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The forest sector in the green economy in Africa



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Front Cover Photos:

Top to bottom: protected forest in Nigeria, anonymous; forest tree nursery in Ethiopia, anonymous; a river in Zambia, anonymous; the majestic African Greater Kudu in Zambia, anonymous.

Back Cover Photo:

Top to bottom: A dam in Cameroon, anonymous; Giraffes in Tanzania, anonymous; fishing at Tema harbour in Ghana, anonymous; market women selling fish in an African market, anonymous.

Nature & Faune is a peer-reviewed open access international bilingual (English and French) publication dedicated to the exchange of information and practical experience in the field of wildlife and protected areas management and conservation of natural resources on the African continent. *Nature & Faune* has been in wide circulation since 1985.

Nature & Faune is dependent upon your free and voluntary contribution in the form of articles and announcements in the field of wildlife, forestry and nature conservation in the Region.

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Volume 26, Issue 1

The forest sector in the green economy in Africa

Editor: Foday Bojang
Deputy Editor: Ada Ndeso-Atanga
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Message to Readers

Maria Helena Semedo¹

The African Forestry and Wildlife Commission (AFWC) is dedicating the present edition of **Nature & Faune** publication to the 2011 International Year of Forests - "Forests 2011". This is the second consecutive edition of the publication to be dedicated to Forests 2011. The first was the June 2011 edition.

With its special focus on "**The forest sector in the green economy in Africa**", this issue shows many ways in which the forestry and natural resource sectors can contribute to the needs of the green economy in Africa. A green economy is defined as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities². The Global Citizens Center, led by Kevin Danaher, defines green economy as a global aggregate of individual communities meeting the needs of its citizens through the responsible, local production and exchange of goods and services.

The present edition highlights the significance of the forestry sector to the overall economy and its importance overall in the region's land use, demonstrating its potential to make a difference in improving (or worsening) an economy's green

credentials. It is an important message about forestry and greenness.

You will discover how forestry helps greenness and what challenges it faces in doing this with regard to energy, water, carbon management, biodiversity management and conservation. The articles envisage how forestry will continue to deliver its economic, environmental and social functions in Africa while interacting with other sectors in making the collectivity of sectors to build up a "green" overall economy.

Mr. Gueye in the editorial, provides an overview of what a green economy can do to decrease poverty in Africa and why that is important. The author goes on to make some suggestions on winning the "hearts and minds" of the general public to support the greening of forest management and its influence on other sectors of the economy.

The special article featured in this issue, by Mr. Marshall and Mrs. Mkumbo is on fisheries. The story of Lake Victoria's fisheries is a fascinating one, and is a cautionary tale of how not to carry out initiatives that have uncontrollable environmental impacts. That some of the predicted 'disasters' have not turned out that way is a relief.

How do we go about changing things to achieve green economics in forestry? This is the question posed by Mr. Chipeta in an 'Opinion Piece'. The premise is that the green economy needs to pay for itself. This needs difficult adjustments.

Mr. Wencélius, in another 'Opinion Piece' makes strong points about national forest programmes and what the forest sector can contribute to the green economy. He argues that national forest programmes can be important tools for the "greening" of the forestry sector in Africa.

Authors contributed articles that showcase different approaches and actions in integrating sustainability in economic

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² *UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers, www.unep.org/greeneconomy*

sectors. A team of eight scientists in a collaborative effort presents the contribution of community forestry in Cameroon to the green economy and highlight the current and future challenges in integrating community forestry into the process of greening the national economy.

On the other hand, a team of four researchers analyse the governments of countries of Central Africa sub-region regarding their Sustainable Forest Management practices.

Mr. Heath presents his country, South Africa, under the regular feature 'Country Focus'. He reveals that despite its "low forest cover" status, South Africa ranks as the third most biologically diverse country in the world. Mr. Heath goes further to declare that the forest sector of South Africa has preempted the drive to a green economy through the implementation of forest certification, and is therefore well-placed to support a national

green economy strategy and ensure best possible use of forest and forest products.

According to Mr. Boroto of FAO, the organization is active in promoting and aiding efforts of countries to transition to a green economy. He proposes a methodology (still under development) for the sustainable exploitation of water, wetlands and forests in the context of a watershed and towards a greener economy in Africa. If adopted, it could assist in 'doing things better', through practical steps.

I welcome you all to this edition of *Nature & Faune*, which marks the end of the International Year of the Forests 2011.

We treasure your ongoing support as we all work together to achieve the transition to a green economy that is a major pathway to promoting sustainable cycles of production and consumption while ensuring the health and integrity of Africa's ecosystems, and our continued survival and wellbeing.



Editorial

Forests in a green economy transition in Africa

Moustapha Kamal Gueye¹

Natural capital assets, both renewable and non-renewable, are estimated to account for 24 per cent of sub-Saharan Africa's total wealth. This includes sub-soil assets (39 per cent), cropland (36 per cent), timber resources (9 per cent), pastureland (8 per cent), non-timber forest (5 per cent) and protected areas (3 per cent)². A number of studies have underscored the larger gains to be made by expanding investments to enhance natural capital (Millennium Ecosystem Assessment, 2005; The Economics of Ecosystems and Biodiversity, 2010). Given the natural resource-dependence of most African economies, capitalizing on Africa's natural capital will play a critical part in the continent's transition to a green economy.

A green economy can be defined as one that results in improved human well-being and social equity, while significantly reducing

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² World Bank. 2006. *Where is the Wealth of Nations? Measuring Capital for the 21st Century*, The World Bank: Washington, D.C.

environmental risks and ecological scarcities³. In a green economy, growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. These investments need to be catalyzed and supported by targeted public expenditure, policy reforms and regulation changes. This development path should maintain, enhance and, where necessary, rebuild natural capital as a critical economic asset and source of public benefits, especially for poor people whose livelihoods and security depend strongly on nature.

Forests represent critical assets to economic activity and livelihood in Africa

African forests account for 23 per cent of the continent's total land area - close to 675 million hectares - and represent about 17 per cent of global forest area. Forests provide a basis for livelihoods to people, serve as carbon sinks and stabilize global climate, regulate water cycles and provide habitats for biodiversity while hosting a wide variety of genetic resources. These various ecosystem functions and services make African forests a vital asset to society and to the national, regional and global economy.

In 2010, Central Africa accounted for 37 per cent of Africa's total forest area, Southern Africa for 29 per cent, North Africa for 12 per cent, and East and West Africa for 11 per cent respectively. The five countries with the largest forest area were (Democratic Republic of the Congo, Sudan, Angola, Zambia and Mozambique), while countries reporting the highest percentage of their land area covered by forest were Seychelles (88 per cent), Gabon (85 per cent), Guinea-Bissau (72 per cent), Democratic Republic of the Congo (68 per cent) and Zambia (67 per cent)⁴.

³ UNEP (2011): *Toward a Green Economy – Pathways to Sustainable Development and Poverty Eradication*. Available at: <http://www.unep.org/greeneconomy/>

⁴ FAO. 2010. *Global forest resources assessment, 2010 – Main report*. FAO Forestry Paper 163. Rome, Italy.

Forestry contributes 6 per cent of GDP in Africa on average, and up to 13 per cent in tropical African countries. In Eastern and Southern Africa, the average annual forest income is about 22 per cent of household income⁵. They provide significant timber and non-timber forest products, thus supporting both local communities and national economies. Fuel wood supplies represent a significant proportion of household energy needs for cooking and heating for the vast majority of African, particularly in rural area. Africa accounted for 33 per cent of global fuelwood removals in 2010⁶.

For Africa, forest resources are important export commodities, with timber products alone accounting for 60 per cent of export earnings for Gabon and about 50 per cent for the Central African Republic⁷, making it essential for these countries to ensure a sustainable management of the resource. Furthermore, forests are important providers of ecosystem services such as climate regulation, carbon sequestration, watershed protection, and habitat for species that provide bush meat for communities and tourism opportunities. In central Africa rural communities obtain a critical portion of the protein and fat from forests, in particular from bushmeat⁸. While employment data is relatively uncertain due

to limited accounts of non-formal employment, in 2005, some 571,000 people were reportedly involved in the primary production of goods in forests in Africa.⁹

Well-managed forests and proper use of their vital supporting functions can therefore yield real economic benefits for Africa and have knock-on effects on poverty.

Yet despite these huge ecological, economical, social and health benefits, forests are still being destroyed at an alarming rate – 13 million hectares annually – often for limited private and short-term gains because of over-harvesting and pressures from other land uses, including crop farming and livestock husbandries. Over the past decade, forest cover stabilized in North and Central America and expanded in Europe. Forest cover expanded in Asia, mainly due to large-scale afforestation in China, which offset continued deforestation in South-east Asia. Africa and South America experienced the largest net loss of forests during this period¹⁰. Over the last two decades, agricultural expansion and timber extraction were the main proximate causes of tropical deforestation.

African forests can and should be an important driver towards a green economy

Forests can be a critical driver in a transition to a green economy when the myriad of economic, social and environmental benefits they can deliver are realized. While still at a slow pace, there is growing recognition among policy makers and local communities of the need to maintain, sustainably use and invest in forests in order to prevent the loss of forest-based biodiversity and ecosystem goods and services that support the livelihood of populations and to enhance their potential to reduce carbon emissions.

⁵ Vedeld, P., Angelsen, A. Sjaastad, E., and Kobugabe Berg, G. (2004). *Counting on the environment forest incomes and the rural poor. Environmental Economics Series, Paper No. 98, World Bank Environment Department, World Bank, Washington, D.C.*

⁶ FAO. 2010. *Op Cit.*

⁷ Gumbo, D. 2010. *Regional review of SFM and policy approaches to promote it – Sub-Saharan Africa. Background Paper for the Forests chapter, Green Economy Report.*

⁸ Nasi, R., Brown, D., Wilkie, D., Bennett, E., Tutin, C., van Tol, G., and Christophersen, T. (2008). *Conservation and use of wildlife-based resources: the bushmeat crisis. Secretariat of the Convention on Biological Diversity, Montreal, and Center for International Forestry Research (CIFOR), Bogor, Indonesia.*

⁹ FAO. 2010. *Op. Cit.*

¹⁰ UNEP. 2011. *Forests in a Green Economy: A Synthesis. Available at: <http://www.unep.org>.*

The vital importance of forests to society and new economic values that are emerging in the context of the fight against climate change and the loss of biodiversity offers Africa new opportunities to transform the management and use of its forest resources to advance its development agenda. In 2010, Africa contributed 21 per cent of the global total of carbon in forest biomass, with Central Africa containing the largest amount of carbon in forest biomass. However, overall, with the exception of North Africa, all African subregions experienced a decline in carbon stocks in forest biomass between 1990 and 2010 because of the loss of forest area¹¹.

Beyond direct benefits, African forests support a growing ecotourism industry. Overall, tourism, which relies primarily on the continent's natural and cultural wealth, directly and indirectly contributes an estimated 8.3 per cent to GDP and 5.9 per cent to employment in Africa¹². In the Great Lakes area, about \$US20 million is generated annually from tourism based on gorilla viewing and other activities¹³.

Today, investments in forests remain low and forest related activities are predominantly extractive. It has been estimated that an approximate US\$ 64 billion is invested annually in the forest sector¹⁴. Of this, approximately 28 per cent is spent on forest management and the rest is invested in forest product processing and trade. The UNEP Green Economy Report suggests that an additional investment of 0.034 per cent of global GDP each year (equivalent to US\$ 40 billion in constant 2010 dollars per year) could raise value

added in the forest industry by US\$ 600 billion in 2050. This is 20 per cent more than value added under the business as usual (BAU) scenario which models growth under assumptions that mirror the current economic policy climate. Under the green economy scenario, additional investment is undertaken in reforestation and forest conservation. Under this scenario, concomitant increases in sustainable productivity enhancing improvements in agriculture and carefully targeted tree planting ensure that poor farmers are not displaced and there are increased income earning opportunities in rural areas.

Governments are increasingly recognizing the importance of sustaining and possibly enhancing the natural and cultural assets from which new income, employment and growth opportunities are arising. Translating such recognition into action requires new investments in protected areas, reforestation efforts and rehabilitation of valuable ecosystems. In Kenya, for example, resource valuation efforts that indicated a value to the economy of the Mau forest complex — including tourism, hydropower, agriculture and the tea industry — of possibly as much as \$US1.5 billion a year, triggered a multi-million shilling restoration initiative to reverse the trend of decades of deforestation¹⁵.

New policies and initiatives are needed to sustain and enhance the contribution of forests in Africa

To enhance the contribution of forests to society and economies of Africa governments, the international community and other actors need to scale up initiatives and reform policies in order to create incentives to maintain and invest in forests and to modify rent-seeking behavior.

¹¹ FAO 2010. *Op. Cit.*

¹² World Travel and Tourism Council. 2009. *Travel and Tourism Economic Impact, sub-Saharan Africa.*

¹³ Gumbo, D. 2010. *Regional review of SFM and policy approaches to promote it – Sub-Saharan Africa. Background Paper for the Forests chapter, Green Economy Report.*

¹⁴ Tomaselli, I. 2006. *Brief study on funding and finance for forestry and forest-based sector, United Nations Forum on Forests.*

¹⁵ Nellemann, C., E. Corcoran (eds). 2010. *Dead Planet, Living Planet – Biodiversity and Ecosystem Restoration for Sustainable Development. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal.*

Examples of these enabling conditions include national regulations, smart subsidies and incentives, information management, supportive international markets, and the promotion of community-based and participatory forest management. At the regional and international level, African governments can take new initiatives to send signal to markets and to renew their commitments to working individually and collectively to strengthen frameworks of governance and management of forest resources.

In the context of 2011 as the International Year of Forests, new regional and international initiatives are being spearheaded by African countries to enhance forest conservation and sustainable management. On May 31 through June 3, 2011, at the initiative of the Republic of

Congo, leaders of more than 35 nations covering the world's three major rainforest regions - the Amazon, the Congo and the Borneo-Mekong forest basins - met in Brazzaville at the Summit of the Three Rainforest Basins and agreed to prepare an action plan on sustainable management of forests for signature next year at the Rio+20 Summit meeting in Brazil. The recognition at highest political level that forests contribute to the livelihoods of more than one and a half billion people and that forests function as a cross-sectoral service utility through carbon sequestration and storage, water and pollination services for food production and provision of sustainable construction material and renewable energy, amongst others, provides a new momentum to national, regional and global efforts for conservation and sustainable use of vital forest resources.

ANNOUNCEMENTS

IUFRO-FORNESSA regional congress-
ITTO/AFF forest policy day
Nairobi Kenya, 25 – 30 JUNE 2012

***THEME: FORESTS AND TREES SERVING
THE PEOPLE OF AFRICA AND THE WORLD***

OBJECTIVES AND CONGRESS THEMES

The first IUFRO regional congress in Africa will be held in partnership with the Forestry Research Network of Sub-Saharan Africa (FORNESSA), the International Tropical Timber Organization (ITTO), the World Agroforestry Centre (ICRAF), and the African Forest Forum (AFF). The Congress will provide a platform for African forest scientists, forest managers and policy makers and their colleagues from other parts of the world to share and exchange information and experiences on critical issues affecting forest and wildlife resources in Africa. The overall goal of the congress is to demonstrate how forest science is impacting on livelihoods, environmental management and development in Africa.

Congress Themes:

- Forests and Climate Change
- Forests and Water
- Forest Policy, Governance and Trade
- Forest Biodiversity and Conservation
- Agroforestry, Energy and Food Security
- Education, Training and Institutional Capacity Building

REGISTRATION

Conference registration fees of US\$200.00 per person will be charged with discounted rates for students (US\$120.00). This fee will cover congress material, inaugural cocktail, coffee breaks and lunches on session days,

congress dinner and in-congress field trip. On-line registration on (www.fornis.net).

FINANCIAL SUPPORT

IUFRO through various donors is offering financial support to a limited number of participants from developing countries. Selection criteria are: a) approved abstract(s) (presentation of paper or poster); b) below 45 years. Female scientists are particularly encouraged to apply for support.

SUBMISSION OF ABSTRACTS

If you wish to submit a paper or a poster related to any of the congress themes, please send your abstract of 300 – 350 words to: DR. JOE COBBINAH, CHAIR, CONGRESS SCIENTIFIC COMMITTEE

E-MAIL:

iufrofn2012@yahoo.com ; E-MAIL: [jacobbinah@csir-forig.org.gh](mailto:jcobbinah@csir-forig.org.gh)

DEADLINES: Submission of Abstracts: 31 December 2011; Notification of Acceptance: 29 February 2012

PRE-CONGRESS TRAINING

IUFRO's Special Programme for Developing Countries (IUFRO-SPDC) will organize two pre-congress training workshops taking place on 23 and 24 June 2012. Topics: -
a) Preparing and Writing Research Proposals
b) Communicating Forest Research - Making Science Work for Policy and Management
Participants of the congress who are interested in joining one of the training workshops are encouraged to express their interest through a special expression of interest form available on the congress website.

Special Feature

The fisheries of Lake Victoria: Past, present and future

Brian E. Marshall¹ and Oliva C. Mkumbo²

Lake Victoria is the largest tropical lake in the world. With an area of almost 70,000 km² it is the world's second-largest (natural) body of freshwater but supports what may be the world's largest inland fishery, yielding about one million tonnes per annum. This fishery in turn directly or indirectly supports several million people and is a major contributor to economic growth and food security in East Africa. In spite of this, the fishery of Lake Victoria is surrounded by controversy and criticism largely generated by a non-native predator, the Nile perch *Lates niloticus*, which was introduced into the lake 50-60 years ago. A cursory search of the internet reveals many, sometimes hyperbolic, articles on the destruction of the Lake Victoria ecosystem (the "dying" lake), the impoverishment of local communities

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through the loss of their livelihoods, malnutrition of children resulting from the export of fish, and so on. What then is the situation in Lake Victoria? Are its fisheries sustainable or are they in imminent danger of collapse?

Early history of the fisheries

Commercial fishing on Lake Victoria began with the introduction of gill nets in 1905 and the opening up of new markets when the railway reached Kisumu in 1908. The fishery initially targeted the endemic tilapias *Oreochromis esculentus* and *O. variabilis*. However, their stocks rapidly collapsed; and the catches fell from around 25 fish per net in 1910 to seven in 1920 and two in 1940 (Kudhongania & Chitamwebwa, 1995). Colonial officials from the three territories surrounding the lake disagreed acrimoniously on what should be done, with the result that no management measures could be agreed upon (Jackson, 2000), and the endemic tilapias are now commercially extinct in the lake. In an attempt to rectify this situation a number of non-native tilapias were introduced but only one of them, the Nile tilapia *Oreochromis niloticus*, became successful but only after Nile perch became abundant (Ogutu-Ohwayo, 1995).

Attention then turned to the 500+ endemic haplochromine species that made up some 85% of the fish biomass in the lake (Kudhongania & Cordone, 1974). Although widely utilised by local people, these were regarded as "trash fish" by British colonial officials (Anderson, 1961), and the introduction of Nile perch was proposed as a means of converting them into a more valuable product³. After extensive discussions and in the face of opposition from scientists then working on the lake, it was agreed that they should be introduced into the lake. Nile perch were therefore officially stocked into the lake in 1962-63 but there is compelling evidence, however,

³ Eccles (1985) implied that these officials were mostly concerned with the angling qualities of Nile perch and never considered the potential value of haplochromines as human food.

that staff of the Uganda Game and Fisheries Service had already introduced them unofficially as early as 1955 (Pringle, 2005).

The impact of Nile perch

Only about 400 Nile perch were introduced into the lake (Pringle, 2005) and they were at first of little importance; and for about 10 years after their introduction, they comprised less than 1.0% of the demersal biomass (Kudhongania & Cordone, 1974). This changed when the population began an exponential growth phase a few years later, and by the 1980s, the Nile perch had become the most abundant species in the lake (Table

1). Nile perch was introduced to utilise haplochromines, which they did so effectively that these fish almost disappeared during the 1980s, and there were fears that the entire community could become extinct. Other native species declined as well and the only one to increase during this period was the small endemic, sardine-like cyprinid *Rastrineobola argentea* ("dagaa"). Why the introduced Nile tilapia also increased during this time having been a minor component of the fish community is unexplained; perhaps the haplochromines competed with it and their disappearance allowed it to flourish.

Table 1. The proportion (%) of major fish taxa captured in trawls (1969-71) and different types of gear (1988-93) in Lake Victoria

	1969-71		1988-93		
	Trawl	Trawl	10-mm seine	51-mm seine	Gill nets
<i>Lates niloticus</i>	0.1	80.0	13.1	97.9	97.2
<i>Oreochromis niloticus</i>	0.2	14.4	22.8	1.9	1.0
<i>Rastrineobola argentea</i>			39.1		
Haplochromines	83.0	0.1	5.8	0.1	+
Other species	16.7	5.5	19.2	0.1	1.8

Data from Kudhongania & Cordone (1974) and Ogutu-Ohwayo (1995). The symbol + denotes a proportion of <0.1%.

Not surprisingly, the almost instantaneous destruction of some 90% of the lake's fish biomass brought about major ecological changes. Most strikingly, the lake appeared to have become eutrophic with the appearance of a water hyacinth infestation and dense algal blooms. The algal blooms were implicated in massive fish kills and contributed to the extensive and prolonged deoxygenation of the deeper waters of the lake. Of course, Nile perch was not responsible for the eutrophication of the lake, which was the result of increased nutrient loading to the system from the growth of the human population in its basin (Verschuren *et al.*, 2002). There is evidence that eutrophication began in some parts of the lake as early as the 1950s (Stager *et al.*, 2009) and it is likely that the changes brought about by Nile perch disrupted the ecosystem and accelerated the appearance of eutrophic characteristics.

The eutrophication of parts of Lake Victoria has been identified as one of the major threats to its fisheries, even though it is known that eutrophic systems can be highly productive. Nutrient enrichment has undoubtedly contributed to an increase in fisheries productivity and the deleterious effects of eutrophication are now less obvious than they were two decades ago. The concentrations of chlorophyll *a* have decreased across the lake, although still high in some areas, transparency has increased in open waters, and no fish kills have been reported since the late 1980s (Sitoke *et al.*, 2010). The water hyacinth infestation that caused such alarm has now been reduced to nothing more than a localised nuisance through biological control (Wilson *et al.*, 2007).

The most widely condemned impact of Nile perch was, however, the destruction of the

endemic haplochromine population. This is indeed a highly regrettable outcome and was probably never considered at the time these fish were introduced into the lake. But there is some hope; the intensive fishery for Nile perch has allowed some haplochromine species to recover. Most of the recovering species are generalised benthic feeders (Kishe-Machumu *et al.*, 2008) and the original trophic diversity may never reappear. Nonetheless, morphological changes have occurred in these haplochromines, and a new adaptive radiation may be about to begin, which is predictable, given that rapid speciation in haplochromines has occurred in the past.

The present state of the Lake Victoria fisheries

Nile perch dominated the fisheries in the 1980s and caused considerable problems as the fish were very large and unsold catch needed to be smoked to be preserved, leading to deforestation and a loss of quality. The situation was saved by the development of the export industry, which began in 1991 and now accounts for most of the Nile perch caught in the lake. This industry is now worth about USD 350 million per annum and makes Lake Victoria unique in being the only artisanal inland fishery that contributes significantly to global fish markets. The export industry has been criticised on the grounds that fish are no longer available to local markets and was therefore leading to malnutrition (WRI, 2001). There may have been some truth in this assertion when Nile perch were the only fish being caught, but it now constitutes less than 30% of the catch (Table 2). The rest of the catch consists primarily of tilapia and dagaa, and haplochromines in Tanzania, all of which are available in local markets.

Table 2. The average annual fish catch (thousands of tonnes) from Lake Victoria, 2005-08

	Nile perch	Dagaa	Tilapia	Haplochromines	Others	Total
Kenya	40.1	73.0	12.7	3.3	4.1	133.3
Tanzania	133.1	342.3	23.6	98.3	3.0	600.4
Uganda	91.9	98.5	26.4	2.3	2.1	221.3
Total	265.1	513.8	62.7	103.9	9.2	955.0

Data from Lake Victoria Fisheries Organisation catch assessment survey reports.

Another criticism of the fishery is that it has not benefited local populations; this was expressed forcibly by Vitule *et al.* (2009) who wrote “[Gozlan] writes as if this introduction were a great success from the standpoint of fishermen. This is simply wrong. It was very successful from the standpoint of a few wealthy corporations. Most of the fishermen who had subsisted on the lake before the introduction of the perch were driven out of business, with terrible social

consequences.” The facts belie this conclusion. The total number of people directly dependant on fishing almost quadrupled over 30 years (Table 3) even though the total population in the basin only doubled over the same period (UNEP, 2006). This confirms that there has been a migration of people to the lake to take advantage of the opportunities offered by the growth of the fishery.

Table 3. Employment in the fisheries sector around Lake Victoria, pre- and post-Nile perch

	c. 1978	c. 1989	2008
No. of boats	11,100	21,987	69,400
Catch per boat (t yr ⁻¹)	7.91	23.06	14.41
Direct employment	52,800	105,500	199,200
Secondary employment ^a	158,400	316,500	597,600
Total employment	211,200	422,000	796,800
Total fishers + dependents ^b	1,056,000	2,110,000	3,984,000

Data for 1978 and 1989 are adapted from Reynolds et al. (1995) while 2008 estimates are taken from reports of the Lake Victoria Fisheries Organisation.

^a*Reynolds et al. used secondary: primary ratios of two and three in 1978 and 1989 but noted that this was a conservative estimate and we have used an estimate of three here.*

^b*Reynolds et al. suggested that each employee supported two dependents but this seems improbably low and we have used four here. The number of dependants may be higher than this.*

Indirect indicators can also be used to assess the impact of the fishery. For example, in 2000 only 4,000 fishing boats (10% of the total) were propelled by outboard motors, but by 2008 there were 14,000 of them with motors (20% of the total) (LVFO frame survey data), which suggests a considerable measure of improved prosperity. While most attention focuses on Nile perch, it should be emphasised that the lake now provides a large quantity of fish other than Nile perch (Table 2), in part a consequence of the nutrients that made it eutrophic. In 1980, when the population of the lake basin was around 15 million the catch of all fish was around 120,000 t which amounts to 8.0 kg per capita; now the population is around 40 million but the non-Nile perch catch is around 750,000 t or 18.8 kg per capita. These fish, almost all sold fresh or sun-dried, are available locally at a more affordable price and have created an extensive industry servicing both local and regional markets.

Nile perch is by far the most valuable fish in the lake and commands a higher price than any other species and therefore an important cash crop for fishermen around the lake. African fishermen, like most other people, need cash for their daily activities and the post-Nile perch development of the fisheries in Lake Victoria has allowed a great many of them to enter the cash economy.

What of the future: are the fisheries sustainable?

The human population in the Lake Victoria is amongst the fastest-growing in the world (Uganda's population is growing at >3% per annum) and the demand for fish will inevitably increase. This, in turn, will lead to increased fishing intensity on a lake that already supports around 200,000 legal fishermen, as well as an unknown but certainly large number of illegal ones. Concerns about overfishing are already growing and these can be expected to increase in future as pressures on the fishery increase.

