders with Angola, Democratic Republic of Congo, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana and Namibia. The total surface area of the country is about 752, 614 km² most of which is plateau between 1,000 and 1,600 metres above sea level. 9% of this area is gazetted forest estate.

The country has a sub-tropical climate, with a warm wet season from mid November to April, a cool dry season from May to August and a hot dry season from September to mid-November. The average annual rainfall decreases from about 1,300 mm in the north-west to about 800 mm in the south-west.

The greater part of the country is covered by the deciduous woodland often referred to as the "Miombo". The structure and composition of this vegetation varies in soil quality, rainfall and treatment. It ranges from tree grassland in the lower and drier areas to what is almost dry deciduous forest in the areas of high rainfall and deep soils. Much of this is not within reach of the consumption centres, and, the slow growth and low volume production of the woodlands together with the intractable nature of their timber render them unsuitable as providers of purpose timbers.

According to the 1994 estimates, Zambia's human population stands at 9.3 million with a growth rate of 3.5% per annum. This means that, at the moment, the country's population density is about 10.4 persons per square kilometre.

1.2. The economy

The Zambian economy which was solely based on the copper production and export has suffered from lack of real economic growth. According to the available information on the economic growth of the country, the real Gross Domestic Product fell 2.5% in 1992, by 3.1% in 1994, and by 4.3% in 1995 (ZFAP, 1997). The economy of Zambia is heavily depended on the copper earnings which account for about 90% of export earnings and contributes about 50% to government revenue.

With the depression of the copper industry and lack of an alternative industry, the Government attempted to maintain the standard of living of relatively privileged urban residents by strengthening regulations, by intervening in the economy and tightening the control over farm villages. The Government's policy was to subsidise the maize (staple food) price and to set up a uniform producer's price for the entire country. This was an excessively heavy burden on the Government, bringing about a budget deficit and the deepening of aid dependency.

As a result, the Structural Adjustment Programme (SAP), under the International Monetary Fund (IMF) and the International Bank of Reconstruction and Development (IBRD) aimed at decreasing such government regulations and interventions was ushered into the Zambian economy. A strong power base was needed to promote the structural adjustment.

Zambia's debt was incurred when the inflation rate became higher than the interest rate. Conditions have changed and Zambia is caught in a trap. Zambia's bilateral Paris Club debt was US\$ 3.2 billion, its multilateral debt to the IMF, World Bank and others was US\$ 3.2 billion in 1997 (*Zambia's Business Magazine, No. 7/2, July 1998*). A certain amount of debt forgiveness may be appropriate, but it is likely to materialise only if the Government takes genuine measures to facilitate the stability of the local industries.

1.3. The economic position of forestry and forest products industry

In considering the general economic conditions of Zambia in terms of GDP, the forestry sector generated US\$ 26.2 million, on average, per year over a five year period (1989–1993), representing 0.9% of the country's GDP. The forest product industry is included in the miscellaneous sector of the manufacturing industry, and the figures, unfortunately, are not available. During the same period, this industry contributed US\$ 395.7 million, accounting for 13.5% of the country's GDP.

1.4. Social and human context for forestry

Forests and forestry are very important factors in the socio-economic well being of the people Zambia. The forests are valuable in many ways, they provide shelter, food and medicines and woodfuel which is the main source of domestic energy for the majority of the Zambian people.

Forests also play a very important role in the creation of the employment opportunities, thus contributing to the income generation and the uplifting of the living standards of Zambians.

2. FOREST RESOURCES

2.1. Land ownership

Ownership of all land in Zambia is vested in the President of the Republic who holds it in perpetuity for and on behalf of the people of Zambia. For the purpose of administration, the land is divided into state land and customary or traditional land.

State land is administered by the Commissioner of Lands, and is largely used for development work such as the urban settlements, mineral exploration and commercial farming. Customary land is administered by the traditional rulers and is used by individuals or families in rural communities. State land covers about 3.5% of the total land and customary land covers about 96.5%.

Land holding in state land is based on renewal leasehold titles up to 99 years. In the customary land, an individual who has been allocated land by the traditional ruler returns ownership by cultivation, which includes fallow, and may pass ownership to his or her descendants or relatives. Under the customary tenure, land is not sold but, can be inherited though it is now possible to convert customary tenure into lease hold with the approval of the chief or local authorities.

2.2. Land use

The major land use systems in Zambia are outlined as follows:

Land use Extent (million hectares) Sub Area Total

Forests	
Forest reserves	7.2
National parks	6.4
Game management areas	15.6
Forests in open areas	15.4
Total Forest Area	44.6
Agriculture	15.1
Councils and Settlements	7.2
Swamps and Grassland	7.5
Water	0.8
TOTAL	75.2

SOURCE: Alajarvi, 1996.

Due to high population growth demand for more agricultural and settlement land is on the increase. Consequently, land under settlement and particularly under agriculture is rapidly increasing while that under forests is declining. Forest reserves in which, by law, settlements are prohibited, are being encroached and squatted..

2.3. Natural forest resources

Area: About 80% of the country is potential forest and woodland, but 20% has been converted to agriculture (MENR, 1994). The vegetation has been divided into four groups: closed forests, open forests or woodland, anthill vegetation and grassland.

Closed forests: On the basis of species composition and dominance, the closed forests, which are two or three stories are classified into the following categories:

Parinari forests;
 Marquesia forests;
 Cryptosepalum forests;
 Baikia forests;
 Itigi forests;
 Montane forests;
 Swamp forests; and
 Riparian forests.

Open forests or woodland: These are forests with less under wood or vegetation growth. These too, are subdivided into different types according to species composition and dominance. The main open forest type is the miombo woodland, which accounts for about 47% (or 35.34 million hectares) and is characterised by the *Brachystegia*, *Isoberlina* and *Jubernardia* species (Sekeli, 1997). Others are the Kalahari, Mopane, Munga, and Chipya .

Anthill vegetation: This occurs on the termite mounds and are found in different vegetation types.

The common species found in the anthill vegetation are *Boscia*, *Strychnos*, *Diospyros* and *Sterculia*.

Grassland: This is land which naturally has no trees and found in places with permanently high water table. *Loudetia simplex* is the most characteristic grass (Chidumayo, 1995). It includes bamboo, flood plains and swamps.

Table 5: Distribution of Land Cover Types in Zambia

land cover type	area (km ²)
Forest	
Dry evergreen	16, 060
Deciduous	6,830
Montane	40
Swamps	1,530
Riparian	810
Plantation	500
Chipya	15,560
Thicket	1,900
Miombo Woodland	
Wet	191,840
Dry	119,620
Kalahari	85,460
Savannah Woodland	
Mopane	38,700
Munga	32,600
Termitaria	24,260
Grassland Wetland	130,030
Dambo	76,320
Open Water	10,500
TOTAL	752,560

Source : Chidumayo, 1995

Volume: Reliable national wide information on the growing stock and growth levels does not exist (Alajarvi, 1996). Since the first forest inventory, covering the whole country, was conducted in the 1960s, there has been no detailed forest inventory to determine or to assess the quantity and quality of the country's forest resources. Estimates of the forest cover, growing stock and stocking are based on limited local level inventories and assumptions of changes over the past years.

