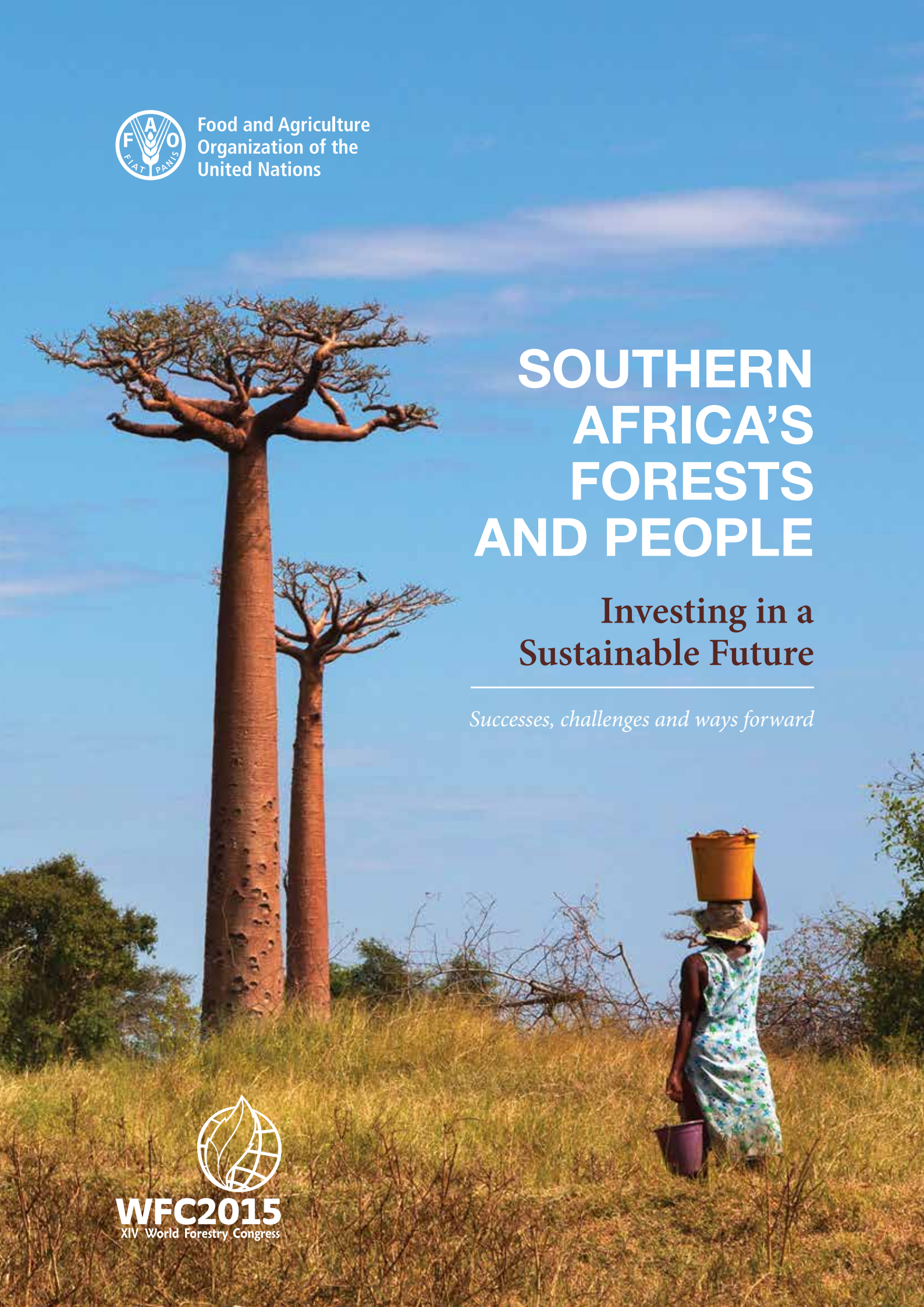
Food and Agriculture Organization of the United Nations

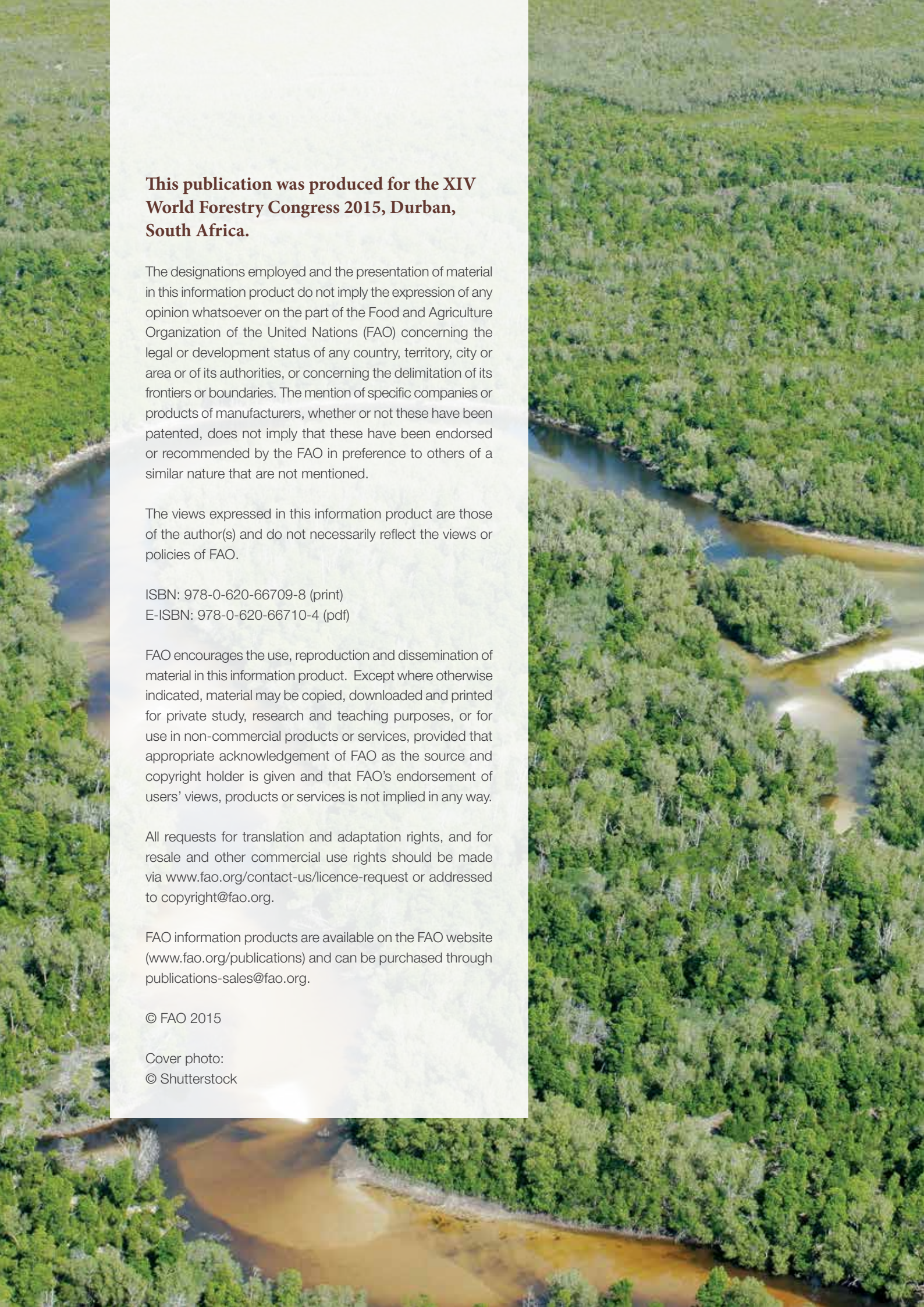


SOUTHERN AFRICA'S FORESTS AND PEOPLE

Investing in a Sustainable Future

Successes, challenges and ways forward

WFC2015
XIV World Forestry Congress



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FOREWORD

The World Forestry Congress, which is held every six years, brings together a wide array of stakeholders in the natural resources sector to discuss challenges and solutions in the forestry sector to help shape the future of our forests. This year, the 14th World Forestry Congress takes place in Durban, South Africa from 7 to 11 September 2015, the first time ever on the African continent.

For this occasion, the FAO Subregional Office for Southern Africa is supporting countries in the subregion to present the best practices, challenges and opportunities in the forestry sector of Southern Africa. The objectives of this publication are to share lessons learned from Southern Africa with other important forest regions and to build a platform for enhancing collaboration across the countries in the subregion and with other regions.

The forests of Southern Africa comprise a multitude of forest types and ecosystems, ranging from mangroves to rainforests, dry and humid ecosystems and are home to an incredible wealth and diversity of fauna and flora. The importance of forests cannot be highlighted enough. They provide significant benefits in terms of timber and wood as well as non-wood forest products and an array of ecosystem services, not to mention supporting millions of livelihoods across the subregion.

Because the forests of Southern Africa are facing increasing pressure from the negative impacts of climate change and massive agricultural expansion, the need for sharing best practices to overcome such challenges is becoming more important than ever.

Chimimba David Phiri

FAO Subregional Coordinator for Southern Africa

ACRONYMS

AAC	Annual Allowable Cut
AFD	Agence Française de Développement
AFF	African Forest Forum
CBO	community-based organization
CEO	Chief Executive Officer
ER-PIN	Emission Reduction Program Idea Notes
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment
GDP	gross domestic product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IEFN	Inventaire Ecologique Forestier National
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature and Natural Resources
JICA	Japan International Cooperation Agency
KMF	Comorian frank
MRV	monitoring, reporting and verification
NAFORMA	national forest resources monitoring and assessment
NDS	National Directorate of Statistics
NFI	National Forest Inventory
NGO	non-governmental organization
PCI&S	Principles Criteria Indicators and Standards
PERR-FH	REDD+ Eco-Regional Project - Humid Forests of Madagascar
R&D	research and development
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
SADC	Southern African Development Community
SNPA	Seychelles National Parks Authority
TZS	Tanzanian shilling
UN	United Nations
UN-REDD	The United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific and Cultural Organization
USD	United States dollar
WFC	World Forestry Congress
ZMK	Zambian kwacha

INTRODUCTION

Southern Africa is renowned for its rich biodiversity and endemism. Its terrain is varied, ranging from rainforests to deserts. The multitude of forest ecosystems are home to a wealth of fauna and flora. As the "green lungs" of our planet, forests are vital to our health and survival. They multitask as habitats, suppliers of raw materials, a source of livelihoods, places of recreation and a means of climate protection.

Yet forests all over the world, including the Southern African region, are vanishing at an alarming rate in the face of an array of challenges such as climate change and agricultural expansion. It requires a concerted effort to preserve Southern Africa's forests for all its inhabitants and to promote sustainable forest management throughout the region.

This publication provides a brief analysis of the challenges facing the forestry sector in Southern Africa and some of the best practices that have been developed to deal with these. The analysis carried out for each country comprises an introduction to the forestry sector; key challenges in the sector; best practices, including some encouraging success stories; and future interventions planned to strengthen the sector and increase its impact.

The information for each country - Angola, Botswana, Comoros, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe - was submitted by the respective heads of forestry and forestry departments. It is evident that initiatives aimed at promoting awareness and knowledge about the conservation and sustainable development of all types of forests are starting to bear fruit. Public participation in programmes such as South Africa's Champion tree project (page 45) has been encouraging.

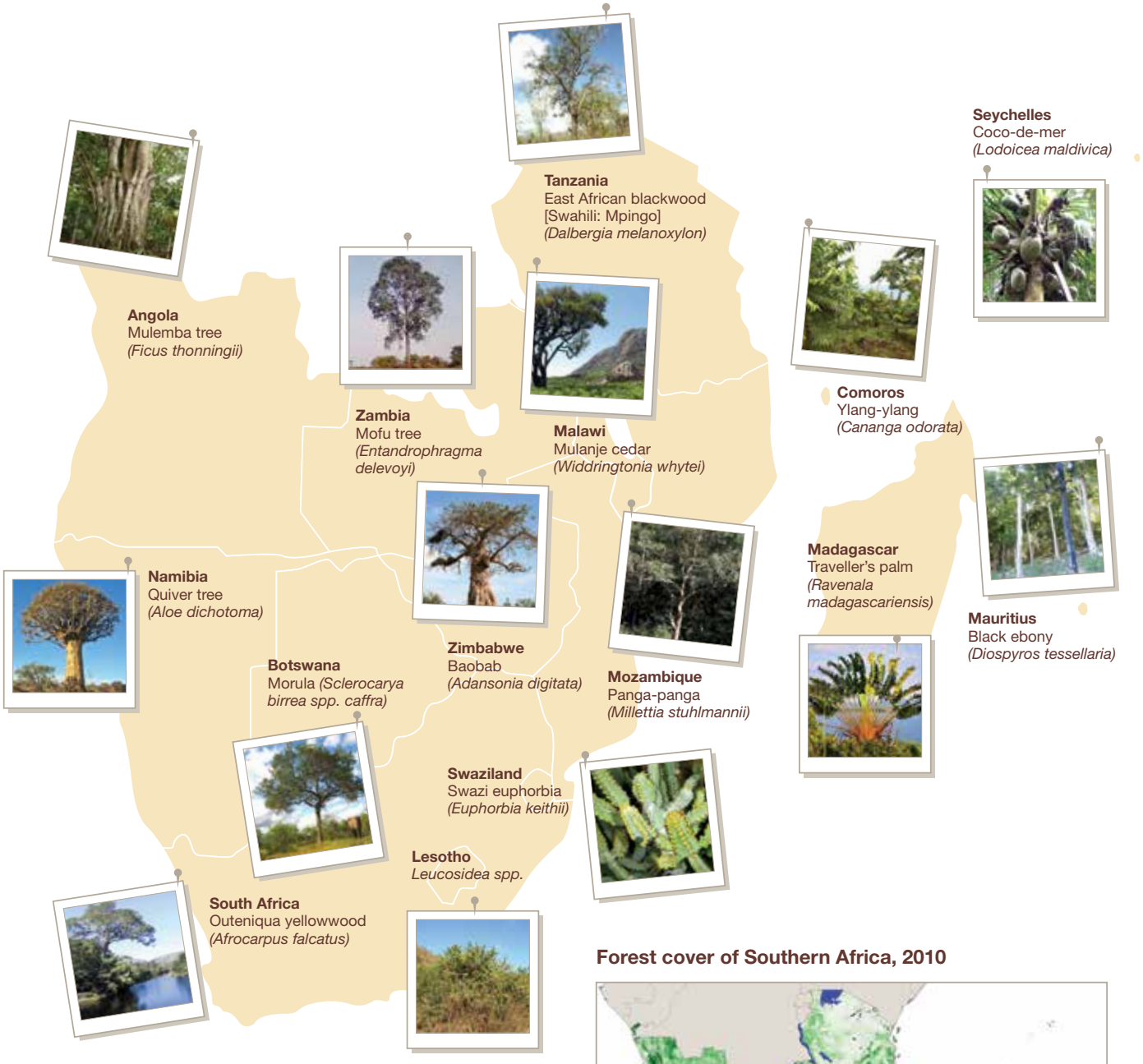
Other best practices and success stories include management programmes to combat forest fires and desertification; reforestation, agroforestry and tree planting outside forests; increasing collaboration with stakeholders and funders; capacity development within the sector, especially with regard to research and development; creating protected areas to safeguard valuable pockets of natural forest; and concerted efforts to protect endangered forest species such as the coco-de-mer.

The information is intended to stimulate networking and fruitful discussion with a view to the sharing of best practices and future collaboration among countries across the globe.

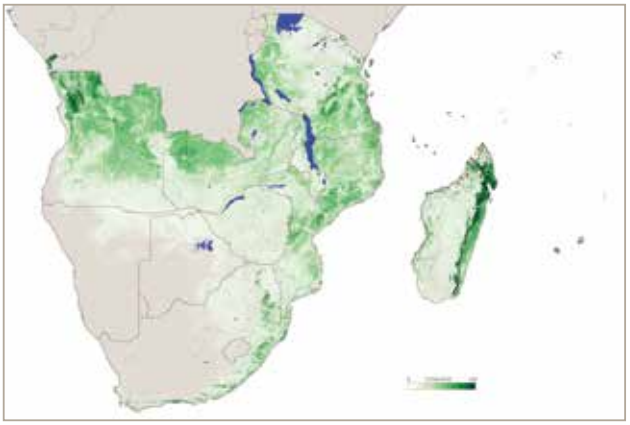
In Africa certain trees are said to be imbued with great symbolic, medicinal and cultural power. Forest trees, the links between the sky and earth, often symbolize links between the spiritual world of ancestors and people. Physically and mystically forests have defined the environment of communities in the region throughout time. It is therefore of special significance that each country in the region has nominated a special tree (page 4) to convey their commitment to the protection of their forest resources and as a token of their people's hospitality and warm welcome to visitors.