The Nile perch has been a particular source of concern because of its diminishing proportion of the total catch; in 1990 it made up about 70% of the total catch but only 30% in 2005-08. In fact, the catch of Nile perch has remained relatively constant around an average of 260,000 t over annum since 1990 and its declining proportion in the catch reflects an increased catch of other species, notably dagaa and haplochromines. While there is still a danger that Nile perch will decline, the species has displayed extraordinary resilience in the face of intense fishing (gillnets increased by 1.6 times and long line hooks by 3.2 times between 2000 and 2008). Large individuals have become relatively rare and the size of first maturity in females has decreased from around 80 cm TL to 50 cm. Fish are maturing earlier but their mortality rates have increased as has the production/biomass ratio. How long they can maintain this is unknown at present and concern about this species is certainly justified, as fisheries based on top predators are usually the first to collapse. The other species are smaller and at lower trophic levels, have higher relative fecundity and production/biomass ratios, and are therefore of less concern. The ecosystem of Lake Victoria seems to be rather more stable than it was 20 years ago and these smaller fish seem to be able to support a productive fishery at present.

The three countries around the lake have made an effort to coordinate management policies through the Lake Victoria Fisheries Organisation and are developing a system of co-management through the development of Beach Management Units (BMUs) around the lake. These units are expected to involve local communities in the management and conservation of the stocks in their areas and it is hoped that the participation of the fishing communities will prove more effective than the top-down management approach that had hitherto been employed. Much remains to be done, however, as few fishermen have experience in community management and they still require both financial and technical support from outside

sources. The BMUs have formed National and Regional Networks and it is expected that with time, they will become strong institutions to work in partnership with the Government Institutions and the Private sector for sustainable management of the fisheries of Lake Victoria

References

- Anderson, A.M. (1961). Further observations concerning the proposed introduction of Nile perch into Lake Victoria. *East African Agricultural and Forestry Journal* **26**: 195-201.
- Eccles, D.H. (1985). Lake flies and sardines: a cautionary note. *Biological Conservation* **33**: 309-333.
- Jackson, P.B.N. (2000). Freshwater fishery research organisations in central and eastern Africa: a personal recollection. *Transactions of the Royal Society of South Africa* **55**: 1-81.
- Kishe-Machumu, M., Witte, F. & Wanink, J.H. 2008. Dietary shift in benthivorous cichlids after the ecological changes in Lake Victoria. *Animal Biology* **58**: 401-417.
- Kudhongania, A.W. & Cordone A.J. (1974) Batho-spatial distribution patterns and biomass estimates of the major demersal species in Lake Victoria. *African Journal of Tropical Hydrobiology and Fisheries* **3**, 167-181.
- Kudhongania, A.W. & Chitamwembwa D.B.R. (1995). Impact of environmental change, species introductions and ecological interactions on the fish stocks of Lake Victoria. In: T.J. Pitcher and P.J.B. Hart (eds) *The Impact of Species Change in African Lakes*. Chapman and Hall, London: pp. 19-32.
- Ogutu-Ohwayo, R. (1995). Diversity and stability of fish stocks in Lakes Victoria, Kyoga and Nabugabo. In: T.J. Pitcher and P.J.B. Hart (eds) *The Impact of Species Change in African Lakes*. Chapman and Hall, London: 59-81.
- Pringle, R.M. (2005). The origins of the Nile perch in Lake Victoria. *BioScience* **55**: 780-787.
- Sitoki, L., Gichuki, J., Ezekiel, C., Wanda, F., Mkumbo, O.C. & Marshall, B.E. (2010). The environment of Lake Victoria (East Africa): current status and historical changes. *International Review of Hydrobiology* **95**: 209-223.
- Stager, J.C., Hecky, R.E., Grzesik, D., Cumming B.F. & Kling H. (2009). Diatom evidence for the timing and causes of eutrophication in Lake Victoria, East Africa. *Hydrobiologia* **636**: 463-478.
- UNEP (2006) Lake Victoria, Africa's largest lake. In: Africa: *Atlas of our Changing Environment*. United Nations Environment Programme, Nairobi, pp. 48-51.
- Verschuren, D., Johnson, T.C., Kling, H.J., Edgington, D.N., Leavitt, P.R., Brown, E.T., Talbot M.R. & Hecky R.E (2002). History and timing of human impact on Lake Victoria, East Africa. *Proceedings of the Royal Society, London B* **269**: 289-294.
- Vitule, J.R.S., Freire, C.A. & Simberloff, D. (2009) Introduction of non-native freshwater fish can certainly be bad. *Fish and Fisheries* **10**, 98-108.
- Wilson, J.R.U., Ajuono, O., Center, T.D., Hill, M.P., Julien, M.H., Katagira, F.F., Neuenschwander, P., Njoka, S.W., Ogwang, J., Reeder, R.H. & Van, T. (2007). The decline of water hyacinth on Lake Victoria was due to biological control by *Neochetina* spp. *Aquatic Botany* **87**: 90-93.
- WRI (2001). Trade-offs: Lake Victoria's ecosystem balance sheet. In: *A Guide to World Resources: People and Ecosystems, the Fraying Web of Life*. World Resources Institute, Washington, DC, p. 21.

Opinion Piece

Greening the African forest economy - Can Africa's lean earnings from forest products exports pay for it?

Mafa E. Chipeta¹

1. This is an opinion piece on Africa's capacity to launch a green economy in the forestry sector. However, instead of a trend analysis to show progressive progress (or rather lack of it) in African forestry's economic strength to adopt green ways and yet be economically vibrant, I adopted a cross-sectional approach. I looked at only year 2009 data, which I present in this note, with some bullet point observations on what it all says about Africa's state.
2. Although a green forest economy starts in the forest and ends with the consumer of forest goods and services, I have chosen only the one segment which can earn the most income – the mainstream forest products and have looked at whether it can finance “greening”.² I did this because unless forestry has prospects of adequate subventions from other sectors, it is mainly the sector's

¹ The author (emchipeta@gmail.com) is a retired FAO staff; he is a forester by training but with a career that also spanned general agricultural and food security policy engagements.

² There will be cries that I have ignores non-timber forest products (NTFPs) and services (such as tourism) – but NTFPs rarely generate incomes of great macro-economic significance; for tourism, the attribution of income due to forest habitat is not easy to tease out.

own capacity to generate financial resources from producing, processing and trading its own products and services that can enable it to contribute to national consumption and to reinvestment, including into meeting the cost of “going green” in response to the current climate change.

Going Green Has a Cost

3. Going green does not come cheap. Major industrial countries are resisting going green or are having to impose taxes on their industries in order to fund going green. Even then, some of their industries are resisting, for fear that the higher costs of producing in a “green environment” will make their products too costly to compete. One outcome of this is that some are trying to escape compliance – in the case of manufacturing and utilities, they are paying other countries to grow trees or other carbon sinks so that they can continue to pollute – it is cheaper for them to do this than to go green immediately.
4. What then of Africa, whose economy is reported to be weak? It is public knowledge that sector public budgets are inadequate for even routine management of the resource - many African countries are dependent on donor supplements for forestry even without additional complications of coping with climate change and pursuing greater greenness.
5. This aside, what other costs would have to be met? In general, the costs to meet in having Africa's forestry go green are about starting to sail in *uncharted waters*, in the following perspective: almost all glitches have been removed from the tried and tested “non-green” economy, which therefore runs as smoothly as a sewing machine. Introducing a new economy brings in a lot of unfamiliar things and therefore higher costs. Some of these include re-tooling for the new forestry; costs of complying with stricter environmental

standards in the field, in processing and trade; costs of transporting products to market with a minimal carbon footprint; higher unit costs of lower-intensity and more selective harvesting; additional precautions to reduce damage to residual elements of ecosystems; costs of stricter monitoring evaluation and reorientation etc – I could go on and on.

6. What do the numbers reveal? I give all data for Africa in comparison with the world and with other regions. I show what the Africa figures mean in money terms at its present level and then I compare with what they would show if Africa tried the first steps to increase earnings from exports. The low-hanging fruit in this case is to add value to the raw logs that Africa exports without processing. As an easy way out, I have reduced complication by focusing only on conversion to sawnwood and wood-based panels (mostly plywood) to see orders of magnitude in improvement of earnings from forestry.
7. The above is driven by a conviction that if Africa wishes to begin to talk seriously of greening forestry, it must make more decent money by adding value to what it produces. Failure to do this will leave it with no resources to fund its own greening; such a situation would raise some fundamental issues of African pride: can Africa continue to beg others to green its own forestry sector when it is so well endowed? Is Africa to beg for forest salvation as much as it begs for food? Is there no limit to what Africa must depend on others for, even where its own resources can easily generate the funds for carrying out its own development?

Africa's Forest Economy in World Context

8. Analysis of summary data on production, trade and consumption for Africa are revealing. Even though the broad results can be defended, the calculations used are crude and therefore the author

invites those with curiosity, especially university students, to cooperate in expanding the analysis and refining it for more serious use in policy work (cross-sectional data for the 2009 were used¹)

Do Timber Exports Earn Enough?

9. Thereafter, we look at export earnings for Africa, with Scenario 0 being the actual Yearbook published value of exports. An additional three scenarios are then built assuming for all three the world average ratio of suitable size logs in total industrial roundwood being 75% to sawnwood and 25% to veneer/plywood. The revenue increase to Africa for each scenario is calculated assuming its current exports of raw round logs are entirely converted into sawnwood and plywood/veneer; the rough and ready scenarios are as follows, with the results given in Table 1 below:
 - a. Scenario 0: actual published earnings from exports in current breakdown of raw logs vs processed products.
 - b. Scenario 1: where saw/veneer logs make up 55% of total industrial roundwood, as per the global average;
 - c. Scenario 2: where saw/veneer logs make up 43% of total industrial roundwood, as per the Latin America average (Latin America is also dominated by tropical ecosystems, as is Africa; it is also in the developing-countries category);
 - d. Scenario 3: where saw/veneer logs make up 61% of total industrial roundwood, as per the Asia average (Asia has a greater proportion of temperate timber countries – especially china, Japan) but also has

¹ All data used are from the 2009 version of the FAO "Forest Products" Yearbook, available under FAOSTAT on the internet.

enough tropical ecosystems to be worth comparison with Africa, especially given that many of its countries fall into the “developing” category).

10. It is obvious that with the change being only in diversion of raw sawlog exports to domestic processing, the incremental earnings are not comprehensive of how much more the whole sector could earn if other improvements were initiated.



Table 1: Possible Increases in Earnings from Diverting Logs Currently Exported Raw to Domestic Processing in Africa

Scenario	Breakdown of Industrial Roundwood (IR)	IR (million cum)	Volume		Value (US\$ million)		
			Sawnwood (SW) (75%)	Panels (PN) (25%)	Sawnwood (SW) (75%)	Panels (PN) (25%)	Total
Scenario 0: Data from FAO Yearbook	World IR:	1424	(published data all cells)		24147	24697	48844
	• Total IR						
	• Saw/veneer (SV) logs	782					
	• % (SV) logs	55	Calculated				
	Africa – total IR	72	(published data all cells)		858	483	1341
	Increment - over baseline				0	0	0
Scenario 1: SV at 55% as derived from world ratio in yearbook – prices being averages of import and export unit values at \$391.5/cum SW; \$816.0 PN – applied assuming 50% net yield.	Africa – total IR	72					
	Africa SV 55% share – to domestic processing	29	21	8	4110	3264	7374
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone ¹				-	-	1313
	New Africa total income SW + PN				4968	3747	7402
	Increment - over baseline					-	-
Scenario 2: SV at 43% as derived from Latin America ratio	Africa – total IR	72					
	Africa SV 43% share – to domestic processing	31	23	8	4502	3264	7766
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone				-	-	1313
	New Africa total income SW + PN				5360	3747	7794
	Increment - over baseline					-	-
Scenario 3: SV at 61% as derived from Asia ratio	Africa – total IR						
	Africa SV 61% share – to domestic processing	44	33	11	10960	4488	15448
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone				-	-	1313
	New Africa total income SW + PN				11818	4971	15476
	Increment - over baseline					-	-

¹ The reduction of SW and PN imports is not factored in; it might lead to double counting of benefits.

Africa's Challenging Earnings Situation

11. All data considered, the following can be highlighted about Africa's situation and from it readers can judge its readiness or otherwise to afford a "green forestry economy" within a reasonable timeframe and without relying on begging for help:
- a. In mainstream forest products production, Africa does not feature among the global top five, except for fuelwood, where Ethiopia (4th) and DRC (5th) come in. Fuelwood is almost completely not traded internationally and therefore cannot contribute to meeting any greening costs that require foreign exchange;
 - b. In mainstream forest products trade, Africa does not feature at all among the global top five;
 - c. There are no data on non-timber forest products and services of forests: it is assumed that they are mostly of local rather than macro-significance;
 - d. Africa is globally significant only for fuelwood in both production and consumption – but this is a little-traded commodity which brings hardly any earnings for investment into forest management;
 - e. Africa's share of global production and apparent consumption is for all the products included here below 5%; very often it is around 1%. Given that Africa's share of the global population is around 15%, this is a clear signal of under-consumption and sub-par production contribution;
 - f. For the five products considered (Industrial roundwood, Sawnwood, Wood-Based Panels, Wood Pulp, Paper & paperboard) , Africa has a trade surplus only for industrial roundwood and wood pulp. It has major deficits for sawnwood and paper/paperboard. Overall, Africa earns about US\$1.6 billion annually for the surpluses (roundwood and wood pulp) and spends US\$4.1 billion annually for the deficit products (sawnwood, panels and paper/paperboard). *With Africa spending far more than it earns from forestry, the chances of auto-funding the routine sector development are pretty poor, let alone investing further for "sector greening";*
 - g. The trade is concentrated in/dominated by a few countries: in general North Africa (Egypt in lead) and South Africa lead in imports; South Africa/Swaziland and humid Central Africa (one country or two for each product) lead in exports – the rest of the countries are very insignificant in trade but generally are net spenders on forest products imports;
 - h. It is of interest to see that sawnwood and panels could be made from the very logs which Africa continues to export in raw, unprocessed form. However, the volume of logs Africa exports (1.7 million cum), would after processing losses cover perhaps only 10-15% of the volume of imported sawnwood and panels (8.5 million cum). There is clearly a structural deficit, apart from likely mismatch between Africa's need for relatively large volumes lower-value construction products and its export of more costly decorative products. The need is thus not just to process logs currently exported raw but to harvest more all round to meet African demand and to earn enough to reinvest, including in the greening of forestry.

The Apparent Major Positive Impact of Processing Logs in Africa

12. Although the scenarios in Table 1 are rough and ready, they are good enough to show that attention to domestic processing could make a big difference to earnings. Just by attending to converting saw/veneer logs domestically, the current earnings of \$1,7 billion would be increased by about \$6 billion under scenario 1, \$6.4 billion under scenario 2 and \$14.1 billion under the third scenario. The main difference among the scenarios is the ratio of saw/veneer logs to total roundwood, which in Africa is relatively low.¹

13. A key thing to note is that in all three new scenarios (1 – 3), the earnings are far higher than Africa spends on imports of forest products and so, presumably, would have increased capacity for discretionary expenditure on reinvestment including into greening the forest economy.

So What Next?

14. Africa is rich in resources but is poor in economy. There should be a contradiction in this but it is the reality. A continent with enough timber to process and earn so much that it could reinvest at will is, instead, still dependent on foreign aid even for routine SFM activities. With the advent of climate change, Africa is under pressure to also play its part and it hasn't the money to pay for it. Will it beg for aid again? Or will it, this time round, change its policies so that they can (sustainably) transform its resources into investable capital surpluses?

15. For decades now Africa has been exporting roundwood, initially almost solely to Europe but now also to Asia. Major timber countries like Nigeria offer lessons – they exported most of their forest as raw materials and now are major importers of processed products: does this have to be repeated for all the other forest countries before Africa learns? For those who may consider the figures given above fanciful, the answer is not just to criticise them but to support further and more refined analysis so that serious policy discussions and decisions can be possible.

16. The answer is also not to run away from the hard financial returns that wood industries can generate and instead to praise non-timber forest products as the most valuable outputs of Africa's forests. Much is made of how harvesting NTFPs leaves the ecosystems unharmed for Africa's future generations to admire. Yet the same countries that exhort Africa to practice low-impact NTFP harvesting instead of logging continue to import from Africa the very timber they condemn as harmful; if the mushrooms and forest vegetables were so good and important, why are foreign investors not importing them rather than the ecologically destructive timber? – the buyers from these regions continue to prefer African timber to African NTFPs – they must have good reasons for this.

¹ Africa ratios of SV logs are depressed by the relatively major harvests of pulpwood in South Africa and Swaziland.

National forest programmes: Tools for the green economy in Africa

François Wencelius¹

This paper presents a brief reminder about national forest programmes (nfps) and a brief look at what the forest sector can contribute to the green economy. It argues that nfps can be important tools for the “greening” of the forestry sector in Africa.

Key Features of National Forest Programmes

National forest programmes (nfps) emerged some fifteen years ago as potentially powerful frameworks for planning and action in the forestry sector at the country level. They have been designed as dynamic and iterative processes responsive to change, providing strategic orientation to the forestry sector and ensuring coordinated implementation of sustainable forest management by all stakeholders in the forest sector.

National forest programmes are based on several principles usually clustered around the following three pillars:

- **National sovereignty and country leadership**, meaning that national states are managing and using their forests in accordance with their own environmental policies and development needs, and that countries assume full responsibility when preparing and implementing their nfp. This implies national ownership, firm commitment and strong political will by decision

makers regarding sustainable forest development;

- **Consistency within and integration beyond the forestry sector.** Within the sector, means mainly (i) coherence among the economic, social and environmental roles of forests and objectives assigned to the sector, (ii) synergies among all stakeholders, and (iii) consistency of policies with their legal, fiscal and institutional instruments on one hand and with operational implementation measures on the other hand. Beyond the forestry sector, means (i) “vertical” integration into overarching macroeconomic and financial policies and national strategies (e.g. sustainable development, poverty eradication) and into decentralized arrangements and structures, and (ii) “horizontal” coordination and synergy with all the sectors related to the forestry sector, whether they are impacting or impacted by the latter (the agricultural sector, the mining sector, and the energy sector, are but to name a few);
- **Participation and partnership**, meaning that all stakeholders of the forestry sector participate in policy formulation and programme preparation, and become partners to implement joint activities. This goes with functional participatory, coordination and cooperation mechanisms, together with active and continuous capacity building initiatives.

National forest programmes in Africa are being developed and implemented in a variety of contexts and through different processes, depending on the level of socio-economic development, the government structure, the type and condition of forest resources and the importance of the forest sector in the country. Over the last ten years or so, nfps in Africa have been strongly influenced by policies, strategies and programmes related to reducing poverty, hunger and environmental degradation,

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with a strong focus on non-state stakeholders' participation.

The Green Economy and the Forestry Sector

The green economy concept provides a fresh and global approach to sustainable development, which would “improve human well-being and social equity, while significantly reducing environmental risks and ecological scarcities”. In order to achieve the transition towards a green economy, the UNEP “Green Economy” report is proposing a comprehensive set of policy reforms and investment opportunities in 10 central sectors of the economy, including the forestry sector which is given great visibility.

Looking at the forestry sector through the lens of the green economy, however, does not provide a really new picture of its different roles. Forests are indeed seen “as “factories” producing private goods from timber to food, as ecological infrastructure producing public goods from climatic regulation to water-resource protection, and as providers of innovation and insurance services (forest biodiversity being key to both)”. The greening of the forest sector is expected to meet both societal demands for products and ecosystem services, and “critical livelihood needs of local communities by providing a stream of fuelwood, construction materials, food sources and medicinal plants”. The guiding principles spelled out for this are very much in line with those of nfps.

The following key areas of investment, identified for the “greening” of the forestry sector, are also very much in line with what is expected under sustainable forest management: protected areas, payment for environmental services (PES), improved forest management and certification, planted forests, and agroforestry. The same goes with the important enabling conditions put forward in order to back-up and catalyze these investments: forest governance and policy reform, tackling illegal logging, mobilizing green investment, leveling the

playing field (fiscal policy reform and economic instruments), improving information on forest assets, and making REDD+ (Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon, sustainable management of forest and enhancement of forest carbon stocks) a catalyst for greening the forest sector.

Nfps for the “Greening” of the Forestry Sector

Since they were designed to advance sustainable forest management, nfps should also fit the “greening” of the forest sector in Africa at the country level very well. For this, however, some issues should be emphasized and the way nfps are run should be enhanced.

Issues to focus on

In order to meet the requirements of the greening of the forestry sector, the following particular substantial aspects should be focused on during the successive phases of the nfp standard cycle.

Analysis of the forestry sector. The country-led assessments of the forestry sector, based on which the nfp process is expected to start, should focus on the drivers of forest loss in order to serve the needs of a potential REDD+ regime. Particular attention should be paid to capturing and valuing the full range of marketed and non marketed goods and services from both natural forests and plantations. Finally, all efforts are needed to provide the Government and other stakeholders with comprehensive information on forest assets to help them set priorities on forests against those on agriculture and other sectors.

Policy formulation. Before embarking on developing national forest policies, time and energy should be spent on how to address key issues that are crucial for many African countries (e.g., land tenure, rights of forest dependent people, unacceptable practices in

the sector, including elite capture and corruption). A clear consensus is also needed on how to balance public and private goods together with community requirements; a clear understanding should be sought of respective roles of the different stakeholders, with a focus on the informal sector (which is a key actor in the forestry sector of many African countries) and the role to be conferred to the private sector (e.g., co-managing protected areas, expanding and managing forest plantations).

When developing national forest policies (i.e., a vision for the forestry sector, realistic objectives to be met in a reasonable timeframe, and relevant strategies and action plans), determined efforts are needed to ensure coherence with other sectors' policies with a focus on those aiming at the greening of the agriculture and energy sectors, and the development of biodiversity "offsets" (e.g., to compensate for mining and infrastructures policies). Real commitment should be made to actually integrate international endeavors that are crucial in the African context (e.g., engaging in the REDD+ regime, implementing Forest Law Enforcement Governance and Trade (FLEGT) schemes to tackle illegal logging).

Implementation. Instead of trying to "reinvent the wheel", the implementation of national forest policies should concentrate on scaling-up the economic mechanisms and markets that have been tested and proven successful in many African countries (e.g., certification, PES, benefit sharing schemes). If not already there, a focus is needed on developing instruments adapted to the countries' circumstances like realistic legislation and fiscal/subsidies systems, decentralized institutions and capacity building and information sharing initiatives; particular attention should be paid on efficient mechanisms to compensate local communities for forgone revenues, which is essential for the upcoming REDD+ regime. Finally, strategies to mobilize green investment are essential (e.g., attracting private investment seeking long term growth and security, warranting public

investment to complement private or community investment resulting in positive return for the society as a whole).

Monitoring and evaluation. The set of indicators to assess nfps implementation and achievements should be adjusted in order to meet the requirements of the green economy. A focus is needed on measuring (i) changes in consumption and markets of forest goods and ecosystem services, and in ownership of forest land and enterprises, (ii) improvements in forest governance, (iii) investments in sustainable forest management, and (iv) actual sustainability of the greening of the forestry sector.

Improvements in Running nfps

The National Forest Programme Facility (Facility), that supports nfp processes in 70 partner countries of which half are African countries, carried out with FAO an in-depth survey worldwide in 2010 in order to better understand how nfps work in practice. The preliminary key findings of and recommendations derived from this survey regarding the operational aspects of nfp processes are reproduced below. The detailed conclusions from this survey will be provided under the upcoming joint FAO/Facility publication "NFPs in practice".

Governance, intersectoral cooperation, and leadership. Most African countries have established structures and assigned personnel in order to run their nfps, but few succeeded in coordinating all forest-related initiatives which have proliferated at the country level recently. Having often allocated inadequate resources to nfps, several countries end up having parallel structures and processes for different initiatives thus hampering consistency within the forest sector.

Other sectors show only limited interest in participating in nfp processes, since they rarely see the benefits of doing so. Moreover, other sectors do not fully consider the outcomes of nfp processes in their respective policies or planning processes, mainly because the contributions

of forest products and services to local livelihoods and wider economic development are still insufficiently recognized. On the other hand, forest agencies do not fully understand the views of other sectors and how they work.

Finally, agencies heading nfp processes have a leadership problem in many countries. Most of the time, nfps are run by forest administrations that lack the power and capacity to coordinate change across sectors. Important emerging forest-related issues, such as climate-change and tenure reform, are almost always located in other ministries. In order to provide leadership and coordination within and beyond the forest sector, the steering body of the nfp must have the authority, capacity and determination to lead the process at the national level.

Options to address these issues include:

- positioning the structure in charge of the nfp process at the highest level possible, the best being to have it as an inter-ministerial body;
- providing this structure with adequate administrative support, budget, and human resources;
- making it mandatory that the nfp process is included in overarching frameworks and processes at the national level (e.g., poverty eradication, sustainable development, and climate change);
- encouraging joint activities by several ministries, such as to address key environmental, land-use planning or household energy issues of common interest;
- involving nfp coordinators in the development of policies and strategies in other sectors that are affecting the forest sector.

recognized. In most African countries, the participation of local groups and the private sector in forest-related decision-making is increasing. However, insufficient access to information and a lack of organization and capacity still hinders the involvement of certain stakeholder groups in nfp processes (especially indigenous peoples, women and local community groups). In order to increase stakeholders' participation, nfps should ensure:

- sufficient involvement of high-level political players and decision makers representing the forest sector and other
- sectors, so that key nfp recommendations are actually taken up;
- adequate involvement of technicians, to make sure that nfp recommendations can be implemented in the field;
- proactive capacity building and information sharing initiatives, so that that the potential of civil society actors, including indigenous groups and women, is fully realized;
- a balanced involvement of private sector stakeholders, representing the different categories of forest related enterprises.

The nfp has a greater chance to contribute to the green economy of African countries, when the above suggestions for adjusting the substance and enhancing the nfp process are made.

Stakeholder participation. The importance of involving public and private stakeholders at all levels in nfp processes is now broadly

Articles

The forest sector in the context of green economy in Africa

Rao Matta¹

With more than 75 percent of the population living directly off the land, nowhere is the concept of green economy- our wise use and stewardship of ecological resources- is more relevant than in Africa. The continent is bestowed with immense natural wealth, yet it is directly and immediately vulnerable to ecological shocks and scarcities than any other region. It also often suffers first and the most when such crises arise.

In its simplest meaning, a green economy is one which is low carbon and resource/energy efficient. It builds on and enhances the earth's natural capital and endeavours to mitigate ecological scarcities and environmental risks. Thus the transition to a green economy is seen as a major pathway to promoting sustainable cycles of production and consumption while ensuring the health and integrity of ecosystems, and thereby, our continued survival and wellbeing. In pursuit of this path, preference might be given to programmes and actions that:

- Maintain ecosystem integrity and resilience²

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² Based on the belief that our biosphere is a closed system with finite resources and a certain capacity for self-regulation and self-renewal. The economic system therefore must respect the integrity of ecosystems and ensures their resilience.

- Make efficient use of natural resources
- Reduce emissions and other forms of pollution
- Renew, recycle and reuse
- Sustain processes spatially and temporally
- Internalize externalities or negative effects
- Promote equity and fairness in resource utilization and distribution of negative impacts.

Effective management of ecological assets

Viewed from the above principles, Africa already has many elements of a green economy in place. Although it harbours about 15% of the world's population, it represents only a small fraction (3.6%) of the total CO₂ emissions. Even of this meagre quantity, five nations (South Africa, Egypt, Nigeria, Algeria, and Libya) account for 80 percent it, which exemplifies the tiny carbon footprint that Africa has on the globe.