The current estimates of the growing stock at are about 4,900 million cubic metres of cordwood, and the stocking density of about 75 m³ per hectare of stem wood.

Table 6: Estimated Growing Stock Volume

province	stocking (m ³ / ha)	growing stock(million m ³)
Central	82.88	176.03
Copperbelt	154.00	657.20
Eastern	84.98	344.65

Luapula	41.16	112.46
Lusaka	48.58	117.78
Northern	40.32	173.10
North Western	154.28	1,830.41
Southern	64.68	234.38
Western	144.20	1,263.43
TOTAL		4,909.44

Source : Alajarvi , 1996.

Change of area and volume over time: Accurate information on the area and volume changes of the forest resources is lacking. Calculations and estimates of the changes are based on the 1965 inventory that indicated that a total forest area of about 61.2 million hectares, representing 81% of the country's total land area.

Estimates of the woodland in 1986 by FAO, by Woodroffe, was 58.194 million hectares indicating a loss of about 3 million hectares over a period of three years. The estimates also put the annual loss of the forests at 0.5% which amounts to about 5.5% loss or 3.2 million hectares loss during the last 11 years, thus reducing further the forest area to about 54.997 million ha.

There are, however, some variations in the estimates of the annual loss of the forests, with other estimates indicating a much higher rate. These variations point to the fact that the actual situation is known.

2.4. Planted forest resources

The common plantation tree species in Zambia are the exotic species of *Pinus kesiya*, *Pinus oocarpa* and *Eucalyptus grandis*. Pines cover about 80% of the plantation area. Almost all the plantations are owned by the Government through the Forest Department and the Zambia Forestry and Forests Corporation (ZAFFICO). The rotation periods vary from 15 to 25 years.

Plantation area: Plantations are estimated to cover 60,000 hectares of which about 50,000 hectares are managed by ZAFFICO; 7,000 hectares by the Forest Department; and 3,000 hectares by the private sector.

Volume: According to Alajarvi (1996), the mean annual increment for the 25 year old Pine stand is about 14.4 m³ per hectare, while that of the Eucalyptus stand is about 18.6 m³ per hectare per annum. The stocking density for the Pine and Eucalyptus is about 280 m³ per hectare and 300 m³ per hectare, respectively.

Change of area and volume over time: Statistical information on the area and volume changes exist in scanty form. However, what is evident is that the plantation area is on the decline due to the unsustainable management practices. It is estimated that ZAFFICO is harvesting at the rate of about 350,000 m³ per year resulting in the clearing of 1,000 ha while carrying out the annual planting and replanting at the rate of 300 and 400 ha respectively. Similarly, the planting and replanting programme by the Forest Department is almost at a stand still, although harvesting from the old stock has continued.

3. FOREST PRODUCTS PRODUCTION, TRADE & CONSUMPTION

According to ZFAP (1997), the information regarding the forest products production, trade and consumption statistical data in the country is scanty. However, the 1997 scenario is as shown in the following table:

Table 7: Forest Products Production, Trade and Consumption

products	production	consumption
Round Wood	26,042,00	26,042,00
Indust. Round Wood (m ³)	319,000	319,000
Sawn Wood (m ³)	156,894	156,894
Paper and Paper Board (Tonnes)	3,900	3,900

3.1. Woodfuels and wood energy

Woodfuel in Zambia plays a major role in the national energy supply. Woodfuel in the form of firewood and charcoal is the principal source of energy in the country accounting for about 68% on average of the total energy supply. The sectoral pattern of the woodfuel consumption is dominated by households which consume 88%, and commerce and industry 9% (Chiwele, 1998).

Charcoal is the preferred form of wood energy among the urban households, and serves mainly as a source of income for the rural households. Firewood use on the other hand predominates in the rural areas. Woodfuel use in the households include cooking, heating and lighting.

Industrial uses of woodfuel include smelting of copper in the mining industry, beer brewing, tobacco curing and fish preservation. Charcoal is also used in the copper refineries as a reducing agent (Chidumayo, 1988) .

Table 15: Energy consumption by source (TOE)

Year	Petroleum Products	%	Electricity	%	Coal	%	Woodfuel	%	Total
1986	505,000	12	553,300	13	338,800	8	2,879,082	67	4, 276,182
1987	545,000	13	560,400	13	286,800	6	2,922,800	68	4,314,660
1988	564,400	13	610,000	14	326,700	7	2,855,033	66	4,356,133
1989	698,200	16	524,500	12	304,300	7	2,914,905	66	4,441,905
1990	590,245	13	567,112	13	243,474	6	2,981,570	68	4,382,401
1991	631,374	14	517,317	12	239,457	5	3,063,053	69	4,451,202
1992	628,726	14	529,432	12	233,691	5	3,135,717	69	4,527,566
1993	514,685	11	545,785	12	229,546	5	3,210,457	71	4,500,473
1994	543,032	12	650,914	14	112,100	2	3,289,473	72	4,595,518
1995	572,883	12	635,279	14	95,502	2	3,367,086	72	4,670,750

1996	565,402	12	567,107	12	239,400	4	3,449,552	72	4,821,461
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Source: Chiwela, 1998

3.2. Wood supply from non forest areas

Trees in non-forest land-use areas or outside forests are estimated to cover an area of about 15.8 million hectares according to Alajarvi, and have an estimated stocking of 5 cubic metres per hectare. Estimated growing stock at the 1996 levels was 81 million cubic metres.

Table 16 : Growing Stock by land Category in 1996 (Million M³)

provinces	FR	FOA	GMA	NP	TOF
Central Copperbelt	49.74	0.17	115.83	0.17	10.12
Copperbelt	81.46	441.92	15.37	115.10	3.35
Eastern	72.96	57.48	169.67	38.88	5.67
Luapula	16.10	27.41	8.22	50.47	10.26
Lusaka	1.53	79.13	19.40	15.87	1.86
Northern	45.91	21.32	72.45	17.47	15.95
North Western	377.09	781.96	523.65	139.42	8.31
Southern	43.96	39.42	77.48	63.46	10.07
Western	90.21	298.63	748.55	110.63	15.41
TOTAL	778.96	1,747.44	1,750.61	551.44	80.99

Source: Alajarvi, 1996

FR = Forest Reserves, FOA = Forests in Open Areas , GMA = Game Management Areas

NP = National Parks , TOF = Trees Outside Forest.

3.3. Non-wood forest products

Forests in Zambia produce or maintain a variety of non-wood products. The products are usually hunted for subsistence by the rural communities, although trade in these products is increasingly becoming wide spread. Non-wood forest products in Zambia's forests include: honey, mushrooms, insects, fruits, leaves, roots, fodder, grass, medicines and bush meat.

Collection of the non-wood forest products sometimes tends to have some negative impact on the forest ecosystem. Trees, for example, are cut down by the honey hunters to collect honey or are debarked by the traditional bee-keepers to make bark hives. Trees are also quite often cut down by the caterpillar collectors as an easy way of collecting caterpillars. Game hunters, especially poachers, are also in the habit of setting fire to the forests so that they could improve visibility.