This publication was prepared for the World Forestry Congress (WFC) held in Durban, South Africa from 7 to 11 September 2015. It was launched at a special WFC side event on 7 September, which included presentations by the heads of forestry from all the countries of Southern Africa.

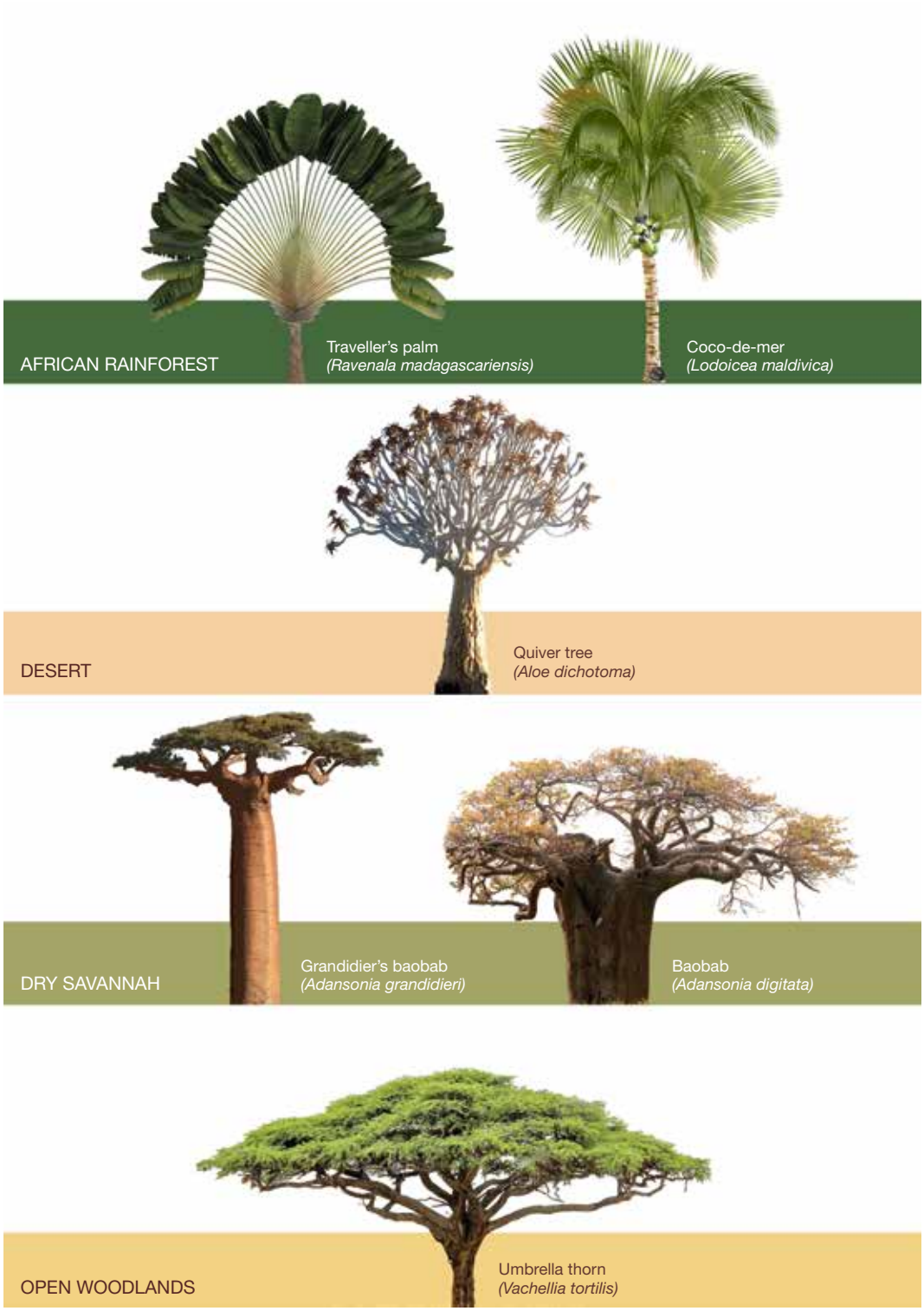
MAP OF SOUTHERN AFRICA



Forest cover of Southern Africa, 2010



ICONIC TREES OF THE MAIN HABITATS



ANGOLA

Historical data, to be confirmed or rectified with the completion of the National Forest Inventory under way in the country, indicate that Angola has approximately 57.85 million hectares of varied natural forests comprising about 46 percent of its total land area. These are grouped into seven major categories according to floristic composition and geographical location.

- *Dense rainforest*, which occupies approximately two percent of the total forest area and covers the rugged terrain of the Atlantic basin from Cabinda to the Balombo river, strongly represented in the Mayombe tropical rainforest (north of Cabinda) and Dembos (triangle formed by the provinces Uíge, Bengo e Kwanza-Norte). It is characterized by galleries of tall trees and is a highly productive source of wood.
- *Open miombo forest* occupies about 45 percent of the total forest area distributed over the provinces of Huila, Kuando Kubango, Moxico, Bie, Huambo, Malanje, Benguela and Kwanza-Sul. It is of medium productivity in terms of commercial timber, but a valuable resource from a social point of view due to the fuelwood, building material, forest products, non-food timber, cosmetic and medicinal plants it provides for the local population.
- *Dry savannah with trees and/or shrubs* occupies about 24 percent of the total forest area in coastal provinces and some of the interior.
- *Guinean forest-savannah mosaic* covers about 20 percent of the total forest area in the northern wetlands of the country, consisting predominantly of Guinean savannah-type vegetation characterized by scattered trees and shrubs.

The remaining groups, no less important, are made up of meadows, grasslands, wetlands and mangroves which occupy about five percent of the total land area; the steppes of the subdesert coastal strip with three percent; and formations of desert plants (0.3 percent).

Angola has a rich biodiversity of between 5 000 and 8 000 plant species, of which 1 260 are endemic.

Plantations

The country's forest plantations of exotic species, which consist mainly of eucalyptus and pine trees, cover a total area of about 148 000 hectares, with a trade volume of approximately 17 450 000 m^3.

Mulemba tree (Ficus thonningii)

Institutional framework

The forestry sector falls under the Ministry of Agriculture, which is responsible for the formulation and implementation of policy in the areas of agricultural development, forestry and livestock in the country, and depends directly on two institutions: the National Forest Directorate and the Forest Development Institute, the first with administrative, technical and regulatory functions and the second with executive and development functions.

Best practices in the forestry sector

The Government of Angola recognizes the important role played by the forestry sector in the country's economy and social development – in particular integrated rural development, the production of goods and services aimed at meeting basic needs of the population, job creation and contribution to food security.

Within the framework of best practices and utilization of forest and wildlife resources, the Government approved the National Forest, Wildlife and Conservation Areas Policy (Resolution 1 of 14 January 2010), an important document that describes the long-term vision, objectives and strategies to be adopted for the sustainable use and conservation of the forest and wildlife resources of Angola.

In the implementation of the policy, the Government of Angola:

- Approved the National Strategy of Settlement and focused on reforestation in five areas of intervention: commercial and industrial, energy, research, agroforestry and tree planting outside forests;
- Prepared a recovery programme for the wood industry with a view to the relaunch of the extraction activity and timber processing, increased domestic production of goods and services, economic diversification and the reduction of imports;
- Implemented a programme to combat desertification;
- Is implementing the first National Forest Inventory, a key instrument for sustainable management of all types of forests in the country, in partnership with FAO.

The Government of Angola recognizes the important role played by the forestry sector in the country's economy and social development.

Challenges in the forestry sector

The sector is currently experiencing the following structural constraints and limitations:

- Outdated Forest Law and regulations;
- Lack of qualified staff in the management chain;
- Poor responsiveness of forest inspection services;
- Key forestry statistics not updated regularly;
- Low production (wood logs);
- Deforestation (charcoal production, burning and subsistence farming).

Future forestry interventions

Forestry interventions of the future should be focused on entrenching best practices and seeking new solutions to challenges/problems in order to strengthen and enhance existing initiatives. Future interventions should also address the gradual removal of the main structural constraints and limitations referred to in the section on challenges, by revising and implementing the sector strategy already approved by the Government of Angola.

BOTSWANA

Over 81 percent of the land surface of Botswana has a significant tree and shrub cover. The vegetation is characterized by shrub savannah, tree savannah, closed tree savannah on rocky hills, semi-arid shrub savannah, grass savannah, aquatic grassland, dry deciduous forest and woodland. Less than 20 percent of the vegetation, mostly in the northeast, is tall and dense enough to be considered a forest.

Prominent species in the dense canopy are *Acacias* such as *A. nigrescens, A. albida, A. tortilis* and *Combretum imberbe*. The shrub layer is often characterized by typical shrub form species such as *Dichrostachys cinerea* and *Rhus lancea*. The woodlands consist of trees and shrubs between eight and 15 metres high. According to the FAO (2010), the forest cover suffered a reduction of 17.3 percent from 1990 to 2010 owing to uncontrolled forest fires, overexploitation of forest resources, urbanisation, overgrazing and various other forms of land degradation.

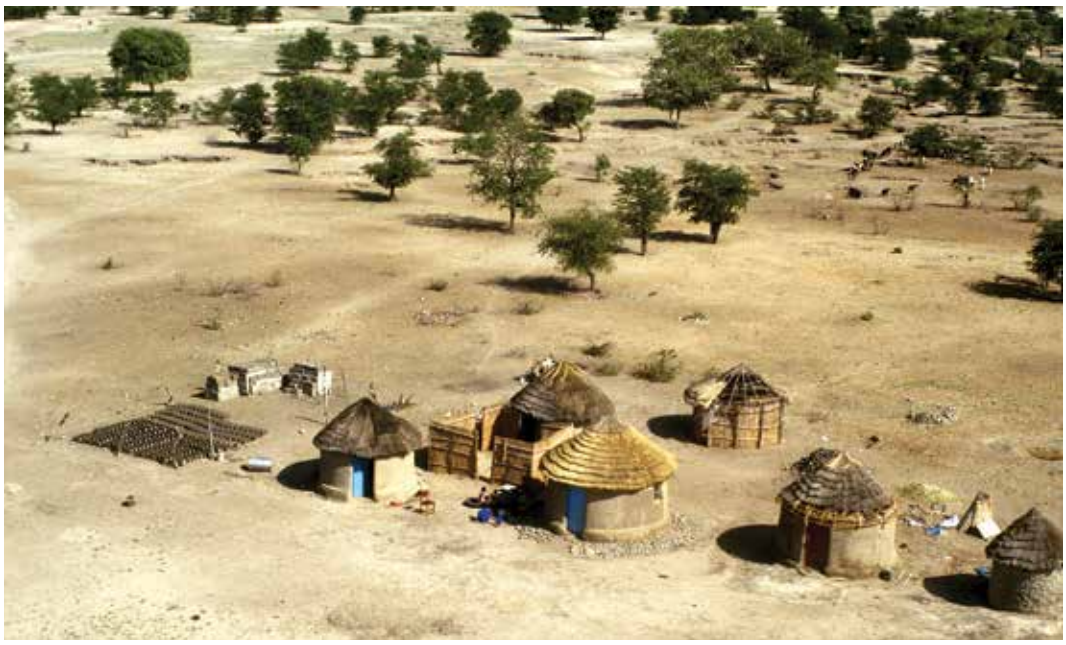
Botswana is renowned for unique habitats such as the aquatic grassland of the Okavango Delta, the grass savannah of the Makgadikgadi Pans and the deciduous forests in the northeastern corner of the country. The six forest reserves in the extreme northeast of the country cover an area of about one percent (4 550 km^2) of the country's total land surface.

Botswana is renowned for unique habitats such as the aquatic grassland of the Okavango Delta and the grass savannah of the Makgadikgadi Pans.

The extent of forests and other wooded land according to Global Forest Resources Assessment (FRA) categories

Vegetation type	Area (ha) by year			
	1990	2000	2005	2010
Forest	13 718	12 535	11 943	10 749
Other wooded land	34 791	34 791	34 791	31 312
Other land	8 164	9 347	9 939	11 379
Inland water bodies	1 500	1 500	1 500	1 500
Total	58 173	58173	58173	58173

Source: FRA 2010



Best practices in the forestry sector

Monitoring, reporting and verification (MRV) systems for REDD+ pilot project: 2012-2014

Botswana has successfuly completed the SADC project on the development of integrated MRV systems for REDD+, a pilot project commisioned in collaboration with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The objective was to capacitate Botswana in methodologies for determining the amount of carbon stored in the forest area, which is compliant with the guidelines of the Intergovernmental Panel on Climate Change (IPCC) for the REDD+ MRV system.

The project assisted the forestry sector in addressing the institutional technical and human resource limitations for collecting measurable and reliable data on vegetation changes, to establish reference levels and develop a monitoring system to enable Botswana to prepare for participation in a future REDD+ mechanism. The MRV methodology developed has been modified to be used on the ongoing nationwide forest inventory.

Morula (Sclerocarya birrea spp. caffra)

Enhancing the national forest monitoring system for the promotion of sustainable natural resources management

Botswana is collaborating with the Japanese Government through the Japan International Cooperation Agency (JICA) on a project aimed at enhancing the national forest monitoring system for the promotion of sustainable natural resources management. The project has assisted the country in the:

- establishment of a national forest-monitoring system;
- establishment of methodology for a national forest inventory;
- production of a nationwide forest distribution map;
- development of a national forest-monitoring plan;
- capacity development in forest inventory and spatial technology; and
- development of a database for forest inventory.

Fire management

An integrated wildland fire management strategy has been developed as the basic guiding tool for national cooperation and integration in wildland fire management. The strategy promotes proactive and comprehensive approaches to wildland fire management and strongly calls for active participation of all relevant stakeholders such as traditional leaders, communities, land users, CBOs/NGOs, the private sector, academia and government institutions. Focus areas include the establishment of a community-based fire management programme, training of stakeholders such as communities and forest employees as first responders, training on basic firefighting techniques and the establishment of a localized community fire brigade.

Challenges in the forestry sector

The forests and woodlands of Botswana represent an important resource in terms of providing the majority of rural populations with an energy source, materials for fencing, construction, building and crafts, while maintaining environmental balance.

However, deficits are beginning to occur in areas surrounding major population centres. The situation is exacerbated by persistent drought cycles, wildland fires, deforestation, overgrazing, illegal harvesting and overharvesting of forest resources including non-wood forest products. The results have been devastating, as large areas have been stripped of tree cover through indiscriminate cutting of live trees. These combined effects have resulted in the conversion of 20 000 hectares of productive woodland to less productive grasslands and shrub formations, leading to serious soil erosion problems, flash flooding and a localized shortage of firewood and construction wood particularly around major rural settlements and urban centres.

Other contributing factors are a weak forest department, inadequate financial allocation for forest management activities, lack of relevant research output and lack of political support in forestry development, which result in poorly managed forest resources and the unmonitored use of resources.

Future forestry interventions

Economic valuation of non-wood forest products

The contribution of non-wood forest products towards the national economy has never been quantified in economic terms. This is despite the fact that forests and woodlands provide numerous essential social, cultural, economic, ecological and environmental benefits, many of which are fundamental to the well-being of the nation, both now and in the future. There is a need to establish the economic value of non-wood forest products for their inclusion in national accounting.

Development of land degradation management strategy and action plan

Land degradation poses a threat to biodiversity and food security. The strategy will help to define interventions for ecosystem improvement, and hence for improved livelihoods.

Forestry research and development

There is a need for specialized research for use in addressing technical forestry problems in order to provide a fundamental basis for forestry research information, technology and knowledge. Research should be undertaken to document the contribution of forests, trees and non-wood forest products to livelihoods and investigate means of diversifying such contributions to sustained livelihoods. Research should take into account emerging issues such as climate change, especially the forest-related goals of sustainable development.

COMOROS

The Comoros, officially the Union of the Comoros, had a population of 575 660 inhabitants in 2003. Projections of the National Directorate of Statistics (NDS, 2015) suggest that the Comoros currently has 784 745 inhabitants living in a total land area of 1 861 km^2. The land area differs from one island to another: 1 147 km^2 on Ngazidja, 290 km^2 on Mohéli and 424 km^2 on Anjouan.