However, the biggest concern for Africa would be effective management of its ecological resources, be it improving the efficiency and sustainability of their usage or ensuring equity and fairness in the distribution of ensuing benefits. In particular, there has been a steep, three-fold increase in population in Africa between 1961 and 2005. And as the populations continue to grow at a much faster rate than the capacities of the ecological systems and the institutions that support them, there is tremendous pressure on natural resources. While some of these resources are used, often with short-sighted goals and interests, some of them are also liquidated, for example, for export, legally and illegally, to support demand elsewhere.

Continued exploitation of natural resources could result in collapse of productive ecosystems and a permanent loss of sustainable revenue streams. There are also considerable differences within and across nations in terms of production and resource mobilization. Massive resource transfers are occurring from rural areas to urban centres

often resulting in staggering social and economic inequities. Similarly, just two nations, South Africa and Nigeria, account for half of sub-Saharan Africa's GDP. The net result of this uneven development pattern is Africa's continued inability and low capacity to meet basic requirements such as food, shelter, health, and sanitation. Growing poverty and inequities and fewer economic opportunities in rural areas also often manifest into civil and political unrests.

Thus effective management of Africa's ecological assets, including enhancing their productivity, is key to improving the well-being of its citizens. In particular, adoption of appropriate policies to promote efficiency in resource production and utilization can help the region minimize the loss of its natural assets while advancing the prosperity its people.

Forest sector in the context of green economy

It is particularly in this context of effective management of natural resources that forests and woodlands in Africa have a vital role to play. Such a role extends not only in improving the quality of life of people living in the region but also helping other nations by serving as part of the global commons that absorb harmful greenhouse gases.

Forests and woodlands in Africa already support the livelihoods of millions of people besides rendering several critical environmental, social, and cultural services. Africa has a high per capita forest cover at 0.8 ha per person compared to a global average of 0.6 ha. Their relative contribution to sub-Saharan Africa's GDP is highest compared to any other region and as such, they form the foundation for economic development in many countries. More than this formal part that goes into official statistics; the informal and unaccounted-for part of their contribution towards energy, health, food, fodder and other household needs is immense and far reaching. For instance, more than 80 percent of the population in sub-Saharan Africa depend on forests and woodlands for their fuelwood

and other energy needs. Millions of households are also engaged in community forestry and small and medium-size forest enterprises. Particularly in rural areas that lie in the vicinity of forests, the indigenous, poor, and the most disadvantaged people depend on forests for their daily subsistence and long-term survival. Forests are thus crucial to achieving the Millennium Development Goals.

Forests and woodlands are also key components of the environment and perform a wide range of essential ecosystem functions such as mitigating the impacts of climate change, regulating water supplies, and buffering floods and droughts. For example, the forest complex of the Fouta Djallon highlands of Guinea, sometimes called as the "water tower of West Africa" is vital to maintaining the water flow of river Niger, river Senegal and river Gambia. Forests also harbour a large number of flora and fauna, many of which are endemic. The Congo basin is home to the world's second largest continuous block of tropical rainforest.

For these reasons, augmenting forest resources and enhancing their contribution to people through their sustainable utilization should lie at the heart of any green economy agenda. Yet forests and woodlands are often the subjects of disregard and low value in several countries. While low budgets and inadequate investments continue to plague the forest sector, weak governance and disincentives often drive deforestation and forest degradation. During the last decade alone, the continent lost about 3.4 million hectares of forests per year. As the health of a forest deteriorates, its functions and services are severely threatened. This undermines poor people's ability to survive and aggravates their dependence on forests, which ultimately leads to the formation of a vicious cycle of poverty and resource degradation chasing each other to the detriment of both. Continuation of this pattern can soon lead to the permanent loss of a valuable renewable resource that supported Africa for centuries.

Realizing the full potential value of forests and woodlands

The green economy approach can be a powerful means to turn the tide in favour of forests and help countries and communities realize their full potential value and progress toward a sustainable future. Specific reasons that underpin this argument include:

- Wood being intrinsically natural, recyclable, reusable, and biodegradable, it holds tremendous potential for increased use in a green economy. Such prospectus range from their use in green buildings and green infrastructure to bio-energy to recyclable parts in other applications. Many unique characteristics of wood¹ lend it to be an excellent substitute for many products that are cheap but harmful to the environment and economy.
- Forests are now at the centre of global responses to combating climate change, particularly mitigation. Associated financial incentives could change the current dynamics hugely in favour of forests. By enhancing forest stocks and ensuring their sustainable management, Africa can in fact hold the key to climate related forest financing in future.
- Africa is likely to suffer the most from human-induced climate change. For increased resilience and reducing the vulnerability, not only the loss of primary forests needs to be reversed but forest area needs to be further expanded. Agroforestry particularly holds promise as a significant component of sustainable agriculture and food security.
- Investments in forestry also offer some unique advantages such as low capital and technology requirement and

- flexibility to adapt to diverse conditions and capacities that are relevant to Africa. Forestry thus can be an engine for rural economic development.
- The strong focus on efficiency in green economy can also help to improve forest revenues. By bringing the systems of forest fees and charges better in line with market realities and by promoting effective processing, value-addition, and marketing of forest products, forest enterprises can substantially enhance the value of and income from forests. Management and technological advances can particularly help Africa leapfrog some of outmoded and resource intensive modes of production.

The way forward

However, much needs to be done to spur dramatic changes in the way policy makers view forests and to gain a wider acceptance of the role of forests in fostering green economy. It includes, foremost, policies and programmes to provide entrepreneurs the requisite incentives to promote forestry and sustainable utilization of forest resources. It also includes removal of perverse incentives that result in deforestation and degradation and conversion of forests to other uses. Creating appropriate revenue streams for forest ecosystem services such as carbon sequestration that typically have no market can also encourage forest landholders and managers to protect and restore forests. Open and decentralized systems of management can help promote efficiency and transparency and offer a diversified range of opportunities for local entrepreneurs. Importantly, as the old adage -“what gets measured gets managed”- emphasizes, systematic resource inventory and monitoring systems are also sorely needed.

¹ E.g., cyclic, solar, and safe. Cyclic: Different from a linear process of resource extraction, manufacture, consumption and disposal to a system where resource remains in perpetual use.

Bioenergy, REDD+ and the Green Economy in Africa

Monika Bertzky¹, Val Kapos², Punjanit Leagnavar³ and Martina Otto⁴

The relationship between bioenergy development and REDD+ (Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon, sustainable management of forest and enhancement of forest carbon stocks) is complex, dynamic and varies on global, regional and local scales. In Africa, activities relating to both bioenergy and the emerging REDD+ mechanism have the potential to contribute to the role of the forest sector in a Green Economy, increasing opportunities for employment as well as local economic development. The need for land for both these uses requires countries to prioritise and make choices on land use based on an

understanding of potential synergies and trade-offs. There are cases where bioenergy activities can contribute to REDD+ objectives and REDD+ can support improved (more sustainable) bioenergy development and use. However, each may also impede the other. What do governments in Africa need to consider in order to make the most of the synergies and minimise the conflicts?

Bioenergy and REDD+ in Africa

Traditionally, bioenergy use in Africa has predominantly been at a household level through the use of wood and charcoal for heating and cooking. More recently, however, a number of African countries have explored and begun to develop their potential for modern bioenergy production and use. Types of modern bioenergy development include a transition from traditional to more efficient charcoal use, liquid biofuels, solid and gaseous biofuels and bio-electricity. This development is projected to increase particularly with liquid biofuels as African demand for biofuels for transport is expected to increase in the medium term (IEA, 2011)ⁱ. Several African countries, such as Kenya and Uganda, have used agro-ecological zoning (AEZ) to investigate the national potential for growing biofuel crops; additionally, several countries have begun extensive planting programs (e.g. *Jatropha* in Mozambique). Some Southern African countries play a role in international trade of wood/ forestry residue biomass for wood pellets (IEA, 2011)ⁱⁱ. Locally, medium-scale biogas systems are now in use. Such developments may reduce oil import bills, modernise the agriculture sector, create job opportunities and support local economic development. Interest in REDD+ is also increasing in Africaⁱⁱⁱ. While Africa's contribution to CO₂ emissions is small, it accounts for almost 20% of global net CO₂ emissions from changes in land-use and land management, mainly forest degradation and deforestation^{iv} v. While the details of the REDD+ mechanism are still under discussion, including the form of financing and the specific actions it will support under different national circumstances, countries

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are moving ahead with their REDD+ preparation and pilot activities are underway. For example, Tanzania, Zambia, Nigeria and the Democratic Republic of Congo are active participants of the UN-REDD Programme. In most cases REDD+ actions will need to encompass a broad range of interventions and sectors, including the establishment of protected areas, development of forest management plans and techniques, and work with local communities to enhance livelihoods and reduce pressures on, and exploitation of forest resources. Overall, REDD+ provides an opportunity for sustainable economic growth in forested African countries.

Dynamics: Bioenergy and REDD+

Bioenergy development and REDD+ both have the potential to contribute to economic growth. However, both encompass many distinct approaches and therefore consideration needs to be given to their potential synergies and to the ways in which their activities and impacts may conflict. Where modern bioenergy development reduces pressure on forests and/or improves their management, for example by substituting traditional biomass (thus reducing local deforestation) with other more efficient technologies such as biogas and clean burning cookstoves, it can contribute to achieving the objectives of REDD+. However, where bioenergy development requires significant amounts of new agricultural land it may increase pressures on forests and emissions from forest conversion thereby conflicting with REDD+ objectives. Conversely, REDD+ programs may directly contribute to bioenergy development by providing funds to support initiatives that reduce pressure on forest by reducing use of wood fuel. However, REDD+ programs may also inhibit bioenergy development by reducing the land available for cultivation and/or restricting use of forest resources for bioenergy. Whether there are synergies or conflicts depends very much on how measures to support REDD+ or promote modern bioenergy development are implemented.

Several projects are currently using bioenergy approaches to contribute to REDD+ objectives. For example, UNEP has partnered with local organizations and communities in Douala-Edea, one of Cameroon's largest estuaries, to work towards reducing pressures on their mangrove forests (over 36,500 ha). Between 1980 and 2006 the mangrove forest area in the region was reduced by about 30%^{vi}; the need for wood fuel for fish smoking and processing activities being among the main causes for this degradation and loss^{vii}. The joint project between UNEP and local communities aims at promoting sustainable utilization, management and conservation of mangrove ecosystems through the promotion of the use of improved energy-saving smoke houses. The project is expected to reduce wood consumption by about 32%^{viii}, and fish smoking time four-fold with considerable positive impact on the mangrove ecosystem. At the same time, the project has the potential to help reduce health problems caused by indoor combustion while supporting the local economy. Another way in which bioenergy can contribute to REDD+ objectives is through sustainable production of woody biomass through reclamation or restoration of degraded forest. By helping to reduce forest related emissions or enhancing forest carbon stocks, projects such as these can contribute to achieving REDD+ objectives. Other forms of bioenergy development, such as large-scale agricultural production of feedstocks for liquid biofuels, can conflict with REDD+ objectives, principally through their demand for and use of land. The growing demand for land for the production of biofuel crops is reflected in a number of large-scale land deals in Africa^{ix}. These and other biofuel production efforts may depend either on the conversion of forest land or a change in the use of existing agricultural land. The latter can lead to indirect land use change (ILUC) as the previous use and production systems are displaced to new areas^x. In the case of Brazil, for example, bioenergy crops such as sugarcane (bioethanol) and soybean (biodiesel) are expected to contribute to 41% and 59% of

all Amazonian indirect deforestation^{xi}. Conversely again, planning and action under REDD+ can create barriers to bioenergy development by constraining the use of land and forest resources.

The long-term balance between REDD+ and bioenergy development will depend on how economic incentives for conservation, sustainable management and enhancement of carbon stocks compare with the potential gains from bioenergy development and other forms of land use. Understanding how sustainable bioenergy development and REDD+ affect each other and identifying ways of meeting both sets of needs is therefore crucial. Where such solutions are found, multiple benefits can be gained, including assuring continued supply of ecosystem services provided by forests, such as regulation of water quality and quantity, soil conservation and pollination, all of which can contribute to sustainable production of biofuel feedstocks.

REDD+ and bioenergy in a Green Economy

A Green Economy is one that not only improves human well-being and reduces inequalities, but also reduces environmental risks and ecological scarcities^{xii}. Building a Green Economy requires recognition of the importance of the many goods and services provided by the natural environment and the dependence of human well-being upon them, and active consideration of their values in decision-making. Another of the key steps in the transition to a Green Economy is making energy production and use both more efficient and less dependent on fossil fuels. Improvements to agricultural productivity and sustainability are also vital. Between them, REDD+ and modern bioenergy development can help contribute to a Green Economy.

Countries are faced with different options for future land use planning on their way towards a Green Economy. Different options for implementing bioenergy development and REDD+ have different impacts on society, environment and

economy. Careful examination of the synergies and trade-offs is essential to effective decision-making. For example, REDD+ is likely to play a particularly strong role in maintaining ecosystem services that contribute both to bioenergy development and to other economic activities and local livelihoods, but benefits for energy security may be limited. Bioenergy development clearly plays an important role in ensuring energy efficiency and reduced dependence on fossil fuels. Depending on the approaches used, it can also contribute to agricultural innovation. However, these developments may result in the loss of biodiversity and ecosystem services. Both bioenergy and REDD+ systems can provide local communities with economic opportunities if carefully designed and implemented with social inclusion and development in mind. In Africa, particular attention will be needed regarding resource rights and land tenure systems, which are complex and dynamic. Involving stakeholders in the planning process, in particular women and marginalized communities that often do not receive fair representation, will be important to help ensure the success and sustainability of land use under a Green Economy in Africa.

Opportunity cost will be another important factor in future land use planning processes. In some cases, where tension between land uses exists, the conversion of forest, for example to oil palm, may be more profitable to landowners than conserving forests under a REDD+ scheme (Butler *et al.* 2009)^{xiii}. However, under a Green Economy, minimising harmful effects of economic development on the environment is desirable. To ensure sustainability of a Green Economy, innovative policies may be needed to create a balanced policy environment that supports conservation policies without inhibiting economic development.

Conclusion

Globally, bioenergy has been seen as an important part of the solution to reducing global emissions of greenhouse gases. Many countries have also promoted bioenergy

development (particularly liquid biofuels for transport) as facilitating economic growth and energy independence. REDD+ is another important approach to reducing emissions and can also contribute to local economic growth. REDD+ and bioenergy development can be complementary where more efficient bioenergy production and use reduces pressures on forest, and where REDD+ offers support for enhancing forest carbon stocks and sustainable use of forest residues. This potential is important in Africa, where many communities rely on local forest resources for energy. However, increasing demands for bioenergy feedstocks add to the demand for agricultural land, and thus potentially compete with other land uses, exerting pressure on forest. Careful and integrated land use planning is needed to ensure that this mixed relationship between bioenergy production, forestry, and forest conservation has positive outcomes for climate change mitigation, society and environment. Careful and integrated national planning and innovative policies are essential to ensure that both REDD+ and bioenergy development contribute to a Green Economy in Africa.

Reference

International Energy Agency (2010). Technology Roadmap: Biofuels for Transport. http://www.iea.org/papers/2011/Biofuels_Roadmap.pdf

International Energy Agency (2010). Technology Roadmap: Biofuels for Transport. http://www.iea.org/papers/2011/Biofuels_Roadmap.pdf

Henry, M., Maniatis, D., Gitz, V., Huberman, D., and Valentini, R. 2011. Implementation of REDD+ in sub-Saharan Africa: state of knowledge, challenges and opportunities. *Environment and Development Economics*, 16 (Special Issue 04): 381-404.

Houghton, R. A. 2003. Revised estimates of the annual net flux of carbon to the

atmosphere from changes in land use and land management 1850-2000. *Tellus B*, 55 (2): 378-390.

IPCC 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC. <http://www.unepwcmc.org/resources/publications/>

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC. <http://www.unepwcmc.org/resources/publications/>

Feka N. Z., 2005. Perspectives for the sustainable management of mangrove stands in the Douala-Edea wildlife reserve, Cameroon; p 107

Cotula, L., Vermeulen, S., Leonard, R. and Keeley, J., 2009, LAND GRAB OR DEVELOPMENT OPPORTUNITY? AGRICULTURAL INVESTMENT AND INTERNATIONAL LAND DEALS IN AFRICA, IIED/FAO/IFAD, London/Rome.

Ernst and Young (2011). *Biofuels and Indirect Land Use Change: A Case for Mitigation*. <http://www.endseurope.com/docs/111005a.pdf>

Lapola D M et al 2010 Indirect land use changes can overcome carbon savings from biofuels in Brazil Proc. Natl Acad. Sci. USA 107 3388-93

United Nations Environment Programme (UNEP) 2010. *Green Economy: A Brief For Policymakers on the Green Economy and Millennium Development Goals*. <http://www.rona.unep.org/documents/part>

[nerships/GreenEconomy/GREENECO-MDGs_Policymakers_Brief.pdf](#)

Butler, Rhett A., Koh, Lian Pin., Ghazoul, Jaboury (2009). REDD in the red: palm oil

could undermine carbon payment schemes. Conservation Letters 2 (2009) 67–73



Africa's forests and climate change – what to do?

Mafa E. Chipeta¹

Most of the world agree that global warming is real and it is important also for forests and forestry. Therefore foresters need to come to grips with it, and seem to be doing so, with a passion. In fact the danger for African forests appears to be that climate change has largely diverted the attention of us foresters away from good old-fashioned Sustainable Forest Management (SFM) towards talking about mostly about carbon and how to REDD this, REDD that and REDD the other – here and everywhere. It would be an exaggeration to say that climate change forestry has fully displaced the pursuit of SFM but it has largely done so in many cases instead of being treated as complementary; foresters appear to have forgotten or are deliberately ignoring the fact that if SFM is well implemented, it will get them all that REDD wants and then much more.

This diversion of attention from SFM is a worry but is for another day. This time, the focus is instead on an opportunity which can *secure funding for a greener forestry economy* based on the shared interest of two sectors in climate change as a bridge for co-operation. It is being proposed that Africa develops its enormous fossil-fuel resources

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for power/energy generation and pays the penalty for pollution arising from this into funding for the continent's own carbon-capture forestry directly and but also funding agricultural productivity enhancement that also leads to carbon sequestration by reducing pace of deforestation and forest/woodland degradation.

The permanence of climate change

1. On matters of climate, only change is constant and permanent. Those who have flown over the Sahara will have seen evidence of major rivers that existed there in the past but are no more. Come another few million years, we may see the Sahara rivers full again and the desert in bloom while the lush Amazon and the Congo become a distant memory, having been converted to new deserts. A future may be possible where we could face sweltering heat at one of the poles and ice on the present equator. We should therefore never be surprised when climate changes.
2. Moreover, the impacts of climate change are not necessarily negative: it is scientific fact that over the past millions of years the earth has had repeated ice ages alternating with periods of warmth. Indeed we have climate change to thank for some very important resources which drive economic development today: (a) the petroleum now powering our economies comes from luxuriant vegetation that bloomed in many parts of the world (some of which are now deserts) from which the oil has been distilled over geological time; (b) some of the best agriculture in the world is on alluvial soils deposited as periodic ice-age glaciers retreated each time the world became warm again; and (c) some of today's major hydropower-generating plants are located where ice deepened mountain gorges.
3. Why then are we panicking? *We panic not because the climate is changing but because we are here to see it and to face its effects. Unlike earlier climate reversals into cold or hot eras, the current global warming is happening when the world is no longer under-populated but instead is crowded*

with people whose "comfort zone" as they know it is threatened. Communications technology has also developed so well that mass hysteria can be generated in no time and society can be herded into making cloned responses. We are busy scrambling to protect what we are used to. The climate we are used to may not be the ideal way for earth to exist but by now we have designed everything we do and how we do it to suit it, due to the prevailing temperatures having been stable for so long in human history terms. The changes being forced on us by the current climate change may in the greater scheme of things be a mere natural "reset" button opening up new opportunities for the earth – the only problem being that the "better future" so achieved may not have mankind as a central player.

4. Box 1 records some expected agricultural impacts, showing that Africa may be particularly hard hit by the current cycle of global warming. Given Africa's comparatively severe economic and capacity constraints, the region can only avoid being brought down (in the short term) if it takes bold steps which do not rely on unrealistic and non-feasible levels of external help to carry out. Given the severe debt-induced dislocation of major world economies, it is in any case not reasonable for Africa to expect much external assistance to propel it forward, hence the Africa-centred suggestions which follow in the last section of this note.

Climate change and Africa's forestry and agriculture

5. Even before the climate alarm was raised, Africa's forests were being cleared at alarming rates. The primary challenge for the sector in the region is the prospect that within decades no meaningful expanses of forest and woodland may remain in Africa. This arises from the fact that our agriculture (whether for food, biofuels or fibre production) is the least productive in the world and consequently our farming clears more of forests or woodlands per unit farm output than in other regions. The pressure on forests and woodlands will

persist as long as we practice low-input/low-output agriculture: against a realistic global average of 5 tons per hectare, cereals in Africa at present yield only 1.0 – 2.0 tons per hectare while the developing country average is some 3.5 tons/ha. *Obviously, with such low productivity of cereals, we in Africa are deforesting our land at 3 to 5 times the rate we should be causing if our agricultural productivity were raised.*

6. The current round of global warming could exacerbate this problem. We as African foresters are already worrying: in addition to faster forest loss, are our natural forests going to die, fail to regenerate or grow fast enough?; will forest/woodland fires, pests and diseases become even more frequent than now? will the familiar deciduous evergreen or savanna woodland species be replaced by different types or even (God forbid) by mere shrubs? *It is worth stressing that we are talking of the near future (i.e. the coming years and decades); in millions of years time, it is a matter of indifference whether Africa will have become the top agricultural performer – that will not save its forests from threats that are occurring now and can be worsened by the current cycle of global warming.*
7. Unfortunately, most of our forests currently suffer benign neglect – indeed, we often plead poverty to justify our failure to achieve SFM, including of our protected areas. Yet nowadays it is often not shortfalls in SFM that we foresters talk about - we are busy using our limited capacities to negotiate and prepare projects for capturing carbon or to adapt to a warmer world. *For us in Africa, "climate change forestry" has far too often come to replace rather than to supplement mainstream SFM of the whole resource.* If we were at least putting the talk of REDD and other climate change forestry into practice, perhaps things would not be so bad; the reality however, is that carbon investments are largely occurring outside our region. We are not investing our own money in it and we are singularly unsuccessful in attracting foreign funds

too. Unlike the HIV/AIDS sector, where funds for combating the pandemic are routinely used to also upgrade general health services, we are yet to systematically use climate change as a bait to attract greater sector funding for application to generalized SFM achievement.

8. FAO/IIASA modelling shows that Africa will be the hardest-hit region by the current cycle of global warming. Therefore its already catastrophically low levels of farm productivity could go even lower and become more unpredictable. While our high birth rates are already driving rapid deforestation (including in environmentally fragile locations), adverse climate could by lowering farm productivity accelerate this further. If this were to happen, we in Africa would further lose capacity to contribute to climate mitigation and to effectively adapt to climate change.
9. To the fundamental question of how, despite climate change, Africa can save its remaining forests and woodlands so that they can continue to make their economic, social and environmental contributions in future, the most important answer must be that *our countries must prioritise raising agricultural productivity in order to arrest further clearing, denudation and other reduction of forests, woodlands and other tree cover*. In the very long term (geological time) we can of course pray that future climate reversals will favour Africa, but that is a subject for another day. Some school of thought would say that it is true that there has been climate change before but there has never been human induced climate change before, which is what we have now.

Box 1: Under the Current Global Warming: Africa Will Be Hit Hard

Under the current cycle of temperature change, global mean surface temperature is projected to rise in a range from 1.8°C to 4.0°C by 2100. Modelling continues on expected changes and impacts, of which a pioneering effort was under the FAO/IIASA Agro-Ecological Zones (AEZ) methodology. Examples of some indicative results (all being in the future tense, being projections) of this and other modelling efforts are given below:

A. On balance:

- FAO reports that climate-change impacts are not location-neutral; for example, between 2000 and 2004, around 262 million people were affected by climate-related disasters but of these, *98 percent lived in developing countries*.
- It appears climate change will favour altitudes where the industrialised countries that currently dominate agricultural surpluses. *Developed countries will largely benefit since cereal productivity is projected to rise in Canada, northern Europe and parts of Russia*. In contrast, many of today's poorest developing countries are likely to be negatively affected - *most severely affected will be sub-Saharan Africa due to its inability to adequately adapt through necessary resources or through greater food imports*.
- The unequal current patterns will be worsened (most hunger in the "developing tropics" but most food surpluses in the "developed temperates") - *access to food will, even more than now, depend on capacity to purchase, not to produce*.
- If the developing countries remain dominated (especially in Africa) by low-input/low output farming, the future for forests and other natural vegetation will be bleak: new land clearing could accelerate even more and destroy biological resources and economically productive vegetation too.

B. Positive:

- Global agricultural potential is likely to increase with increases in global average temperature up to about 3°C, but above this is likely to decrease.
- Some change may be positive for instance reduced plant water use and "CO₂ fertilisation" (CO₂ is a limiting factor of plant growth, increasing CO₂ also increases plant yields).
- At higher latitudes (i.e. far from the equator) cold climates would benefit from higher temperatures, and new agricultural land may become available at high latitudes and high elevations - there could be significant expansion of suitable land with production potential for cereals.
- China's (more temperate) rainfed cereal production potential of 360 million tons could increase by 15%.

C. Negative:

- At lower latitudes (i.e. closer to the equator), especially the seasonally dry tropics, crop yield potential is likely to decrease for even small global temperature increases, which could increase risk of hunger; there are likely to also be more frequent droughts and floods.
- About 11% decrease in cultivable rainfed land, with consequent decline in cereal production. Sixty-five developing countries, representing more than half the developing world's total population in 1995, will lose about 280 million tons of potential cereal production valued at US\$ 56 billion, equivalent to some 16% of the agricultural gross domestic product of these countries in 1995 (if price averages US\$ 200 per ton).
- Increase in arid and moisture-stressed lands: in Africa the 1.1 billion hectares of land with growing period of less than 120 days could, by 2080, expand by about 50 - 90 million hectares - this reduction in the area suitable for agriculture and in length of growing seasons and yield potential, will increase risk of hunger.
- It has been estimated that the aggregate negative impact of climate change on African agricultural output up to the 2080-2100 period could be between 15 and 30 percent.
- Sub-Saharan Africa's share in the global number of hungry people could rise from 24 percent to between 40 and 50 percent, depending on model scenarios. The dependence of developing countries on food imports will increase.
- India (being largely tropical) could lose 125 million tons, equivalent to 18% of its rainfed cereal production
- By 2050 the world's population will be 34 percent higher than today, with nearly all the increase being in developing countries. To meet the necessary increase in food production, the use of fertilisers, energy, and greenhouse gas emissions especially of livestock (meat supply) will be considerable.
- If there is diversion of considerable grain to biofuels, there could also be considerable risk to food security.

An opportunity for foresters to grasp?