3.4. Recreation and tourism

Game viewing, which is concentrated in the national parks and game management areas, is the main tourist attraction in the country. There are 19 national parks and 22 game management areas which together cover an area of about 22 million ha. Miombo woodland is the most extensive vegetation type in the national parks and game management areas (Chidumayo, 1995). Forests, therefore, both as a habitat for wildlife and as a landscape, play an essential role in recreation and tourism.

3.5. Recycling and other re-use of fibre

Information regarding the recycling and other re-use of the fibre materials is not readily available in the country, although some recycling of paper is done by the Zambezi Paper Mill.

4. FORESTRY POLICIES, LEGISLATION, AND INSTITUTIONS

4.1. Forest management, law and policy

Until July 1998, the forestry sector was guided by a forest policy that was formulated and adopted in 1965. This policy was heavily criticised and blamed for the poor performance of the forestry sector as it tended to exclude other stakeholders from forest management and development, and to concentrate the responsibilities in the hands of one institution (Forest Department).

The new forestry policy which came into force in July 1998, encourages the participatory Joint Forest Management system with active involvement of the local communities and other stakeholders in the protection, management and utilisation of forest resources.

Preparations for the new forestry legislation have also reached an advanced stage, and it is expected that before the end this year (1998), a new forestry act will be in place to facilitate the implementation of the new forestry policy. At the time of writing this report, the Forests Act of 1973 was still in force. This law recognises the Forest Department as the only institution to manage and control the utilisation of the forests resources in the country.

4.2. Private sector

The new forestry policy states that most commercial activities in forestry can be better handled by the private sector while the Government creates an enabling environment for private sector participation. Areas of intervention by the private sector include plantation establishment, management and utilisation of forest resources, harvesting and marketing of forest products and development of forestry industries and small scale enterprises.

4.3. Public sector

The role of the public sector (Government), represented by the MENR will be to formulate and review the forestry policy and legislation, co-ordinate their implementation and ensure enforcement of rules and regulations pertaining to forestry development.

4.4. Investment in forestry and forestry products

Investment in forestry over the years has been minimal and the contribution of the forestry sector to GDP is reported to be only 0.9%. Many observers, however, say that this is an under estimate since it does not include forest products traded in the informal sector, and production by wood-based industries which is grouped under the general manufacturing sector (Tables 2, 8 to 14).

4.5. Institutional strengthening and capacity building

The Forestry Department is the only institution at the moment which has the overall field

responsibility of managing and controlling the utilisation of the country's forest resources. But the resources at its disposal are significantly inadequate. Because of this, the Department has not been able to manage the forest resources professionally or fulfil its technical functions. In an effort to revitalise the forestry sector, the Government has taken a number of actions. These include restructuring the Forest Department, review of the forest policy and legislation.

4.6. Environmental issues.

The main environmental issues in Zambia include: deforestation and forest degradation, soil erosion and fertility loss, land degradation in watershed areas, and loss of Biodiversity. Others are air pollution, water pollution, wildlife and fish depletion. The annual rate of deforestation in Zambia is estimated to be between 250,000 and 300,000 ha. This figure has not been current for a long time and does not take into account the increasing population and the resulting increase in the consumption of forest resources and the demand on forest land. The actual deforestation rate may, therefore, be higher than this.

4.7. Sustainable forest management

Due to lack of detailed inventory data and inadequate resources, forest management in Zambia currently is not based on sustainable practises. The only management activity at the moment is control of forest exploitation through licensing. Minimum and maximum extractable volumes per month, and minimum exploitable diameter are fixed for all commercial licences. But even this is not working effectively due to difficulties in monitoring the activities of the licence holders.

4.8. Biodiversity and ecosystem sustainability

Conservation of the biological diversity and the ecosystems in Zambia date back to the 1930s when the first Government agencies mandated to conserve and manage biodiversity were established (MENR, 1997). The purpose was to protect and maintain the biological diversity for both faunal and floral species while providing a sustainable flow of benefits. The two actors in biodiversity consumption the Forest Department and the National Parks and Wildlife Service.

Biodiversity and ecosystem management has suffered, declining due to increased exploitation and reduced management capacity. The 1995 SADC report quoted by the MENR (1997) indicates that 10 species of mammals, 10 species of birds, 2 species of reptiles, and 7 taxa of plants are classified as endangered.

The challenge for the nation, therefore, in biodiversity sustainability is to halt the decline in the species population.

4.9. Soil and water conservation

Zambia's forest cover plays an important role in soil and water conservation because its influence on water run-off and soil stability. A number of forest reserves have been established in hilly areas and areas of shallow soils to prevent soil erosion. Others have been established in main catchment areas for the purpose of maintaining water sources and the flow of rivers. The rampant forest destruction, however, has not spared such protection forests, and the problem of soil erosion is evident in many areas. Drying up of streams and rivers due to siltation is also very common and this is causing local shortages of water.

4.10. Indigenous people's issues

Issues of indigenous people in Zambia mainly revolve around the livelihood systems. Zambia at the moment is in difficult economic times and poverty among the people is wide spread. It is estimated that 76% of the people live below the poverty line (Mukumbuta, 1998). People are, therefore, more concerned about issues that pertain to means of survival and enhancing household food security. These include food, energy and housing. Other issues of serious concern by the indigenous people are the declining and deteriorating social services, and the unemployment.

4.11. Energy

Wood in Zambia is the principal source of energy for most of the indigenous people. 88% of households (Chiwele, 1998) depend on woodfuel for domestic energy. Demand and supply of wood energy for the increasing population is, therefore, a critical issue. In heavily populated areas, woodfuel deficit is experienced, and people, especially women, are walking long distances in search of firewood.

Issues pertaining to food and woodfuel production are particularly having a negative impact on the forest resources as more and more people turn to forest land in order to make a living. More forest land is cleared each year for food production or for charcoal production which is increasingly becoming a source of income for many people especially in the rural areas.

4.12. The outlook for forest resources

It is generally observed that Zambia still has good amounts of the forest resources, although accurate information on the extent of the resource is lacking. It is also generally observed and agreed that the resource is under serious threat mainly from the expanding agricultural and indiscriminate cutting for timber and woodfuel. Two scenarios have been used to give future outlook of the forest resource situation in the country using various assumptions on the factors. That is, the current trends in wood demand and supply, and the ZFAP scenario.

Table 17a : Annual Demand of Wood by Periods (in Million M³)

	1996	2001	2006	2011	2016
Households	19.4	22.1	25.1	28.6	32.5
Industry	3.1	3.6	4.3	5.1	6.1
TOTAL	22.5	25.7	29.4	33.7	38.6

Source : Alajarvi, 1996.

Table 17b : Annual Demand of Wood by Periods (ZFAP Scenario) (in Million M³)

	1996	2001	2006	2011	2016
Households	19.4	21.8	24.1	26.6	29.4
Industry	3.1	3.6	4.3	5.1	6.1
TOTAL	22.5	25.4	28.4	31.7	35.5

Source: Alajarvi, 1996

This scenario indicates substantial increase in demand for wood if the current trends continue. The objective under the ZFAP scenario is to limit consumption through various interventions, i.e.

increasing charcoal production efficiency by 8%, and reducing consumption of wood by 20%.