According to the 2010 National Forest Inventory (NFI, 2010), forests cover nearly 14 percent of the total land area of the Comoros. On Anjouan, forests occupy one percent or 430 hectares of the total area of the island; on Grande Comore, they cover 17 percent or 19 600 hectares and on Mohéli, 19 percent or 5 700 hectares (NFI , 2010).

Ylang-ylang (Cananga odorata)

Based on the distribution of forest areas according to different phenology types and species composition, Comorian forests consist mainly of three categories:

- Evergreen rainforest, covering an area of 19 500 hectares (76 percent);
- Semi-deciduous rainforests, covering an area of 5 200 hectares (20 percent); and
- Forest plantations, occupying an estimated area of 1 000 hectares (four percent). These are hardwood plantations (eucalyptus).

The dense rainforests, bushy or shrub thickets, savannahs, mangroves, swamps, ponds, grassy meadows, saxicolous groups on slag, plantations and crops are the main vegetation types found on the Comoros archipelago, which is renowned for its rich biodiversity, wealth of endemic and endangered species and its social, economic, scientific and cultural importance.

Best practices in the forestry sector

These include the creation of protected areas such as the forests of the Karthala volcano on Grande Comore Island and Ntringui Mountain in Anjouan and the Mlédjelé forest on Mohéli. Eco-development activities have been implemented for the local population to ensure that they focus on these activities outside the protected areas. This project is scheduled for the end of 2015 until the end of 2020. The implementation process of protected areas and, subsequently, their operation, solicit significantly in many ways the involvement of village communities who occupy or use the territories and resources covered by the conservation and sustainable use of natural resources.

The Global Environment Facility (GEF) has allocated an amount of 4 246 000 USD (equivalent to 1 469 116 000 KMF) towards the project. Through UNEP, UNDP and the Government of the Comoros, the money will be mobilized for the realization of the project activities. The funds have been made available for a five-year period to implement activities that will facilitate the protection of natural resources in the three sites mentioned above. The project will pave the way towards a full-fledged forest resources management plan.

The Comoros archipelago is renowned for its rich biodiversity and wealth of endemic and endangered species.

Challenges in the forestry sector

Globally, the Comoros archipelago ranks among the top 20 islands or archipelagos characterized by remarkable endemism and biodiversity. Yet the island's species have been decimated by the onslaught of the woodman's axe and pioneer's fire so that today the primary formations exist only in the form of residual fragments.

The forests of the Comoros are also impacted by natural phenomena (such as volcanic eruptions) and various anthropogenic phenomena related to the use of the green space. Yet the forests remain a key ecosystem and natural habitat and are regarded as a national priority due to their biological potential. They also offer the best conditions for achieving the Millennium Development Goals.

Future forestry interventions

Future interventions include reforestation projects in degraded areas and the creation of "community forests" for communities to utilize their own trees and conduct their farming activities in designated areas outside of the protected natural forests.

LESOTHO

Lesotho is a small, very mountainous constitutional monarchy in Southern Africa with a land area of about three million hectares. The country's productive natural forest is better described as 'woody vegetation'. It occurs in varying degrees of density on non-arable land (about 74 percent of Lesotho) on shallow-soiled hills and escarpments at the lower altitudes. Any part of this 'natural forest' may contain several of just 32 plant species that can grow with single main trunks and to heights of at least five metres. The total forest area is estimated to be about 43 000 hectares.

Essentially, Lesotho's very small area of tree plantations comprises exotic species, and can be categorized in two types. The first category is plantations grown primarily for wood production (mainly government-owned woodlots). The second comprises those planted by the present and past governments mainly for the stabilization of erosion. These plantations are self-regenerating and regularly harvested by rural people for firewood and poles.

There is virtually no deforestation for the expansion of arable agriculture because all arable land was occupied many decades ago. It is quite impossible to estimate the rate of deforestation on non-arable land because virtually all the indigenous species and most of the exotic plantation species are self-regenerating. Thus, the widespread overharvesting of woody fuel results in the plant's regrowth being cut at a younger age. Stumps of the larger woody plants may be dug up for fuel, and too frequent cutting and browsing by Lesotho's abundant livestock eradicates other woody species.

No forest produce from Lesotho's wood resources is manufactured and traded to appear in trade statistics, but a tiny proportion of the fuelwood used is collected by the rural poor for sales to more affluent neighbours. Forestry in Lesotho does not contribute to the official revenue figures in the national economy.

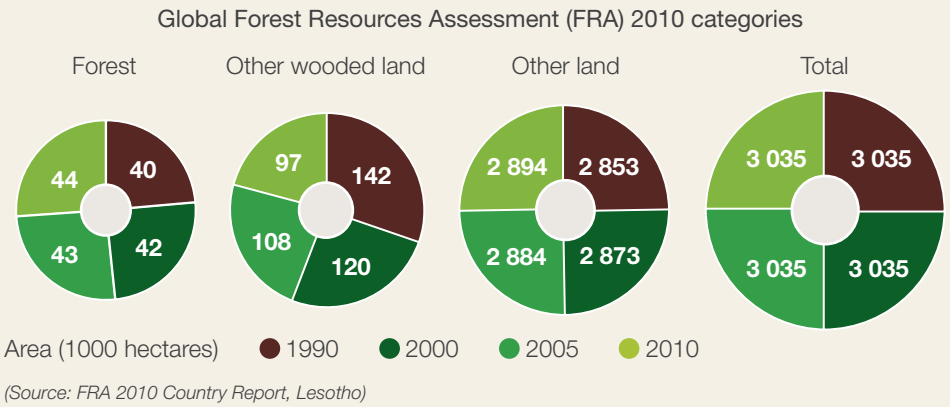
The greatest threat by far to forest resources in Lesotho is posed by its huge population of free-ranging domestic livestock browsing the regrowth of harvested woody plants. The second threat is from resource harvesting for household fuel at levels considerably in excess of the regenerative capacity of the forest resources.

The Forestry Act of 1998, the new Forest Policy of 2008, the Environment Act of 2001 and their subsequent legislation under the respective ministries provide the legal framework to the appropriate institutions for supporting sustainable forest management in the country. The main government body responsible for the coordination of forestry affairs is the Forestry Department under the new Ministry of Forestry and Land Reclamation, whereas the Environment Act falls under the portfolio of the Ministry of Environment, Tourism and Culture.

Major forest types and percentage of forest cover

The total forest area occupies 44 000 ha, which is equal to 1.4 percent of land surface. Gazetted forest reserves (mainly eucalyptus and pine plantations) occupy 10 400 ha and indigenous forests (mixed evergreen and deciduous forest patches in the lowlands and foothills) 33 600 ha. No comprehensive survey has been undertaken on private and community forests, which consist of small groves or patches of grey poplar often planted in dongas under the catchment rehabilitation scheme (Lesotho Forest Resource Assessment Report, 2010).

The graphs below show the different types of forests and the area covered from 1990 to 2010:



(Source: FRA 2010 Country Report, Lesotho)

Best practices in the forestry sector

Projects and programmes that have been developed and implemented include:

Dissemination of forestry information

The main agency responsible for tree planting in Lesotho is the Department of Forestry in the Ministry of Forestry, Range and Soil Conservation. In 1987 the Forestry Department (then the Forestry Division) took over the activities of the former Lesotho Woodlot Project together with all infrastructure and other resources. The Department encourages non-governmental tree planting by individuals and communities through weekly radio and television broadcasts and the publication of pamphlets, posters and stickers.

Poverty alleviation (watershed management) project

The overall goal of this project is to rehabilitate degraded lands. Another objective is the creation of temporary employment through the engagement of local communities in the rehabilitation of degraded lands. In order to achieve this objective, the programme supports the afforestation and rehabilitation of existing forest resources, rehabilitation of degraded lands and construction of water resources, among other activities.

Transfer of user rights of forest reserves to local communities

The Department of Forestry and the Ministry of Local Government and Chieftainship, Division of Decentralization are currently involved in the transfer of user rights and management of state/government-owned plantations or woodlots to the communities. The main target group is the local authorities, who have full responsibility for implementing the local people's initiatives. To date more than 33 state-owned woodlots are under pilot for transfer to the local communities

Engagement of other government departments/ministries and NGOs

Apart from the Department of Forestry, there are several other government ministries and departments as well as NGOs that have a stake in the development of Lesotho's forests. The Department of Environment is the overriding policy-maker and coordinator of all environment-related activities, which include those on indigenous forests, trees, shrubs and afforestation.

Main wood forest products and non-timber forest products

Wood forest products:
Fuelwood and treated poles.
Non-timber forest products:
Fruits (rosehip), honey and grass (*Hyparrhenia spp.*).

The Ministry of Local Government and Chieftainship has overriding control of all land, indigenous forests, trees, shrubs and afforestation under the Land Act. It also has control over communally owned plantations and over firewood in *leboella* ("rest areas") and effectively controls all wild trees and shrubs. The Ministry of Natural Resources and the Department of Energy carried out an in-depth study into energy consumption in Lesotho, after which a National Energy Masterplan was drawn up. The use of trees and shrubs, crop residues and dung as fuel was quantified on a national basis.

The Lesotho Highlands Development Authority, in collaboration with government line ministries, is responsible for the management and development of all natural resources, including indigenous forests, tree shrubs and afforestation in the Katse and Mohale catchments.

The Lesotho Agricultural College undertakes the development of forestry staff. Non-governmental organizations active in forest development include the Lesotho Boy Scouts, Lesotho Red Cross, World Vision, Care Lesotho International, United Nations offices in Lesotho (United Nations Development Programmes, Food and Agriculture Organization, World Food Program), German International Development, etc.

Challenges in the forestry sector

Poverty

Forest development is a long-term process which requires a long-term commitment. As the rural communities are in most cases concerned with meeting their immediate needs, forestry activities are bound to conflict with the priorities of the rural communities. For example, in cases where resources are scarce, priority is given to provision of food and other basic needs.

Staff complement

The Department of Forestry currently has only a few officers trained in forestry and/or forestry-related subjects at a degree level. Most of the foresters have a diploma in Forestry and Natural Resources combined with a degree in Agriculture, Soil Science and Environmental Science or Management. The universities in Lesotho do not offer forestry studies at degree level; the Lesotho Agricultural College is the only institution in the country that offers Forestry.

Urban pull, rural push

Rapid population growth in the urban areas of the country has led to an increase in the demand for forest products. This has resulted in an unprecedented destruction of forests within the peri-urban areas.

Wildfires

Deforestation and burning of grasslands are some of the human activities which constitute major sources of forest fires. These two activities are common in the highlands and peri-urban areas of the country where livestock rearing is given priority, resulting in competition for land use between range and tree planting.

Leucosidea spp.

Future forestry interventions

Establishment of bamboo plantations

As a non-wood forest product, bamboo will contribute significantly to transforming the country's landscape. Lesotho is currently experiencing an unprecedented level of erosion which requires immediate and urgent action. Since bamboo grows fast, the hope is that it would not only assist in slowing the loss of soil, but would also address fuelwood and furniture requirements as well as the unemployment challenges which the country faces.

Beekeeping

Honey is a non-wood forest product. The prospects for this intervention in Lesotho are very good as people are becoming increasingly interested in beekeeping. Most people argue that, as the country is currently not heavily industrialized, beekeeping will work to the country's advantage in that the honey that will be produced locally will be free of pollutants.

Capacity building

In order to address the problem of insufficient professional staff, the Ministry is currently engaged in negotiations with the Department of Manpower Development to fund fellowships for students interested in studying Forestry. To date Forestry does not appear on the list of courses supported by the Department. The Ministry of Forestry has moreover established a rapport with the People's Republic of China, the Government of Iceland and the Republic of Kenya to offer short courses in Forestry.

Research

One of the proposals in the three-year strategic plan of the Ministry of Forestry, Range and Soil Conservation is the establishment of a new research arm for forestry.

MADAGASCAR

Madagascar's natural forests cover an area of 9.2 million hectares, representing 15.8 percent of the national territory. The island is a biodiversity hotspot that holds more than five percent of the global biodiversity, with high rates of endemism (around 90 percent). Its unique environmental wealth offers a wide range of development opportunities that are yet to be explored.

The major forest types encountered in Madagascar are summarized in the following table:

Forest types	Description	Area (IEFN[1] 2000)	Area in hectares (FRA 2015)
Wet evergreen forests of the East and Central Sambirano	Upper layer formed by large trees (25 m to 30 m) with straight trunks, with a diameter rarely exceeding 80 cm in lauriforme foliage, forming a dense thicket containing interwoven vines.	4 342 347	6 062 000
Sclerophyllous forests of the western slopes of the central mountainous area	In the form of a grove of low, highly branched sclerophyll trees (10 m to 12 m).	147 153	
Sclerophyllous forests and thickets of the central mountainous area	In the form of a port formed in thicket of ericoid shrubs, hardly exceeding 6 m in height, dense, impenetrable, often fragmented, with absent or discontinuous grass cover. As a grove of crooked small trees with a low-branching foliage ball barely exceeding 10 m to 12 m in height, evergreen, glossy colour, leathery, these forests allow plenty of light to penetrate to the ground.	1 057	
Dense dry deciduous forests in the West	In the form of a mature forest with large emerging shafts (20 m to 25 m) and deciduous trees of smaller dimensions (12 m to 15 m).	3 438 099	7 198 000
Dense dry deciduous forests in the South	As a grove with two strata: • upper layer of deciduous trees (12 m to 15 m high), sometimes discontinuous; • less dense shrubs, mostly deciduous, rarely thorny, with xerophytic adaptations, outnumbering bushes.	860 833	
Xerophilous thickets in the South	A dense, bushy vegetation from which a few scattered trees (8 m to 12 m high) emerge.	1 495 482	
Mangroves	Muddy deposits of brackish estuaries subjected to alternating tides.	303 817	
Riparian forests and/or alluvium	As a dense, humid, evergreen forest bordering rivers and alluvial deposits with a lush, varied composition of tall trees (25 m to 30 m) characterized by a variety of evergreen species.	1 434 816	
Human-made forests	Plantations consisting of deciduous and coniferous tree species.	215 188	

Main forest products

Timber forest products (precious wood and plain wood)	Non-timber forest products
Roundwood; Sawn wood; Charcoal; Woodfuel and Poles	Essential and vegetable oils; Hydrosols; Extracts; Medicinal plants; Medicinal seeds; Resin Ramy; Raffia; Bamboo and Honey

Traveller's palm (Ravenala madagascariensis)

1. IEFN: *inventaire ecologique forestier national*

Best practices in the forestry sector

System of Protected Areas of Madagascar

- 84 new protected areas developed and validated (with the creation of decrees) in the first half of 2015.
- Management plans preserving biological processes necessary for biodiversity conservation.
- A policy for clearing access restrictions for local people formalized in the social protection and environmental plans.

Renewable Natural Resource Transfers Management, a sustainable management tool for renewable natural resources

- 1 248 management delegation contracts to basic communities initiated in 15 years.
- 2 447 917 hectares or 4.17 percent of national territory.
- Concerted forest development plans.
- Structured base of local communities and privileged partners of the Forestry Administration.

Fire management by satellite in collaboration with Conservation International every five years

- Number of fires recorded within the first half of the year: 7 783

New Validated Forest Policy

- Integration of precious woods (rosewood, ebony wood and palisander wood from Madagascar) in Appendix II of CITES[2].
- Studies were conducted in the context of supporting the capitalization of forest regulations with a view to ensure the implementation of the country's forestry code.

Challenges in the forestry sector

- Rate of deforestation in Madagascar: 4 percent (2005-2010); 0.5 percent (2000-2005); 0.8 percent (1999-2000)
- Area converted to other uses from 2000 to 2005: 36 000 ha/year

Challenges	Factors/Causes
Subsistence agriculture ("tavy", coffee, sugar cane, fires, clean ups, cash crop and slash-and-burn culture)	Poverty, immigration, demographic growth, lack of arable land, dry/arid land encroachment into productive/arable land, land acquisition logic legitimized by both customary law and ignorance of the law
Mining – precious stones (Andilamena), gold (Anosibe An'Ala), bauxite (Anosy).[3]	Poverty, easy access, flight zone, development policy
Illegal logging (wood-business values usage: ebony, rosewood, palisander, etc.)	Poverty, easy access, flight zone, non-compliance clauses, strong demand for wood, domain change of activities, breach of logging permits
Inadequate security	Political instability, lack of access, lack of means of intervention
Bushfires	Pasture renewal, discontent and protest, cleaning, vandalism
Energy (firewood, charcoal) (Wood consumption: 22 million m^3/year of which 80 percent is in energy wood)	Accessible areas, evacuation facility products

2. https://www.rainforest-rescue.org/news/4011/illegal-logging-and-trade-of-madagascar-s-precious-woods
3. Names in brackets are geographical names.