10. "Never let a crisis go to waste" is an adage Africa could usefully heed in matters of climate change response. It is necessary to see the silver lining in what is far too often portrayed in the gloomiest of terms – there must be developmental opportunities to craft from the climate change crisis. But to do this will require action across sectors: the proposal below is for exploitation of one African resource to generate funding for anti-climate change actions in forestry directly and through agriculture.
11. The proposal is that we demonstrate to our governments that given our abundant fossil fuel reserves (coal, petroleum), we should develop our power (energy) generation capacity based on these fossil resources (and perhaps some biofuels) rather than trying for currently less cost-effective renewable alternatives (solar, wind)¹. However, given their heavy carbon footprint, the fossil-fuel-based power generation industries should be forced to buy the right to pollute by financing carbon capture or reduction of current levels of carbon release through forestry and agricultural actions within Africa. This mechanism would thus serve as direct funding for a green economy in forestry.
12. This would be the key to securing assured funding for forestry and agricultural productivity enhancement i.e. the linking of exploitation of Africa's large reserves of fossil fuels (both coal and petroleum) to Africa's own

¹ Other regions continue to use these fossil fuels to much greater degrees than Africa; there is a worrying tendency for African countries to be easily pressured away from using their coal for power while being encouraged to export it so that others can then use it in no less polluting ways than if it had been burned in Africa in the first place.

agricultural and forestry development through climate change mechanisms. This decision to require an intra-Africa sectoral link is political and is therefore the more difficult part; the mechanics of funding transfer pose no difficulties, since this would be merely an all-Africa variant of tried and tested carbon-trading regimes that are already being applied at global level. The logic is as follows:

- a. Africa needs to develop its energy generation so as to allow industrialisation and better human livelihoods;
- b. The easiest and least costly way to generate energy in Africa will be exploitation of coal and petroleum reserves²;
- c. Since coal and petroleum power generation is a fossil carbon emitter activity, Africa will need to buy the right to use them for power generation: the power sector would therefore be obliged to pay for this right of use (which is thus a right to pollute). *The global danger level is in fact negligible – Africa has only about 2% of global power generation and so even if this is multiplied five-fold, the net global impact will be minor;*
- d. The beneficiary of the payments should, however, not be the general global carbon budget –or the corporate carbon budget of non-African parties, but Africa's finance-starved carbon-sink sectors i.e. payments from the African power industry should go to fund:
 - o accelerated agricultural productivity enhancement measures;
 - o afforestation and forest conservation under an "Africa-REDD" regime (as one of the ways of mitigating climate

² With biofuels as next least costly supplements; renewable solar and wind technologies will for long be so much more expensive in Africa as elsewhere, while nuclear is technologically too much of a challenge in the region.

change is reforestation, which would not only mitigate climate but also have the enormous benefit of creating jobs on a large scale. Reforestation could and should be a priority where payments from the African power industry should go); and

- ecologically sound biofuel production under high-productivity approaches ranging from sugar, starches, biological oil fuels, and wood (efficient charcoal and firewood).
13. Global carbon-trading mechanisms already exist but we in Africa have only captured a marginal share of the market to date: We need to correct many weaknesses if the intra-Africa carbon trading funding mechanism proposed above is to work. Here are some of the weaknesses we faced under the Kyoto regime which we must defeat if we are to succeed: our small producers are disorganised; our institutions are weak; we have failed to be entrepreneurial in the post-Kyoto carbon environment; and our costs have been too high for certifying how much carbon we have conserved (by avoiding deforestation), how much we have freshly captured (by plantation in concentrated or scattered / dispersed fashion). It has not helped that we also failed to develop low-cost assessment / certification procedures for carbon valuation, as a result of which we continue to rely on experts from distant countries, whose cost is often unaffordable for our small-scale operations.
14. Do we as African foresters have the will to capture the above opportunity?; are we confident enough about our REDD science to sell it to the economic leaders?; can we sell an Africa-focused REDD to the power sector so as to simultaneously uplift and make more “green” our own sector directly and through agriculture? What can we do to make an Africa carbon trade regime

work when we have failed so far to capture a decent share of the global trade in carbon both under the Kyoto and successor regimes? Finally, shall we be able to place all this under the SFM umbrella, which is where it really belongs, rather than being an outlier flying at a tangent?

Selected reading

Climate change 2000: synthesis report, by R. Watson and the Core Writing Team, eds. Cambridge, UK. Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press.

Global climate change and agricultural production: direct and indirect effects of changing hydrological, pedological and plant physiological processes. FAO, 1996

World Agriculture towards 2015/2030: An FAO perspective. FAO, Rome, 2003.

Impact of Climate Change, Pests and Diseases on Food Security and Poverty Reduction. Background Document: Special Event at 31st Session of the Committee on World Food Security. 23-26 May 2005 [Brief prepared by Anna Carla Lopez, Food Security and Agricultural Projects Analysis Service, FAO Rome].

Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. Summary for Policy Makers (Final draft). (Fourth Assessment Report; Under Government Review). Working Group II to the Intergovernmental Panel on Climate Change.

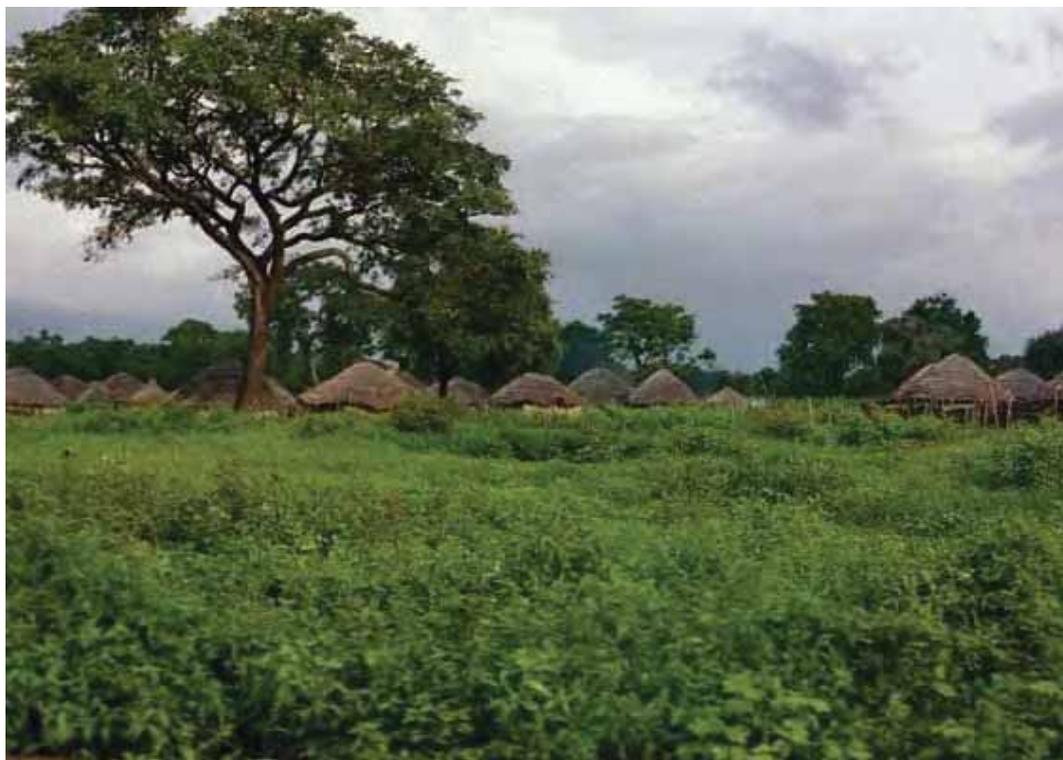
<ftp://ftp.fao.org/docreg/fao/011/i0765e>

How to Feed the World in 2050 – FAO. http://www.fao.org/fileadmin/template_s/wses/docs/expert-paper/how_to_feed_the_world_in_2050.pdf

Agriculture and Environment Challenges of the Twenty-First Century: A Strategic Approach for FAO. Doc COAG/2009/3: 21st Session of the FAO Committee on Agriculture. Rome 22-25 April 2009

Impact of Climate Change on Food Security and Implications for Sustainable Food Production. Document CFS: 2003/INF/12. FAO, Rome

Welcoming Remarks by Mrs Sebueng Chipeta. SADC Regional Workshop on Forests and Climate Change and the SADC Forest Protocol. (Gaborone, Botswana, 12 May 2009).



Timber legality definition: Does consistency matter for EU FLEGT partner countries?

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Summary

Demand side timber procurement policies such as the EU FLEGT Action Plan could impact positively on timber-producing African countries' efforts in attaining a green economy through Voluntary Partnership Agreement (VPA). Although VPAs have the potential of ensuring responsible purchasing, there is a need for setting consistent minimum requirements for "legal timber". Agreement on such standards could help contribute effectively to sustainable forest management in VPA partner countries using VPA as a trade instrument. The concept for legal timber definition in VPAs is good and respect sovereignty issues; however this paper argues that it has a downside of not clearly setting consistency in the minimum requirements for legal timber.

Introduction

In recent times, global interest in timber legality is increasing. There are strong indications that verification of timber legality can contribute to better governance and forest management and conservation and, also, help ensure that forests contribute to economic growth and poverty reduction in a sustainable manner. Countries that have signed the Voluntary Partnership Agreement (VPA) are using the concept as a governance tool to ensure that their forests become part of a green economy. This may

manifest in several ways which include among others: (i) securing legal rights to timber harvest and use; (ii) reducing illegal access and trade in timber products; (iii) increasing revenue to the state and recognized beneficiaries through improved collection of relevant forest fees and taxes; and (iv) VPA partner countries will secure market share of timber products traded with the European Union (EU).

The objectives of the EU procurement policies have been to ensure that purchases and import of timber products do not contribute to forest degradation and loss in the exporting countries, while at the same time providing leadership and helping to set standards in the timber product markets. The coming into force of the EU Forest Law Enforcement Governance and Trade (FLEGT) Action Plan² has demonstrated that VPA³s have the potential to meet the objectives of both private and public timber and timber products procurement policies. As many countries develop procurement policies to avoid the use of illegally sourced timber and timber products, illegal logging may reduce at both national and global scales. It is also increasingly becoming apparent that VPA may contribute to the realization of sustainable forest management practices. This is because through VPAs legality issues such as use rights to forest, compliance to harvesting and environmental regulations and social obligations, which are all fundamental requirements for sustainability, may be clearly defined and enforced through stakeholder engagements.

Legality definitions from VPAs are an indication of the set of core laws which are not only relevant to partner countries but

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² A plan that was approved by the European Union Council in October 2003 and which aims at supporting timber producing countries; favouring the purchase of legally harvested timber; and promoting sound timber products procurement policies and support for private initiatives.

³ A bilateral trade agreement based on EU FLEGT action plans that govern trade in legal timber products between the EU and producer country.

are also acceptable to major stakeholder groups. More importantly, the bilateral nature of VPAs allows exporting and importing partner countries to negotiate what constitutes legal timber. Although defining “legal timber” in the context of individual VPAs respects sovereign rights of countries concerned, this paper argues that this practice has the downside of leading to a lack of *consistency as regards common, minimum requirements* for the concept.

Legality Standard Development through the EU FLEGT Initiative

The EU FLEGT initiative (EU-FLEGT Briefing Note 2, 2007) provides guidance to prospective VPA partner countries on (i) What elements should be included in a legality definition; (ii) the process for deciding which laws are to be included in a definition for legality, through wide consultation with all interested parties; and (iii) adopting definition for legality (or implementing policies based on an explicit definition of legality). Examples provided by the Briefing Note as those likely to be included in the definition of legal timber are:

- Granting of and compliance with rights to harvest timber within legally-gazetted boundaries;
- Compliance with requirements regarding forest management, including compliance with relevant environmental, labour and community welfare legislation;
- Compliance with requirements concerning taxes, import and export duties, royalties and fees directly related to timber harvesting and timber trade;
- Respect for tenure or use rights to land and resources that may be

affected by timber harvesting rights, where such rights exist;

- Compliance with requirements for trade and export procedures.

However, the lack of clearly stated minimum requirements for timber legality has allowed countries that have signed VPAs with the EU to fashion definitions suitable for individual countries, thereby encouraging an open-ended definition for legal timber.

Comparative Analysis of Timber Legality Elements in Selected VPA Partner Countries

Five selected countries, namely Ghana, Liberia, Cameroon, Republic of Congo (ROC-Brazzaville) and Indonesia have all signed and agreed to implement VPAs, though at different times. Ghana was the first to initiate a VPA in September, 2008 and Indonesia and Liberia are the most recent ones of these countries to sign VPAs, in May 2011. Apart from Indonesia and Liberia all the other countries have shown further commitment by ratifying the agreement. Currently all these countries are at the system development phase of their respective implementation planning process. From the EU side, the import of FLEGT licensed products will be mandatory in the Region from year 2013. The speed with which any of the VPA partner countries may show leadership in implementing this trade instrument would be influenced by country-specific definitions of “legal timber”, and the compliance system put in place. Table 1 provides indicative numbers of key legality subject areas/principles used in the five countries studied.

Table 1: Legality Principle /Subject Area used per Voluntary Partnership Agreement (VPA) Partner Country

VPA Partner Country	Timber Legality Principles/Subject Areas used in the Definition	Total Number of Key Principles/ Subject Areas
Ghana	<p>(i) Source of timber including land ownership: Examples of areas for compliance include forest management plans and written consent of landowners; clear delineation of boundaries of various forest zones.</p> <p>(ii) Allocation of timber rights: A key element for compliance is transparent and competitive timber rights allocation process.</p> <p>(iii) Timber harvesting operations: Examples of areas for compliance include forest resource inventory, timber harvesting within productive and approved areas; logging and environmental standards.</p> <p>(iv) Transport: Examples of areas for compliance include timber transport documentation and time of transport.</p> <p>(v) Processing: Examples of areas for compliance include timber processing standards and health and safety issues.</p> <p>(vi) Trade: Examples of areas for compliance include registration of business and acquisition of export license.</p> <p>(vii) Fiscal obligations: Examples of areas for compliance include payment of stumpage fees, ground rent, export levies, and corporate income taxes.</p>	7
Republic of Congo (ROC-Brazzaville)	<p>(i) The necessary administrative pre-conditions for every forestry enterprise: Examples of areas for compliance include valid license for company's business; clear delineation of boundaries of subdivision of forestry concession.</p> <p>(ii) The right of access to forest resources within areas of operation: Examples of areas for compliance include grant of certificate of exploitation of natural forest; land title deeds for plantation; operational license, etc.</p> <p>(iii) Social obligations associated with individual concessions, such as the use of local labour, or the participation of local communities and indigenous people.</p> <p>(iv) Forest management, harvesting and processing of timber: Examples of areas for compliance include preparation of management plans and inventory report; logging standards; environmental impact studies; timber processing standards.</p> <p>(v) Transport and sales of timber: Examples of areas for compliance include timber transport documentation; identification and traceability of marketed products.</p> <p>(vi) Fiscal obligations: Examples of areas for compliance include payment of all relevant taxes and social security contributions.</p>	6
Cameroon	<p>(i) Forest management, harvesting, and processing operations: Examples of areas for compliance include forest management and logging rules; industrial requirements; health and safety in forestry operations.</p> <p>(ii) Transport: Examples of areas for compliance include timber and derived product transport documentation; regulatory marking of timber to certify legal origin.</p> <p>(iii) Social obligations include among others compliance with employment, social security and labour laws.</p>	5

VPA Partner Country	Timber Legality Principles/Subject Areas used in the Definition	Total Number of Key Principles/Subject Areas
	<p>(iv) Environmental obligations: Examples of areas for compliance include biodiversity and environmental protection.</p> <p>(v) Administrative and fiscal obligations; Examples of areas for compliance include legal authorization of logging/processing forestry entity to operate; payment of relevant business and forestry tax obligations.</p>	
Liberia	<p>(i) Legal eligibility to operate in the forestry sector includes for example the forest contract or permit holder is a legally recognized business, community or an individual.</p> <p>(ii) Allocation of rights to harvest forest includes for example compliance with the National Forestry Reform and Community Rights laws.</p> <p>(iii) Social obligations of contractors to local people include for example compliance with benefit sharing requirement and negotiated social agreements.</p> <p>(iv) Forest management standards for operations and harvesting to ensure sustainability (v) Environmental obligations include for example compliance with environmental impact assessment.</p> <p>(vi) Regulation of timber transport and traceability obligations include for example compliance with timber products transport documentation and chain of custody requirements.</p> <p>(vii) Timber processing requirements include for example compliance with relevant laws and regulation governing transformation and recording of timber products to ensure traceability</p> <p>(viii) Workers rights, health, safety and welfare in forestry operations.</p> <p>(ix) On-time payments of all taxes and forest fees as required by law.</p> <p>(x) Export and trade requirements include for example official registration of exporter; shipment of logs and timber products are in compliance with chain of custody system</p> <p>(xi) Transparency measures and information disclosure include for example making trade statistics information regularly available to the public.</p>	11
Indonesia	<p>(i) For state-owned natural and plantation forests, the principles cover: (a) the legal status and of forest areas to be harvested, and right to utilize the forest; (b) compliance with the legal requirements for harvesting; and (c) compliance with the environmental and social aspects related to harvesting.</p> <p>(ii) For privately-owned forests, the principles cover: the ownership of the timber as it relates to the area harvested, the logs, and the trading of logs; cross checked for traceability.</p> <p>(iii) Other timber harvesting permits: regulation of logging from non-forest zones (e.g. agricultural landscapes) that may or may not lead to forest conversion.</p> <p>(iv) In addition, there is a general legality standard covering the management of the supply chain timber, from the forest through processing to the point of export.</p>	7

Observations from some VPA Partner Countries on Legal Timber Definition

In countries that have signed VPAs, existing relevant national laws have served as the pillars around which timber legality has been defined and framed. However, it has been observed that:

- Liberia has a relatively lengthy legality definition that includes a principle on transparency measures and information disclosure (see VPA Briefing Note, 2011). This principle arguably relates more to the overall VPA governance rather than timber legality. Although, in theory, the elaborate definition of legality for Liberia has the potential to enhance good forest governance, one may have to wait and see how effective the VPA implementation plays out in Liberia.
- In Ghana and Indonesia some laws relating particularly to source of timber and access to timber right were found to be inconsistent and/or conflicting, rendering the definition of legality prone to different interpretations. For instance, the laws of Ghana recognize and accept timber confiscated by the Government in its supply chain, once originally illegal timber has gone through the required court procedures and issued with a certificate of purchase (Ghana VPA Document, 2008). This, however, appears to defeat the spirit and intent of the legal timber definition. In Indonesia, unlike the other VPA partner countries, the legality standards recognize differences in scale and size of timber production. The standards have been designed to meet timber from large-scale enterprises, focusing on the export market; and timber from small to medium scale enterprises which focus on the domestic market (Indonesia Forestry Production Development's Regulation, 2009).
- Further, Indonesia distinguishes between private (or communal) and publicly owned forests in the demonstration of legal compliance (VPA Briefing Note, 2011). It is a composite standard, providing separate criteria

and indicators for four different forest classifications: state forest, management unit-based; state forest, non-management unit-based; state forest, community managed; and propriety rights forest and non-forest areas (VERIFOR and FAO, 2009). By recognizing such differences within a standard there is a higher likelihood that the system will complement broader national development strategies of meeting the needs of small to large scale enterprises.

- Cameroon (VPA Briefing Note, 2010) and Congo Brazzaville (VPA Briefing Note, 2010) appear to include fewer principles for the legality definition (Table 1), however, most of the essential elements necessary to impact on timber legality are covered.

Potential Benefits of Adopting Consistent Minimum Timber Legality Definition

Country specific conditions allow for some differences in defining timber legality. This notwithstanding, consistent minimum requirements for timber legality, common to all VPA partner countries from the beginning of the negotiations is being advocated with the view of providing the following benefits:

- Stronger and better basis for VPA impact monitoring across the different VPA partner countries;
- VPA partner countries better placed to draw informed lessons through VPA implementation in the different countries;
- Terminology for concepts such as principles, criteria, indicators and verifiers, as used to define legal timber, would be well spelt out, commonly understood and agreed upon in order to reduce ambiguity;
- Layout and design of the timber legality definition/matrix would be standardized for easy adoption in all VPA partner countries;
- Facilitating common understanding of timber legality among African countries and thereby promoting regional trade in legal timber would be promoted;

- Engagement by the EU with the different partner countries would be less time consuming and more efficient as regards the use and allocation of manpower and financial resources;
- Potential “leaks”, based on differences in the definition of legal timber and country-specific differences in the interpretation of applicable laws, would be reduced.

Recommended Guiding Policy Notes on Timber Legality Standards

1. VPA partner countries should be given assurance that, although timber legality limits exploitation to what is sustainable in a green economy, the VPA provides opportunity for timber industry players to stay in business, adopt better traceability systems and efficient wood utilization practices that will ensure optimal economic and environmental benefits from the forest resources.
2. Supply side requirements for timber legality, if not guided by consistent minimum requirements, may show large differences (implicit or explicit) amongst producer countries. This could potentially distort trade and erroneously place VPA as a “convenient” market instrument for demand side countries at the expense of promoting sound policies and sustainable forest management in the producer countries.
3. Clear policy statements about timber legality based on defined, consistent minimum requirements for legal timber which positively impact forest policies, sustainable forest management and trade should be well articulated in the VPA process. Elements that do not directly impact on timber legality but enhance broader forest governance can

4. be considered as “legality plus” (e.g. workers’ rights, and health and safety issues).
5. Controversial sources of timber that may compromise implementation of the principles of timber legality should be avoided (e.g. legally disputed production forest areas and confiscated timber).

References

FLEGT Briefing Notes Series. 2007. Briefing Notes Number 02- What is legal timber? Prepared by an expert group convened by European Commission. 2 pp.

Indonesia Forestry Production Development’s Regulation. 2009. Director General of Forestry Regulation Number P.6/VI-Set/2009- Standards and Guidelines on Assessment of Performance in Sustainable Production Forest Management and Timber Legality Verification. Jakarta, Indonesia. 46 pp.

VERIFOR and FAO. 2009. Meeting the challenge of timber legality verification. A policy brief prepared for VERIFOR and FAO. Rome. 10pp.

Voluntary Partnership Agreement (VPA). 2008. FLEGT VPA between Ghana and the European Union. Accra, Ghana. 50 pp.

VPA Briefing Note. 2010. FLEGT VPA between Cameroon and the European Union. Yaoundé, Cameroon. 11 pp.

VPA Briefing Note. 2010. FLEGT VPA between Republic of Congo and the European Union. Brazzaville, Congo. 21 pp.

VPA Briefing Note. 2011. FLEGT VPA between Indonesia and the European Union. Jakarta, Indonesia. 10 pp.

Sustainable Forest Management based on State Practice in Central Africa Countries

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Summary

This piece of writing briefly reviews the interpretation of the concept of sustainable forest management (SFM) deduced from state practice in some Central Africa countries. This assessment of SFM practices draws upon the earlier and highly variable definitions of sustainable development. It demonstrates that some progress has been made in terms of the more nuanced meanings of SFM now adopted by States in Central Africa. This reflects the fact that it is difficult to find a good balance between the three functions (economic, social and environmental) which structure the concept of SFM. Congo Basin countries seek to translate SFM by institutionalizing and implementing forest concessions, protected areas and community forestry. However, these efforts have been hindered by some governance shortcomings.

Background

In 1991 Sharachchandra Lele published a review of the concept of 'Sustainable Development' (SD) which by then had

been widely adopted by both governmental and nongovernmental organizations (NGOs) as a new paradigm of development. This critical review highlighted the lack of consistency in its interpretation, and a number of weaknesses which had led to inadequacies and contradictions in policy making in *inter alia* the forest sector (Lele, 1991). The concept of SD resulted in a proliferation of meanings – already over forty definitions by the late 1980s (Pearce et al., 1989). These did not reflect a simple exercise in academic or practical clarification but a highly political process of 'different interests with different substantive concerns trying to stake their claims in the sustainable development territory' (Dryzek, 1997).

Balancing the economic, social and ecological functions of tropical forests is challenging. Consequently, forest sustainability is often reflecting conflicts of interests and power unbalanced amongst forest stakeholders (Davenport et al., 2010). As a result, Tladi (2007) proposes a variation in approaches to integrating the three pillars of sustainability that have emerged from the SD discourse. These various approaches are distinguishable on the basis of the three functions that take priority in the case of trade-offs between them i.e. in terms of the economic, environmental and social welfare benefits of forests.

Central Africa is the second largest continuous block of rainforests on the planet after the Amazon Basin. Although degraded in some areas, forest cover is relatively well preserved overall (Eba'a Atyi et al., 2009). In 1999, the Heads of State of Central Africa sub-region expressed their joint commitment to work towards SFM through the Yaoundé Declaration. This positive political will to promote SFM was further shored up in 2005 by the adoption of the Brazzaville Treaty on Conservation and SFM in Central Africa. This article reviews the current meaning of SFM based on actions of individual countries within the Congo Basin.

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It draws on legal materials and conduct of national governments.

Sustainable Forest Management in Central Africa

The concept SFM, calls for a realistic balance between the economic, social and ecological functions of forests in the development of policies, attendant regulations and implementation strategies. The achievement of this balance is often tricky in view of the trade-offs between these three functions of sustainability. This is why the authors prefer to use the explanatory model of Tladi (2007) on the variable integration of the underlying functions of the concept of SD. To further clarify his model, Tladi (2007) provides two explanations. First, SD is based on the integration of the three underlying functions of sustainability. Consequently, there is no exclusion of any of the three functions. The economic and social functions have an anthropogenic origin because both place human needs over and above longer-term ecological sustainability.

The transposition of Tladi's theoretical explanatory model of SD to the forest sector in Central Africa sub-region suggests the following: given that the concept of SFM includes the ecological, social and economic functions, there are three variations of forest sustainability. These are determined by the three functions of forests, in the event of trade-offs between them. The first variation presupposes that in a forest area where the management option favours economic returns as for example the case with most forest concessions - the economic function tends to prevail over the two others; but without excluding them completely. In reality, the aim is to reduce the social and ecological functions in the case of conflict with the dominant economic function in forest concessions. The second variation implies that in a forest area where the SFM option is social with the aim of prioritizing devolved authority for forest management - as is the case with community forest and Co-management of some forest areas - the social function may be prioritized more than the two others. In the case of trade-offs, the

ecological and economic function must yield to the social function in this context. The third variation presupposes that in a forest area intended for conservation, - such as protected areas the ecological function will take priority over the other two functions.

The variation in the integration of the functions of SFM derived from Tladi's explanatory model of sustainable development tends to reflect with States practice as outlined in most legislation in Congo Basin countries. In most of the forest legislation and attendant regulations currently in force in several Central African countries, a fundamental distinction is made between forest concessions; protected areas and community forest. These forest classifications reflect to certain extent, the distinction of three functions of SFM through the allocation of forest areas for specific purposes. Forests are commonly classified according to their purpose or use (Bigombé & Dabiré, 2002; CBFP, 2006). Production forests such as forest concessions have a prevailing economic function. They provide economic benefits to private sector operators and generate taxes for the State to help public finance and other development activities and also a portion of Forest Annual Fees Area to some local councils and communities (Cerutti *et al.*, 2010). Accordingly, it would be logical to give priority to economic production activities in a forest allocated for timber harvesting, in the case of a trade-off between the three underlying functions of sustainable management. However, this does not mean that the social and ecological functions should be systematically banned. In fact, the difficulty to find a suitable balance between the three functions of sustainable forest management may actually favour the adoption of a legislative/regulatory process to allocate/classify forest areas. In contrast, in a forest area earmarked for protection, the ecological function should prevail in the event of trade-offs with two other functions (economic and social). In effect, in any type of protected areas, the conservation of plant and wildlife species should take the upper hand over social and economic values. But

again, this does not imply the total exclusion of the social and economic functions. In some countries efforts have been made to foster greater engagement with communities living around protected areas with the aim of ensuring more effective protection whilst allowing small-scale extraction of Non wood forest products to meet subsistence needs and household income. The aim is to ensure that all stakeholders around the protected area comply with the main purpose of protecting the forest area by giving priority to the ecological function.