Table 18a: Cordwood Supply (Current Trends), Growth in Million M³ / Annum.

	1996	2001	2006	2011	2016
Forests in open areas	16.7	15.3	14.0	12.8	11.6
Forest reserves (without plantations)	11.4	11.3	11.3	11.2	11.1
Plantations	0.9	0.8	0.8	0.8	0.8
Game Management Areas	16.6	16.6	16.6	16.6	16.6
Trees outside Forests	1.6	1.5	1.5	1.4	1.3
National Parks	1.1	1.1	1.1	1.1	1.1
TOTAL	48.3	46.7	45.3	43.9	42.5

Source: Alajarvi, 1996

The 1996 cordwood supply level of 48.3 million cubic metres is expected to decrease to 42.5 million cubic metres in the year 2016 under the current trends due to deforestation, degradation and lack of management.

Table 18b : Cordwood Supply By Periods (ZFAP Scenario), growth in Million M³/Annum.

	1996	2001	2006	2011	2016
Forests in open areas	16.7	17.4	18.7	20.5	22.7
Forest Reserves(without plantations)	11.4	12.6	14.0	15.6	17.3
Plantations	0.9	1.0	1.1	1.2	1.4
Game Management Areas	16.6	16.6	16.6	16.6	16.6
Trees Outside Forests	1.6	1.7	1.8	2.0	2.1
National Parks	1.1	1.1	1.1	1.1	1.1
TOTAL	48.3	50.4	53.3	57.0	61.3

Source: Alajarvi, 1996

Under this scenario, the annual cordwood supply is expected to increase to 61.3 million cubic metres by 2016 because of intensified management activities.

4.13. Wood supply and demand balance

The balance of supply was estimated separately in production forests(Forest Reserves and Forests in Open Areas) and other tree producing areas(Trees Outside the Forest), and then for protected forests (Game Management Areas and National Parks). The first production of wood was considered feasible and the second not sustainable in the long term (as it comes from conservation areas). The balance of this two cases is presented as follows:

Table 19a : Annual Cordwood Supply & Balance (Current Trends) in Million M³/Annum.

	1996	2001	2005	2011	2016
Supply From Production Areas	30.6	29.0	27.5	26.2	24.8
Supply From Protected Areas	17.7	17.7	17.7	17.7	17.7
Demand	22.5	25.7	29.4	33.7	38.6
Balance Not Sustainable	25.8	21.0	15.8	10.2	3.9
Balance Sustainable	8.1	3.3	- 1.9	-7.5	-13.8

Source : Alajarvi, 1996

Table 19b : Annual Cordwood Supply and Balance (ZFAP Scenario) in Million M³ / Annum.

	1996	2001	2006	2011	2016
Supply From Production Areas	30.6	32.7	35.6	39.3	43.5
Supply From Protected Areas	17.7	17.7	17.7	17.7	17.7
Demand	22.5	25.4	28.4	31.7	35.5
Balance Not Sustainable	25.8	25.0	24.9	25.3	25.7
Balance Sustainable	8.1	7.3	7.2	7.5	8.0

Source : Alajarvi, 1996

5. CONCLUSION

It is generally observed that Zambia still has sufficient indigenous forest resources which, if properly managed will greatly contribute to the socio- economic development of the country. But, the extent and condition of these forest resources are not accurately known due to lack of national detailed forest inventory. What is known about the country's forest resources is based on the inventories from the 1960s and the assumptions of that time.

It is also generally observed and agreed that forest resources in the country are facing serious threats of destruction mainly through clearing of the forest land for agriculture, and the uncontrolled wood harvesting for timber and woodfuel. However, there is no accurate information on the extent and rate of forest destruction as different estimates have arrived at conflicting figures.

The need, therefore, for the national wide forest inventory is urgent in order to facilitate the sustainable management of the forest resources. This will also help to guide the investment into the forest-based industries.

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THE STATUS OF FORESTRY STATISTICS IN ZIMBABWE

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1. INTRODUCTION

Forestry information was obtained from extensive literature on the extent of forest resources, ownership, species, composition, volumes, age, trade, consumption, value of forest products, projected demand and supply, and employment.

Information on plantations was adequate, but information about indigenous forests was inadequate and is unlikely to be obtained in the near future given the financial and methodological constraints. This lack of certain information on indigenous forests compromises the efficiency of planning and management of these forests. There is need to develop methodologies for collecting data particularly for non-wood forest products and provide adequate financial resources for collecting information on indigenous forests to improve planning and management of these forests. The FAO-EC Partnership Programme on "*Data Collection and Analysis for Sustainable Forest Management - Linking National and International Efforts*" provides an opportune time for Zimbabwe to develop methodologies for collecting information on products from natural forests.

2. BACKGROUND

2.1. Location and area

Zimbabwe is a member of the ten SADC member states. It is a land-locked country bordered by Mozambique on the east, South Africa on the South, Botswana to the west and Zambia to the north. It is located between latitudes 16⁰30' and 22⁰30' S and longitudes 25⁰ and 33⁰ E.

Zimbabwe covers an area of 390,757 km². One-fifth of the country is over 1,200 m (highveld), three-fifths between 600 and 1,200 m (middle veld) and one-fifth is below 600 m in altitude. Most of the country is subtropical except low-lying valleys which experience tropical conditions.

2.2 Population

The estimated population of Zimbabwe is 12 million. The population growth rate is 3.3% a year. The fertility rate is six children per family, causing a projected doubling of population every 20 years. Rapid population growth puts intense strain on natural resources. Table 1 shows the relationship between land area under different tenure categories, population density, farming potential and woodland area in the different tenure-systems in Zimbabwe. The table indicates that the majority of the population in Zimbabwe is rural and is concentrated in areas with poor farming potential and low woodland resources.

Zimbabwe's population density is 27 people per square kilometre. In comparison, the population density in Zambia is 113 and in Malawi 162 persons per square kilometre. Population growth in

Zimbabwe is especially worrying considering the high pressure on forest resources.

Table 1. Relationships between population density, woodland cover and farming potential in the main land tenure categories of Zimbabwe.