Future forestry interventions

Forest carbon valuation:
State of REDD+ sites.

At local level:
Development and implementation of REDD+ pilot projects that have already sold carbon credits (Ankeniheny-Zahamena Corridor, Makira Forest Protected Area) or ultimately plan to sell carbon credits (Forest Corridor Ambositra-Vondrozo, Holistic Conservation Programme for Forests).

At eco-regional level:
- Implementation of REDD+ Eco-Regional Project for the Eastern Rainforests (PERR-FH).
- Objectives: Harmonization of REDD+ methodology in the inventory of carbon stock and establishing a baseline scenario, testing a measuring, reporting and verification system at eco-regional scale.

At national level:
- Creation of the National REDD+ Coordination Office (coordination, supervision and monitoring).
- Support UN-REDD Madagascar in identifying needs for REDD+ (national forest monitoring system, vision and intersectoral dialogue, tenure) and targeted support on legal aspects related to REDD+ (executing agencies: FAO and UNDP, completion was scheduled for May 2015).
- Support of the GIZ in the preparation of REDD+ (consultation workshops in three regions from September to December 2014).

The sale of carbon credits from REDD pilot projects generated USD 1.5 million, including the sale of carbon credits to finance the DELL forest corridor Ambositra-Vondrozo, Zurich Zoo, Microsoft and the new protected area in northeast Makira, Air France and Agence Française de Développement (AFD) Holistic Conservation Programme for Forests.

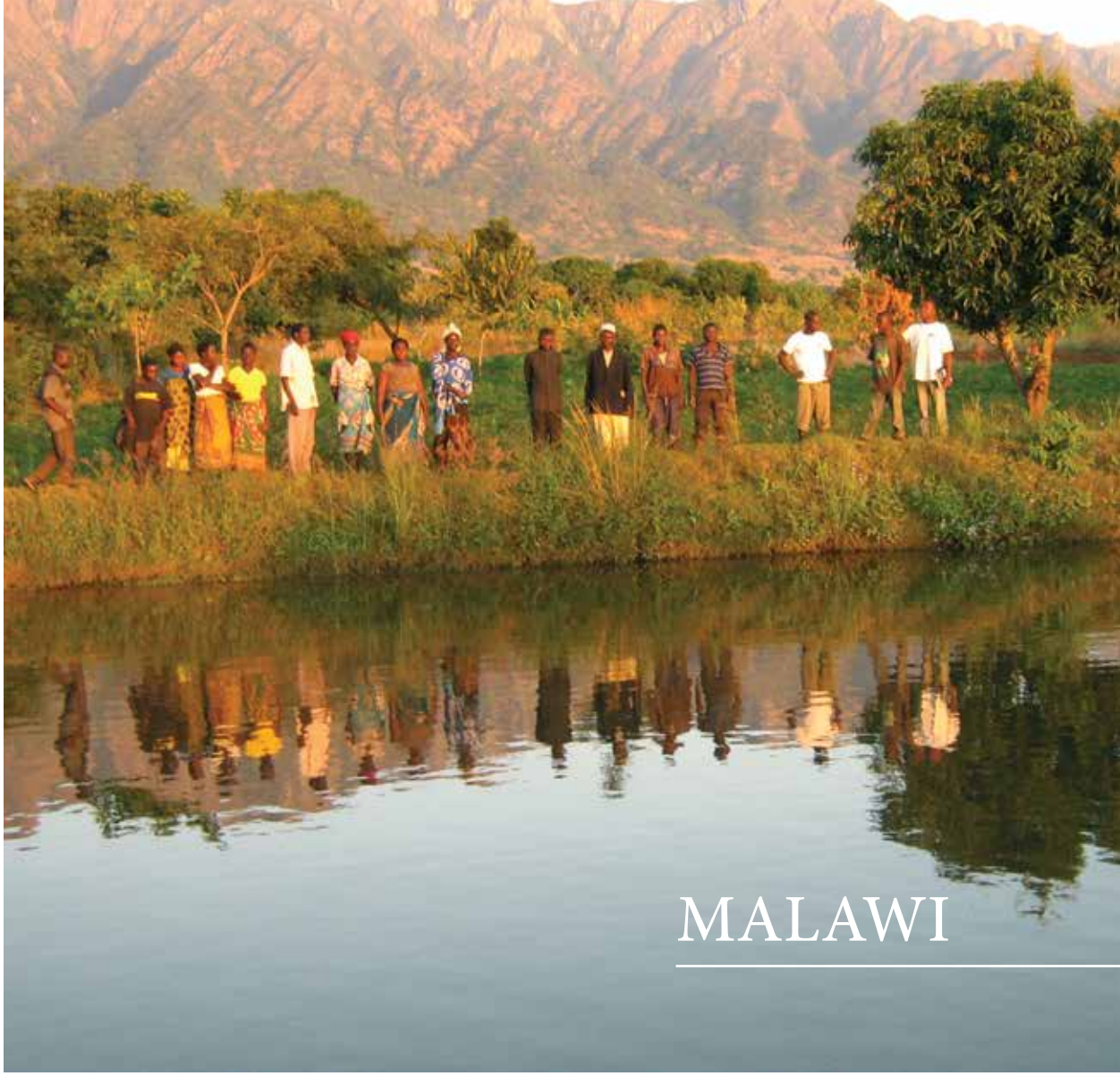
REDD – next steps:
- Development of a national REDD+ strategy.
- Development of a national REDD+ programme document for funding (ER-PIN Document Financing Facility/World Bank submission expected in October 2015).
- Development of a REDD+ Madagascar UN-REDD programme.
- Strengthening of REDD+ national coordination.
- Targeted support of the new UN-REDD strategy for 2016-20 potentially available before the end of 2015, depending on the nature of activities.
- Competitive process for national programmes.

Reviving the concept of "Sustainable Forest Management Sites" or "KoloAla"
Points out all forest areas that are legally, technically, economically, socially and culturally sustainable for the conservation of forest resources, and at the same time for the production of material goods including timber forest products, non-timber forest products and intangibles such as carbons, in compliance with requests made by local, national and international markets in accordance to their respective productive capacity.

Actions performed/completed
- Signing of a framework agreement between the Ministry of Environment, Ecology, Sea and Forestry and Madagascar's National Association of Forest Operators, as part of the revitalization of KoloAla.
- Project document for the implementation of priority activities on KoloAla sites within the Development Operational Plan 2015.
- Strategic framework with budget (KoloAla).
- Operational Work Plan (KoloAla): Development of the Rapid Results Initiative (April-June 2015).
- Draft decree to create, manage and develop KoloAla site.

Next steps
- Validation of the creation of the draft decree.
- Search for sustainable financing.

In addition to these two projects, the promotion and valorization of non-timber forest products also form part of projects aimed at the development of the forestry sector in Madagascar.



MALAWI

The altitude in Malawi ranges from 50 to 3 000 metres above sea level on Mulanje Mountain in the south and 2 600 metres on the Nyika Plateau in the north. With slopes varying from steep escarpment to plains, there is a wide variety of vegetation formations in Malawi. The interaction of slope, soil, geology and climatic variables has resulted in at least 19 distinct vegetation communities, but population pressure has modified biotic communities, resulting in woodlands/trees interspaced with agricultural crops. Most of the natural forests are miombo woodland, with typically low annual growth rates. Most forests have low commercial value.

The country's forests occupy about 20.4 percent of the land area. The major forest types are natural forests, covering about 22 967 km^2 and exotic (plantation) forests, occupying about 1 210 km^2. Natural forests comprise about 22 344 km^2 of miombo forest and 623 km^2 of evergreen forest.

Exotic (plantation) forests consist of about 258 km^2 of eucalyptus plantations and 811 km^2 of pine plantations; with other species such as *Senna siamea* and *Senna spectabilis* covering an area of some 141 km^2.

Forests in Malawi provide a diverse range of products such as firewood, poles, timber and charcoal. Non-timber products include mushrooms, thatch grass, wild fruits, wild animals, medicinal plants and honey.

Forests in Malawi provide a diverse range of products such as firewood, poles, timber and charcoal.

Best practices in the forestry sector

The forestry sector in Malawi is coordinated by the Ministry of Natural Resources, Energy and Mining. Current forestry policy recognizes and gives power to all resource users, particularly rural communities, for greater involvement in the management and control of forest resources.

Current best practices in the sector include tree planting by different stakeholders; development of forest-based enterprises; involvement of local natural resource committees in the establishment and conservation of village forest areas; engagement of the private sector in the exploitation and management of forests; formation of local village-level institutions such as Village Natural Resources Management Committees; and the promotion of natural regeneration.

Mulanje cedar (Widdringtonia whytei)

Challenges in the forestry sector

There has been a net decline in forest lands over the last two decades, especially on customary land. This trend is continuing at a rate of 1.6 percent per year. Some of the main challenges in the sector include deforestation and forest degradation owing to charcoal and firewood production and infrastructure development, agricultural expansion, population growth, poverty and high demand for energy. Population growth is leading to increased demand for forest resources in the face of a dwindling supply. There is a high dependence on charcoal at the national level as the main source of energy for domestic use.

Although protected forests have overall been effective in conserving biodiversity, there is growing pressure for cropland and wood fuel. Some of the main demands on forests and tree resources are forest services, non-timber forest products, wood energy and industrial forest products.

These challenges, coupled with the frequent introduction of forest invasive pest species, are placing increased demands on a forestry sector already burdened by capacity constraints owing to low budgetary support and a high staff turnover rate.

Future forestry interventions

The two key determinants of the future of forestry in Malawi appear to be the developments that will take place in the agriculture and energy sectors.

The outlook for Malawi's forestry sector in the next decade has great potential to meet the social, economic and environmental needs of the country and the international community. The future of forest lands will be determined by the ability of planners to provide more benefits from forests than from clearing forests for crop production. Collaborative forest management holds promising prospects for meeting both local needs and global interests of biodiversity conservation and mitigation of climate change. This would include the further promotion of community-based forest management, involvement of the private sector in the rehabilitation and sustainable management of industrial and fuelwood forest plantations and the introduction of fast-growing plantation tree species to shorten plantation management cycles.

Technological interventions could improve wood processing efficiency and reduce waste. As other forms of energy become available, pressure on woodfuels could be reduced and new products could replace wood products. More innovative and efficient ways of producing food could release land for uses other than crop production.

Maintaining the balance between local needs and international expectations and between development and environmental conservation will be a major challenge in the next two decades. Promotion of payment for ecosystem services schemes (including REDD+) in important forests such as water catchment forests will be a priority.

The capacity of the Department of Forestry will be enhanced to take up extension, monitoring, policy and coordinating roles and management systems to minimize the introduction and spread of forest invasive species and enforce forest legislation. Appropriate training will be offered to build capacity in the sector.

Another initiative would be to address the energy sector to minimize the use of charcoal as the major source of domestic energy. Malawi's forests provide about 94 percent of the country's energy requirement for industrial and domestic uses. With woodfuels providing 94 percent of energy in the country and no viable alternatives in site, the ever-increasing demand for woodfuel will have a very profound effect on the forestry sector. The impact may not necessarily be negative. The increasing demand for woodfuel could spur tree-growing activities in the rural areas for sale, especially if the pricing policy was conducive to tree planting.

MAURITIUS

Mauritius is one of the three volcanic islands of the Mascarenes, located near latitude 20 °S and longitude 57 °E in the Western Indian Ocean. It covers an area of 2 040 km² and culminates at 828 metres above mean sea level.

The total extent of forest cover in Mauritius is estimated at 47 108 hectares, representing about 25 percent of the total land area. About 22 108 hectares are state owned and 25 000 hectares privately owned. There are no communal forests, nor do any communities depend on forests for their livelihoods.

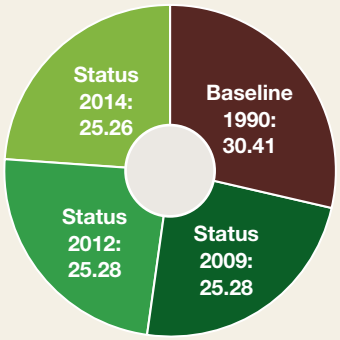
Black ebony (Diospyros tessellaria)

Forest statistics

Category	Area (hectares)
State forest lands	
Plantations	12 088
Black River National Park	6 574
Bras D'Eau National Park	497
Islet national parks	134
Nature reserves	
- Mainland	200
- Islets	599
Vallee D'Osterlog Endemic Garden	275
Other forest lands	1 741
Total	**22 108**
Privately owned forest lands	
Mountain reserves	3 800
River reserves	2 740
Private reserves	13
Plantations	2 600
Other private forest lands, including scrub and grazing lands	15 847
Total	**25 000**
Grand Total	**47 108**

Source: Records Office, Forestry Service (2014)

Baseline data



Baseline data indicate that there has been no reduction in the proportion of land area covered by forests since 2005.

Forest types and plantations

Ecological zone (tropical)	Category	Species
Wet upland forest Rainfall > 2 000 mm	Plantation	*Pinus elliottii*
	Plantation	*Eucalyptus tereticornis*
	Plantation	*Cryptomeria japonica*
	Plantation	*Araucaria cunninghamii*
	Natural	Mostly native forests severely invaded by alien plant species
Moist forest 2 000 mm> Rainfall > 1 000 mm	Plantation	*Eucalyptus tereticornis*
	Plantation	*Tabebuia pallida*
	Plantation	*Araucaria cunninghamii*
	Plantation	*Casuarina equisetifolia*
	Natural	Mostly native forests severely invaded by alien plant species
Dry lowland forest Rainfall < 1 000 mm	Plantation	*Eucalyptus tereticornis*
	Plantation	*Tabebuia pallida*
	Plantation	*Araucaria cunninghamii*
	Plantation	*Casuarina equisetifolia*
	Scrublands	Mainly exotics and grass cover

The main tree species cultivated for timber production are *Pinus elliottii* and *Eucalyptus tereticornis*. Both are introduced species. Pine and eucalyptus provide utility timber, which meets about five percent of the local demand. There is no timber exploitation in native forests. Mauritius is a net importer of timber.

Mauritius recognizes the essential role of forests, which are valued for their ecosystem services and environmental functions rather than for the production of timber. The objectives of the National Forest Policy are conservation, protection and development of the remaining forests through sustainable management.

Best practices in the forestry sector

- On account of its limited land resources and increasing population, Mauritius is gradually phasing out timber exploitation in line with its National Forest Policy (2006). The current emphasis in forest management is on increasing the size of the state forest estates, resource conservation, watershed protection, forest ecosystem and biodiversity conservation and replacement of invasive alien species by native species. Non-consumptive use of forest resources is favoured through leisure, recreational and ecotourism activities.
- In order to increase the protected area in Mauritius, the National Parks Conservation Service in collaboration with the Forestry Service weeded about 276 hectares of forest under the Protected Area Network project.
- About 300 000 plants are produced annually for the reforestation programme and national tree-planting campaign.
- About 50 000 plants are recruited annually for the restoration of water catchment areas, mountain reserves and other forest areas.
- Proposal for review of the existing National Forest Policy (2006) for the next ten years and preparation of the National Action Programme.
- Amendment of the Forests and Reserves Act to include the control of felling of trees on private forest lands.
- The Ministry has initiated a re/afforestation programme to plant 100 000 plants per annum in the next five years. About 10 hectares of land have been targeted for this project on an annual basis.

Mauritius recognizes the essential role of forests, which are valued for their ecosystem services and environmental functions rather than for the production of timber.

Challenges in the forestry sector

- As a result of limited land resources, forest lands are being targeted for infrastructural developments and agricultural projects and also for the fulfilment of socio-economic goals. Land-use changes and conversion of forest lands are considered important in order to advance agricultural production for food security, biomass exploitation for energy production and other renewable energy projects such as wind and solar farms.
- The Forests and Reserves Act (1983) does not provide any legal framework for the control of activities on private forest lands (6 540 hectares) outside of mountain and river reserves. Pending approval of revised legislation to manage private forest lands is a major constraint.
- Forest degradation in the past has had such severe impacts on native biodiversity that restoration is expensive and time consuming.
- Emerging issues such as the fuel crisis, food security and climate change are expected to have a direct impact on forests.
- Absence of a national forest action plan.
- Other challenges include a lack of trained personnel, resources and funding.

Future forestry interventions

These include:

- A review of the existing National Forest Policy (2006) for the next ten years and preparation of the National Action Programme.
- A review of legislation governing privately owned forest land to allow for more efficient implementation of sustainable management of private forest lands and conservation activities.