Another example is that in most Congo Basin countries, there is a clear distinction between the permanent forest estate and the non-permanent forest estate (CBFP, 2006). The latter is reserved mainly for agro-forestry and community forestry activities with local communities. The permanent forest estate is intended for production and conservation purposes. Tladi's explanatory model can also be applied at the ground level. From this perspective, it is possible to note that stakeholders in a forest arena act according to their main interests. However, given that such interests are often conflicting, management and use decisions have to be in line with the nature of the legal classification of the forest to be used. In the context of a protected area set up where the surrounding local population claim historical rights to the land the theory of co-management of natural resources (Borrini-Feyerabend et al., 2004) can enable the various stakeholders (park managers, local communities, NGOs, and the local and national government administration) to arrive at a minimum consensus which can reconcile the main objective of the forest (conservation), with the secondary objective :promotion of the rights of local communities (Haller & Galvin, 2008). In practice, the blurred boundaries between protected areas and customary agroforestry landscapes are porous, and subject to continuous re-negotiation (Wardell & Lund, 2006). This does not imply abandoning the other forest functions, but rather seeks to

find solutions and trade-offs between them. In the case of certifying a forest concession, the evaluator first tries more or less to give priority to the economic function before considering the ecological and the socio-cultural functions. This was confirmed by comparing the social function inside and outside a certified concession to two other concessions without certification managed by three different economic operators (Cerutti et al., 2011). This comparative study showed that quality of living standards and the respect of the rights of the local communities and national employees had not significantly improved even in the certified concession. Social claims persist even in forests that have been certified in spite of many promises made during forest certification (Cerutti et al., 2011).

Concluding remarks

The transposition of Tladi's model drawing on the concept of sustainable development to SFM in Congo Basin countries demonstrates that some progress has been made to translate such generic principles into operational principles at the ground level. State SFM practices distinguish between the economic, social and ecological forest functions in most national forest legislation and regulation, with forest areas generally allocated for specific purposes. The key task is how to achieve a balanced approach to SFM according to each of the three priorities outlined by Tladi in the different forest areas. According Eba'a Atyi et al. (2009), the progress of Central Africa countries towards SFM comes from the implementation of forest management plans, advances in forest certification and trends of greater involvement of forest dependent communities in SFM, as well as the sharing of benefits generated by all stakeholders. However, these efforts have been to date undermined in the Congo Basin countries by continuing governance challenges (especially illegal logging, corruption) and the unregulated operations of the informal sector, coupled with limited access to information.

References

- Bigombé, L.P & Dabiré, A.B. 2002. *Gérer autrement les conflits forestiers au Cameroun*. Yaoundé : Presses de l'UCAC.
- Borrini-Feyerand, G., Kothari, A., Oviedo, G. 2004. *Indigenous and Local Communities and Protected Areas: Towards Equity and Practices for Co-managed Protected Areas and Community Conserved Areas*. Gland: IUCN.
- CBFP. 2006. *The Forests of Congo Basin: State of the Forest 2006* available at www.cbfp.org
- Cerutti, P.O., Assembe-Mvondo, S., German, L., Putzel, L. 2011. Is China Unique? Exploring the Behaviour of Chinese and European Firms in the Cameroon Logging Sector. *International Forestry Review* Vol. 13 (1): 34-39.
- Cerutti, P.O., Lescuyer, G., Assembe-Mvondo, S & Tacconi, L. 2010. The Challenges of Distributing Forest related Monetary Benefit to Local Governments: A Decade of Logging Area Fees in Cameroon. *International Forestry Review* Vol.12 (2): 130- 138.
- Davenport, D., Bulkan, J., Hajjar, R & Hardcastle, P. 2010. 'Forests and sustainability'. In, Rayner J, Buck A, Katila P (Eds). *Embracing Complexity: Meeting the Challenges of International Forest Governance*. Vienna: IUFRO World Series Volume 28, p. 75-92.
- Dryzek, J.S., 1997. *The Politics of the Earth* OUP, New York.
- Eba'a Atyi, R., Devers, D., De Wasseige, C., Maisels, F. 2009. 'State of the Forests of Central Africa: Regional Synthesis'. In, De Wasseige C, Devers D, De Marcken P, Eba'a Atyi R, Nasi R, Mayaux Ph (Eds). *The Forests of Congo Basin: State of the Forest 2008*. Luxembourg: CBFP, p 17- 44.
- Haller T & Galvin M. 2008. 'Introduction: The Problem of Participatory Conservation'. In, M. Galvin M, Haller T (Eds.) *People, Protected Areas and Global Change: Participatory Conservation in Latin America, Africa, Asia and Europe*. Bern: NCCR North-South, p 13- 34.
- Lele, S.M., 1991. Sustainable development: a critical review. *World Development* 19 (6): 607-21.
- Pearce, D., Markandya, A & Barbier, E.1989. *Blueprint for a Green Economy*. London: Earthscan.
- Tladi D. 2007. *Sustainable Development in International Law: An Analysis of Key Environ-Economic Instruments*. Pretoria: Pretoria University Law Press.
- Upton C & Bass S. 1995. *The Forest Certification Handbook*. London : Earthscan.
- Wardell, D.A. & Lund, C. 2006. Governing access to forests in northern Ghana. Micro-politics and the rents of non-enforcement. *World Development* 34 (11): 1887-1906.

Community forestry and the challenge of aligning with Cameroon's green economy

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Initiated more than two decades ago through forest legislations and policy reforms in Cameroon, community forestry has experienced mixed opportunities partly due to its evolution. After humble beginnings, it is now better established due to a review of the legal framework. With the demand for environmental standards, it attempts to align with the green economy. In Cameroon, the reforms aimed, among other objectives, at implementing a forestry based on people

(Bigombe, undated). According to the International Tropical Timber Organization (ITTO), these reforms concerned the institutional, legislative and regulatory frameworks and a new mapping of forest territories (Minsouma, 2008). The participation of local communities in forest resource management was at the centre of this reform via the introduction of decentralized forest management concepts. In its approach, community forests encompass (i) communal forests; (ii) community forests; (iii) the annual forest royalties; and (iv) community managed hunting zones (Oyono *et al.*, 2007). One of the main expectations is to transform these efforts into a dynamic process to empower rural communities in forest resources management; this will ultimately contribute to improving their livelihood options and foster local development. This dual objective of ensuring the balance between conservation and development matches the approaches of both sustainable development and green economy. The contribution of this natural resource management model to the green economy is poorly understood.

This paper presents the contribution of community forestry to the green economy and describes the current and future challenges in terms of integrating or aligning community forestry objectives to those of Cameroon's green economy.

A. Contribution of community forest to the green economy

Community forest produces goods and services that contribute to improving the economic and social conditions of rural households, and sustainable natural resources management (MINFOF 2009). Overall, the forestry sector is one of the main drivers of development in Cameroon with a contribution of over 6% to the GDP (COMIFAC, 2010). Paradoxically, the annual income bracket of community forests currently logged makes only a small contribution to this activity, ranging between 1,500,000FCFA (€2,288) and 25,000,000 FCFA (€38,135) (Oyono *et al.*,

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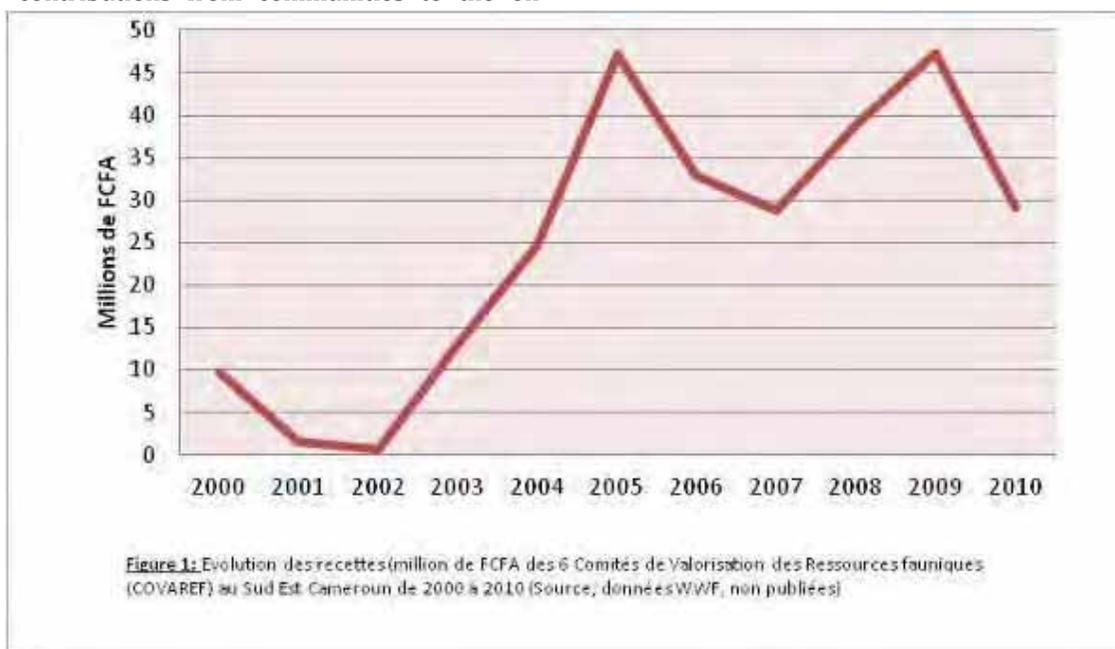
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2007). Because community forestry plays an increasingly significant social and economic role, an ecological combination is therefore needed for this sub-sector to fully play its role within the green economy and this requires sustainable resource use as well as a reduction of environmental waste.

According to the law, a Simple Management Plan (SMP) is one of the major requirements for communities to obtain and manage community forests. The revision of exploitation guidelines for community forests has resulted in authorizing communities to exploit the forest during the initial two years, helping them to receive revenues that permit the elaboration of the required management plan. . The mechanism for acquiring and appropriating community forests in savannah areas is based on the fact that forests can also be established in non-forest zones. This mechanism therefore encourages communities to reforest degraded areas, and also to help communities to have a better control of their resources, including wildlife. Several thousand trees have already been planted in the north by communities to green some savannah areas. Community forestry is thus no more exclusively dedicated to timber management. In the south-east region for example, over 20% of incomes generated by Community Hunting Zones (ZICGC) have been reinvested as contributions from communities to the on-

going fight against poaching. The bulk of funds received by local communities are devoted to the development of social infrastructure such as building schools or health centers. From 2000 to 2004, the 16 ZICGCs exploited in the South-East, have generated about 43,000,000 FCFA. Experts from the World Wide Fund for Nature (WWF-Jengi Project) have constituted the following percentages in terms of achievement by COVAREF (Bigombé Logo *et al.* 2005): 33.27% for the operation of the segments of Community Wildlife Management Committees (COVAREF); 18.90% for the building of headquarters for the various sub-branches of COVAREFs ; 14.40% for education; 8.31% for the establishment of community farm fields; 5.18% for village water pumps; 6.62% for the purchase of equipment (vehicles, bicycles, etc.) 3.13% for the material support to Baka Pygmies; 0.80% for village electrification; 3.10% for habitat improvement; and 6.25% for the safety of some ZICGCs (Oyono *et al.*, 2007).

Between 2000 and 2010, six COVAREFs have benefited from 274 million FCFA (about €417,310), with a general progressive increase over time (**Figure 1**).



The legal framework also restricts the negative impact of community forest exploitation on the ecology of the landscape; if it now forbids the physical transport of wood collected from community lands, it also restricts the hauling trails to a width which will not allow the entry of heavy trucks. Some of the communities have also started processing wood waste, thus reducing raw material loss. This is the case for the Model Forests of Dja and Mpomo (FOMOD) in the Eastern region of Cameroon, where these residues are transformed into pens. Other communities around Mambele, recycle wood residues into coal, which are then sent to urban markets located hundreds of kilometers from the production zone. In the Lomié area in the Dja-Odzala-Minkebe trinational landscape (TRIDOM) between Cameroon, Gabon, and Congo Brazzaville, the communities in Makobitol and Nemeyong have also created Common Initiative Groups (CIG). They organize the logging and sale of wood from community forests and the allocation of revenues to applicant-households. These funds are used for the purchase of equipment and the construction of houses, to the tune of €330, 1/9 being given to the technician in charge of building the roofs. Moreover, the members of the community are authorised to recycle the poor quality wood as building material or to sell it.

Even if land title issues remain a trial for the communities who wish to adopt a community forestry approach, the softening of the legal framework is certain. In fact, this has enabled the establishment of the first community forests belonging to indigeneous Baka people from Mambele, in the eastern region of Cameroon. In addition to using the resources, these populations can peacefully practice their rituals which also facilitate a sound management and maintenance of community lands, since the people want to safeguard the areas where these rituals are practiced. We often overlook this function of community forestry which enables culture to be perpetuated, and this holds true for the forests of indigeneous populations in the East of Cameroon and the sacred forests in

the western and north-western regions of Cameroon where all the economic, ecologic and social functions of green economy are fulfilled.

B. Current and future challenges of community forestry

In Cameroon, the number of community forests has increased over the years. In 2008, the number of simple management plans approved by the Ministry in charge of forestry, was 174 out of a total 402 applications received (Minsouma, 2008). The greater concentration is found in the eastern region and is explained by the high local demand for timber. According to Smith (2010), 75% of domestic wood consumption of wood logged in Cameroon comes from artisanal logging. This wood comes not only from community forests, but also from individual logging permits. Special attention should therefore be given to this sub-sector, notably at the ecological level.

The legal framework governing the establishment of community forests has been reviewed, however the financial capacity of communities to mobilize funds is subject to doubts. Indeed, most of the funds used to support the finalization of Simple Management plans come from international partners. In the absence of these funds, the process will halt and annul the efforts made by communities to manage their forests in a sustainable manner. Ezzine *et al.* (2009) show that the financial support to community forests should be continuous until they become established as small forest enterprises, since an interruption of this support will lead to a lower performance than that of the self-managed forests. The funds required for the exploitation of community forests are actually very high to the extent that communities prefer subcontracting to minimize market-related risks. Such transactions no longer guarantee environmentally friendly management by the new loggers. The initial exploitation of the forest often experiences problems due to the delay in delivering annual operating certificates and waybills which enable

communities to sell in remote markets. This could be due to bureaucratic red tape, perhaps because the State wants to reclaim its control over community forests (Ribot et al., 2006) or to the prevailing corruption in the forest sector.

The contribution of community forests to the sustainable management of wildlife weighs heavily on the incomes collected by communities. This is the case in community-managed hunting zones where this could hinder local development. According to Oyono *et al.* (2007), the emergence of 'new local authorities', the empowerment of management committees through decentralization dynamics, were viewed by traditional authorities as a *coup d'état*. This leads to disunity among villages, or an institutional dualism and increasing conflicts between groups, thus having a negative impact on the dynamics of local community forest management. Concerning Forest Management Units (UFA) one of the essential correlations to community forest is the management by the communities of the annual forest royalty. Indeed, the new decree improves their involvement through the creation of a roadside committee by granting it a measure of authority, namely, that its Chairman can invite resource people to the Committee's meetings. This approach is also stipulated in the provisions for the logging of communal forests which also strengthened the aspects of community forestry by improving the representativity of communities; traditional chiefs are henceforth part of the monitoring committee. Moreover, 30% of the incomes generated by the logging of communal forests are devoted to the development of roadside village communities.

Conclusion

The community forestry approach was established to improve the integration of communities in the management and control of their zones. These areas include forest landscapes as well as other ecological sites that can be subjected to direct or indirect forestry activities. Community forestry was more confined to the management of

community forests from the point of view of wood cutting and sale. It somehow escapes the integrated approach of sustainable wildlife and wood species use in the same space. In purely forest zones, wildlife community management has appeared more efficient and the incomes generated by community-managed hunting zones are more invested in social infrastructures, as compared to those generated by the logging and sale of wood. Community forests have begun initiating an optimization of the management of their resources with an improved local organization of those entities, a maximum use of the resource collected and a timid recycling of wood waste. Community-managed game zones located at the periphery of protected areas have continuously produced incomes and have been involved in poaching control activities. In the absence of sustained self financing, these results remain fragile since the communities exploiting the wood still heavily rely on external funding. In case the good performances of community forests do not materialize, especially in terms of the concretization of socio-economic effects anticipated after the review of the Manual of Procedures for the Attribution and Norms for the Management of Community forests, there is a risk that the State will reclaim these areas.

The proliferation of entities managing community incomes could, in the long run, lead to misunderstandings. At least three committees involved in community forestry have been recently put in place: the farmer-forest committee, the Community Wildlife Management Committee, the riparian committee. There is no effective coordination among these three committees even when they are established on the same surface area. The green economy supposes a good planning and thus an inevitable business plan for the activities related to the development of community forestry which should evolve in small enterprises. Therefore, it is important that the will of communities to envisage their local development plan and its implementation should not be inhibited by community

development plans conceived by municipal councils.

The experiences of community forests for the past twenty years reveal both the difficulties and potential of this approach. The low organizational capacity of communities slows down the progress, together with their isolation and various technical challenges. However, a dialogue has been initiated; populations have increased their involvement and are henceforth engaged in the debate on the future of their forests. There remains a lot to be done because the past failures during the inception period of the programme are viewed as part of the learning process leading to a greater involvement of populations in shaping the future of their forests. Efforts to capitalize on the enforcement of the 1994 Forestry Law should be envisaged to improve the orientation of future community management strategies and their actual contributions to the green economy in Cameroon.

References

- Bigombe Logo, P, (non daté) Foresterie Communautaire et Réduction de la Pauvreté rurale au Cameroun : Bilan et tendances de la première décennie. WRM in <http://www.wrm.org.uy/countries/Cameroun/Bigombe.html>
- Minsouma Bodo A. (2008). Politique de foresterie communautaire au Cameroun. Communication à l'atelier sous régional sur la gestion communautaire forestière et faunique en Afrique centrale, Lomié, les 7, 8 et 9 mai 2008
- Bekaye, M. (2011). Le contexte mondial et régional de l'économie verte: avancées et enseignements. Communication au Séminaire sur l'option stratégique de l'économie verte au Maroc- IRES- Rabat, 21 mars 2011
- Oyono, P. R. Ribot, J. C. Assembe, S. Bigombé Logo, P. (2007). Correctifs pour la Gestion Décentralisée des Forêts au Cameroun: Options et Opportunités de Dix Ans d'Expérience. Governance Brief, Center for International Forestry Research (CIFOR). Forests and Governance Programme. , Février 2007, Numéro 33(f)
- Nguenang, G. M. ; Delvienne, Q. Beligne, V. ; Mbolo, M. (2007). La gestion décentralisée des ressources forestières au Cameroun : Les forêts communales après les forêts communautaires.
- Bigombé Logo, P., Abbé Abessolo, J. et Koulbout, D.(2005) Vers une conservation bénéficiaire aux pauvres au Cameroun ? La gestion participative et le développement intégré des aires protégées de Lobéké, Boumba-bek et Nki au Sud-Est du Cameroun. Working Paper Series. IUCN/IUED/ RUIG-GIAN, Gland et Genève
- Pye Smith, C. 2010 Cameroon's hidden harvest, Center for International Forestry Research (CIFOR)
- Ribot, J. C., Agrawal, A., & Larson, A. M. (2006). Recentralizing while decentralizing: How national governments reappropriate forest resources. *World Development*, 34(11), 1864–1886
- Ezzine de Blas, D., Ruiz Perez, M., Sayer, J. A., Lescuyer, G., Nasi, R., Karsenty, A. (2009). External influences on and conditions for community logging management in Cameroon. *World Development* Vol. 37, No. 2, pp. 445–456, 2009
- COMIFAC (2010) Forêts du Bassin du Congo : sources de richesses et de réduction de la pauvreté. Bulletin d'information de la Commission des Forêts d'Afrique Centrale. No 008 Octobre 2010.
- MINFOF 1999: Manuel des Procédures d'Attribution et des normes de gestion des forêts communautaires, Yaoundé, Cameroun

Diversity, distribution and utilization of urban trees in Ibadan metropolis, southwest Nigeria

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Summary

In a study conducted to assess the diversity and distribution of trees in Ibadan, and their significance in their respective locations, 62 tree species were identified. The identified uses of the trees include their use as shade, windbreakers, edible fruits, fuelwood, ornamentals/landscaping, medicinal and fetish among others. The high tree diversity and population were attributed to the trees located in solitary and cluster forms in different locations within the metropolis, and as a result, Ibadan can be considered a green city. Owing to the benefits derived from the trees, majority of the respondents wants the tree to remain, suggesting people's positive response towards urban forestry. The paper concludes with advocating for planting of indigenous trees rather than exotics.

Introduction

Urban forestry refers to all forest tree crops, both public and private, which is found growing in cities, towns, and other urban communities. In another words, an urban forest is a forest or a collection of trees that grow within a city, town or a suburb. In a wider sense it may include any kind of woody plant vegetation growing in and around human settlements. Fuwape and Onyekwelu (2011) listed six types of urban forests in West African cities to

include (i) semi-private space like green space in residential and industrial areas (ii) designated parks, street trees and roadside plantations (iii) public green areas like green parks, botanical gardens, recreational gardens (iv) public and private tree plantations on vacant lots, green belts, woodlands and peri-urban tree plantations (v) rangeland, and forests close to urban.

Nigeria has been experiencing increased urbanization over the last five decades. The proportion of the population living in the urban centres has risen from 15% in 1960 to 43.3% in 2000. Total area taken up by urbanization in Nigeria during the same period increased by 131% from 2,083sq.km in 1976 to 5,444sq.km in 2000, with an average rate of urbanization estimated to be 3.7% per year (National Population Commission, 2004). The number of urban centres (settlements with population of 20,000 or more) increased from 56 in 1953 to 359 in 1991 and 450 in 2000. With urbanization come population explosion and its attendant adverse environmental consequences.

Ibadan is considered the largest indigenous city in West Africa, located in the south western region of Nigeria, with the population of 2,550,593 (NBS, 2007) within 11 local government areas. With the land area of 128km², the overall population density of Ibadan metropolitan area is 586 persons per km². Ibadan is an ancient city, with the name originating from 'Eba Odan', meaning a settlement beside the savanna. Historians put it that Ibadan was established in the forest region with many hills and close to the savanna region. Ibadan people belong to the Yoruba tribe, with a relatively high migrant population from other parts of Nigeria. Economic activities undertaken by people in Ibadan include trading, public service employment, and agriculture in decreasing order of importance. The city of Ibadan is located approximately on longitude 3°5' East of the Greenwich Meridian and latitude 7°23' North of the Equator.

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The fact that Ibadan was established in a forest region and once occupied by trees is evidenced in the names of some of the streets and areas within the city given after the trees formerly or still standing in those areas. These include *Idi-Ose* (*Ose* is local name for *Adansonia digitata*), *Idi-Ayunre* (*Ayunre* is local name for *Albizia odoratissima*), *Idi-Oro* (*Oro* is local name for *Irvingia gabonensis*), *Idi-Osan* (*Osan* is local name for oranges, *Citrus* spp), *Idi-mangoro* (*mangoro* is local name for mango, *Mangifera indica*), *Idi-Ishin* (*Ishin* is the local name for *Blighia sapida*) among many others. In most of these places however, the trees from which the area got its name have been felled. The same trend is also obtainable in other South-western cities, such as *Idi-Araba* in Lagos (*Araba* is local name for *Ceiba petandra*), *Idi-iroko* in Abeokuta, Ogun state (*Iroko* is local name for *Milicia excelsa*). However, with the increasing influx of migrants into Ibadan and improved economy, the city is expanding with more wild areas being opened up and buildings being erected, mostly for residential purposes.

With attention given to urban forestry in recent times, this study is therefore conducted to assess the biodiversity of the trees within Ibadan and their significance in the area.

Materials and Methods

A city-wide survey was carried out to identify different trees, their locations and an informal interview of the people working or living around the area, using a structured questionnaire, for any useful information about the tree. This was done between Thursday, July 28 and Tuesday, August 9, 2011.

Results

A total of 62 different tree species were identified during the survey. Table 1 shows the list of the most prominent trees within the metropolis. Generally, the significance of these trees in the different locations include their use as shade (shelter from sun for homes, cars), fresh air (oxygen released by

the trees), windbreaks, edible fruit, medicinal uses, landscape/ornamental purposes and fuelwood. The general trend observed was that trees with edible fruits are planted beside residential houses, while huge timber trees were found on roadsides and inside institutions. All the respondents to the questionnaires on the trees could not state who planted the roadside trees, but assumed that the landowner also automatically owns the tree; while only 5 of 45 respondents wanted the tree cut off due to adverse effects such as dropping dried branches that break car windscreens and destroy roofing sheets.

Discussions

This study has shown a comparatively high diversity and distribution of economic tree species within Ibadan Metropolis, therefore, Ibadan can be considered a green city. In addition to the secondary forests surrounding the Metropolis and Onigambari Forest Reserve located at the outskirts, urban forestry in Ibadan can be grouped into the following:

1. Forest belt within organised institutions such as research institutes, tertiary institutions, International research institutions, army barracks and some secondary (high) schools;
2. Forest patches in highly restricted areas such as the Government House, golf course, Government recreation centre called Agodi gardens and Government Reserved Areas (GRAs);
3. Trees in cemetery and a sacred grove, called '*Igbo Agala*' on one of the hills within the Metropolis;
4. Riparian forest escarpment along the River Ona and Eleyele dam;
5. Collection of scattered trees on roadsides, and inside individual residential compounds.

Furthermore, this study has demonstrated a high biodiversity and distribution of trees in Ibadan Metropolis, and this supports the finding of Konijnendijk *et al.* (2004) that green areas in urban centres have high biodiversity. For instance, as endangered as *Milicia excelsa* is, over 100 stands of it were encountered within Ibadan Metropolis.

The uses of these trees widely vary among the locations but the most common uses of the trees planted around residential areas are for shade from sun, as windbreakers and the edible fruits.

While waiting for commercial transport, commuters stay under tree shades in the heat of the day, even within schools, students are found playing under those trees during free periods. Often times, social events are organized under the shade of these trees, especially at weekends. At homes, during the heat of the day, people leave the house and get shade and cool breeze under the trees planted in their compounds. During the survey, most artisans, like automobile mechanics site their workshops in proximity to trees and many of them use the tree shade as their 'office' or they are found relaxing under tree shades when less busy. Vehicles are preferably parked under tree shades at home or at work.

The major observation on the trees located at roadsides is that bills and posters were nailed on them, indirectly serving as means of advertisement, but notwithstanding, they are mainly planted for ornamental/landscape purposes, while they also serve as shade for humans and cars.

Edible fruits appear to be the most important use of urban trees in Ibadan. And most tree planting inside residential areas are influenced by this. Furthermore, many other edible fruit-bearing trees along freeways are exploited by students, passersby, wandering insane people, urban poor, and artisans among many others. It is interesting to note that often times, conflicts were recorded between the tree owners and some people who have come to collect the fruits without permission. An important economic significance of these edible fruit-bearing trees is that they are often harvested and sold in markets during their fruiting season. Such examples include *Anacardium occidentale*, *Cocos nucifera*, *Mangifera indica*, *Citrus* spp, plantains and

bananas, *Spondias mombin* among many others.