Characteristics	Land tenure category			
	Communal land	Resettlement land	Commercial farms	State land
Land area a) area(ha) b)% of total land area	a) 16,360, 000 b) 42%	a) 3,790,000 b) 8%	a) 12,450,000 b) 31%	a) 6,970,000 b) 18%
Farming potential natural regions	poor farm land 74% of the communal lands are under Natural regions IV and V	mixed spread over all Natural regions. 56% of resettlement land is in Natural Region II and III	good farm land, spread over all Natural Regions. 63% of land is under Natural Regions I and II	Poor farm land. 80% of state land is in Natural Regions IV and V.
Population a) total b) density c)% rural population	a) 5,352,304 b) 32 pers/km ² c) 74%	a) 426,687 b) 11 pers/km ² c) 6%	a) 1,346,753 b) 10 pers/km ² c) 19%	a) 38,806 b) < 2 pers/km ² c) < 1%
Woodland area a) area (ha) b)% of total woodland area	a) 10,000,000 b) 43%	a) n.a b) n.a	a) 7,000,000 b) 30%	a) 6,000,000 b) 26%

2.3 Rainfall & temperature

The rainy season for most of Zimbabwe is from November to March, but along the eastern border rainfall also occurs at other times of the year. In general, rainfall increases from south to north and with increasing altitude. Areas in the low-veld receive less than 400 mm/year, while those in the eastern highlands more than 2,000 mm/year and those in the central watershed about 1,000 mm/year. Mean annual temperature is 15⁰C at 1,800 m, 18⁰C at about 1400 m, 23⁰C at 450 m above sea level. The highest temperatures are experienced in October and November, but when prolonged dry spell occurs, very high temperatures are recorded in December and January (45⁰C has been recorded in low-lying areas). The temperatures are also influenced by soil type. Lowest temperatures are found in very sandy soils that cool more rapidly than clay soils.

2.4 Natural regions

Differences in rainfall patterns, altitude and temperature give rise to five agro-ecological regions:

Natural Region I is situated along the eastern highlands of the country and is defined as the specialised and diversified farming region. It has high effective rainfall and is thus suitable for afforestation using pines, eucalyptus, wattle, horticulture, tea and coffee plantations, and intensive livestock production.

Natural region II has reliable a rainfall pattern and is suitable for intensive crop (maize, tobacco and cotton) and livestock production. The region produces 90% of the country's crop.

Region III is a semi-intensive farming region receiving between 650 and 800 mm of rainfall per year, but the rainfall pattern is not reliable. Therefore, the region is suitable for livestock production and growing of short-season crops.

Region IV experiences fairly low total rainfall and is subject to periodic seasonal droughts and

extended dry spells making the region unsuitable for cropping. Therefore appropriate systems in this region are based on livestock ranching and wildlife utilisation.

Region V represents the hot and dry areas below altitude of 900 m and follows the major river systems (Zambezi, Limpopo and Save). This is the extensive farming region and is suitable for livestock ranching and wildlife utilisation.

2.5. Macro economic policies

Zimbabwe's economic policies are based on the Economic Structural Adjustment Programme (ESAP, 1991-1995) and Zimbabwe Programme for Economic and Social Transformation (ZIMPREST, 1996 - 2000) which are supported by the International Monetary Fund (IMF) and the World Bank. The economic policies include tight fiscal controls, removal of subsidies and opening up of foreign investment. One of the vehicles that the economic policies delivered is the Public Enterprise Reform. It is designed to reduce public enterprise reliance on taxes. Such enterprises were expected to operate more efficiently and effectively in the commercial environment using private sector measures and to encourage competition in the industry. The Forestry Commission being a public enterprise is being restructured in response to this policy. These policies have resulted in less budgetary allocations to government departments including those in the natural resources sector leading to inability of these respective departments to effectively regulate exploitation of natural resources.

For the natural resources sector (including forestry), ZIMPREST proposes the formation of an overarching policy which includes:

land reforms,
drought mitigation,
research and extension,
promotion of sustainable, balanced, utilisation of natural resources for economic and social development.

Zimbabwe's per capita income in 1996 was US\$ 718, and it is likely to be much lower now due drastic devaluation of the Zimbabwe dollar (exchange rate was Z\$ 10 per US\$ 1 in 1996 and in November 1998 it is Z\$ 37 per US\$ 1) and high inflation. Zimbabwe's economic structure is dominated by agriculture, manufacturing and service provision. Manufacturing contributes for 25% of GDP. Forestry for about 3%. The timber industry contributes 8% to the manufacturing value. Forestry contribution to the economy is largely based on the wood processing industry (plantations of exotic species, particularly pine and eucalyptus).

Natural resource conservation and use, at the provincial level, are coordinated by the Provincial Council, at district level by the District Council and at the local level by traditional chiefs.

3. FOREST RESOURCES

3.1. Extent of forest resources

Forest (both natural and plantations) and woodlands in Zimbabwe cover about 66% of the total land area of the country (39 million ha) (Table 2). About 40% of the indigenous woodlands are situated in communal areas where they are traditionally exploited for fuelwood and pole supply. There is a

decline in woodlands due mainly to clearing for agriculture, and partly due to fuelwood and pole collection, infrastructural development and overstocking of domestic animals. Approximately 100,000 ha are cleared annually (Gondo and Mkwanda 1991). Most forest cover in the gazetted state forests, commercial farming areas and the eastern highlands of the country. The current assessment do not give estimates of woody biomass in natural woodlands except where commercial timber extraction is taking place. Exotic plantations cover about 156,000 ha (0.4% of the country) of which 90% is located in the high altitude, high rainfall eastern highlands.

Table 2. Estimates of extent of each land use system in Zimbabwe

Land use	Area (000 ha)	% of total area
Rain Forest	12	0,03
Plantation	156	0,40
Indigenous woodlands	25 772	66,00
Grasslands	1,894	5,00
Cultivated land	10,738	27,00
Settlements	139	0,36
Other (waters, rocky outcrops)	257,500	0,70
Total	39, 090	100,00

Source: Forestry Commission (1996)

3.2. Vegetation types

The indigenous woodlands and bushlands can be divided into 5 types (Bradley & McNamara, 1993):

Miombo woodland is dominated by *Brachystegia spiciformis* in association with *Julbernardia globiflora*. It covers most of the highveld at altitudes above 1200 m. The woodland is normally associated with sandy soils.

Mopane woodland is characterised by the species *Colophospermum mopane* and occurs at low altitudes below 900 m, where the climatic conditions are hot and dry. The woodland is normally associated with clay soils.

Teak Woodlands are found on the aeolian Kalahari sands in the north west of the country. The woodlands are characterised by *Baikiaea plurijuga* which grows in association with *Pterocarpus angolensis* and *Guibourtia coleosperma* mainly. These species are the main sources of commercially exploitable timber.

Acacia woodlands are dominated by various acacia species, depending on soil type.

Terminalia combretum woodlands are characterised by *Terminalia sericea* and *Burkea africana* species.

The distribution of the major vegetation types are shown in Table 3.

Table 3. Distribution of the major woodland types by land tenure category in Zimbabwe (1,000 ha)

Vegetation type	Communal	Private	State	Total
Miombo	671	158	1,037	35,666
Mopane	22,264	3,520	2,395	8,180
Teak	16	206	981	1,365
Others	237	1,501	1,129	2,868
Total area	3,333	7,085	5,542	15,960

Source: Coopers and Lybrand 1985

3.3. Indigenous forests

Indigenous woodlands are quite extensive. The woodlands are divided into communal areas (CA), resettlement areas (RA), large scale commercial farming area (LSCFA) and gazetted state forests. The CA woodlands provide rural households with firewood, merchantable timber, construction timber, browse, fruits, medicines, mushrooms, bark and many other non-timber products. The woodlands are severely degraded due to over-exploitation as a result of high population growth, insecurity of tenure (communal ownership), agricultural expansion and conflicting land use policies. The RAs were once commercial farms and were endowed with tree resources. Because of population influx into these areas, the RA woodlands are now experiencing high rates of deforestation as land is cleared for farming. The woodlands found on the LSCFA's are fairly intact as the demand for forest resources (e.g. firewood) is low when compared to the CA and RA woodlands. The woodland areas in the different land use categories are given in Table 1.