MOZAMBIQUE

Mozambique has extensive forest resources. The wide range of forest types and compositions gives the country a rich biological diversity and serves as a natural habitat for wildlife. These resources not only provide numerous environmental goods and services, but are a capital asset that contributes to the country's socio-economic growth.

According to National Forest Inventory data (2007), natural forests cover about 54.8 million hectares (70 percent) of the country's total land area. It is estimated that 26.9 million hectares consist of forests with high commercial value suitable for timber production; 13.2 million hectares are conservation areas; and 14.7 million hectares are made up of other forest types (thickets, woodlands and forests under shifting cultivation).

About 50 percent of the total forest area in the country is classified as productive forest. The total volume per hectare is estimated at 36.6 m^3/ha, the total commercial volume per hectare is 11.3 m^3/ha and the commercial allowable cut is 4.5 m^3/ha.

Provinces with more timber available are Zambezia (7.7 m^3/ha); Cabo Delgado (7.3 m^3/ha) and Sofala (7.1 m^3/ha). Commercial tree species with the highest volumes are mopane, wild teak, panga-panga and pod mahogany. The Annual Allowable Cut (AAC) is estimated at between 515.7 to 640.5 thousand m^3/year, based on the availability of timber of high commercial value.

Best practices in the forestry sector

Logging in the country is performed under three schemes:

- For private consumption: intended for the use of local communities; no fee is applied.
- Simple licence for a volume of 500 m^3 applies to national forest operators and local communities for commercial purposes in compliance with a dedicated management plan.
- Forest concessions (a 50-year, renewable contract) granted to an individual or collective legal person for forest exploitation dedicated to an industry, according to a management plan.

From 2010 to 2014 simple licences were granted to about 680 forest operators, with a peak recorded in 2012. There are currently 211 forest concessions in the country, occupying an area of about 8.6 million hectares. From 2010 to 2014 a volume of about 1.2 million m^3 of logs was registered. The average annual logging volume is about 250 thousand m^3.

The most harvested native species are mopane (*Colophospermum mopane*), leadwood (*Combretum imberbe*), panga-panga (*Millettia stuhlmannii*), wild teak (*Pterocarpus angolensis*), pod mahogany (*Afzelia quanzensis*) and ironwood (*Swartzia madagascariensis*). These species can only be exported after being processed locally. In recent years, certain species that served as a secondary source of timber have been increasingly harvested, such as mutiria (*Amblygonocarpus andongensis*) and mitzeeri (*Bridelia micrantha*).

The forestry sector contributed USD 330.3 million to the economy in 2011, which is appoximately 2.8 percent of the GDP.

The wood volume harvested with the concession system has been steadily increasing over the past five years. It currently stands at about 37 percent of all wood harvested in the country. Mozambique has 251 processing units, consisting of a primary process, with yields of between 45 and 50 percent in terms of log production.

Twenty percent of the revenue derived from forest harvesting has been allocated to natural resource management committees in local communities throughout the country. As part of this process, 1 089 beneficiary communities have received a total of 157 138 004.54 Mozambican meticals (approximately 4 029 722.53 USD).

Local communities use this 20 percent allocation according to their own priorities. In general, communities have decided to use it towards the acquisition of milling equipment; the sinking of boreholes (thereby reducing the distance they have to travel to obtain water); the establishment of a micro-credit system aimed at stimulating entrepreneurship by supporting small businesses that would increase household income, empower households and improve their quality of life; and the acquisition of bicycles for the monitoring of resources.

Panga-panga (Millettia stuhlmannii)

Future forestry interventions

- Finalize the National Forest Programme.
- Prepare an action plan detailing interventions for the forestry sector.
- Strengthen information management through the implementation of forest management information systems.
- Improve coordination between the various stakeholders in the supervisory process: National Police Force; Customs; concession holders; paralegals and the Forest Resource Management Committees (community agents).
- Increase local timber processing capacity and the export of forest products with higher added value.
- Prohibit the exploitation of tree species currently under pressure, if any.
- Ban the export of wood logs of all tree species.
- Strengthen the sector's ability to monitor compliance of forest management plans.
- Complete forest inventories on a scale of 1: 250 000 in order to obtain more detailed information on forestry potential and to improve its management and planning.
- Continue to mobilize funds and ensure the implementation of forestry sector activities.
- Strengthen the involvement of the different stakeholders in the management of forest and wildlife resources.
- Develop a legal provision that allows the use of a portion of incomes to strengthen the forestry sector.
- Accelerate the allocation of 20 percent of the income derived from forest licensing to local communities.
- Finalize the refund of 40 percent of the logging fee towards forest operators who put in place a secondary timber processing industry.
- Establish conditions for creating a balance between the involvement and participation of the private sector, local communities and civil society in the design and implementation of social development policies towards a sustainable and economically viable use of forests.

NAMIBIA

Forests dominated by *Baikiaea, Burkea, Combretum, Acacia, Terminalia* and *Mopane* species cover approximately 7 000 000 hectares (eight percent) of Namibia's total surface area. Other species such as *Strychnos* and *Schinziophyton* occur in small patches.

Namibian forests offer a variety of products, both commercial (especially *Pterocarpus angolensis*) and non-commercial. At a local level, communities mainly depend on forests for fuelwood, construction, fencing, food and medicinal products. Commercially, forest products are used for wood carving, timber (for furniture), charcoal and firewood as well as medicinal or pharmaceutical applications. Fruits and mopane worms are among the non-timber forest products harvested in Namibia. Furthermore, forests provide shelter for both humans and animals and serve as a habitat for birds and other organisms.

Best practices in the forestry sector

Namibia's forestry sector includes the management and utilization of forest resources under the custodianship of the Directorate of Forestry in the Ministry of Agriculture, Water and Forestry. Projects of the Directorate of Forestry aimed at the sustainable utilization of forest resources are listed below:

Community forestry

As a component of the Namibian Community Based Natural Resources Management Programme, this initiative is aimed at supporting and empowering local communities through capacity building and transfer of rights to manage forest resources in order to benefit from related income and employment opportunities. Communities are expected to be organized and take some responsibility for the management and caring of their forests. A community-based fire-fighting project has been developed and implemented. De-bushing of bush-encroached farms aimed at gaining an appropriate ratio of grass and woody plants is progressing well.

Tree planting and orchard development

Although climatic conditions in Namibia are not very conducive to tree planting, limited tree planting does take place. This project is aimed at implementing reforestation and afforestation at the national level. Additionally, the project deals with orchard development with the purpose of increasing fruit production, reducing poverty and creating an opportunity for industrial development through agro-processing.

Development and implementation of forest policy and legislation

This is an intervention by the Government of the Republic of Namibia through the Directorate of Forestry to regulate and manage the use of forest products. This is done by sensitizing communities to the value of forest products by issuing permits whenever harvesting is required. Members of the public are advised which tree species can be utilized and which are protected. Furthermore, forest policy and legislation are in place to support the protection and sustainable use of forest resources.

Forestry-related research

Research is undertaken mainly for the purpose of generating forestry information, for example to broaden understanding of the economic value of forest biodiversity conservation. Proven results from mainstream forestry research to increase the yield of forest products will be adopted from the international community, or developed in-country when required.

There is a dire need for research to enhance the quality of forest products, develop drought-resistant plants and provide solutions to forestry-related problems.

Quiver tree (Aloe dichotoma)

Challenges in the forestry sector

The management challenges facing the sector are many and varied:

Demand for wood materials
There is an ever-increasing demand for wood materials, especially in the north to north-eastern parts of the country where the population is heavily dependent on trees to construct houses and related structures. Most people in these areas cannot afford construction material such as bricks and metal and it is a big challenge to manage forest resources in the vicinity of these communities.

Limited research
This is arguably the greatest challenge facing the forestry sector today. There is a dire need for research to enhance the quality of forest products, develop drought-resistant plants and provide solutions to forestry-related problems.

Clearing the land for agriculture
The growing population needs land to farm and thousands of hectares are cleared for agriculture every year. This is regarded as the greatest contributor to deforestation.

Illegal logging
Illegal logging, mainly by the commercial sector, contributes markedly to forest degradation. Certain species are targeted for use in industries such as the manufacture of planks, furniture and canoes and for direct export.

Fires
Despite significant efforts to fight bush fires, such fires remain one of the huge challenges faced by the forestry and rangeland sectors. Millions of hectares are burnt by veld fires every year despite fire management measures adopted by the Directorate of Forestry. Some of the challenges coupled with this are insufficient fire-extinguishing materials, human resources and vehicles to accelerate the response rate to veld fires.

Inadequate funds to implement forest policy and legislation
Owing to the shortage of official vehicles, patrols and field inspections cannot be carried out as and when required.

Inadequate professional staff
Although a training programme is in place, activities are hampered by a shortage of trained staff at both technical and professional levels. There is a dire need for highly qualified staff to conduct forestry-related research. Professionals tend to leave the Directorate for greener pastures in related sectors.

Future forestry interventions

Although there are many projects in place, not all of these are effective. This can be attributed to the lack of research during the development process, which has made most of the policies difficult to implement. Also, most of the projects are not monitored or evaluated on a short-term basis to gauge if they are still serving a purpose. It is therefore important that research is strengthened.

There is a need for integrated projects combining many different sectors in order to deal with climate change. Forest fire management will continue to receive the attention of all stakeholders. Tree-planting activities in the country will be intensified. Programmes promoting climate change adaptation will be implemented throughout the country. Staff training programmes at all levels will also be strengthened.

SEYCHELLES

The Seychelles is an island archipelago in the Western Indian Ocean located between 3 and 10 degrees south of the equator and between longitude 46 and 57 degrees east. It has a total land mass of 455 square kilometres. The archipelago consists of 115 islands, of which 42 are granitic and the rest of coralline origin. The main granitic islands, in descending order of size, are Mahé, Praslin, Silhouette and La Digue.

The climate is equatorial with an average annual rainfall of 2 200 mm. Humidity is uniformly high, and mean temperatures at sea level range from 24 °C to 30 °C. The prevailing winds bring the wet northwest monsoon from December to March and the drier southeast monsoon from May to October, with heavier wind. Climatic conditions vary considerably between islands. High-intensity rainfall, with intermittent heavy downpours and even occasional torrential rains (up to 250 mm/day) may occur from December to March. Recent meteorological research has shown that with ongoing climate change, the drought periods may become longer and the frequency of extreme weather, including torrential rains, may increase.

There are three types of forest found in the Seychelles – the "lowland forest" (0-300 m), the "intermediate forest" (300-550 m) and the "mountainous rainforest" (from 550 m to the top, at 905 m).

At elevations below 610 metres, palms, pandans and hardwoods characterize the natural forests of the granitic islands. Above this elevation, there is cloud forest, rich with tree ferns and mosses. Forest composition varies somewhat from island to island within the Seychelles, but common tree species include *Phoenicophorium borsigianum*, *Albizzia falcata*, *Pterocarpus indicus*, *Adenanthera pavonina*, *Morinda citrifolia*, *Phyllanthus casticum*, *Pisonia grandis* and introduced coconut palms. Tree ferns, palms, orchids and an endemic species of pitcher plant (*Lalyann potao*) are all relatively common.

Main forest products are hardwood/timber and to some degree also cinnamon. Non-timber forest products include the coco-de-mer palm tree nut and its kernel.

Anecdotal evidence suggests that some form of agro-forestry trials were conducted during the late seventies and early eighties on a few sites on Mahé, Praslin, La Digue and possibly on a few outer islands, but there is no official documentation on these. Species planted were mainly breadfruit (*Artocarpus altilis*), jackfruit trees (*Artocarpus integrifolia*) and a number of fruit trees. These trials did not last long and eventually some of the sites were re-allocated for other developments. As a consequence there are no records of the results of these trials as monitoring was stopped.

The Department of Environment under the Ministry of Environment and Energy has prime responsibility for environmental management. The Forestry section of the Seychelles National Parks Authority (SNPA) has the mandate to manage, protect and exploit the forest resources in Seychelles. The section is headed by a director who reports to the CEO of SNPA. It has three outstations (two on Mahé and one on Praslin), with a relatively small staff complement (19 on Mahé and 30 on Praslin). This figure is very low compared to the late 1990s when the forestry section employed over 200 staff. The decrease in the number of staff is the result of a gradual reduction in budget allocation, undermining the importance of the sector.

The Environment Protection (Seychelles National Parks Authority) Order 2009 summarizes the functions of the section as follows:

- Shall assist with the development and implementation of policies and related legislation;
- Shall manage forests sustainably;
- Shall make timber and non-timber forest products available to members of the public;
- Shall be responsible for the management of terrestrial parks;
- Shall undertake routine maintenance, integrated management, development and extension of forest plantation and reserve;
- Shall undertake and manage the harvesting and use of timber and non-timber forest products;
- Shall assist in the diagnosis of tree pests and diseases and adopt measures to control and combat these threats;
- Shall prevent, detect and suppress forest fires and the spread of invasive species;
- Shall prevent, detect and prosecute illegal activities including poaching of forest resources.

Best practices in the forestry sector

Because of limited land and limited natural resources such as forest products, wood and timber, there is a need for the sustainable utilization of these resources. As part of its sustainable forest management programme, the Government is working on projects and programmes with financial support from the Global Environment Facility to ensure the sustainability of natural resources.

To ensure food security, the Government is also working on an agro-forestry project with the assistance of the FAO.

Coco-de-mer (Lodoicea maldivica)

Challenges in the forestry sector

The main challenges facing the forestry sector are poaching of protected palms, illegal felling of protected trees, social housing development, invasive species, bush fires, climate change and management of protected areas.

The main contributing factors are deforestation and forest degradation, limited land for social housing development, and natural disasters such as bush fires and landslides. The coco-de-mer serves as an example – on account of its economic value both locally and on the international market, there have been recent increases in poaching incidents which are now threatening the coco-de-mer trees in the Vallée de Mai. The coco-de-mer has been listed as critically endangered by the IUCN.

The main challenges facing the forestry sector are poaching of protected palms, illegal felling of protected trees, social housing development, invasive species, bush fires, climate change and management of protected areas.

Future forestry interventions

It has been said that, "having survived since the time of the dinosaurs, it would be a tragedy to see the future of the (Vallée de Mai) palm forest foreshortened by the actions of a seemingly uncaring minority".

The Department of Environment together with the Seychelles Island Foundation, a not-for-profit public trust charged with managing the two UNESCO World Heritage Sites of the Seychelles – the Vallée de Mai and Aldabra atoll, is working in partnership with the general public on strategies to strengthen the fight against the illegal poaching of the biggest seed in the world, so that future generations can also enjoy this wonderful natural gift.

SOUTH AFRICA

South Africa's forest land covers just over 40 million hectares (about 36.7 percent) of the country's total land area of 122 million hectares. The forests are divided into three categories – natural forests, commercial plantations and wooded savannahs (woodlands).

Although natural forests (492 700 hectares) are the smallest forest type category, occupying less than half a million hectares, they boast the highest biodiversity per unit area. All natural forests in South Africa are protected in terms of the National Forests Act of 1998. Covering some 40 million hectares, the wooded savannahs, commonly referred to as woodlands, provide essential resources such as non-timber forest products, building materials, fuel for energy, household utensils, fencing material and a variety of food and medicinal products for sustaining the livelihoods of rural people.

Of South Africa's total land area (122.3 million hectares), only one percent (or 1 268 443 hectares) is used for commercial forestry (industrial plantations). The quantity of land under plantation shrunk from 1.5 million hectares in 1997 to about 1.3 million hectares in 2012. Plantation forestry needs about 1 000 mm of rainfall per annum, so the area available for commercial forestry is very limited and competes with agriculture and other land uses. The total area available for forestry decreased over the years, especially after the introduction of the National Water Act of 1998, which specifically led to the industry losing about 80 000 hectares to comply with both the water and environmental legislation.

South Africa has the highest percentage of certified plantation area in the world in terms of proportional area. About 82 percent of commercial plantation areas in South Africa have achieved the global Forest Stewardship Council certification. The forestry sector contributes significantly to the South African economy through its well-developed and diversified forest products industry. Although forestry's overall contribution to total gross domestic product (GDP) is modest (0.7 percent in 2012), it supports manufacturing subsectors such as sawmilling, paper and pulp production, as well as mining and construction. Commercial forestry's upstream and downstream impact renders a strong potential for job and small business creation.