Very many of these trees are still being used for medicinal purposes. This was confirmed by significant cases of bark slashing was observed on some of the trees, and this was also confirmed by some of the respondents, who cited the use of the bark of *Mangifera indica*, *Morinda lucida* and *Azadirachta indica* for treating malaria fever, *Melicia excelsa* sap used for treating arthritis and *Newbouldia laevis* bark and leaves used for treating haemorrhoids, eye and ear infections, paralysis and as abortifacients among other variant uses. This was confirmed by Osemeobo (1993) that about 40% of urban dwellers depend on traditional medicine for primary health care. And with the influx of more people into urban centres in Nigeria, the number of those depending on plant for medicinal purposes would have increased rapidly. Aside this, there is recent revolution on *Moringa oleifera* for its wide medicinal uses, and a lot of people are planting the tree at homes for personal use and for commercial purposes. The tree was found to have high medicinal values for treating malaria, jaundice, yellow fever, toothache, rheumatism, asthma and many other diseases, in addition to its high protein content. And in many cases, the tree barks are harvested for sale in the markets. There are many major herbal markets present in Ibadan, most popular of which is Bode market recording high sales of plant parts for herbal medicine. It is estimated that tens of thousands of Ibadan people are directly or indirectly involved in the harvesting, collection, transportation, processing and sale of plant parts for herbal medicine.

Another important use of the trees and their branches is as fuelwood by urban poor, and this becomes worse due to scarcity and price hike of fossil fuel (kerosene) and high cost of cooking gas. Perhaps the use of these trees as fuelwood is a major threat to the conservation of urban trees in Ibadan.

It was also noted that fetish materials and occultic activities were sighted under *Milicia excelsa*, confirming the widely-spread

superstition that the tree harbours some 'spirits' which are still worshipped by some traditionalists.

Summarily, the uses of these trees can also be grouped into three:

1. Ecosystem services: These include provision of shade to ameliorate high temperature, carbon sink, reduction of wind speed, mitigation of flood, mitigation of pollution, release of oxygen into the air, prevention of ultraviolet rays, soil protection and air cooling.
2. Socio-economic uses: These include their use for fuelwood, edible fruits and vegetables, car parking lots, wrapping leaves, medicinal uses, land demarcation, ornamental/landscape, and the use of the shades for parties and playgrounds.
3. Cultural uses: The act of worshipping some of the trees, evidenced by some fetish materials found under them.

These findings corroborate with earlier discoveries of Konijnendijk *et al.* (2004) who described urban trees as lungs of the cities. In addition, El Lakany (1999) reported that trees planted in erosion prone areas in Imo, Anambra, Abia, and Enugu states in Nigeria have enhanced water percolation during rainfall and reduced instances of runoff and soil erosion.

The effectiveness of urban forestry in conservation of trees in Nigeria was demonstrated in this study with just few of the respondents wanting the tree to be cut off. In such cases, they found it difficult to cut the trees because of the damage the falling tree can cause to surrounding electric cables and buildings. It could be concluded that most of the trees planted within the Metropolis are most likely to be preserved from deforestation.

However, the major threats to urban forestry in Ibadan Metropolis is tree felling to give way for construction purposes, old age, strong rainstorms and fuelwood exploitation by the huge population of the urban poor. Unfortunately, there are existing laws governing tree felling in the state, but

implementation is weak and most of the trees are left at the mercy of the land owners. However, a barrier to felling the trees is the damage the falling tree will do to nearby houses, roads and properties. There is the need for the government, through the State Ministry of Environment and Department of Forestry to give serious attention to urban tree conservation and public enlightenment on tree planting for environmental health.

Tree planting in Ibadan have received boost in the recent past with successive governments in Oyo state of which Ibadan is the capital, have done series of projects on landscaping of the city, which includes tree planting. Furthermore, the *Moringa oleifera* revolution have helped also in more tree planting, in addition to individual edible fruit-bearing tree planting at homes by individuals. However, there is the need to include strategic tree planting campaigns in Ibadan as part of the strategies for poverty alleviation, considering their economic and ecological significance.

However, it was observed that majority of the trees within the Metropolis; especially the ones with high population are mainly exotic trees, planted for ornamental purposes. Considering the likeliness that urban forestry is a key tool for tree conservation, planting of indigenous trees in these urban centres is strongly advocated. Incorporating trees in urban landscape improves biological conservation and biodiversity, while greenbelts and greenways can serve as biological corridors, reconnecting a city to its surrounding bioregion (Konijnendijk *et al.*, 2004).

References

- El Lakany, H. (1999). Urban and Peri-Urban Forestry: Case Studies in Developing Countries. FAO Rome, 194 pp.
- Fuwape, J.A and Onyekwelu, J.C. (2011). Urban Forest Development in West Africa: Benefits and Challenges. *Journal of Biodiversity and Ecological Sciences* No. 1 Vol.1, Issue1: 77-94.

Konijnendijk, C.C, Sadio, S., Randrup, T.B. and Schipperijn, J. (2004). Urban and peri-urban forestry in a development context-strategy and implementation. *Journal of Arboriculture* 30(5): 269 – 276.

National Bureau of Statistics (2007). 2006 Nigerian Population Census. Available at www.nigerianstat.gov.ng

National Population Commission (Nigeria) (2004). National Policy on Population for Sustainable Development 2004, Abuja. National Population Commission.

Osemeobo, G.J. (1993). The Hazards of Rural Poverty: Decline in Common Property Resources in Nigerian Rainforest

Ecosystems. *Journal of Environmental Management* 38:201-212

United Nations (2006). World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, <http://esa.un.org/unpp>

United Nations (2007). Urban Population, Development and the Environment 2007. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

Table 1: List of prominent trees within Ibadan Metropolis

S/N	Biological name	Family	Local and common names	Uses
1	<i>Albizia odoratissima</i> (Linn. f.) Benth	Mimosaceae	Ayunre, fragrant albizia, Ceylon rosewood	Landscape, shade, fuelwood, windbreak
2	<i>Antiaris africana</i> Engl.	Moraceae	Oriro (oro), Antiaris, bark cloth tree, false iroko	Shade
3	<i>Azadirachta indica</i> A. Juss	Meliaceae	Dogoyaro, Neem	Shade, medicinal, fuelwood
4	<i>Cassia fistula</i> Linn.	Caesalpiaceae	Kasia, Cassia	Ornamental, windbreak
5	<i>Ceiba petandra</i> (Linn.) Gaertn.	Malvaceae	Araba, Kapok tree	Landscape
6	<i>Cocos nucifera</i> Linn.	Araceae	Agbon, Coconut	Edible fruit, fuelwood
7	<i>Elaeis guineensis</i> Jacq.	Araceae	Ope, Oil palm	Cooking oil
8	<i>Gliricidia sepium</i> (Jacq.) Walp.	Papilionaceae	Agunmaniye, Gliricidia, Mexican lilac	Shade
9	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Gmelina	Shade, fuelwood
10	<i>Leucaena leucocephala</i> (Lam) de Wit.	Mimosaceae	White leadtree	Fuelwood
11	<i>Mangifera indica</i> Linn.	Anacardiaceae	Mangoro, mango	Edible fruit, medicinal, windbreak
12	<i>Milicia excelsa</i> (Welw.) Benth	Meliaceae	Iroko	Shade, fresh air, fuelwood, fetish, medicinal
13	<i>Morinda lucida</i> Benth.	Rutaceae	Oruwo, brimstone tree	Medicinal, shade
14	<i>Newbouldia laevis</i> (P. Beauv.)	Bignoniaceae	Akoko, African border tree	Medicinal
15	<i>Oxytenanthera abyssinica</i> (A. Rich) Munro	Poaceae	Oparun, bamboo	Fuelwood, construction poles
16	<i>Peltophorum pterocarpum</i> (DC) Baker	Caesalpiaceae	Yellow flamboyant	Ornamental, windbreak
17	<i>Samanea saman</i> (Jacq.) Merrill.	Mimosaceae	Rain tree	Shade, landscape, windbreak, fuelwood
18	<i>Spondias mombin</i> Linn.	Anacardiaceae	Iyeye, Hog plum	Edible fruit
19	<i>Tabebuia rosea</i> (Bertol.) DC.	Bignoniaceae	Pink Trumpet tree	Ornamental
20	<i>Tectona grandis</i> Linn. f.	Verbenaceae	Teak	Food wrapping, shade, fuelwood
21	<i>Terminalia catappa</i> Linn.	Combretaceae	Furutu, Tropical almond	Edible fruit, shade, fuelwood

Local names were given in Yoruba language, which is the language spoken by Ibadan people.

Importance of savanna woodlands in rural livelihoods and wildlife conservation in southeastern Zimbabwe

Edson Gandiwa¹

Summary

Increasing human population, economic challenges, climate change impacts are intensifying reliance by local communities on savanna woodlands in tropical regions. Knowledge of the importance and value of savanna woodland ecosystems to rural livelihoods and wildlife conservation is therefore needed to enhance lasting benefits from them. Savanna woodlands are of economic, social and ecological importance in southeastern Zimbabwe. Recommendations for conserving woodland resources include the strengthening of control systems and enhancing community based natural resource management programmes.

Introduction

Zimbabwe is a landlocked country with a land surface area measuring 390,757 km². It is bounded by Zambia, Mozambique, South Africa and Botswana. The country's forest and woodland resources covering approximately 66 percent of the country's total land area fall into three broad categories namely; rainforest, indigenous woodlands and forest plantations (Mabugu & Chitiga, 2002).

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Woodland forms much of the natural vegetation, with bushland, which is natural vegetation comprising of native species dominated by shrubs and few trees, becoming more prominent in the drier regions in the south and west. Almost two-thirds of the country is covered with woodland (53%) or bushland (13%). The indigenous woodlands of Zimbabwe fall into three tenurial categories: (a) woodlands in protected areas and on state land, (b) woodlands in large-scale commercial agricultural farming areas and (c) woodlands in communal areas, consisting of small-scale farming areas owned by the state but allotted to families locally (Vermeulen, 1996). Woodland cover is most extensive in the State Forest Reserves, National Parks and Safari Areas, which together account for about 15% of the country's land surface area (Mabugu & Chitiga, 2002).

High population growth and limited land resources, combined with difficult economic circumstances, often aggravated by adverse weather conditions such as drought, constrain rural incomes. These factors tend to encourage people to increase reliance on natural woodlands for additional agricultural and pasture land. Rural communities also frequently increase harvesting of various woodland products for sale to supplement incomes (see below). The understanding of the dependency of households on woodland resources is critical in the development of sustainable management strategies.

Reducing the human pressure on biologically rich hot spots and conserving valuable genetic resources has been and still is a fundamental policy concern in many countries (Lepetu *et al.*, 2009). In the face of rapidly growing human populations in and around the bio-diverse regions of the tropical forests, including woodlands, sustainable use of forest products, both timber and non-timber forest products, is not easy. This paper attempts to contribute to the growing literature on the importance of woodland resources in savanna

ecosystems, in particular the semi-arid savanna ecosystem encompassing the Gonarezhou National Park (GNP) and adjacent communal areas in southeastern Zimbabwe.

Typical ecosystems in southeastern Zimbabwe

This paper focuses on the GNP and adjacent communal areas in Chiredzi and Chipinge districts, in southeastern Zimbabwe (Fig. 1). The study area lies within the Great Limpopo Transfrontier Conservation Area (GLTFCA). Established in the early 1930s as a Game Reserve, GNP was upgraded into a National Park under the Parks and Wildlife Act of 1975. GNP, which covers an area of 5,053 km², is located in southeastern Zimbabwe, between 21° 00'–22° 15' S and 30° 15'–32° 30' E.

Annual average rainfall in the southeastern lowveld of Zimbabwe ranges between 400

and 600 mm. The major vegetation type is mopane (*Colophospermum mopane*) woodland, which covers approximately 40% of GNP (Fig. 1). The vegetation of GNP and adjacent areas is typical of semi-arid mopane zone (Rattray & Wild, 1955) and is predominantly dry deciduous savanna woodland of varying species composition (Wild & Barbosa, 1968). The vegetation structure and composition is influenced by browsers, grazers, fire, rainfall and human activities (Tafangenyasha, 1997; Gandiwa *et al.*, 2011). The general appearance of vegetation types in GNP are woodland savanna (59%), scrubland dominated by shrubs with few trees (40%) and savanna grassland (1%). The plant checklist for GNP includes at least 924 species from 118 families and 364 genera, with 265 trees, 310 shrubs, 55 woody climbers and 137 grasses (*e.g.* Gandiwa & Zisadza, 2010).

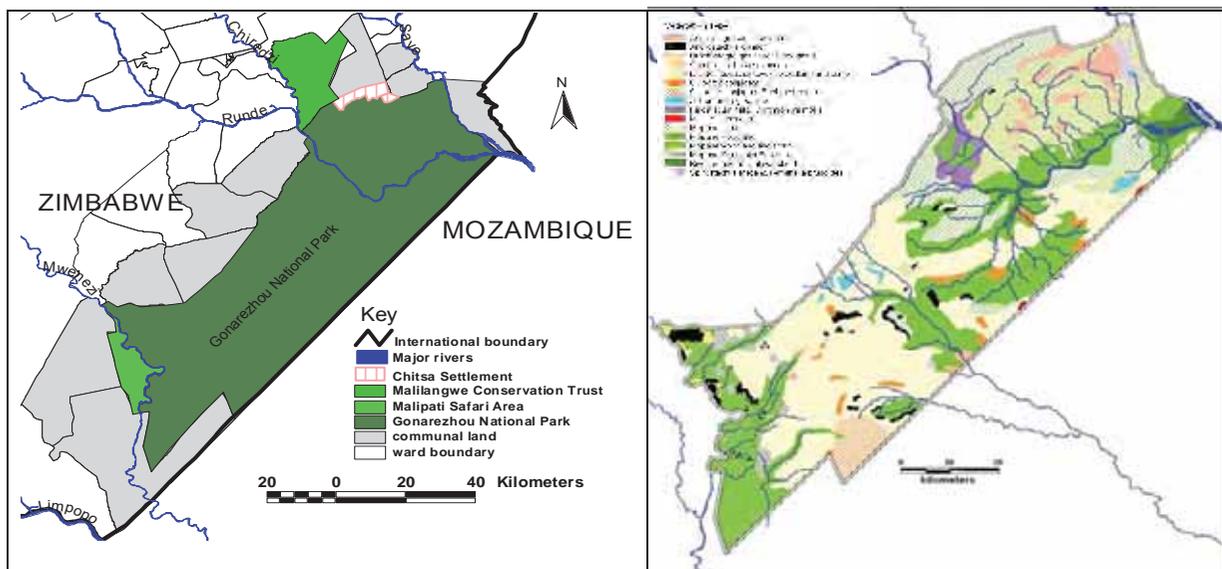


Figure 1: Left–Location of the Gonarezhou National Park and surrounding areas, source: Gandiwa & Zisadza (2010). Right–Vegetation map of the Gonarezhou National Park, southeastern Zimbabwe, source: Sherry (1977)

Importance of woodland resources in southeastern Zimbabwe

Like many forest and woodland resources in other areas across Africa, ecosystems in the

southeastern lowveld of Zimbabwe generate a wide range of timber and non-timber products and services (Mutenje *et al.*, 2011). Products and services include consumptive resources such as bark for rope, building

materials, fodder, fruits, fuel wood, fungi, bushmeat, gum, honey, insects, termites, leaf litter, medicines, mushrooms, roots, thatching grass, tubers, and wood for small artisanal crafts; social services such as cultural and spiritual benefits; aesthetic value; wilderness experience and recreation; employment; and ecological services such as carbon sequestration, grazing, shade, soil stabilization, water catchment, wildlife habitat and act as windbreaks. Some of the most valued fruits include those collected from *Adansonia digitata* and *Sclerocarya birrea*. Especially in periods of extreme weather events such as droughts and floods, woodlands becomes very important to the livelihoods of local communities in the study area and they form the only easily accessible safety net for food and income since external support, for example, in the form of food-aid support from the government and non-governmental organisations may not fully meet local communities requirements.

Mopane woodland products are key resources to rural communities and wildlife conservation in the southeastern Zimbabwe. Where mopane is dominant, it assumes economic importance especially as a source of browse for both domestic and wild animals. The “mopane worm”, which is actually the caterpillar of the emperor moth, *Imbrasia belina*, used as food, is one of the best-known and most economically important woodland resource products of the mopane woodland. For rural households in southern Zimbabwe, the annual harvest of mopane worms may contribute up to quarter of a household’s cash income, depending on the quantity of mopane worms harvested, the proportion that is sold, and the household’s other sources of income (Gondo et al., 2010). Mopane worms can therefore, contribute to improving rural people’s livelihoods in various ways, including: (i) supplementing seasonal shortages in cash or food; (ii) buffering families against unexpected shortages in food or income, for example, caused by droughts; (iii) supplementing expenditure on important things like education, food, health, clothing and agricultural tools; and

(iv) providing cash for investment in various productive enterprises, such as purchasing agricultural inputs (Gondo et al., 2010).

Natural resources management in Zimbabwe

According to a growing body of literature, rural communities across the developing world depend greatly on indigenous natural forest and woodland resources, which act as a buffer against poverty (e.g. Campbell et al., 2000; Twine et al., 2003; Shackleton & Shackleton, 2004; Makhado et al., 2009; Mutenje et al., 2011). For example, the majority of sub-Saharan Africa’s population relies on forest and woodland products for subsistence uses, cash income, or both (Timko et al., 2010). However, conservation of biodiversity and endangered species of plants and animals in protected areas is more challenging if local communities are heavily dependent on harvesting or hunting them for various products and subsistence needs (Lepetu et al., 2009). Some of the major threats to woodland conservation in southeastern Zimbabwe include effects of climate change, human settlement expansion and poor land use practices including overstocking of domestic animals, increasing local use of woodland resources for construction and fuel wood, unimplemented population reduction programmes which has led to increasing elephant populations, uncontrolled fires, infrastructural development such as power lines, and, to some extent, policy related activities related to land-use, settlement and human encroachment into conservation areas.

Protected areas in Zimbabwe, including the GNP, are often surrounded by communal areas. Protected areas are managed by the Zimbabwe Parks and Wildlife Management Authority on behalf of the government. Local communities adjacent to protected areas in Zimbabwe do not have direct and open access to natural resources inside protected areas. However, under the collaborative management programme of the general management plan for the GNP, provisions for local communities to access the

protected area and harvest woodland products such as thatching grass and access to areas of cultural and spiritual significance are provided for under special arrangements with the park management. The GNP acts as the source for wild animals whereas the adjacent communal areas act as the sinks. Communities adjacent to the GNP and other protected areas in Zimbabwe are expected to utilise and manage natural resources occurring within their boundaries. In communal areas, natural resources are commonly managed under the communal areas management programmes for indigenous resources (CAMPFIRE).

Zimbabwe's CAMPFIRE is a grassroots programme established in 1989 (Murphree, 1997; Logan & Moseley, 2002) following the amendment of the Parks and Wildlife Act in 1982. CAMPFIRE conceptually includes all natural resources (Metcalf, 1994), and its objectives are (Martin, 1986): (i) to initiate a programme for the long-term development, management, and sustainable utilization of natural resources in the communal areas; (ii) to achieve management of resources by placing the custody and responsibility with the resident communities; (iii) to allow communities to benefit directly from the exploitation of natural resources within the communal area, and (iv) to establish the administrative and institutional structures necessary to make the programme work.

Some of the recorded benefits of CAMPFIRE since its inception include; strengthening of capacity in terms of natural resources management; income to local communities from leasing trophy hunting concessions, harvesting natural resources, tourism, live animal sales, and meat cropping (Logan & Moseley, 2002). In addition, CAMPFIRE has created temporal and permanent employment, through community projects such as construction of schools and clinics; safari hunting industry, anti-poaching units as game scouts and also local village's benefits directly from cash dividends from the projects (Sangarwe, 1998; Mutandwa & Gadzirayi, 2007).

On the other hand, several challenges have also been faced under CAMPFIRE. For example, between 2000 and 2008, following the socio-economic challenges in Zimbabwe, CAMPFIRE was affected by a key external shock, i.e., the end of international donor funding for CAMPFIRE projects and rural development (Balint & Mashinya, 2008; Frost & Bond, 2008). This external shock destabilised local level CAMPFIRE institutions resulting in sharp decline in transparency, accountability, participation by the local people in some of districts with CAMPFIRE (Balint & Mashinya, 2008). Overall, Frost & Bond (2008) summarised the major challenges faced by CAMPFIRE as follows: (i) deepening poverty forces local people to rely more heavily on extracting natural resources, including wildlife, for both subsistence and commercial purposes; (ii) in some areas, wildlife areas in the communal lands are properly delineated; (iii) the organisational complexity of communal areas brought about by overlapping jurisdictions among different authorities such as traditional, spiritual and modern government institutions, results in challenges in achieving consensus on key issues, and (iv) property rights are not clearly defined; both individual and community land tenure are insecure hence creating uncertainty, competing interests, and opportunistic use of resources.

Besides the Parks and Wildlife Act of 1975 (amended in 2002) which focuses on wildlife and woodland resources management on both protected areas and communal areas, there exist other pieces of environmental legislation that focuses on woodland and forest resources management in Zimbabwe. These include: (i) The Forest Act of 1948 (amended in 1990) which authorizes the Forestry Commission of Zimbabwe to protect and conserve indigenous forests and regulate the harvesting of trees on both private and communal land; (ii) The Communal Lands Act of 1982 (amended in 1985) which places communal land under the control of Rural District Councils (RDCs); (iii) The Communal Lands Forest Produce Act of 1987 which

vests authority over the commercial utilization of forest and woodland products in the communal lands in the hands of RDCs, while allowing the subsistence use of such products by local communities, and (iv) The Environmental Management Act of 2002 which deals with environmental issues across all sectors, including basic environmental management principles and sustainability considerations in natural resources management (Chibisa & Rwizi, 2009).

It is unlikely that the central role of savanna bio-resources in the lives of rural households in southeastern Zimbabwe will diminish in the near future. Poverty, low incomes, and immediate survival needs often drive local people to overharvest, at the expense of sustainability (Mutenje et al., 2011). Sustainable use of local natural resources, including forests and woodlands, is therefore a central issue that needs to underpin rural development in southeastern Zimbabwe. The value of savanna woodland resources needs to be fully appreciated by the local people and government policy makers alike. Sustainable woodland utilisation is based on the respect of boundaries and authority rules determining who can use resources, and under what conditions. Therefore, there is need for the implementation of government laws and regulations (control systems), and also continued enforcement and monitoring of compliance by appropriate authorities in both the protected areas and communal areas (e.g. Campbell, 1996). At the same time there is need to strengthen programmes such as CAMPFIRE so as to encourage local management to adopt sustainable approaches on the utilisation of natural resources, and at the same time ensure that tangible benefits filter to the local people, who are required to collaborate in ensuring the sustainable management and use of the natural resources.

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References

- Balint, P.J. and Mashinya, J. (2008). CAMPFIRE during Zimbabwe's national crisis: local impacts and broader implications for community-based wildlife management. *Society & Natural Resources*, 21(9): 783–796.
- Campbell, B. (Ed). (1996). *The miombo in transition: woodlands and welfare in Africa*. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Campbell, B.M., Costanza, R. and van den Belt, M. (2000). Special section: land use options in dry tropical woodland ecosystems in Zimbabwe: Introduction, overview and synthesis. *Ecological Economics*, 33: 341–351.
- Chibisa, P. and Rwizi, L. (2009). Traditional crafts and rural livelihoods in Manicaland's semi-arid areas: Implications for biodiversity and environmental sustainability. *Journal of Sustainable Development in Africa*, 11(1): 16–40.
- Frost, P.G.H. and Bond, I. (2008). The CAMPFIRE programme in Zimbabwe: Payments for wildlife services. *Ecological Economics*, 65: 776–787.
- Gandiwa, E. and Zisadza, P. (2010). Wildlife management in Gonarezhou National Park, southeast Zimbabwe: climate change and implications for management. In: Bojang, F. and Ndeso-Atanga, A. (Eds). *Climate change implications for agricultural development and natural resources conservation in Africa*. *Nature & Faune*, 25(1): 95–104.
- Gandiwa, E., Chikorowondo, G., Zisadza-Gandiwa, P. and Muvengwi, J. (2011). Structure and composition of *Androstachys johnsonii* woodland across various strata in Gonarezhou National Park, south-east

- Zimbabwe. *Tropical Conservation Science*, 4(2): 218–229.
- Gondo, T., Frost, P., Kozanayi, W., Stack, J. and Mushongahande, M. (2010). Linking knowledge and practice: assessing options for sustainable use of mopane worms (*Imbrasia belina*) in southern Zimbabwe. *Journal of Sustainable Development in Africa*, 12(1): 281–305.
- Lepetu, J., Alavalapati, J. and Nair, P.K. (2009). Forest dependency and its implication for protected areas management: a case study from Kasane Forest Reserve, Botswana. *International Journal of Environmental Research*, 3(4):525–536.
- Logan, B.I. and Moseley, W.G. (2002). The political ecology of poverty alleviation in Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). *Geoforum*, 33: 1–14.
- Mabugu, R. and Chitiga, M. (2002). Accounting for forest resources in Zimbabwe. CEEPA Discussion Paper No 7, CEEPA. University of Pretoria, Pretoria, South Africa.
- Makhado, R.A., Von Maltitz, G.P., Potgieter, M.J. and Wessels, D.C.J. (2009). Contribution of woodland products to rural livelihoods in the northeast of Limpopo Province, South Africa. *South African Geographical Journal*, 91(1): 46–53.
- Martin, R.B. (1986). Communal Areas Management Programme for Indigenous Resources (April 1986, revised edition). Branch of Terrestrial Ecology, Department of National Parks and Wild Life Management, Harare, Zimbabwe.
- Metcalf, S. (1994). The Zimbabwe Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). In: Western, D. and Wright, R.M. (Eds). *Natural connections: Perspectives in community-based conservation*. Island Press, Washington, DC. pp. 161–192.
- Murphree, M. (1997). Congruent objectives, competing interests and strategic compromise. Paper presented at the Conference on Representing Communities: Histories and Politics of Community-based resource Management, Helen, Georgia, USA.
- Mutandwa, E. and Gadzirayi, C.T. (2007). Impact of community-based approaches to wildlife management: case study of the CAMPFIRE programme in Zimbabwe. *International Journal of Sustainable Development & World Ecology*, 14: 336–344.
- Mutenje, M.J., Ortmann, G.F. and Ferrer, S.R.D. (2011). Management of non-timber forestry products extraction: local institutions, ecological knowledge and market structure in south-eastern Zimbabwe. *Ecological Economics*, 70: 454–461.
- Rattray, J.M. and Wild, H. (1955). Report on the vegetation of the alluvial basin of the Sabi valley and adjacent areas. *Rhodesia Agricultural Journal*, 52: 484–501.
- Sangarwe, M. (1998). Evaluation and use of the economic incentives in the sustainable management of community-owned natural resources: The CAMPFIRE experience MSc thesis, University of Manitoba, Winnipeg, Manitoba, Canada.
- Shackleton, C.M., and Shackleton, S.E. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science*, 100: 658–664.
- Sherry, B.Y. (1977). Basic vegetation types of the Gonarezhou National Park, Zimbabwe. Project No. GNP/3Y/2. Department National Parks and Wildlife Management, Harare, Zimbabwe.
- Tafangenyasha, C. (1997). Tree loss in the Gonarezhou National Park (Zimbabwe) between 1970 and 1983. *Journal of Environmental Management*, 49: 355–366.