The gazetted forests or forests reserves are divided into two categories. The first category are the woodlands found on the Kalahari sand formation spread in the north western part of the country. The woodlands contain commercially productive species such as *Pterocarpus angolensis* (Mukwa) and *Baikiaea plurijuga* (Red Mahogany). Table 4 shows the list of the gazetted state forests and the areas they cover.

Table 4. List of gazetted forest in Zimbabwe under management of the Forestry Commission

Name of Forest	Area (ha)
Chesa	14,250
Inseze	8,400
Umgusa	32,200
Gwaai	144,230
Ngamo	102,900
Nyamandlovhu (Grants/Batley)	7,420
Mbembesi	55,100
Lake Alice	39,000
Gwampa	47,000
Mzola	67,200
Sikumi	54,400
Kazuma	24,000
Fuller	23,300
Panda-Masui	35,500
Kavira	28,200
Sijarira	25,600
Molo	2,900
Umzibane	2,471

Mvutu	2,100
Mafungautsi	82,100
Ungwe	567
Mudzongwe	1,420
Total (22)	800,258

The woodlands are also an important habitat for wildlife and have recently become vital to the tourism industry. Because of increasing population pressure, these woodlands are under pressure for the provision of services such as grazing, land and other forest products from legal and illegal settlers living in or on the periphery of these forests. The other category of gazetted forests are the remnant mid-altitude montane forests found in the eastern highlands. These are currently protected for biodiversity, cultural and scientific values.

The Forestry Commission, through its Research and Development Division, also manages the Chirinda Forest which is a mid-altitude afro-montane forest located in the south eastern highlands. It is about 700 ha in size and is a centre of endemism for many plants and animal species.

3.4. Wood stocks demand and supply

Generally the woodlands in Zimbabwe have very low growth rates averaging 0.8 m³/ha/year. This coupled with the high population pressure has resulted in the fragmentation of the communal woodlands. The official deforestation rate in Zimbabwe is about 100,000 ha/year, or 0.6% of the total forest area, translating into about 7 million m³ of woody biomass. The demand for fuelwood, which is the main product from natural woodlands, is estimated to be 13 million m³ per year. Table 5 shows the estimate of total wood stocks of natural forests and woodlands.

Table 5. Estimate of total wood stocks of natural forests¹ and woodlands

Land tenure category	Wood stocks (million tonnes)
Communal Land	104
Resettlement Land	11
Commercial Land	252
National Parks	269
Forest Reserves	1
TOTAL	637

¹plantation forests are not included

Natural woodlands are also a source of fuelwood, fodder, construction timber, fencing poles, fruits, and grass. These products form the basis for woodland enterprises. There is not much information available about trees and forestry enterprises, but it is reported that 10-20% of rural households use woodland resources mainly as alternative sources of income (Bradley and Dewees 1993). Benefits from woodlands in Zimbabwe can be placed in the following categories; direct, local private benefits (e.g. fruits, fuelwood), indirect, local private benefit (e.g. nutrients, fodder and browse), indirect regional and semi-public benefits (e.g. soil erosion control, water catchment and recreation) and indirect global public benefit (e.g. carbon sequestration and biodiversity conservation).

Empirical data to quantify values is not available except in a few case studies in different parts of the country. For example, the wood carving industry which has mushroomed along the major tourist routes records monthly incomes ranging from Z\$ 42 to Z\$ 4,000 per month (Matose *et. al.*, 1996). It

is therefore difficult to give a global figure of the total contribution to the national economy, but it suffices to quote that "indigenous woodland management holds the potential for generating favourable returns compared to other land use options particularly in the drier parts of the country" (World Bank 1991). Table 6 shows values of some common forest products obtained from natural woodlands.

Table 6. Value of common forest products and services based on a case study in Zimbabwe.

Product	Value Z\$/ha	Share
Wild fruits	65	33
Woodfuel	42	21
Nutrient cycling	32	17
Construction wood	27	14
Wild foods	15	8
Grazing	5	3
Wooden implements	4	2
Wooden crafts	3	2

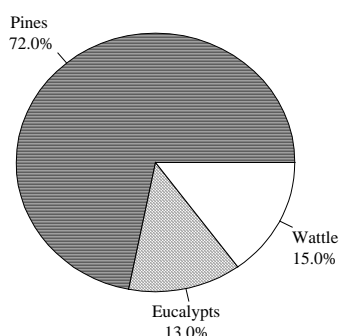
Source: Campbell et al. 1993

Fuelwood is one of the major sources of energy in Zimbabwe constituting about 52% of the total energy consumption. About 80% of the rural households depend on fuelwood for energy used in cooking, brick making, beer brewing, tobacco curing and heating. Fuelwood resources in accessible woodlands cover about 20% of the total land area representing a stock of 320 million metric tonnes, with a sustainable yield of 13 million metric tonnes per annum. Although this sustainable yield is able to meet the total national demand, there are localised shortages in most districts creating the need for local trade. However, there is little trade in fuelwood due to low trading margins, most people harvest for personal consumption. Fuelwood consumption in wood deficient districts is using up accessible stock in wood rich areas leading to increased cost of supply and further degradation of the woodland resources. The appropriateness of investment in interventions such as tree planting and woodland management depends on the relationship between cost of such intervention to the economy compared to the cost of providing alternative sources of energy. Thus tree planting has largely been funded by donor agencies (Rural Afforestation Programme- Phase I funded by the World Bank and Phase II funded by DANIDA) instead of government.

Timber harvesting concessions are issued in communal area (managed by Forestry Extension Division) and gazetted state forests (managed by Indigenous Resources Division). The Forestry Commission stopped harvesting of logs in 1987 in the gazetted state forest as response to diminishing resource base. Limited harvesting has just re-begun. A total of 18,431 m³ was extracted in 1995/96 raising Z\$ 456,364 from communal areas.

3.5. Commercial plantations

The major forest plantation species grown in Zimbabwe are *Pinus patula*, *P. elliottii* and *P. taeda*, *Eucalyptus grandis*, *E. cloeziana* and *Acacia mearnsii*. The pines are used mainly for structural timber production, and pulp and paper; eucalyptus for poles, and pulp and paper, and the black-wattle (*A. mearnsii*) for the production for tannin. Exotic plantations cover about 156,000 ha (Table 2). Figure 1 shows the percentage areas planted under the major commercial species in Zimbabwe.

Figure 1. Percentage of area planted under the major commercial species

The state owns 42% total forestry plantations, private companies 54% and small growers 4%. The major forest companies in the country are vertically integrated to include plantation development and saw-milling. Other primary processing plants include manufacturing of doors, block boards, plywood, pulp and paper, and treated poles. The timber industry contributes 3% to the GDP. Direct jobs involved in plantation and processing of industrial forest products were estimated at 18,400 in 1996/7 of which 37% were contract employees.