In 2012, the sector had 165 300 jobs across its entire value chain. Commercial forestry had 62 100 direct jobs and 30 000 indirect jobs. Total processing jobs in subsectors such as pulp and paper (33 percent), sawmilling (41 percent), timber board (eight percent), mining timber (three percent) and other (15 percent) totalled 73 200 (Department of Agriculture, Forestry and Fisheries, 2014). The forest products industry ranks among the top exporting industries in the country, maintaining a positive trade balance with a total value of R19.3 billion in 2013 for exported forestry products. The main markets for South African forestry exports in 2013 were China (11 percent), Indonesia (10 percent), Namibia (eight percent), Japan (eight percent) and Botswana (seven percent) (UN Comtrade Database, 2014).

Outeniqua yellowwood (Afrocarpus falcatus)

Best practices in the forestry sector

Champion tree project

South Africa has a rich heritage of trees, with more than 1 300 indigenous woody species and more than a thousand introduced species. These include the tallest and stoutest trees in Africa, and trees of great historic or cultural significance.

In 2003 the Forestry Branch of the Department of Agriculture, Forestry and Fisheries (then still part of the former Department of Water Affairs and Forestry) initiated the Champion tree project. This project is aimed at identifying and protecting individual trees and groups of trees of national conservation importance under the National Forests Act (Act No. 84 of 1998). Champion trees are found in all corners of the country, but concentrations of these trees occur in areas with suitable climate, or with a long history of tree-planting pioneers. Some occur in rural areas, as street lanes, as old plantations, and even single old trees like a centuries-old milkwood at Mossel Bay where Portuguese seafarers left messages about five centuries ago. The trees reflect a long and turbulent history, including a poplar tree that served as landmark to a safe house in Johannesburg for refugees of the Apartheid security forces.

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Trees can be nominated by the public for champion tree status on the basis of their size, age, aesthetic value, cultural-historic value or importance for tourism. These trees are then shortlisted by a panel of experts. Currently 75 trees and groups of trees have been declared protected as champion trees, with another eight trees and groups of trees shortlisted for protection.

The Champion tree project of South Africa is the only one of its kind in Africa. Among the protected trees are the tallest planted trees in the world – a stand of saligna gum trees planted in 1906 at Woodbush Estate near Tzaneen. Tree climbers measured the tallest trees in this grove at more than 81.5 metres. A baobab near Sagole Spa in Limpopo Province boasts the stoutest stem on record in Africa, and at 10.8 m diameter it is close to the world record of about 11.6 m currently held by the Tule Tree in Mexico. In 2013 an international group of tree climbers climbed most of these trees as part of the Explore the Ancient Trees of Africa expedition.

South Africa's rich heritage of trees includes the tallest and stoutest trees in Africa, and trees of great historic or cultural significance.

Protected area planning

The Department of Agriculture, Forestry and Fisheries has declared more than 16 000 hectares of forest nature reserves in Mpumalanga during the past two years, and is in the process of expanding the area of 4 000 hectares protected woodland at Kathu in the Northern Cape. This forms part of the National Protected Area Expansion Strategy led by the Department of Environmental Affairs, which is aimed at including under-protected vegetation types in the network of protected areas. Most of the recently proclaimed areas focused on threatened mountain grassland veld types with forest mosaics, and under-protected woodlands. The Grasslands Programme of the South African National Biodiversity Institute provided funding for the development of management plans for these areas. The remaining challenge is to obtain sufficient resources to bring all the declared areas up to the required management standard.

Currently, planning is under way to declare several more forest nature reserves along the diverse and sensitive Wild Coast area of the Eastern Cape. These would ensure better protection for several thousand hectares of natural forests of high conservation value. Through conditions required by the Department of Agriculture, Forestry and Fisheries for licence applications for the destruction of protected trees and natural forests, environmental off-sets have been obtained that will benefit woodland and forest habitats. In this manner, more than a hundred million rand has been secured for the conservation of forest and woodland habitats, and more than 4 000 hectares of protected areas have been created, with a further 8 000 hectares to be added in the medium to long term.

Criteria and indicators

The National Forests Act provides for sustainable forest management. It encompasses principles to guide decisions affecting forests as well as the promotion of certification programmes that encourage sustainable forest management. Both certification and Principles Criteria Indicators and Standards (PCI&S) aim to achieve sustainable forest management, but accomplish this by means of different processes and are directed from different spheres of influence.

The Department of Agriculture, Forestry and Fisheries have been conducting PCI&S-based audits on its estates since 2006. Following the review of the PCI&S framework and its conclusion in 2009, a new refined set was made available in 2012 and is implemented. In the same year, second and third-party audits were undertaken to help managers comply with and ensure sustainable forest management.

Although woodlands are included in the definition of a forest in the National Forests Act, PCI&S pertaining to woodlands are not mandated; hence the country does not have a set of PCI&S for woodlands. However, the Department is committed to the sustainable management of woodlands.

Challenges in the forestry sector

The forestry sector is currently experiencing a myriad of challenges, which prevent it from reaching its full production and job creation potential. These challenges include low afforestation uptake owing to cumbersome licensing processes, under-investment in long-term timber rotation uses such as timber for sawlogs, and dominance by a few big, vertically integrated forestry corporations. In addition, the sector has not transformed as expected since the signing of the Forest Sector Charter in May 2008 and its subsequent gazetting in May 2009.

Climate change is another inhibitor which frequently affects normal production processes owing to a decline in natural resources. These include varying rainfall patterns that include minimal rain in areas that previously received high rainfall, the impact of pests and diseases on forests, soil degradation rendering previously arable land unsuitable for any planting, and fires from abnormal weather conditions. Therefore, uncontrolled wildland fires, pests and diseases pose serious challenges to the sector. Inadequate investment in commercial forestry transport infrastructure (roads and rail) makes the cost of doing business in the sector very difficult.

The heavy dependency of the rural poor on forest resources is exerting pressure on indigenous forests and woodlands. The unsustainable harvesting of fuelwood, poles and tree bark, urban and rural expansion, logging activity, extension of subsistence farming and expansion of commercial agriculture have resulted in forest degradation, loss of millions of hectares of forest (deforestation) and desertification. The annual deforestation rate in South Africa is estimated to be 0.2 percent.

Living conditions of workers in the forestry sector, beneficiation, rural development and transformation also pose challenges.

Research, development and innovation

Although the South African forestry sector's research and development programme is vibrant and effective, it is facing a number of challenges. The private sector funds 90 percent of the research and implementation through in-house company activities and collectively through the Forestry and Agricultural Biotechnology Institute and the Institute for Commercial Forestry Research. Intellectual property produced by research bodies, often the fruit of private funding, is still not accessible to all. The Forest Sector Research and Development (R&D) Strategy has been approved for implementation. Funding is required for full implementation of the strategy.

R&D support to deal with land reform, technology transfer, human resource development and other broad-based black economic empowerment issues is limited, as is investment in R&D in support of households reliant on forest goods and services for their livelihoods. Little or no consistent attention has been paid to the management of the environmental constraints to development in the forestry sector, including aspects such as biodiversity management, sustainable harvesting of non-timber forestry products and fuelwood. Another area of concern is the potential impact of climate change on productivity in the forestry sector and even more so, future prospects and sustainability.

Research and monitoring in woodlands and natural forests are deteriorating on account of various factors. Several prominent scientists involved in research on natural forests and woodlands have left the country or are approaching retirement. Funding is harder to obtain for such research, and crime has affected research and monitoring in certain localities. These challenges and a lack of funding for vital applied research and monitoring have resulted in certain project restraints. Human capital, the key resource at the core of R&D, is declining within the sector.

Future forestry interventions

- Fast tracking the implementation of the Forest Sector Broad-Based Black Economic Empowerment Growth and Transformation Charter.
- Adoption and implementation of a national certification standard to increase accessibility to certification for small growers.
- The Department is forging ahead with urban greening projects and forest and tree conservation projects such as the million trees programme, the champion trees project and the annual protected trees list as part of the biodiversity preservation agenda.
- The Department will continue to participate in programmes that seek to protect and conserve biodiversity, such as the implementation of the Protected Areas Expansion Strategy.

SWAZILAND

The Kingdom of Swaziland covers an area of 17 363 km^2 and can be divided into three regions based on elevation. In the western part of the country, forested mountains reach altitudes of up to 1 370 m. East of the mountains is a hilly grassland, or veld, with an average elevation of about 600 m. The far eastern region, the low veld, is a rolling plain covered with bushes and low grass and averaging 120 to 300 m elevation.

Altitudes range from 40 m on the coastal plains of Mozambique to over 1 800 m. Climatic variation results in high biodiversity representative of a significant proportion of southern Africa's flora and fauna.

The climate is mostly temperate, with cool temperatures at higher elevations and more tropical weather in the low veld. Precipitation, which is heavier in the west, is concentrated in the warmer months of October through April. The temperature in Mbabane, located in the western highlands, ranges from 15 °C to 25 °C in January and 6 °C to 19 °C in July. Precipitation in the mountains ranges up to 2 000 mm, while as little as 500 mm falls in the low veld.

The vast majority (75 percent) of the population (1.2 million, 2007 census) live in rural areas with a strong dependence on subsistence agriculture and natural resources for livelihoods. Extensive communal grazing occupies 50 percent, ranching 19 percent and small-scale subsistence agriculture 12 percent of the country's land area. Commercial plantation forestry covers eight percent, with the remainder consisting of large-scale crop agriculture, nature reserves, settlements and industry. Swaziland has a dual land tenure system comprising Swazi Nation Land (74 percent), which is communal land held in trust by the King, Title Deed Land (26 percent) and Crown Land (government).

Extent of forest and other wooded land

Global Forest Resources Assessment (FRA) 2005 categories	Area (1 000 hectares)		
	1990	2000	2005
Forest	472	518	541
Other wooded land	152	276	289
Forest and other wooded land	**624**	**793**	**830**
Other land	1 096	927	890
...of which with tree cover	-	-	-
Total land area	**1 720**	**1 720**	**1 720**
Inland water bodies	16	16	16
Total area of country	**1 736**	**1 736**	**1 736**

Best practices in the forestry sector

A community and public awareness/education programme was embarked upon in 1999 to 2004. Jointly carried out by the Ministry of Agriculture and Cooperatives, relevant government ministries and Sappi Usutu Forestry Company, the focus was on the importance and impacts of uncontrolled fires around forestry plantations. These efforts reduced the fire incidence and impact on timber resources.

A memorandum of understanding to foster cooperation on cross-border fire and forestry issues between South Africa and Swaziland has been signed by the two countries. Recent developments include the National Multi-Sectoral Bushfire Contingency Plan and the Swaziland Disaster Risk Reduction National Action Plan (2008 to 2015) to strengthen fire management. Currently there are insufficient government capacity and resources to implement these plans.

The African Monitoring of Environment for Sustainable Development Programme has provided equipment (satellite receiver and computer) to the Swaziland Environmental Authority and is currently housed at the University of Swaziland's Luyengo campus. This programme aims to extend the operational use of satellite data to monitor the environment and climate to ensure long-term management and sustainable development in the region, but there is a current lack of government technical expertise in the use of this system.

Swaziland is a signatory to the Southern African Development Community Regional Fire Management Program (2010) that provides a regional framework for cooperation on fire management issues across national boundaries. It aims to foster cooperation and collaboration through a multiple stakeholder approach on fire management on a regional basis to move towards integrated environmental policies and fire management practices.

Challenges in the forestry sector

The majority of rural households are dependent on traditional/subsistence farming consisting of small-scale, labour-intensive rain-fed crops (predominantly maize). Households are inherently vulnerable to a changing climate and natural disasters such as drought and wildfires. Exacerbated by the impact of the HIV/AIDS pandemic and the current economic slump in the majority of Swaziland, livelihoods are at risk of deterioration, leading to increased poverty and hindering development goals.

There has been a general increase in uncontrolled fires in Swaziland in their occurrence from five percent of the land area in 2000 to ten percent in 2010. This has resulted in an increasingly negative impact on communities, industry, the national economy and development objectives. Impacts are highlighted by the extreme and disastrous fire events of 2007 and 2008, considered the worst on record and resulting in the declaration of the 2007 fires as a national disaster. Significant losses in plantation and natural timber, with associated reduction in forest industry productivity and employment, were experienced. Over 20 000 ha of pine and eucalypt plantation were affected, with an estimated loss of US$45 million. The resultant closure of the Sappi Usutu Pulp Mill and downscaling of Peak Timbers operations has led to 728 direct and 4 368 indirect job losses, affecting the livelihoods of employees and their dependents.

Over the past 21 years the commercial forestry and timber industries have contributed 15 percent of the GDP, 14 percent of total exports and provided employment to over 8 000 people (12 percent of formal employment in 1999). The viability of the forestry industry in Swaziland is currently under serious threat owing to the impact of uncontrolled fires.

With 70 percent of Swaziland's population living a rural existence with livelihoods directly dependent on natural resources, the impacts of uncontrolled fires are significant. Impacts on forest and woodland resources, which account for over 40 percent of Swaziland and provide natural resources for community livelihoods, involve long-term changes in ecosystems affecting food security, health, fuel availability, income and employment. The increase in the wildland-urban interface and the encroachment of settlements into forested/woodland areas exacerbate the issue.

Nearly all fires in the region are caused by human activity. Fire is generally recognized as a land management tool in Swaziland for livestock grazing management, slash-and-burn agriculture, natural product harvesting, clearing of firebreaks and settlements. Fragmented and inconsistent fire management legislation and policies inadequately address the appropriate use of controlled burning, particularly on communal land. Limited government capacity combined with weak law enforcement mechanisms by both state and traditional institutions has created a lack of understanding of fire management among stakeholders (including communities) and government that results in the uncoordinated use of fire across the nation. Many of these fires inevitably develop into uncontrolled wildfires that impact negatively on Swaziland.

Uncontrolled fires also contribute to environmental degradation through reduced habitats, biodiversity and high-value and vulnerable ecosystems. This further impacts community livelihoods through reduced natural resource productivity and land use diversification options. Other impacts include greenhouse gas emissions, loss of genetic resources and threats to human health by smoke inhalation.

In Swaziland, as in many Southern African nations, communities have not been fully involved in natural resource management and exploitation. Fire management is no exception and communities are perceived as the cause of most, if not all, occurrences of uncontrolled wildfires in Swaziland. In recent years, community-based fire management strategies have been established to address fire issues. Programmes usually replicate prevention and suppression policies of past decades, with decentralized implementation to the communities. Not only do these intensive and costly strategies require resources beyond those available to communities, they do not adequately address community land use objectives and the beneficial use of fire to enhance these. As a result, the uncoordinated use of fire continues and communities and other stakeholders continue to experience the impacts of uncontrolled wildfires.

Compounding the issue are the occurrence of trans-boundary fires between Swaziland, South Africa and Mozambique and the use of fire (arson) to accentuate conflicts over land tenure, for example strained social relations between communities and plantation forestry companies.

Invasive alien plant species

The country is heavily infested with invasive alien plant species that were first noticed in early 2000. Invasive species have adverse impacts on livelihoods, livestock production, wildlife ranching, supply of water resources, utilization of natural resources, tourism and the economic contribution of forestry and the environment. The invasive species were declared a national disaster in 2005.

The control of invasive alien plant species commenced in 2005. Combat operations took place from 2005 to early 2010. During this period a total area of 15 000 ha was cleared by private contractors and people from the areas where they were operating.

Additionally, invasive alien plant species were surveyed and mapped by the Agricultural Research Council of South Africa working together with the Forestry Department of the Ministry of Tourism and Environmental Affairs and relevant stakeholders during 2009 and 2010. The study focused on the distribution and intensity of the level of infestation, with special emphasis on the following six species: *Chromolaena odorata* (chromolaena or triffid weed); *Lantana camara* (lantana); *Solanum mauritianum* (solanum); *Ceasalpinia decapetala* (Mauritius thorn); *Rubus* species (bramble) and *Psidium gwajava* (guava tree).

Lessons learned include the following:

- Invasive plant species are not destroyed by bush-clearing alone; it requires a spraying after clearing.
- After the first slashing and spraying there is re-growth that requires several follow-ups of slashing and spraying.
- The re-growth can also be controlled by chemical spraying while the plants are still at the juvenile stage of re-growth (before reaching 45 cm).
- It will require between five to 15 years to bring the invasive plant species under control within manageable thresholds.

Future forestry interventions

Policy and institutional strengthening

National forestry policy has been in existence since 2002 and has never been fully implemented. It needs to be reviewed as it has become outdated. Institutional capacity needs to be strengthened through the establishment of a full-fledged directorate and a full complement of staff. This would require improving and strengthening technical and professional expertise through human resources development and capacity building in areas of greatest need, among others in forest resource accounting; sustainable forest management; and mitigation and adaptation to climate change.