Timko, J.A., Waeber, P.O. and Kozak, R.A. (2010). The socio-economic contribution of non-timber forest products to rural livelihoods in Sub-Saharan Africa: knowledge gaps and new directions. *International Forestry Review*, 12(3): 284–294.

Twine, W., Moshe, D., Netshiluvhi, T. and Siphugu, V. (2003). Consumption and direct-use values of savanna bio-resources used by rural households in Mametja, a semi-arid area of Limpopo province, South Africa. *South African Journal of Science*, 99: 467–473.

Vermeulen, S.J. (1996). Cutting of trees by local residents in a communal area and an adjacent state forest in Zimbabwe. *Forest Ecology and Management*, 81: 101–111.

Wild, H. and Barbosa, L.A.G. (1968). Vegetation map of the flora Zambesiaca area. Supplement to *Flora Zambesiaca*, M.O. Collins, Harare, Zimbabwe.



Urban and peri-urban forestry in Kigali, Rwanda

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Summary

Urban and peri-urban forestry are important elements in Kigali City for economic, ecological and social values. To meet residents' demands, suitable tree species are planted. Although the management of trees is the mandate of department in charge of forestry and terrestrial ecosystems management, under the Ministry of Natural Resources, other stakeholders are involved. In addition, legal instrument exists to guide the planning, planting and management of trees and other vegetation in urban areas. However, pressure to convert green spaces to infrastructure exist. Though trees are beneficial for urban residents, they can also be dangerous and harmful if they are not well located or managed. Therefore, it is essential to provide technical guidelines for proper planning of urban forests in Kigali City and other peri urban areas for Rwanda.

Introduction

Forests are crucial to Rwanda and its people's well being, as all sectors of Rwanda's economy – water, agriculture, tourism, and power – depend on healthy forests. The advantages of forests

are thus manifold. Unfortunately, in Rwanda, most natural and manmade commercial forests are found in rural areas. Only 570 hectares of land area of Kigali have tree cover, most of them being agro-forestry, eucalyptus plantations and individual trees along the roads, rivers and homesteads.

Because of the rugged topography of Kigali some land areas are less suitable for infrastructural development, as they bear risks such as landslides, erosion, problems with road designs, construction, and maintenance. With proper planning, trees can be planted to reduce the environmental impacts as a part of urban planning

Rwanda urban forestry has concentrated on beautification and environmental services such as soil stabilizing, maintaining and stabilizing hydrological cycles, purifying the air, modification of micro-climate, shade provision, acting as wind break protecting building from damage and as a response to climate change. The trees also provide habitat for birds and other wildlife, increase land values, provide employment opportunities and amenity, insulate noise, reduce vehicle accidents by acting as blockage of rolling vehicles and intercept rainfall reducing run-off thereby functioning like retention/detention basins. The psychological impact of trees on people's moods, emotions and enjoyment of their surroundings may in fact be one of the greatest benefits urban forests provide.

Indeed, urban forestry being the careful planning, care and management of urban forests in urban setting for the purpose of creating or adding value to communities as well as for improving the urban environment, there is need to promote the practice as a critical part of the urban infrastructure, to meet needs and services for urban dwellers.

Urban and Peri-urban Forest Development in Rwanda

Forestry/tree management in Kigali City is divided into two categories namely urban forestry and peri-urban forestry. Peri-urban forestry involves planting in the urban

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fringe for various uses, whereas urban planting is essentially for beautification and offering other environmental services. According to Kigali City Master plan, areas considered to plant trees include: along the roads; along rivers and streams; public gardens and private gardens. In fact, due to small land sizes, Rwanda has embraced roadside tree planting in urban and peri-urban areas, where an amenity belt of appropriate tree species on both sides of the road reserves is established. These trees are important for aesthetic and shade effects to travelers along the highways and other public roads. In addition, a belt of amenity trees planted at the interface of road and private lands improve the scenery on both sides of the road and also mark the boundaries between the road reserves and private lands to avoid encroachment into the road reserves.

Urban and peri-urban forests constitute an important component of urban environment for the livelihood of urban population. Rwanda vision envisages that by 2020, thirty percent (30%) of the population will be residing in urban areas through the government settlement improvement program. To meet their needs, the government has developed strategies to develop urban and peri-urban forests in Rwanda, as stated in the National Forestry Policy (NFP). These comprise: identifying potential urban forestry service providers and agreeing on roles and responsibilities; including urban forestry in urban planning; developing guidelines for urban and peri-urban tree planting; developing a programme for urban forestry based on improved understanding of needs; creating awareness on value of urban and peri-urban trees; supporting urban authorities with technical support on tree nurseries and tree husbandry and in locating and developing sites in urban and peri-urban areas for tree growing; as well as involving the private sector in managing urban and peri urban forests for leisure and recreation purposes.

Apart from the NFP, environmentally sustainable development for urban and peri-urban areas is guided by the limitations imposed by Organic Law, which protect

natural resources such as forests and trees. Further, Kigali Conceptual Master Plan (KCMP) identifies land for forestry production. It also gives guidelines on ways to implement renewable management practices, with the primary emphasis to preserve and enhance scenic value. District Development Plans are the critical tools for implementing and prioritizing the KCMP.

Key players in Urban and Peri-urban Forestry

To ensure practice and success of urban and peri-urban forestry, all stakeholders need to come on board. In Rwanda, main stakeholders include government (through the agency in charge of forestry), municipal leaders, environmental policy makers, city planners, researchers, commercial arborists and urban and peri-urban dwellers.

The mandate of the Department of Forest and Terrestrial Ecosystems Management (DFTEM) within Rwanda Natural Resources Authority (RNRA), which is under the Ministry of Natural Resources (MINIRENA), is to conserve, develop and sustainably manage forest resources in Rwanda. In regard to urban forestry, the department gives a list of specific tree species to be planted within and around urban area. For the case of roadside tree planting, care is taken during selection of the tree species to ensure that they meet the required phenotype qualities for urban and peri-urban areas to combat accidents such as falling branches, wind falls etc. DFTEM also promote the many benefits urban trees provide, backstop, as well as offer appropriate technical information and advice, to accrue maximum benefits.

In Rwanda, mayors, assisted by various municipal officials, have been instrumental in the success and active urban forestry programmes. They work together with officers of RNRA/DFTEM, in charge of forestry at District and Sector levels, commercial arborists, as well as city planners. Their involvement and commitment is an important component in ensuring success of urban and peri-urban

forestry programmes, for the wellbeing of urban dwellers and urban environment. Individual urban and peri-urban dwellers are particularly involved in urban and peri-urban forestry through activities such as planting trees on their own land or home compound. In addition, during community work service commonly known as “umuganda”, and which is conducted every last Saturday of each month, the community is involved in preparing tree planting sites as well as planting, especially during tree planting season. Later, they are involved in managing the planted tree through e.g. weeding, pruning or thinning. This they do with guidance from the officer in charge of forestry in their respective jurisdictions.

Legal Issues in Urban Forestry

To ensure that there is effective, planned and systematic management of trees in cities, a measure of legal control is necessary. Indeed, laws are necessary as they guide in the selection of tree species and where they will be planted, spacing, protection of trees from removal or destruction as well as protecting residents from hazardous trees or one that on the long run may pose problems.

In Rwanda, legal instruments such as Forest National Policy, Ministerial Order and Organic Law emphasize the management, removal and conservation aspects of urban and Peri urban tree. For instance, as stated by Rwanda Organic Law, the State and the population are obliged to establish, maintain and manage parklands and green spaces. Further, the population has the obligation to conserve the environment by individual action or through collective activities, associations of the environment, in preparing green spaces and reserved areas and other activities that promote environment. Permits and licenses required for activities altering or impacting trees on peri and urban forestry are issued by RNRA.

Conclusions

Urban forestry provides substantial multitude of critical environmental functions that benefit Rwandan urban environment and dwellers. The benefits

accrued include aesthetic value, reduction of pollution, among others. Under pre-settlement days, most area of Kigali was forested. Because of the limited amount of forests, existing forests/trees need protection, and extensive areas of Kigali need to be reforested. Fortunately, KCMP advocate reforestation of extensive areas of Kigali especially around Lake Muhazi, and other large contiguous areas with steep slopes that are unsuitable for urban expansion. In addition, as residential uses are not allowed, opportunities for eco-tourism might provide for education and research to better understand this important natural resource.

Urban space is a practical and elemental resource to peoples’ abilities to create both viable and livable environments. It is crucial to incorporate reforestation strategies and natural preservation areas into development plans, as well as establish agro-forestry, and reforestation programs in urban open spaces. If well planned and managed, peri and urban forestry will provide a multitude of critical environmental and social functions that benefit the urban environment and dwellers. Thus, emphasis is being laid on local participation in urban forestry initiative, building up of technical knowledge, information dissemination and exchange, as well as elaborating on environmental and productive functions of urban forestry. There is also a need to take an inventory of trees in urban systems and assess the benefits and challenges of managing such trees.

References

- EDPRS -Economic Development and Poverty Reduction Strategy, 2007. Economic Development and Poverty Reduction Strategy, 2008-2012
- Republic of Rwanda, 2010. Government Programme 2010-2017
- Republic of Rwanda, 2010. National Forestry Policy

Republic of Rwanda, 2000. Rwanda vision 2020

Republic of Rwanda, 2005. Organic law determining the modalities of protection, conservation and promotion of the

environment in Rwanda, NO. 04/2005 of 08/04/2005

Rwanda Ministry of Infrastructure, 2007. Kigali conceptual Master Plan



Liberia forest reform and benefit sharing

J. D. Waugh¹

Summary

The West African state of Liberia has emerged from a long period of civil strife as a vibrant, if fragile, democracy. Liberia has embarked on a process of decentralization and empowerment of rural communities. An important component of this process is the reform of the forestry sector.

Extractive industries, mainly mining and commercial forestry, constitute the backbone of the Liberian economy. During Liberia's civil wars (1989–1996 and 1999–2003), armed factions assumed control of these resources. United Nations sanctions intended to choke the money supply to armed groups included a ban on the export of logs and timber products. These sanctions, which were not immediately lifted at the conclusion of hostilities, threatened to become an economic bottleneck, and lifting them became a top priority of the new government. This created an opening for a forest policy reform process supported by international donors through the Liberia Forest Initiative (Altman, Nichols, and Woods 2012). This process culminated in the 2006 National Forestry Reform Law (NFRL) and the 2009 Community Rights

Law (CRL).² The reform closed loopholes that could be exploited for private gain, and began the process of addressing one of the principal underlying causes of conflict in Liberia: the concentration of wealth and power in urban elites, at the expense of the rural populations (Sawyer 2005).

Benefit Sharing Arrangements

A key element of the reform process was the decision by the government to share benefits from the forestry sector through revenue sharing, social agreements, and co-management arrangements. The National Forestry Reform Law (NFRL) stipulated that some revenues from logging concessions would be shared with the relevant forest fringe communities in the form of a National Benefit Sharing Trust. Regulations promulgated in support of the NFRL also require that “social agreements” be negotiated between logging concessions and affected communities, which provide material benefits, typically in the form of employment and the provision of some amenities such as improved roads and bridges, or the construction of schools and clinics. Moreover, under the Community Rights Law, the government is designating community forest lands where management and use of the forests will devolve to the communities directly.

Under the NFRL, 30 percent of the land rental fee charged to timber concessions is reserved for affected communities, and an additional 30 percent is earmarked for distribution to county (provincial) governments nationwide.³ Regulation 106-07, which elaborates the benefit-sharing arrangements, stipulated the National Benefit Sharing Trust as the mechanism for fund disbursement specified the representatives of community interests (FDA 2007, GOL 2011). Implementation of the Trust began in the second quarter of 2011.

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² *An Act Adopting the National Forestry Reform Law of 2006; Community Rights Law with Respect to Forest Lands*

³ *FDA regulation 111-10 details the organization and governance of the NBST*

Having benefit-sharing arrangements on paper does not always translate to meaningful benefits for communities. A World Resources Institute (WRI) study of Cameroon's social agreements, for example, found that relatively little of the revenues from logging reserved for villages actually translated into benefits during the period of study (Morrison et al. 2009). Dysfunctional social agreements (e.g., those that fail to meet either their stated goals or the expectations of participants) can debase social capital and erode trust—which can, in turn, contribute to conflict. One way to improve the functionality of social agreements is to quantify the opportunity costs that resource extraction and related activities create for communities, and to negotiate agreements based on agreed-upon valuations of such costs.

Regulations require that projects funded by Liberia's National Benefit Sharing Trust meet strict accountability requirements, which in turn depend upon effective decision-making capacity at the local level. Monitoring and evaluation provisions seek to create a learning environment based upon experience.

Challenges to Benefit Sharing

The first major challenge for benefit-sharing arrangements is the recipients' capacity and confidence to manage resources. In the case of Liberia, the long history of domination by urban elites has produced an entrenched, and self-fulfilling, belief that rural communities lack the ability to look after their own interests; therefore (it is argued), wiser people must make decisions on their behalf. Many communities have never enjoyed the opportunity to manage their own funds, and lack financial and administrative literacy.

A second challenge for benefit-sharing arrangements with rural communities is rent-seeking behavior¹. Influential members of society — the educated, politically

connected, and wealthy — often justify control by arguing that the community must be protected from economic predators. In practical terms, when the interests of the established order take precedence, subtler forms of rent-seeking behavior can divert resources while at the same time undermining the self-confidence of the community.

Among the remedies are transparency, awareness on the part of residents of a community's need to take responsibility for its own decisions, and increased sensitivity on the part of authorities to the necessity of allowing communities to make those decisions (and learn from their own mistakes). Care must be taken to manage conflict, which emerges when factions within communities disagree over the use of funds. Conflict management and monitoring and evaluation skills are essential to community development within this framework. Favorable conditions for learning and information exchange foster successful local governance outcomes (Andersson 2006) by promoting understanding and thus creating the space for consensus to emerge.

Benefit Sharing and the Green Economy

Benefit-sharing arrangements, as embodied in Liberia's post-conflict forest reform process, are helping to bring equity and accountability to the management of natural resources, and may serve as an important portal to participation in authentic democratic processes that will lead to a more resilient, sustainable society. The benefits available through social agreements and the revenue-sharing arrangements such as those facilitated by the National Benefit Sharing Trust may be relatively small, but if they create institutions that are "organized through processes of decision-making characterized by informed discourse among the people of a society" (Sawyer 2005), they can be instrumental in transforming Liberia. Liberia's experiment has implications beyond its borders. REDD+ projects, for example, involve the payment of carbon credits in exchange for activities that reduce

¹ *Economic gain through manipulation of rules rather than through adding value*

deforestation and forest degradation. To be effective these credits must benefit forest communities. Where forests are tied to communities through customary tenure, and where communities are dependent upon forests for their livelihoods, such payments compensate people for lost opportunities, and thereby function as financial benefit-sharing arrangements. But there are yet comparatively few examples of such arrangements in the African forest sector.

Conclusion and Recommendation

The threshold of a green economy in the forest sector is crossed when a society transitions from sharing benefits from resource decisions made at the top to sharing the actual decision-making. Co-management with central authorities and direct local management, based upon a practice of self-government afforded by benefit-sharing arrangements, will provide the critical ingredients for the development of sustainable livelihoods in the forest sector. In Liberia, the story is incomplete, and success is not assured. But the experiment under way has the potential to transform it from a country that had been written off by some as a difficult case into a leader in the evolution of an authentic African green economy.

References

Altman, S. L., S. S. Nichols, and J. T. Woods. 2012. Leveraging high-value natural resources to restore the rule of law: The role of the Liberia Forest Initiative in Liberia's transition to stability. In *High-value natural resources and post-conflict peacebuilding*, ed. P. Lujala and S. A. Rustad. London: Earthscan.

Andersson, K. 2006. Understanding decentralized forest governance: An application of the institutional analysis and

development framework. *Sustainability, Science, Practice and Policy* 2 (1), pp 25-35. <http://sspp.proquest.com/archives/vol2iss1/0507-010.andersson.html>.

FDA (Forestry Development Authority). 2007. National Forest Management Strategy. www.fda.gov.lr/doc/NFMgmtStrategy.pdf.

GOL (Government of Liberia). 2011. Regulation 111-10, National Benefit Sharing Trust Fund. Monrovia: Forestry Development Authority.

Morrison, K., Cerutti, P. O., Oyono, P. R., and Steil M. 2009. Broken promises: Forest revenue sharing in Cameroon. WRI Forest Note. November. Washington, D.C.: World Resources Institute. http://pdf.wri.org/broken_promises_forest_revenue_sharing_in_cameroon.pdf

Sawyer, A. 2005. *Beyond plunder: Towards democratic governance in Liberia*. Boulder, CO: Lynne Rienner.

Waugh, J. 2010. *Assessment and recommendation for a national benefit sharing trust fund*. Monrovia: Land Rights and Community Forestry Program, U.S. Agency for International Development.

———. 2011. *Implementing the National Benefit Sharing Trust Fund and social agreements: Issues and options for building capacity*. Monrovia: Land Rights and Community Forestry Program, U.S. Agency for International Development.

Waugh, J. and Murombedzi, J. (in press, 2012). Social benefits in the Liberian forestry sector: An experiment in post-conflict institution building for resilience. In *Strengthening Post-Conflict Peacebuilding through Natural Resource Management, Volume 6: Governance, Natural Resources, and Post-Conflict Peacebuilding*. Ed. C. Bruch, W. C. Muffet, S. Nichols), London, Earthscan.

Ten years of managing Kenyan top bar hives in south-western Nigeria

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Summary

Beekeeping (apiculture) is the maintenance of honey bee colonies, commonly in hives, by humans. A beekeeper (apiarist) keeps bees in order to collect honey and other products of the hive (including beeswax, propolis, pollen, and royal jelly), to pollinate crops, or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary or bee yard. This submission thus presents an experience on working with the Kenyan Top Bar Hive, factors to consider before site selection, safety tips in apiary management and how to test for good quality honey.

Introduction

I began to learn about bees in 1996 when I was taught apiculture as a topic in a course at a college of education in Nigeria; but my interest in it was aroused when I visited the departmental stand of Crop Protection and Environmental Biology, during the University of Ibadan Golden Jubilee exhibition in 1998. There, I met the late Olugbenga Adewumi Osaniyi who was a doctoral student working on bees for his thesis. He showed me the pollen trap,

smoker, langstroth hive, Kenyan top bar hive and some samples of good and adulterated honey. Two weeks later I told him I wanted to be a bee-keeper. He agreed to teach me bee-keeping on the condition that I would be his field assistant in inspecting hives and collecting pollen samples on weekly basis for sixty (60) weeks. I agreed to his terms immediately and got involved in beekeeping. In April 1999, he gave me a bee-hive, asked me to bait it with bee-wax and place it at any site accessible and safe. I got a site on the University campus, placed the hive under a gliricidia tree and first noticed bees inside it on 22nd October, 1999. That was how I started and since then, I have established several apiaries and consulted for several bee-keepers.

Lessons Learnt

For site selection, most of the site that have been able to withstand the test of time had rocks underneath and could not be used for arable farming but the surrounding area was cultivated with arable crops. The vegetation on site included shrubs, climbers and few trees. The site selected for the apiary measured an average of 40m² and five to ten hives were kept per site, but with a few cases of fifteen to twenty hives per site. The hives made from *Cordia milenii* (locally called omo) were found to withstand environmental conditions better than planks from other timber species used. Hives made from *Cordia milenii* are light to carry when dry and are not easily destroyed by rain. Although none of the timber species used was termite-proof, termites were controlled with spent vehicle engine oil. Hive stands were made with old tyres, concrete blocks, wooden and iron rods. Stacking two or three tyres before placing the hive has proved to be the most durable and cost effective method

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while used aluminium plates obtained from a lithographic printer was placed on the tyres before placing the hives on the plate. This was done to prevent amphibians, snakes and other reptiles that might make the cool inner side of the tyres as their habitat. Sometimes, swarms of bees were encountered inside the tyres, while swarms in the hives on top of such tyres had absconded. It was not clear if the initial colony had shifted their abode or it was an entirely different colony.

A new hive that is being expected to catch a swarm should be approached and opened with caution because cobras had been found twice in different empty hives while the cast-off skin of snakes had been found in the empty hives and sometimes in those that had active bee colonies. There were some situations in which the cast-off skin of snakes was used as nest by rats under the hive lid but whether it was brought by rats or by the snakes could not be ascertained. What had been observed under the hive lids include scorpions, rats, other small reptiles and cast-off skins of snakes.

When working on the hives, it was observed that the bees were extraordinarily aggressive towards the end of the year when the ambient temperature was high but they were more docile during the cool months of harmattan. When inspecting a bee-hive, care should be taken to open the hive lid facing the opposite direction; this would give any animal hiding underneath to jump out in a direction away from the beekeeper and not towards the beekeeper as would have happened if the hive lid had been opened with the lid facing the bee-keeper.

Different smoker fuels that have been tried include paper-mache, (Paper-mache is a composite material consisting

of paper pieces or pulp reinforced with starch made from cassava, it can be moulded into different shapes when wet but was formed into balls for smoker fuel) dry leaves and POME (Palm Oil Meal Exudate locally called “oguso”. This is chaff, a bye-product of processing *Elaeis guineensis* ripe fruits). I observed that POME burnt with a better whitish smoke than the other types of smoker fuels. I also observed that when working on the Kenyan Top Bar Hive (KTBH), the following steps made working on the hive easier. (i) observe the flight path and do not move across it; (ii) check the number of entry points that the bees are using; (iii) smoke from the busiest entrance; (iv) pump in the smoke and later remove the hive lid; (v) use the hive tool to knock the top bars starting from the right or left till you cease to hear a hollow sound. The bar that makes a “thud” sound signifies presence of a comb attached but not necessarily with honey; and (vi) start opening from the last two (2) hollow bars. Always make sure the first two bars starting from each side are not removed as the bees tend to hide under them, but if the bars are removed then the bees become more aggressive.

Gently raise the bars with the combs and harvest those that contain ripe honey in a bucket. If ever there is need to harvest from the first bar, it should be placed back as soon as possible. Try as much as possible to leave the site with as few bees as possible. When you get home after harvesting, remove the bees that are still attached to the combs and put them in a small container that contains water and drown them in it. Drowning the bees is better done in the evening because if you allow them to fly off, they will return within a short period with more workers and they may attack you. After straining with muslin cloth, allow

the honey to settle overnight, decant into glass or plastic bottles that are air tight and then keep the honey in a cool dry place.

So many domestic tests are done to ascertain the quality of honey and they include: (i) matchstick test. Here, a matchstick is dipped in the honey and is then ignited. If it does not ignite, then it is not good but the scientific basis of this is that you are actually testing for the moisture content and not the type of sugar; (ii) the bottles of honey turned upside down and if the honey does not spill out, this is taken as its authenticity. The thinking behind this is that honey is very dense and it tends to push up all impurities in it. Since the bottle has a narrow neck, then the debris is invariably used to seal the bottle's neck; (iii) some people use odour to confirm honey quality but this is subjective and is also a function of how the hive was smoked during harvesting; (iv) some people say unadulterated honey does not attract ants but I observed that the ants will cluster round a drop of honey on the ground.

Honey is used for a variety of consumptive and non-consumptive purposes and my opinion on testing for honey quality is pouring it in cold water.

A better quality honey will sink and not easily mix with the water while a lesser quality honey will disperse as it is being poured into cold water.

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Bibliography

Adjare, S (1990) Beekeeping in Africa. FAO Agricultural Services Bulletin.

Crane, E (1990) Bees and Beekeeping: Science, Practice and World Resources. Heinemann Newnes.

International Bee Research Association (IBRA) (1997) The Management of African Honey Bees including the design of low cost hives.

Wikipedia (2011) Beekeeping. Available at <http://en.wikipedia.org/wiki/Beekeeping>, accessed on 05 Dec, 2011.

A review of barriers to wealth creation and benefit sharing from forest based green economy in Zambia

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Summary

Expert knowledge and literature review were used to identify barriers to effective participation of rural communities, private sector and other stakeholders in management of wood and non-wood forest products in Zambia. Traditional and non-traditional forests occupy approximately 60% of Zambia's landmass, which has massive potential for economic contribution to both rural and urban communities. Key challenges and opportunities in wealth creation and benefit sharing from forest products are discussed. The conclusion is that enhancing wealth creation and benefit sharing among

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the rural communities and its key partners depend on legal framework reforms, systems development, stakeholder formal and informal relationships and connectedness.

Introduction

The Convention on Biological Diversity (CBD) provides a platform for conservation, sustainable use and equitable sharing of benefits from natural resources. It forms a basis upon which a 'green economy' would be developed. We adopted definition of green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). Therefore, green economy is inextricably linked to natural resource base, which creates it. Wealth creation is an integral part of natural resource management (Anderson, 2002), accompanied by equitable benefit sharing for improved livelihoods (Fisher *et al.*, 2008; The Economist, 2011). According to Chishakwe and Young (2003) benefit sharing encompasses a wide array of issues such as access to genetic resources, transfer of technology, financial matters, ownership and intellectual property rights, which are closely linked.

Due to the nature of the common pool resources, such as forests, rural communities tend to develop collective identity to maximize benefit from common interest of forest utilization as postulated by Berkes *et al.* (1989); Ostrom *et al.* (1999); Burger *et al.* (2001); Klandermans *et al.* (2002) and Ashmore, Deaux and Mclaughlin-Volpe (2004). Based on the common interest, collective action founded on shared experiences and expectations are developed (Meinzen-Dick, DiGregorio & McCarthy, 2004).

The interest based frameworks unite the participating stakeholders (Ury, Brett & Goldberg, 1988), belonging to institutions that can conduct effective and integrative bargain. As such, these institutions form communities of practice which have passion

and also interact, socially learning and practicing perfection in their resolve of the challenges they face (Wenger, 2004). Deforestation, caused by encroachment and agrarian activities, exacerbated by climate change, is probably the greatest challenge confronting forest management (Chundama, 1990). Assuming that events and mechanisms in forest management influence the ability to build wealth and equitably share benefits, we determined key barriers to both wealth creation and benefit sharing and means of removal of barriers.

Key barriers

Barriers are aspects that limit the success by potential beneficiaries in maximizing tangible benefits from forest products. It is assumed that removal of the identified barriers would increase forest management sustainability and permit increased economic benefits. Kajembe and Monela (2000) and Campbell *et al.* (2007) highlighted some barriers that existed within the sub-African region. These were summarized as: low inherent productivity of local forests despite diverse forest product types (including wood carbon storage), elite and external actors capture of values and benefits, restrictive regulations and high transactional cost of producers and traders, limited support by private sector for local forest enterprise development, and lack of strong local organization to demonstrate volumes and engagement. The present research identified (through *expert knowledge and literature review* in 2011) further barriers, including the following:

Failure to legitimize forest benefits

Zambia Forest Act and Policy have been in draft form since 1999 and 2007 respectively. Embodied in these pieces of draft legislation are aspects that would enhance community and private sector participation, increase legal benefits to the rural communities, and avoid rhetoric by interest groups but institute substance to stakeholders. Supportive aspects include: enhanced access to forest resources, commodity markets and equitable benefit sharing mechanisms. In a dynamic socio-

ecological environment imposed by climate change and volatility in global economy, absence of resilient legislation makes it difficult to explore alternative innovations for benefit generation particularly for rural communities. Due to absence of comprehensive legal instruments, Zambia has been unable to access revenue from carbon trading facility which could be used to cushion climate change impacts confronted by impoverished rural communities.