Source: Timber Producers Federation, 1997

4. FOREST PRODUCTS PRODUCTION, TRADE AND CONSUMPTION

Studies on the supply of timber indicate that the age class structure of pine species is not balanced with most trees in the over-mature class (25 years or more). This is based on the Annual Report 1995/96 of the Forestry Commission, Research and Development. The unbalanced age structure was caused by limited markets, low milling capacity, remoteness of some growing stocks and war problems faced in the country before 1980. The quality of the over-mature stock is poor with small diameters and heavy branching caused by poor planting material and no silvicultural management.

Table 7. Roundwood consumption by plant type in 1996/7

Plant type	No. of plants	Roundwood (m ³)	% increase over 1995/6
Sawmills	54	885,971	0.1
Veneer & Ply Mills	2	33,530	5
Particle & Fibreboard	2	133,650	39
Pulp & Paper Mills	2	125,900	8
Match factory	1	12,000	97
Pole production	5	88,278	32
Mining Timber	-	3,807	6
Wattle Factory (stripped bark)	1	69,833	14
Charcoal Production	1	50,125	2
Total		1,323,961	6

In 1996/7 there were 68 primary processing plants, of which 54 were sawmills, 5 pole impregnation plants, 2 pulp mills, 2 particle board mills, 2 veneer and plywood mills, 1 charcoal plants, 1 match factory and 1 wattle extraction (Timber Producers' Federation 1997). Production from these processing plants in 1996/7 is shown in Table 7.

Currently, Zimbabwe is self-sufficient in sawn timber, and approximately 20% of the total output is exported to neighbouring countries and Europe. The current domestic consumption of soft

roundwood is about 172,700 m³ (about half the total production and the other half is exported to the lucrative foreign market). Volume and sales figures for the year 1996-1997 are shown in Table 8.

Future demands for forest products have been estimated by correlating trends in consumption patterns and gross domestic product (World Bank 1991). The Timber Producers Federation and Timber Council project that demand for forest products is strongly linked to the construction and building industry and the demand is increasing. Growth in the agricultural, floricultural and horticultural sectors will see an increase in the demand for packaging material whilst increased standard of living will see increased paper consumption. Pulp companies projected an increase in demand for long fibre (pine) and bleached pulp to improve quality of packaging material. Table 9 shows the projected domestic demand of major forest products.

Plantation forestry has other minor non-wood products such as resin, honey and recreation. It is very difficult to provide production and consumption figures for these products because there is no formal trade.

Table 8. Volumes and sales of timber and timber products during the 1996/7 year.

Plant type	No.	Production Volume	Sale Volumes	Z\$1000	% increase
Sawn timber m ³	54	396,235	339,937	614,325	6.7
Veneer and plywood m ³	2	13,098	10,473	80,795	0.5
Poles m ³	5	64,993	70,524	97,263	2.5
Particle & fibre board m ³	2	58,697	46,198	117,613	26.5
Paper and products ton	2	68,686	66,832	n/a	(8.2)
Wattle extract ton	1	4,939	5,904	40,225	20
Charcoal ton	1	10,025	10,602	13,395	3
Matches	1	6,600	6,600	n/a	50
Total *	-	-	-	963,616	38

* Total comprise Z\$439 million export and Z\$518 million local sales.

Source: Timber producers Federation (1997)

Table 9. Projected demand for forest products

Product	1995	2000	2005	2010
Sawn-wood	199,000	238,000	2,890,00	355,000
Panels	47,000	56,000	68,000	85,000
Paper & Board	131,000	169,000	217,000	280,000
Newsprint	29,000	36,000	46,000	58,000
Packaging	100,000	134,000	175,000	230,000

Source: World Bank 1991

4. POLICIES AND LEGISLATION

4.1. Current laws governing forest resources management and utilisation

The laws that influence forest resources management and utilisation are listed in Table 10. Management and utilisation of forest resource in Zimbabwe are governed mainly by the Forest Act and the Communal Lands Forest Produce Act. Other Acts have indirect effects on management and utilisation of forest resource. Some of these laws do not promote sustainable forest management

(e.g. Mines and Minerals Act).

4.2. Environmental policies

At the international level, conventions such as the Convention on Biological Diversity, the Convention on Combating Desertification and the Convention on Climate Change are addressing the issue of environmental management. These conventions are legally binding and have been ratified by nearly 170 countries, including Zimbabwe, and commits the countries to take collective and individual actions to promote environmentally sustainable development.

An environmental impact policy was developed in 1994 and is being implemented by the Ministry of Mines, Environment and Tourism. Its objective is to ensure unwarranted environmental negative effects are avoided or mitigated when development projects are implemented. This should lead to improved environmental management.

Table 10. Laws that influence forest resources management and utilisation

Law	Main themes and provisions
Land Apportionment Act of 1930 and Land Tenure	Created the present Communal areas on marginally productive land
Natural Resources Act of 1942 (amended many times)	Regulates use of natural resources. The Act is administered by the Natural Resources Board. Provides for the establishment of intensive conservation areas in commercial areas.
Forest Act of 1948 (amended 1982)	The Act mandates the Forestry Commission as the Forestry Authority to protect and conserve indigenous forests, and to regulate the harvesting of indigenous trees on private and communal lands. The Act mandates the Forestry Commission in its role as the State Forestry Enterprise to undertake plantation development and sawmilling.
Communal Land Forest Produce Act of 1987	The Act vests the commercial utilisation of forest products on communal areas in the hands of the Rural District Councils, and only allows subsistence utilisation of forest products by local people and communities.
National Parks and Wildlife Act of 1975, amended 1982	Designates ownership for wildlife to owners and occupiers of alienated land (e.g. communal people).
Communal Land Act of 1982, amended 1985	control of land placed under the President through the Rural District Councils rather than Chiefs.
Rural District Councils Act of 1988	Provides for the Rural District Councils to enact by-laws to regulate natural resources use and issue licences for commercial exploitation of wood products.
Land Acquisition Act of 1993	Provides for the designation of under utilised land
Mines and Minerals Act of 1996	Confers absolute rights to land for mining. Establishes that mining is not subject to impact assessment or land reclamation.
Environmental Management Act of 1998	The Act makes provision for regulations to promote the sustainable use of the environment through environmental impact assessment, environmental audits and penalties for those who pollute the environment.

In 1987 the National Conservation Strategy was developed to document environmental pressures facing Zimbabwe and recommend strategies to solve the problems. No priorities were identified nor were action programmes or projects identified and prepared for implementation, making it difficult

to monitor progress in addressing the issues raised. The implementation of the strategy was also limited due to lack of resources and technical capacity.

Currently, Environmental Action Plans (EAP) are being developed and so are National Biodiversity Strategies and Action Plans to promote sustainable environmental management. A proposal to develop a National Forestry Action Programme has been drafted, and the programme will reveal that Zimbabwe is committed to solving its forest related problems, including environmental issues and contributing to international efforts on sustainable environmental management.

Most of the players in the timber industry have developed corporate policies on the environment to define corporate values and general management guidelines that promote SFM.