Updating of forest data and statistics

The government forest service is unable to cope with the demand for up-to-date data for various applications owing to an acute lack of expertise and skills in forest resource assessment, vegetation mapping, geographic information system and remote sensing. In addition, expertise and skills need to be developed in natural resources accounting in order to capture the true value of forest resources in national accounts.

Improving forest management

Criteria and indicators need to be developed for sustainable forest management and application in the management, utilization and conservation of natural and community forest resources. Sustainable forest management principles and practices should be applied in the management of natural forests and woodlands, wattle forests and community plantations and woodlots. Planning, management and utilization of the community woodlots need to be improved.

Swazi euphorbia (Euphorbia keithii)

Forest protection

With the ever escalating proliferation of invasive alien plant species, there is a great need to develop and implement new policy, strategy and legislation for the control and management of invasive species. Furthermore there is a need to finalize and implement fire policy, strategy and legislation to address the fire incidences and their devastating effects.

Improving forest research

It is vital to continue investigations into:

- the sustainable utilization of indigenous plants and trees for the production and commercialization of indigenous natural products;
- the control and management of the marula pest;
- the biological control and management of invasive alien plant species; and
- the optimal production of non-timber forest products.

Human resources development and capacity building

There is a great need to meet the demand for adequately qualified technical and professional foresters. Forestry needs to become an integral part of the school curriculum and university training programmes. Forestry also needs to be integrated with other national and sectoral policies and plans.

TANZANIA

The United Republic of Tanzania is located in East Africa between longitude 29° and 41° East and latitude 1° and 12° South. It has a total land area of 947 600 km^2. Mainland Tanzania accounts for 945 100 km^2 (99.7 percent), while the islands of Zanzibar (Unguja and Pemba) account for the remaining 2 500 km^2 (0.26 percent).

Tanzania is endowed with a wide range of natural resources as well as ecological and cultural diversity. The country has set aside about 32.7 percent of its land area for natural resources conservation, out of which 10 percent is protected forest reserves (catchment forests and nature reserves). The remaining 22.7 percent is for wildlife protected areas (national parks, game reserves and game-controlled areas).

Tanzania has extensive areas of arable land, coastline, huge mountains (Kilimanjaro and Meru), rivers and lakes that contribute significantly to the socio-economic empowerment and welfare of its people.

Vegetation types and coverage

The forests in Tanzania are high in biological diversity. The country is home to over 10 000 plant species, hundreds of which are nationally endemic. Some 305 plant species are identified as threatened in the IUCN Red List, and 276 species are classified as endangered.

The main forest types include deciduous miombo woodlands in the western, central and southern parts of the country, *Acacia commiphora* woodlands in the northern regions, coastal forests and woodland mosaics in the east, mangrove forests along the coast of the Indian Ocean and closed canopy forests, which grow on the ancient mountains of the Eastern Arc – along the Albertine Rift close to Lake Tanganyika in the west, and on the younger volcanic mountains in the northern and central parts of the country. Woodlands are mostly open and often degraded, with undergrowth of grass and shrubs. Woodlands are subject to frequent grass fires stemming from adjacent human activity such as agriculture.

Forest resources are estimated to cover 48.1 million ha (55 percent) of the total land surface area of the Tanzanian mainland (88.6 million ha). About 44.7 million ha (93 percent) of the forest land is classified as woodlands and 3.4 million ha (7 percent) is classified as catchment forests, mangroves, coastal forests and government forest plantations.

Approximately 28 million ha (58 percent) of the forested land found in wildlife-protected areas and forest reserves is under total protection, which means that no harvesting is allowed. The remaining 20.1 million ha (41.8 percent) contributes 35 percent of the total standing volume of forests in the country (about 3.3 billion m^3). Regulated harvesting is legally permitted in these forests.

The Tanzanian Government has set aside one third of its land as protected area for natural resources conservation (forest and wildlife). The remaining two thirds are under other land uses like residential and agriculture.

The Tanzania Forest Services Agency manages 34.5 percent (16.6 million ha) of the forested land; village governments take care of 45.5 percent (21.90 million ha); local governments look after 6.5 percent (3.1 million ha); the private sector looks after 7.3 percent (3.50 million ha); 5.7 percent (2.73 million ha) are forests in the general lands and ownership of the remaining 0.3 percent (147 583 ha) is unknown.

Measured against the demand for forest products in the domestic and export markets, Tanzania has a small forest plantation area (about 643 000 ha). According to the Tanzania Forest Services Agency, government plantations are the main source of supply of raw material and the total plantation area is about 92 000 ha.

Roundwood (logs and pulpwood) is consumed by the construction sector, pulp and paper industry, furniture and joinery sector, packaging sector and in utility poles. Additionally some volumes are exported. In 2010 the total demand for roundwood was estimated at 1.28 million m^3. Forecast demand in the base scenario indicates that wood demand from plantations will surpass plantations' supply by about 400 000 m^3 by 2030. However, if the economy grows at the same pace as the population, forecast demand will significantly exceed supply from plantations by about 2 200 000 m^3 by 2030. This is equivalent to a deficit of productive plantations of about 7 000 to 8 000 hectares. Furthermore, if natural forests are included and only population is considered, demand will be less than supply by about 18 million m^3. If economic growth is also considered, demand will surpass supply by about 39 million m^3 by 2030. Nonetheless, most of the wood from natural forests will be consumed by households as firewood and charcoal.

The leading export forest product is sawn timber (rough sawn). The single largest export market for sawn timber is Kenya. Preliminary Tanzania Revenue Authority information for 2010 shows that Kenya absorbed about 67 percent of all Tanzania's exports. Other export destinations include the EU, Japan and China. The level of sawn timber exports has varied between 20 000 and 40 000 m^3 annually.[4]

Significance of the forestry sector to the national economy and ecosystem stability

The forestry sector plays a significant role in the economy and ecosystem stability. Although its contribution to the GDP is about 3.5 percent and to total export trade about 11 percent, its contribution to the subsistence economy is over 20 percent. Forests create an environment conducive to agriculture and tourism development and have important links to other natural resources, especially water and soil. These forests and woodlands provide a habitat for wildlife, unique natural ecosystems and biological diversity. Their importance for the maintenance and improvement of the environment, climate, water resources and soil enrichment is evident.

East African blackwood [Swahili: Mpingo] (Dalbergia melanoxylon)

In addition, forests provide about 92 percent of Tanzania's energy source. Charcoal is one of the largest industries, employing tens of thousands of rural people and supplying dependable energy to millions of urban households.

Apart from supplying a wide range of wood products like timber, poles, withies and fuelwood, forests are also a source of various non-wood forest products such as palm nuts, tannin extracts, bark, gums, resins, medicinal plants, aromatics, fruits, edible fungi, wild animals and fodder. Fodder as forage for livestock and wildlife is a critical source of income and an important rural community livelihood.

Trees also provide a source of nectar for honey and beeswax production and increasing pollination of agricultural crops. The beekeeping subsector generates about US$ 19 million per annum (both local and foreign), employs some two million people and promotes biodiversity and agricultural production through pollination.

4. African Forest Forum 2011

Best practices in the forestry sector

Establishment of Tanzania Forest Services Agency and overall achievements

The Public Service Reforms Program, which started in the year 2000 with the aim to improve ministries, independent departments and agencies in service delivery and regulatory functions through a more efficient public service, led to the establishment of the semi-autonomous Tanzania Forest Services Agency under the Executive Agencies Act in 2010. These reforms have changed the macro-economic environment quite significantly and redirected the focus of government socio-economic objectives and policies.

By the time its first strategic plan was implemented, the Agency had significantly attained most of its objectives. During this period, its major outstanding achievements included countrywide national forest resources monitoring and assessments (NAFORMA) that yielded accurate and reliable information on the state, extent and uses of the forest resources that is useful for decision making and development of relevant policies and programmes to achieve sustainable forest management. Revenue accrued amounted to TZS 199 771 416 440; equivalent to 101 percent of the targeted goal.

This has enabled the Agency to operationalize its plans to meet the desired goals:

- The increase in new forest plantation areas by 9 947 ha (from 83 659 ha to 91 606 ha) to ensure sustainability in the management of forest and bee resources and the supply of wood products.
- Replanting 14 200 ha of forest plantation areas.
- Consolidation of forest boundaries of 102 forest reserves by resurveying and clearing 13 238 km.
- Regular patrols and evictions of encroachers in 52 forest reserves.
- Gap planting of about 10 951 ha in degraded areas for both production and protection of forests.
- Support raising of about 13 400 000 seedlings for community tree-planting initiatives to increase the forest resource base in the country.

Other recorded key achievements include identification of 69 613 ha of forest areas for bee apiaries and bee reserves to promote grounds for beekeeping practices; training on beekeeping techniques for 921 beekeeping groups and 7 320 beekeepers; and provision of 14 076 improved beehives to beekeepers and associations. Linking beekeepers to markets as well as support and facilitation to local, regional and international exhibitions and trade fairs has greatly facilitated the use of standard packaging materials and improved cleanliness and hygiene in handling honey. The increased use of improved technology has led to an improvement in the quantity and quality of bee products.

Other achievements include an increase in the participatory forest management area by 3.6 million ha, introduction of conservation programmes and various income-generation activities in order to improve livelihoods and the understanding of local communities regarding the sustainable management of their forest lands.

Generally, the implementation of the first strategic plan has fostered capacity building in the management of forest and bee resources and revenue collection; improved forest resource information; and enforced and monitored quality assurance of forest and bee products. These achievements have contributed significantly to the social, economic and ecological needs of the nation. Major lessons learned include improved implementation performance as a result of deployment and recruitment of staff to field stations, especially at district level. Education, awareness raising and forest boundary consolidation have minimized encroachment incidences; and regular monitoring exercises and visits have been instrumental in rectifying weaknesses in the implementation of the strategy plan.

Private investment in the forestry sector

In the past, the Forest Division of the Ministry of Natural Resources and Tourism and parastatal organizations were the institutions directly involved in forestry and forestry products. Following the trade liberalization and Government reforms, many private role players have started to play a prominent role in the activities formerly undertaken by the Forest Division and parastatals.

Private companies now own paper mills, panel mills, sawmills and other wood-based industries. Sawmilling dominates production in the forestry sector. Most companies own forest plantations. The implementation of trade liberalization policies in Tanzania's forestry sector has been marked by both positive and negative social and environmental impacts. On the positive side, the policies have encouraged the expansion of production and trade in forest products, thereby accelerating the macro-economic contribution of the sector. In 1987 for example, prior to trade liberalization, the sector's contribution to total trade was three to four percent of total exports, but after adoption of trade liberalization, the contribution increased to about 11 percent of total exports. Other positive outcomes include increased importation of inputs, growth in sectoral investment, and an increase in value addition, contribution to GDP and employment.

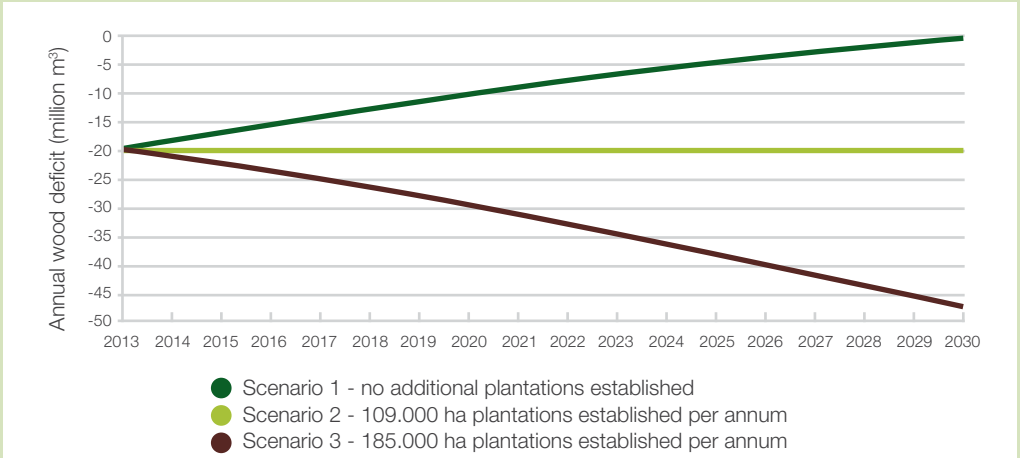
Challenges in the forestry sector

Degradation and encroachment into forest reserves

Tanzania has made significant efforts to address encroachment into forest reserves and has also made some progress in addressing forest degradation. Examples are evictions from protected areas and demarcation of forest reserve boundaries. Despite these efforts, massive land-use demand is still leading to continuous encroachment into the forest reserves and intentional shifting of forest boundary beacons.

Wood supply and demand analysis

Supply and demand analysis based on NAFORMA data (2015) shows that forest harvesting exceeds the Annual Allowable Cut (AAC) by 19.5 million m^3. This leads to widespread degradation of the existing forests owing to illegal overharvesting in the designated forests and logging in protected areas like catchment forests and game and national parks. The negative impacts are severe in terms of loss of water retention capacity of forests, reduction of year-round surface water, reduced rural livelihoods; reduced food security and loss of biodiversity. The graph below shows the projected wood deficit by 2030.



Mainland Tanzania, projected wood deficit (2014 – 2030)

The implication of the wood-deficit scenarios is that in order to meet all domestic wood supply entirely from sustainable domestic sources by 2030, it will be necessary to establish 185 000 ha plantations per year. Considering the magnitude of this planting gap, it would be vital for all stakeholders to collaborate in bridging the gap. Planting 185 000 ha will cost about US$ 131 424 000 per year. Therefore, it is estimated that a total of US$ 2 234 208 000 would be required in the 17-year period up to 2030 to bring the wood deficit to zero.

Agricultural expansion and energy needs

Agricultural expansion and energy needs continue to put pressure on forest resources. Land clearance for small-scale subsistence farming is one of the major causes of forest cover loss, largely owing to increasing populations and low-intensity agricultural practices such as shifting cultivation. Many Tanzanians still depend on fuelwood as their major source of household energy despite the availability of several low-cost energy sources, which include organic residuals such as sawdust, coffee/rice husks and biogas. Public and private institutions such as prisons, army camps, schools and agro-industries (e.g. tobacco, tea and fish-smoking industries) are among the biggest users of fuelwood.

Climate change impacts

Changes in climate, which are partly attributed to deforestation and forest degradation, have economic costs. Periodic droughts and floods (extreme events) already cause major socio-economic impacts and reduce economic growth. Recent major droughts occurred in 2005/6 and major floods in 1997/8. The economic costs related to droughts affect the economy as a whole. These events have economic impacts such as loss of agricultural crops and livestock, reduced hydro-power generation, forest fires, reduced industrial production and reduced water supply. The 2005/6 droughts affected millions of people and led to estimated costs of at least one percent of GDP.

Fragmented institutional arrangements

Administratively, the forestry sector operates under two parallel government authorities – Central, and Regional and Local Government under the Ministry of Natural Resources and Tourism and the Prime Minister's Office respectively. This arrangement results in weak institutional linkage and unclear mandates between the central and local levels, NGOs, local communities and the private sector on the conservation and management of forest ecosystems.

Decentralization of forest management to local governments, communities and the private sector requires effective extension services with harmonized messages regarding forest management and land-use planning, which are not yet in place. Furthermore, effective conservation of ecosystems has been impaired by inadequate coordination and insufficient management resources.

Staffing and recruitment

There is a shortage of staff at all levels in the forestry and beekeeping sectors. In some cases, a single forest officer manages 130 000 hectares of natural forests. The Tanzania Forest Services Agency has experienced serious delays in recruiting new staff, probably on account of complex bureaucratic recruitment procedures that must be adhered to as per government procurement law and regulations.

Future forestry interventions

- Enhance public sector self-financing through pricing forest products and services based on their economic and market value and through efficient collection of royalties and other fees.
- Align and harmonize development partners' interventions with the government systems.
- Involve local communities in forestry-related planning, decision making and protection through participatory extension methods and technical assistance.
- Manage all types of forest reserves through management plans to ensure their sustainability.
- Promote tree-breeding programmes and expansion of industrial forest plantations.
- Scale up joint forest management for improved forest governance, livelihoods and forest condition and mitigation of climate change through implementation of REDD+ and other related mechanisms.
- Promote establishment of village land forest reserves as a means to improve the management of unreserved forests on village lands.
- Upgrade existing forest reserves with high biodiversity value to nature reserves in order to ensure their protection in perpetuity.
- Promote the establishment of private woodlots and adoption of efficient wood energy conversion and use technologies and alternative sources of energy through research, extension services and collaboration with other stakeholders.
- Provide alternative sources of domestic energy to the rural communities in order to minimize forest degradation and damage to the environment.