In 1997 the Timber Producers' Federation developed and encouraged its members to implement the Environmental Conservation Guidelines. The guidelines prescribe conservation procedures at planting, harvesting, construction of roads and other plantation development activities to avoid or minimise adverse impacts to the environment. These self-regulatory mechanisms can only be viewed as an important step towards environmental sustainability in forest plantations. Environmental audits are being implemented by the timber industry to monitor adherence to the guidelines. Currently, the Timber Producers' Federation is in the process of compiling guidelines for sawmilling to complement the existing forestry management guidelines.

Central to SFM is the certification of forests, and forest products. To this end the timber industry is in the process of obtaining environmental certification, primarily from the Stewardship Council that issues internationally recognised certificates for sustainable forest management.

4.3. National forest policy

The most recent National Forest policy statement dates to 1990, it is the mandate of the Forestry Commission. The policy sought to:

- promote the sustained yield of forests;
- promote conservation of forests and trees;
- to maintain an inventory of the forest resources;
- promote research and training in order to meet the needs of the forestry sector;
- promote other land uses in commercial forestry; and
- promote joint ventures.

The National Forestry Policy Statement replaced the 1982 policy statement by including three new areas of focus under its role as the Forestry Authority: promote afforestation and woodland management on communal areas; increase planting of indigenous trees; and supervise logging of indigenous hardwoods.

There is a need to develop a new National Forest Policy which takes into account current socio-economic conditions and promotes the sustainable management of forests.

4.4. Indigenous people issues

It is unfortunate that small holders still play an insignificant role in the forestry industry. The timber industry is dominated by 3 large players which monopolise the wood supply. This situation,

however, may change if the small holders get a stake in the new Forestry Company after the commercialisation and privatisation of the State Forests. Privatisation would increase involvement of local people in the timber industry. This move will be in line with the policy of the government of Zimbabwe. Also prior to privatisation, sub-contracting of services such as transport and thinning will empower indigenous people, particularly employee-formed companies and co-operatives.

Policies prior to independence focused on the regulation, control and exclusion of local communities around forest reserves. These policies continued after independence. They lead to unstructured illegal settlement and encroachment within forest reserves, and illegal activities such as timber poaching, wildlife poaching, cattle grazing and forest fires. It is now recognised that for sustainable management of forest resources to be successful, a partnership approach to resource management which allows access to the resources by the local people and sharing of benefits by all key stakeholders is necessary for effective forest management. This policy is being pursued by the Forestry Commission along the same lines as the successful wildlife resource sharing management approach (CAMPFIRE) developed by the National Parks and Wildlife Department.

Policies outside the forestry sector (macro economic policies, land policies, etc) must be reviewed so that they promote sustainable forest management.

5. DATA COLLECTION

5.1 Institutions collecting forestry information

Below is a list of institutions involved in collecting information on forestry:

Forestry Commission: The Forestry Commission collects information on commercial and industrial forests and roundwood processing. There is a legal obligation on the part of the land owners to complete the questionnaires. Information on commercial and industrial statistics include plantation areas by species, end use, age, ownership and province. Information on a number and categories of staff employed in plantations is collected. The roundwood processing information includes production figures for the various products, and amount imported and exported. Information collected includes ownership, number and categories of staff employed in the processing plants.

Timber Producers' Federation: The Timber Producers' Federation is an association of Zimbabwe plantation timber growers and sawmillers. It collects information on sales and production on a monthly basis from its members. The Timber Producers' Federation, like the Forestry Commission, collect information on plantation area by species, ownership and amount harvested, and primary plant production, and number employed. Unlike the Forestry Commission it collects information on primary plant sales and value. All information is collected through questionnaires sent to organisations and individuals.

Central Statistics Office: The Central Statistics Office collects, on an annual basis, information on agricultural crops and employment figures in the sector. Forestry is included under agricultural crops. Information collected on forestry include volume and value of timber. All institutions & individuals to whom the questionnaires are sent are required by law to give accurate data and to return the questionnaires within a prescribed period. Central Statistics also collect on a monthly basis information on imports and exports (quantities and value) from the department of Customs and Excise.

National Herbarium and Botanical Gardens collects information on plant uses, particularly non-timber uses, species identification and ecology. It has developed vegetation maps for Matabeleland

and Zambezi valley. They are florist maps which show species distribution, and are complementary maps to those developed by the Forestry Commission which show the structure of vegetation.

International Organisations: Various international organisations such as the FAO, WWF and IUCN also collect information on forestry

5.2. Methodology of data collection

Vegetation mapping is done using satellite remote sensing and geographic information system. The satellite images are obtained from South Africa. Existing topographic maps are obtained from the Department of the Surveyor General. Aerial photographs and ground truthing exercises are used to verify satellite image interpretations. Surveys are used to determine forest statistics. Forms are printed and sent to the respective organisations and individuals. Data is then processed by computers and summaries are produced.

5.3. Some information gaps

Many trees are being planted by individuals on farms, as boundary trees, around homesteads or collectively in small plantations or woodlots. The information on the trees outside forests is scanty. Information on non-wood forest products such as fruits, honey, fibre, grasses, etc. is lacking, and this can be attributed to the inadequate knowledge on the methods for assessing non-wood forest products. These methods need to be developed.

With regard to vegetation mapping, the satellite data for monitoring is very expensive, and this has been compounded by the devaluation of the Zimbabwe dollar. Currently, each image costs US\$ 5, 000 from South Africa. The current maps show the extent of forest cover but, not the volumes, hence there is need to gather information on the woody biomass and growth rates.

This information will be particularly important to assess the quality of the forests which are subjected to selective commercial harvesting, and those subjected to selective harvesting of fuelwood, building materials and non-wood products, and seasonal fires. Sustainable forest management is unlikely to be achieved in the absence of such vital information. It should be stressed that indigenous forests are complex, are subject to extensive human activities which are hard and expensive to monitor. Furthermore, funding for such information gathering on indigenous forests, which is dependent on government funding, is limited. The lack of funding and lack of priority given to indigenous forests is also reflected in the disparity in the literature available in plantation forests (over 90%) compared to that on indigenous forests (less than 5%), and yet the indigenous forests consists of over 99% of the total forest area.

Maps produced by the National Herbarium on species distribution have only been done for Matabeleland and the Zambezi valley, and there is need to extend this to other parts of the country.

The most recent forest statistics compiled by the Forestry Commission covers the period 1992/3. This information is old because the Forestry Commission has not been able to process the data fast enough due to poor staffing levels and partly due to delayed responses. More up-to-date information on forest statistics is required in order to make informed decisions. The questionnaire should be revised in order to make it easier to fill. This may result in quicker response. Also a decision may be needed on the most efficient way to collect the information and the frequency of the collection.

6. CONCLUSION

Zimbabwe has done well in terms of collecting information on plantations. However, the same can not be said for the indigenous forests where the lack of information is greater, and decision making inefficient. There is a need to develop methodologies for collecting data particularly for non-wood forest products and to avail adequate resources for collecting information on indigenous forests. Given this information, and appropriate management and enabling policies, Zimbabwe's indigenous forests could be managed sustainably for the benefit of all Zimbabweans.

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