ZAMBIA

Forests in Zambia cover 66 percent of the total land area, representing almost 50 million hectares. Protected forest areas occupy about 7.2 million hectares (9.6 percent) of the total land area. Commercial plantations of pines and eucalypts cover an estimated area of 50 000 hectares on the Copperbelt. In addition, 10 000 hectares of planted forests are located in the ten provinces of the country as local and regional supply plantations.

The country's forests can be classified into three main categories: closed forests in south-western Zambia; dry woodlands of the large valleys; and the extensive miombo woodlands dominated by *Brachystegia* and *Isoberlinia* found on the plateaus throughout the rest of the country.

The indigenous forests in Zambia have a rich biodiversity and are home to approximately 5 500 species of flowering plants, 88 species of mosses and 146 species of ferns. The natural forests are also rich in a number of commercial timber species including *Baikiaea plurijuga* (Zambezi teak), *Pterocarpus angolensis* (mukwa) and *Guibortia coleosperma* (rosewood). Another important emergent timber species is the *Pterocarpus chlysothrix* (mukula). The average stocking of these timber species is in the range of 0.5 to 2.0 tons per hectare.

Fuelwood, charcoal and timber are the main products derived from Zambia's forests. Fuelwood and charcoal are used for domestic energy and it is estimated that 90 percent of the households in Zambia use charcoal. The rural community depends on forests for much of their livelihoods. This includes non-timber forest products such as grass for covering their roofs (shelter), selected tree species for medicinal purposes or as a source of wild fruits, as well as mushrooms and honey. The rural community utilizes the forest products for domestic use and for sale in order to augment their income.

Fuelwood, charcoal and timber are the main products derived from Zambia's forests.

Best practices in the forestry sector

REDD+

Zambia is implementing the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme). The UN-REDD Programme is an international initiative aimed at enhancing the value of standing forests. It further promotes sustainable forest management through a multi-stakeholder approach.

Zambia's three-year REDD+ readiness phase is nearing completion. The main output of the programme is the development of the National REDD+ Strategy, which is already at draft phase. In the development of the strategy, the Government adopted a multi-stakeholder engagement and cross-sectoral approach, which embodies active participation, wide consultation, transparency and technical quality.

In addition to the National REDD Strategy or Action Plan to reduce deforestation, the programme is expected to:

- develop a national forest reference emission level and/or forest reference level (interim measure at subnational level);
- develop a robust and transparent national forest monitoring system for monitoring and reporting of REDD+ activities (interim measure, subnational level); and
- establish a system for providing information on how the safeguards on local community

and forest biodiversity are being addressed and respected during the implementation of the REDD+ activities while respecting national sovereignty.

Integrated land-use assessment

In 2011, Zambia embarked on a second phase of integrated land-use assessment, a multi-sector programme aimed at capturing accurate and timely information on the state and extent of forest resources combined with livelihood aspects for integrated land-management planning in Zambia.

The first phase, implemented from 2005 to 2008, generated baseline data. The continuation of the second phase for four years (2011 to 2014) aims to enhance the use and development of data and information towards sustainable forest management. The second phase also aims to provide information on trends in forest change through refined methodologies and re-assessed field plots. The continuation of integrated land-use assessment in Zambia will strengthen capacity not only in the planning and implementation of sustainable forest management, but also in the emerging issue of implementing REDD+. Therefore, data collection needs in the second phase will encompass more REDD-pertinent parameters including carbon pools.

The project has finalized the collection of biophysical and socio-economic data and is currently focusing on data analysis, which is expected to be completed by the end of 2015.

Decentralized Forest and Other Natural Resources Management Programme

The introductory phase of this programme is a three-year, €4.38-million collaboration between the Government of Finland and the Government of Zambia, with the overall goal to contribute to the reduction of poverty and inequality and the improvement of environmental conditions through devolved integrated sustainable forest and other natural resources management. The project operates in the districts of Chinsali, Shiwang'andu and Nakonde in Muchinga Province and Kasempa, Ikelengi and Mwinilunga in North-Western Province, targeting forest-dependent individuals and households including women, vulnerable groups and households living in extreme poverty. The beneficiaries include traditional authorities, district government administration, locally active NGOs and private sector enterprises.

Mofu tree (Entandrophragma delevoyi)

Commencing in February 2015, achievements to mid-June comprise mobilization of the technical assistance team, start-up activities including establishment of project structures and procedures, and engaging project stakeholders at national and provincial level, including establishing the two provincial steering committees in Muchinga and North-Western provinces in support of the decentralization process. Local planning activities have commenced, with mobilization of district-planning and decision-making structures in the target councils with a view to selecting pilot sites for integrated field-level activities supported by the programme.

National Tree Planting Programme

The National Tree Planting Programme was launched by the Government of Zambia under the new Government in 2012 to respond to the effects of climate change as well as restock the commercial plantations which were slowly being depleted. An initial funding of ZMK 12 000 000 000 (about 23 100 000 USD) was injected into the project as start-up capital for procurement of equipment and setting up of 11 commercial forest nurseries in the 11 provinces of Zambia. As of 2013/14, planting season nurseries have been set up and over 1 000 hectares planted across the country.

Challenges in the forestry sector

The forestry sector is facing a number of challenges:

- High deforestation rate of 250 000 to 300 000 hectares per year, caused by poor agricultural farming practices.
- High rate of illegal charcoal production, aggravated by weak organizational structure of the Forestry Department.
- High encroachment levels in protected forest areas.
- Illegal timber harvesting and export estimated at 25 000 cubic metres per year.
- Lack of operational joint forest management areas that promote community and/or private sector participation in forest management.
- Dwindling resource base for forest plantation stock to support industry owing to poor forest plantation management practices and inadequate funding to support replanting activities.
- Low investment levels for production and value addition in the sector owing to the absence of private sector participation.

Future forestry interventions

In response to the challenges, future projects are expected to address the high rate of deforestation through interventions such as the promotion of natural regeneration in degraded areas, scaling up tree planting and sustainable charcoal production. In addition, priority will be given to the promotion of value addition for timber and non-timber forest products. In tackling these interventions, Government, through the new Forest Law that is expected to be enacted this year, will encourage the community, private sector and civil society to participate in and contribute to the forestry sector.

ZIMBABWE

Zimbabwe has a total land area of 39 076 013 hectares, of which approximately 15 percent is under statutory protection. About 43 percent of the total land area is under some form of forest, of which the wood stock is estimated at 636 metric tons. The area under forest could be steadily decreasing owing to the rate of deforestation, currently estimated to be 330 000 hectares per annum.

The forestry sector can be categorized into three major subsectors – exotic plantation, indigenous hardwood and community/social forestry. The two broad categories of forest types are exotic plantations established under commercial forestry or social forestry woodlots, and the various forms of indigenous woodlands which constitute the bulk of the country's vegetation biomes. There are five major indigenous woodland types in Zimbabwe – miombo, teak, *Acacia*, mopane and the *Combretum/Terminalia* combinations. Pines, *Eucalyptus* and wattle species constitute more than 86 percent of the total exotic plantation species planted in the country.

The Zimbabwe plantation forestry sector is run by a number of plantation owners growing and managing exotic tree plantations covering approximately 168 000 hectares. These plantations, which are generally intensively managed, are comprised of pines, *Eucalyptus* and wattle. About 60 percent of the plantations are privately owned by commercial entities and small growers, while 40 percent is publicly owned through a State forestry company.

Traditionally, the subsector has been heavily vertically integrated, with a few prominent players in both the production and processing chain. At its peak, the subsector employs approximately 15 000 people directly, with 20 000 more in the downstream processing industries. The plantation forestry subsector contributes about four percent to the national GDP.

The forestry sector can be categorized into three major subsectors – exotic plantation, indigenous hardwood and community/social forestry.

Best practices in the forestry sector

The management of forest resources in Zimbabwe is primarily mandated to a quasi-government State forest authority, the Forestry Commission. It administers the management of approximately 829 000 hectares of indigenous gazetted forests, as well as an additional 15 974 546 hectares of various forms of woodland under different land tenure systems, namely commercial plantation areas (168 000 ha), Parks and Wildlife Estate (5 406 000 ha) and other woodlands in communal, resettlement and commercial farming areas (10 400 546 ha). The Forestry Commission has managed to attract the participation of the private sector in afforestation activities in the form of the Friends of the Environment, Sustainable Afforestation Association and Climate Smart Trust, who are contributing significantly to afforestation programmes in Zimbabwe.

The nation also observes National Tree Planting Day on the first Saturday of December each year to launch the tree-planting season through the leadership of the State President.

To enhance conservation of the nation's forest resource, approximately 15 percent of Zimbabwe's land area has been placed under statutory protection, comprising exotic commercial plantations (97 155 ha), gazetted indigenous forests (827 023 ha) and Parks estate (5 406 000 ha). The Parks estate is under the management of the Parks and Wildlife Management Authority.

In view of the prevalence of invasive alien forest pest species in Zimbabwe, the Forest Entomology Unit of the Forest Research Centre has embarked on a programme to breed *Selectrichodes neseri*, a biological control agent for one of the *Eucalyptus* pests, *Leptocybe invasa*.

State of forest genetic resources

Assessment of the state of forest genetic resources for a period covering 10 years (2000-2010) was conducted for input into the State of the World's Forest Genetic Resources. A report was produced and submitted to FAO for incorporation into the global assessment report.

New plantation species

Pinus roxburghii is being improved for planting on marginal sites in Zimbabwe where the traditional commercial pines such as *P. patula, P. taeda* and *P. elliottii* are struggling to grow owing to changes in climatic conditions. Field trials are being conducted to evaluate its performance on marginal sites in the country. This project hopes to contribute to the need to mitigate the negative effect of climate change on timber production in Zimbabwe in the likely scenario of shifting weather patterns and highly unpredictable impacting on agro-based production systems.

Eucalyptus hybrids

Forestry research has produced two fast-growing eucalyptus hybrids by combining *E. grandis* with *E. tereticornis* and *E. grandis* with *E. camaldulensis* to provide genotypes suitable for areas that are marginal for *E. grandis*. Field experiments have indicated that the hybrids show a lot of promise to grow on marginal sites in Zimbabwe. Given the high climate variability, hybrids can replace the planting of pure *E. grandis* in marginal sites in Zimbabwe and elsewhere with similar climatic conditions.

Improved tree seed production

Based on its tree improvement research work carried out in the last six decades, the Forestry Commission has become renowned for being the producer of genetically improved pine and eucalyptus tree seed of high genetic qualities. On average, about 4 000 kg of both pine and eucalyptus seed are marketed annually to local and global markets. Of the pine plantation species, *Pinus patula* and *Eucalyptus grandis* have displayed spectacular growth and volume production, surpassing the unimproved land race *Pinus* and *Eucalyptus* by as much as 47 percent. In the case of *Pinus*, the use of improved seed has seen the rotation cycle reduced from 30 years to 25 years and results from current studies indicate that the rotation can even be further reduced by another five years.

Challenges in the forestry sector

- Deforestation owing to land clearing for agriculture and over-exploitation of trees for fuelwood for domestic and industrial uses.
- Financing for sustainable forest management is a challenge on account of low priority given to the forestry sector in the country.
- Forest fires are degrading the forests every year, destroying thousands of hectares of both exotic and indigenous timber resources.
- Occupation of gazetted forest land by illegal settlers.
- In view of the massive afforestation programmes using exotic eucalyptus, the prevalence of invasive alien insect pests and diseases such as *Thaumastocoris peregrinus*, *Leptocybe invasa* and *Glycaspis brimblecombei* (red gum lerp psyllid) is a major threat to afforestation.
- Mining activities in gazetted forests threaten the existence of forests.
- Localised damage caused by wildlife such as elephants and baboons.

Baobab (Adansonia digitata)

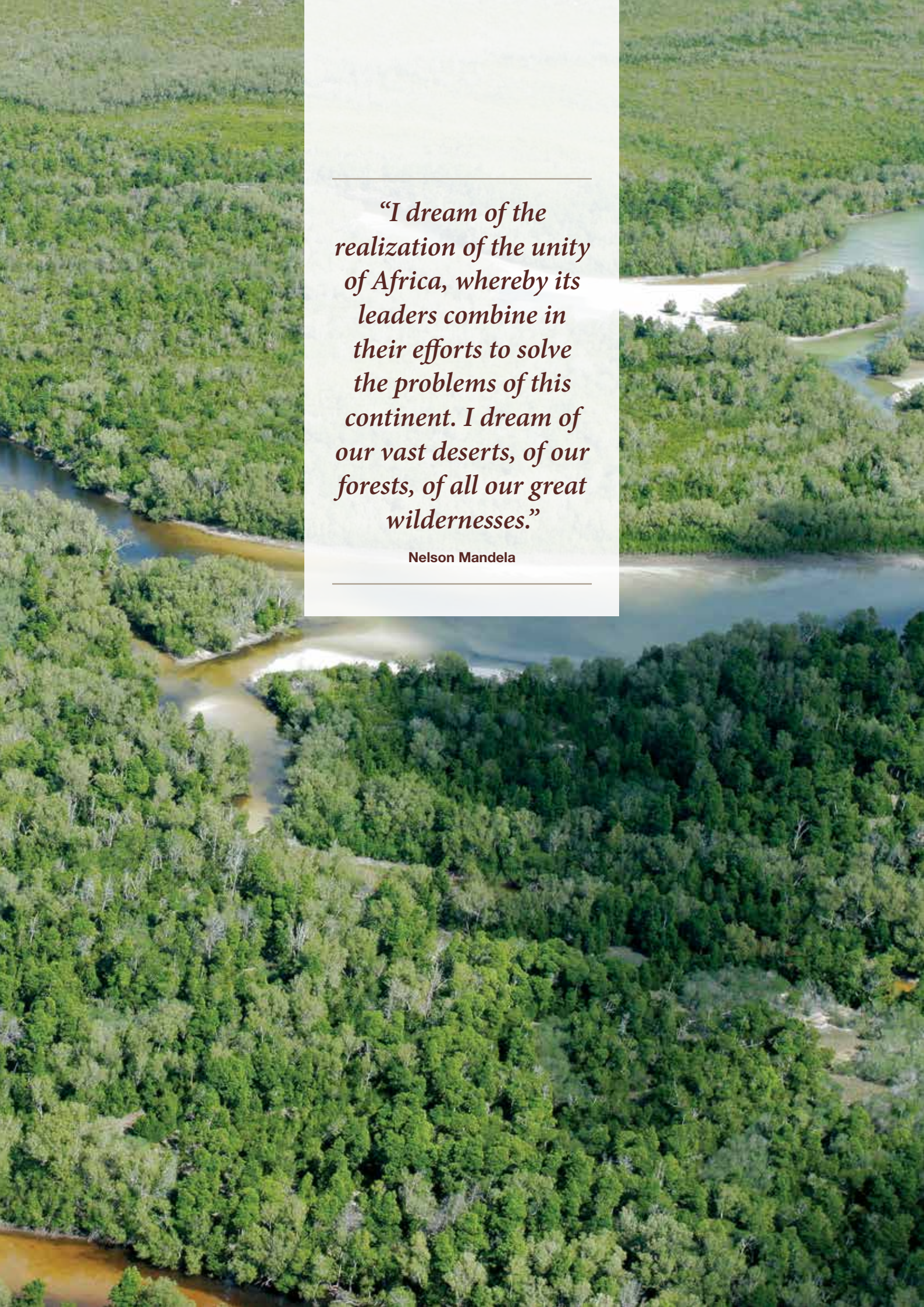
Future forestry interventions

Owing to the problems associated with climate change, up-scaling of interventions such as watershed and soil protection (catchment area protection), biodiversity conservation, management of wildlife habitats, tree planting and woodland management in communal and resettlement areas is envisaged.

The Communal Land Forest Produce Act should be reviewed to allow commercialization of both timber and non-timber forest produce. This would give incentives to farmers to manage their forests sustainably.

Regulations will be vigorously enforced in order to reduce deforestation caused by tobacco curing. Farmers are required to plant more trees for this purpose.

Community participation in the management of both exotic and indigenous forests will be focused on obtaining more buy-in from communities and reducing trivialization of forests.



"I dream of the realization of the unity of Africa, whereby its leaders combine in their efforts to solve the problems of this continent. I dream of our vast deserts, of our forests, of all our great wildernesses."

Nelson Mandela

Food and Agriculture Organization of the United Nations

This publication was produced by the FAO for the 2015 World Forestry Congress (Durban, South Africa). It gives a brief overview of best practices, challenges and future interventions in the forestry sector of southern Africa.

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