Forest resource ownership

Although, user rights are conveyed to various stakeholders including rural communities, forest resource ownership is principally under the state. Increased devolution of rights and power over forest management, through advocacy, may contribute to effective forest management and benefit sharing. Full ownership could be achieved through individual or collective community ownership of forests as is the case in Cameroon, highlighted by Kam Yogo (2010).

Inappropriate approaches and synergies to enticing rural community participation in benefit generation

Here we avail two examples: firstly relating to pricing of forest products and secondly, improper implementation of Community Based Natural Resource Management (CBNRM) programme. As a result of 'differential taxation' (Dalal-Crayton & Child, 2003), perpetuating forest products by emphasizing on quantities and not qualities, that do not have value added renders unattractive competitive commodity pricing, which lowers the economic benefits in favour of other commodities other than natural resources. CBNRM programmes, which are non-organic and non-sustainable in areas where stakeholder coordination has been inadequate, transparency and accountability not fulfilled to the constituencies and incentive driven mechanisms have been insufficient, and have stagnated (Mbewe *et al.*, 2005).

Reliance on rights based claims

In case of rural communities, claims of benefits are mostly based on their perceived rights. As forests are capable of providing various products, demanding different skills from users, a shift towards interest groups such as production based associations, unions and societies is more appropriate. Conditions that allow various interest groups to flourish have not been fully developed. In order to develop this condition there is need to allow for significant fusion between local indigenous technical knowledge and modern skills (Nyirenda *et al.*, 2010).

Opportunities

Despite barriers inhibiting wealth creation and benefit sharing, the following opportunities exist in respect to institutional governance, local representation, commercialization and entrepreneurship diversification perspectives. These are:

- Ardent use of information, communication and technologies (ICTs) that can enhance marketing of forest resources.
- Formulation and implementation of bylaw by local stakeholders to enhance effective forest management.
- At local level, there are diverse forest products which form a resource base for green economy. Gondo, Sola and Kurebgaseka (2002) have reiterated production potential of non-wood forest products in Zambia.
- National Decentralization Policy of 2004 provides plinth for federated local institutions for effective access and utilization of local forest resources.

With increased prevailing advocacy by the various civil advocacy groupings, it is envisaged by stakeholders that gender imbalance will minimize. For instance, women and youth should be involved more in resource based income generation and resource management (e.g. even in beehive setting and management, honey pre-processing and marketing).

- The role of social capital through such features as connectedness and collective action can assist in building capacity among the stakeholders and enhance their participation in wealth creation and equitable benefit sharing as suggested by Nyirenda *et al.* (2010). Social capital tends to lower the transaction costs for production, collection, pre-processing and marketing through such institutions as associations, cooperatives and social networks (*ibid.*).
- There is Government's pervasive interest in empowering the impoverished rural communities, who are among the significant agencies of forest degradation in Zambia and this interest could further be extended to green economy.

Recommendations

In order to increase wealth creation and improve equitable benefit sharing in forest resources in Zambia, the following are recommended:

- Enact appropriate legislation for forest resource management.
- Explore more of the business models in commercializing forest resources, focusing on those that promote market incentives that drive conservation and resource management simultaneously. One such example is the Community Market for Conservation (COMACO) model, which interfaces agriculture,

market driven incentives and natural resources conservation.

- Develop capacity in forest commodity interest groups in such spheres as commodity marketing, interest claims, performance monitoring and evaluation, appropriate forest resources extraction or processing technologies, and finance sourcing.
- For long term sustenance of forest resources, there is need to develop and implement land use and management plans. Most (n=63; 13.1%) of forest reserves in Zambia do not have forest management plans and their absence poses a major risk to posterity, though bylaws exist particularly in the eight community forest sites.
- Develop long term financial commitment by stakeholders, devoted to development of forest resources products.
- Define unit of management and benefits associated with forest management, across administrative (e.g. associations, trusts, clubs and unions) and geographical (e.g. zones) boundaries.

Conclusion

Scaling up of wealth creation and equitable benefit sharing from forest products in Zambia can be facilitated through removal of identified barriers. Much of investments of effort (e.g. financial and knowledge) are required in building institutional and technical capacities in array of stakeholders. Since interest groups particularly local institutions can not by themselves drive wealth creation and benefit sharing, there is need to enhance inter-stakeholder positive connectedness and relationships.

References

Anderson, J. (2002). *Nature, wealth and power: emerging best practice for revitalising rural Africa*. Nairobi: USAID / Africa Bureau (AFR/SD).

Ashmore, R.D., Deaux, K. and Mclaughlin-Volpe, T. (2004). An organizing framework for collective identity: Articulation and significance of multidimensionality. *Psychological Bulletin* 130(1): 80-114.

Campbell, B.M., Angelsen, A., Cunningham, A., Katerere, Y., Siteo, A. and Wunder, S. (2007). *Miombo woodlands: opportunities and barriers to sustainable forest management*. Bogor: CIFOR.

Dalal-Clayton, B. and Child, B. 2003. *Lessons from Luangwa: the story of the Luangwa Integrated Resource Development Project, Zambia*. London: International Institute for Environment and Development. (Wildlife & Development Series 13).

Fisher, B., Turner, K., Zylstra, M., Brouwer, R., de Groot, R., Farber, S., Ferraro, P., Green, R., Hadley, D., Harlow, J., Jefferiss, P., Kirkby, C., Morling, P., Mowatt, S., Naidoo, R., Paavola, J., Strassburg, B., Yu, D. and Balmford, A. (2008). Ecosystem services and economic theory: integration for policy-relevant research. *Ecological Applications* 18(8): 2050 – 2067.

Gondo, P., Sola, P., and Kurebgaseka, N. (2002). *Assessing the potential for production, commercialization and marketing of NWFPS by rural producers in Zambia to improve their livelihoods*. PFAP II. Lusaka: MTENR.

Kam Yogo, E.D. (2010). Possible impacts of modalities for obtaining community forests, on forest resources conservation and climate change in Cameroon. *Nature & Faune* 25(1): 86 – 89.

Meinzen-Dick, R., DiGregorio, M. and McCarthy, N. (2004). Methods for studying collective action in rural development. *Agriculture Systems* 82: 197 – 214.

Nyirenda, V.R, Chansa, W.C, Myburgh, J.W, Reilly, B.K., 2010. Social capital and community responses to natural resource management in the Luangwa Valley, Zambia.

Journal of Sustainable Development in Africa
12(8): 158 – 179.

UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. Synthesis for Policy Makers. Available from URL: www.unep.org/greeneconomy [Accessed: 25/08/2011].

Ury, W. L., Brett, J.M. and Goldberg, S.B. (1988). *Three approaches to resolving*

disputes: interests, rights and power. In getting disputes resolved. Designing systems to cut the costs of conflict. San Francisco: Jossey – Bass; pp. 3-19.

Wenger, E. (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal*. January – February 2004: 1– 8.

**Developing rural communities by
protecting tropical forests:
Contribution of community based
forest management in
Cross-River State, Nigeria**

Fola Babalola¹ and Abi Ene²

Summary

Wanton destruction of forests and its resources necessitated the introduction of Community Based Forest Management into Cross River State, Nigeria with the primary focus of guaranteeing the conservation and protection of the remaining tropical rain forest of the State. The Cross River State Community Forestry Project (CRSCFP) was designed to incorporate local knowledge into the project's decision making processes with the aim that sustainable economic benefits from the natural resource base were secured for the rural communities. Consequent to the participation of the communities in managing forests adjoining to their communities, they were paid royalties by the state government, which was used to fund various rural developmental projects. Having benefited from the proceeds of CBFM, the local communities see forests as their heritage that can further benefit from protection and management strategies.

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Most West African states have initiated decentralization programs, with devolution of natural resource management to local communities as an important component. Most national forestry services in the region now recognize the importance of community forestry, collaborative forestry, or joint forest management and have developed a critique of previous practices based on exclusionary top-down approaches (Amanor, 2003). UNEP (2011) defines a "Green Economy" as one that results in improved human well-being and social equity, while significantly reducing environmental risks. Community Based Forest Management (CBFM) means management of forests which supports the empowerment of local communities and the inclusion of all groups in the community (minorities, women, etc) in decision-making. In addition to serving as an effective strategy for sustainable forest, this participatory approach provides a platform and avenue for rural development (Papka, 1995; Banzhaf *et al.*, 2000). CBFM for sustainable development signifies partnership between communities, forestry agencies and other stakeholders working together for sustainable forest management and rural development (Hesse and Pippa, 2000; Amanor, 2003). For the partnership to be successful, communities must have security of long-term rights to the forest so that they are assured that they will receive benefits from the protection and improvement of the forest resources (Ribot, 2001). This link between local benefits and sustainable development appears to be strong, with improvements in "the quantity, quality, variety and security of forests", based on shared forest management responsibilities.

Currently the practice of CBFM is very limited in Nigeria. It is only in Cross River State that this practice is found. CBFM started in Cross River State in March 1991 with the commencement of a British Government Overseas Development Administration (now known as Department for International Development) assisted

forestry project (CRSFC, 2006; 2007). The project's primary focus was to guarantee the conservation of the remaining one third of tropical rain forest of the State (which includes both tropical moist and dry forest). Two thirds of the forest estate had already earlier been designated as Cross River National Park (CRNP) by decree 36 of the Federal Government of Nigeria. However, participatory forestry practice commenced fully only with the inception of the Cross River State Community Forestry Project (CRSCFP) in 1999. The CRSCFP was designed following extensive consultations and research between 1997 and 1998. The project's goal, as seen by the Cross River State Government, was primarily to ensure that sustainable economic benefits from the natural resource base were secured for women and men in the State, and the incorporation of local knowledge into the project's decision making processes (CRSFP, 1994; CRSG, 2005).

There are number of community based organizations (CBO) supporting community forestry in the State. Among them is Ekuri Initiative which started in 1992 as a cooperative body. The initiative was formally registered as a CBO in 1996 with the goal of conserving the Ekuri community owned tropical high forest (THF) as well as poverty alleviation. The success of Ekuri Initiative has started to inspire other forest communities like Etara Enyeyeng, Gabu, Okorshie in Cross River State to develop management options for their forest lands.

Besides conservation of forest resources and meeting the forest products requirements of the local people, CBFM also serves as income generation for the local people through benefit sharing and employment opportunities. Various community projects have been implemented through the proceeds from CBFM in Cross River State. This study therefore evaluates the financial benefits of the proceeds of CBFM to implement rural projects in selected communities of Cross River State, aimed at strengthening conservation efforts and

utilization of environmental benefits in sustainable forest management strategies.

Data collection

Data for the study was collected in 2009 through the use of questionnaires, interviews, and review of available literature and annual reports. The respondents were randomly sampled in the local communities in which CBFM were practiced. The names of the selected communities for the study included Ekuri, Abo-Ebam, Gabu, Okorshie, and Abu-Emeh (Fig. 1). The State Forestry Commission was also visited to obtain information on project implementation as well and to ensure that the proceeds between the communities and the government were shared.

Results and discussions

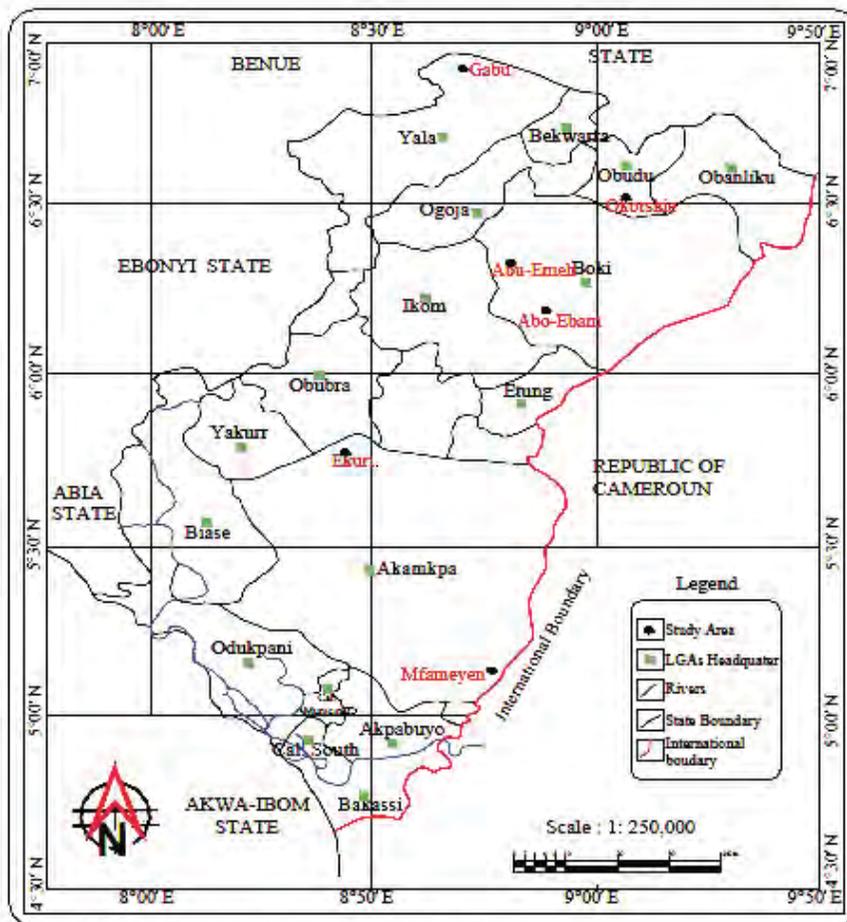
A wide range of NTFPs is planted, preserved, and exploited in the tropical forests around local communities. Some trees are used for carving canoes, mortars, culinary, and furniture items; some bear fruits that provide important foods and condiments, including *Irvingia gabonensis* (wild mango), *Elaeis guineensis* (oil palm), *Borassus aethiopicum* (borassus palm), and *Cola nitida* (cola). Rattans and grasses are used for weaving baskets and furniture. There is also wide range of medicinal plants. Other species provide chewing sticks used for dental cleaning and sponges. Trees are often preserved on the banks of streams and rivers and around headwaters to maintain water resources. Forests also provide bushmeat resources. Timber used for various constructions and building purposes is also obtained from the natural forests and plantations. In addition to being exploited for local consumption, many NTFPs are sold in urban markets. All these benefits yield both social and economic return to the people and the government.

The government restricted entrance and exploitation of products from the natural forests surrounding the local communities as well as the government established plantations. For effective protection and

sustainable exploitation of the forests, the government incorporated the local

communities with the agreement to pay royalty to the local communities involved in the joint management. The sharing formula for the proceeds obtained from the forest reserve between the government and the people was 50%:50%. The sampled communities used the proceeds obtained from CBFM to establish various

developmental projects. Despite of these contributions, many of the sampled local community dwellers informed that they want the government to increase the sharing formula to the advantage of the community. The main reason for this is that the people saw the natural forest as their heritage and belief they deserve larger percentage of accrued proceeds.



Source: Ministry of Lands and Survey, Calabar, Cross River State (2009)

Fig. 1: Map of the study area showing the study areas

As shown in Fig. 2, the highest relative percentage contribution (100%) of the proceeds obtained from CBFM activities to establish various community projects was observed in both Abo-Ebam and Abu-Emeh, although the highest total contribution of benefits (N1,450,000)

(USD9,667) obtained from CBFM to the projects in each of the communities was observed in Abu-Emeh (Table 1). The total of all the contributions of CBFM to implement rural projects was ₦ 4,128,000 (USD27,520) (equivalent of 78.6% of all the total proceeds from CBFM).

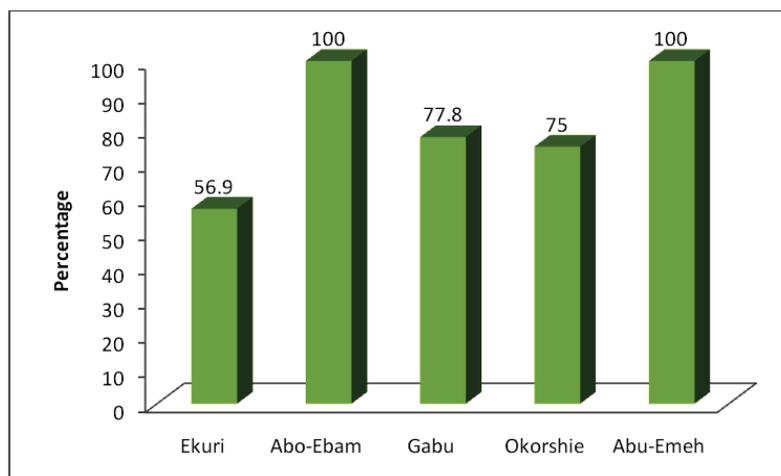


Fig 2: Relative percentage contribution of CBFM in selected communities in Cross River State, Nigeria

Table 1: Summary of contributions of CBFM to Community development projects in Cross River State, Nigeria

S/N	Community	Total amount of project costs (₦) for each of the rural communities (USD equivalent in bracket)	Total contribution of proceeds (₦) obtained from CBFM to implement projects in each rural communities (USD equivalent in bracket)
1	Ekuri	2,409,000 (16,060)	1,371,000 (9,140)
2	Abo-Ebam	990,000 (6,600)	990,000 (6,600)
3	Gabu	388,000 (2,587)	302,000 (2,013)
4	Okorshie	20,000 (133)	15,000 (100)
5	Abu-Emeh	1,450,000 (9,667)	1,450,000 (9,667)
Total		5,257,000 (35,047)	4,128,000 (27,520)

₦ 1 = USD150

The sampled communities implemented various community development projects using the proceeds obtained from CBFM. Some of these included road construction; building of schools, building of a civic center and a health center; implementation of skill(s) development (through various training); and promotion of a gender programme. The awarding of scholarships to girls who were indigene to the community deserves a special mention. In addition, scholarships were awarded also by the womens wing of the "Ekuri Initiative" for girls studying in the University, which thus contributed to furthering the academic excellence of the community. This initiative is a laudable project and should be further strengthened. Acknowledging that transportation plays a central role in the development of the rural economy a bridge was constructed on the Okokori-Ekuri road from CBFM proceeds in the Ekuri initiative and culverts installed in some communities have enhanced the transportation of people as well as their forest and farm produce. This has helped to improving the rural economy through the increase in the sale of products. In the Gabu community, roofing of primary school received the highest contribution from CBFM proceeds. The making of benches for primary schools and building of a church, and the construction of a local bridge, were fully covered by proceeds from CBFM for each of the communities participating in CBFM. Repair of a borehole also received a considerable amount of funding from the proceeds of CBFM in the Gabu community from the proceeds of CBFM.

CONCLUSIONS

Community Based Forest Management has a very great potential in conservation and protection of forest resources as well as contributing to poverty alleviation and implementation of development projects in developing countries. Invariably, the strategy will complement efforts toward attaining the green economy. Meanwhile, all stakeholders must show understanding of, and commitment to, the sharing of proceeds obtained from the forests. There should be a

coordinated, honest communication of the flow of information between all parties to ensure mutual confidence and effective partnership. The communities should not be seen as objects for achieving goals of the programme, but as partners.

REFERENCES

Amanor, Kojo. S., 2003. Natural and Cultural Assets and Participatory Forest Management in West Africa. Conference paper series. International Conference on Natural Assesst held at Political Economy Research Institute and Centre for Science and Environment. 8 – 11 January 2003. 33 pp.

Banzhaf, M., Boureima D., and Herman G., 2000. *From Conflict to Consensus: Towards joint management of natural resources by pastoralists and agro-pastoralists in the zone of Kishi Beiga, Burkina Faso*. Securing the Commons No. 1. London: IIED and London: SOS Sahel.

CRSFC (Cross River State Forestry Commission) (2006): Cross River State Forestry Annual Report. 15 pp.

CRSFC (Cross River State Forestry Commission) (2007): Cross River State Forestry Annual Report. 2 – 4 pp.

CRSFP (Cross River State Forestry Project) (1994): Technical Report 'Overview of a planning process for sustainable management of the forests of Cross River State, Nigeria'. The Forest Development Department, Cross River State and the Overseas Development Administration, UK. 1 – 2 pp.

CRSG (Cross River State Government) (2005): Cross River State Economic Empowerment and Development Strategy (CR – SEEDS) 2005 – 2007. Pp 29 – 30.

Hesse, C., and Pippa T., 2000. *Who's Managing the Commons? Inclusive management for a sustainable future*. Securing the Commons No. 1. London: IIED. Papka, P.M., 1995. Community Participation

in Forestry Development in Nigeria In: E.A. Oduwaye (ed). Forestry and the Small Scale Farmer Proceedings of the 24th Annual Conference of the Forestry Association of Nigeria held in Kaduna, Kaduna State 30th October -4th November, 1995. Pp 1-17.

Ribot, Jesse C., 2001. *Local Actors, Powers and Accountability in African Decentralizations: A Review of Issues*. Ottawa: International Development

Research Centre of Canada Assessment of Social Policy Reforms Initiative. Ottawa, Canada.

UNEP, 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*. UNEP, Nairobi. www.unep.org/greeneconomy.



COUNTRY FOCUS: South Africa

South Africa's forest sector and the Green Economy



Mr Ronald N. Heath¹ presents his country, South Africa. He reveals that the forest sector of South Africa has preempted the drive to a green economy through the implementation of forest certification, and is therefore well-placed to support a national green economy strategy and ensure best possible use of forest and forest products. Mr. Heath goes further to declare that economic stimulus efforts can only provide short-term benefits to the forest sector and hence, the government of South Africa is crafting a long-term vision needed to enable it enhance the shift towards a green economy. Following is a short excerpt from what he shared with Nature & Faune.

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South Africa is generally regarded as a “low forest cover” country. However wooded vegetation covers more than a third of the country’s land surface area. Despite its “low forest cover” status, South Africa ranks as the third most ‘biologically diverse’ country in the world (<http://www.southafrica.info/about/geography/biodiversity.htm#ixzz1ff8vinYm>). The forest biome, although the smallest and most fragmented of all the biomes, has the highest plant diversity per hectare. The total forest resources in South Africa are extensive. Savannas, which are the largest biome in South Africa cover approximately 33% (42 million ha) of the total land surface of the country (Thompson et al. 2001), and contribute the majority of the wooded land area of South Africa (96%) (Shackleton et al. 2007).

The South African forest sector is set to contribute significantly to a national green economy through a focused approach on sustainable forest management, initiated in the mid 1990’s. A green economy is described as the process of reconfiguring businesses and infrastructure to deliver better returns on natural, human and economic capital investments, while at the same time reducing greenhouse gas emissions, extracting and using fewer natural resources, creating less waste and reducing social disparities.

The United Nations Environment Programme launched the Global Green New Deal that aimed at reducing carbon dependency and ecosystem degradation; promoting sustainable inclusive growth and creating new jobs. In response to this initiative, the South Africa’s government has committed itself to working towards the development of a National Green Economy Strategy. Within the framework of the National Green Economy Strategy, the timber and forestry sectors seek to make

significant contributions towards meeting green economy objectives (linked to climate change policies) through the reduction of greenhouse gas emissions and expansion of renewable energy objectives. Three key entry points to attaining green economy include: biomass energy, green infrastructure and building.

In 2008, 97.8% of all plantation areas in South Africa were certified (DAFF 2010). Although the certification of these plantations is a good incentive scheme, it must be emphasised that because of the high cost of implementation of this system, the participation of small growers is still limited. However, this could be addressed through the implementation of out-grower schemes or government support to small growers, and post settlement support to individuals who are rewarded with land through the land restitution processes.



Forest ecosystems and their biological diversity encompass not just trees and landscapes, but the multitude of plant and animal populations and microorganisms that inhabit forest areas and their associated genetic diversity. Although the management of planted forests aims to conserve key habitats by incorporating conservation and biodiversity management, the forest could assist in conservation and other ecological services through the establishment of corridors between these key habitats for the migration of fauna.

There was high profile national debate around introduced invasive species of plants and trees. Moreover, in the past, planted

forests were also criticized for their impact on water flow conservation. Through striving towards a green economy, the sector has transformed itself to a point where the management of the water resources and the plantation resources co-exist. Plantations have limited impacts on stream flow reductions and are playing a role in improving water quality. It has also been shown that plantations have a sponge effect on stream flow and could contribute to the attenuation of extreme water flow such as floods.

Even though the South African forest sector has made significant strides in support of a green economy, the challenge of the forest sector is to develop further the necessary characteristics through sustainable consumption patterns, recycling and recovery of products, increased supply of renewable energy and ecosystem services. Forest managers of all sorts and sizes need to be compensated at a level that enables them to manage sustainably. Compensation is not necessarily subsidy; it is better that prices of products and services are adjusted to reflect this.

References

Department of Agriculture, Forestry and Fisheries, South Africa 2010. Forestry Scientific Services. South African Forestry Facts. 2009

Shackleton, C.M., Shackleton, S.E., Buiten, E. & Bird, N. 2007. The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa. *Forest Policy and Economics*, 9:558-577

Thompson, M.W., Thompson, Vink, E.R., Fairbanks, D.H.K., Balance, A., and Shackleton, C.M., 2001. Comparison of extent and transformation of South Africa's woodland biome from two national databases, *South African Journal of Science* 97, pp. 179-182
<http://www.southafrica.info/about/geography/biodiversity.htm#ixzz1ff8vinYm>)

FAO Activities

A rational approach to managing water, wetlands and forests towards a greener economy for Africa

Ruhiza Jean Boroto¹

Summary

A methodology under development is proposed for the sustainable exploitation of water, wetlands and forests in the context of a watershed and towards a greener economy in Africa. If adopted, it will assist in 'doing things better', through practical steps.

Africa depends a great deal on the exploitation of its natural resources, including water, wetlands and forests. The continent is faced with population growth, an increasing pressure for economic development, and climate change that all affect natural resources. Carrying business as usual will exacerbate the destruction of the continent's ecosystems and the loss of the goods and services that they provide. A rational approach could reverse this trend and contribute to a greener economy in Africa.

The approach that is presented in this paper is work in progress. It consists of two key steps comprising (1) a classification of wetland and forest resources according to their ecological value, (2) a technical guide for the gradual exploitation of wetlands and forest resources focusing on maximizing the benefits of a green economy.

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This methodology is first being developed for wetlands and inland valleys and will be tested on two pilot cases. This paper is part of an early consultative process, comments and contributions from readers are therefore welcome.

Introduction

Increasing pressure on natural resources calls for a radical approach in their exploitation to prolong the benefits of the goods and services that they provide. Water, wetlands and forests can be managed more efficiently. In Africa, water, as a renewable resource, is under the threat of climatic changes that affects hydrological regimes with an impact on the normal course of human activities, of which the biggest water user is agriculture. Africa's forests are only renewable if their exploitation does not exceed their rate of regeneration. Otherwise, the reduction in natural forests means a loss in ecosystem goods and services, including those processes directly related to water, as part of the hydrological cycle. The reduced capacity of dwindling forests for carbon sequestration will also have an impact on the climatic conditions and on the resulting hydrological regime.

Wetlands are under increasing pressure for agriculture, especially for rice. They are fertile and hold water on and off season. Yet, they do play an important ecological role that is so important that some of them are classified as Ramsar sites.

Without explicitly mentioning the 'green economy', two recent publications namely by the Convention on Biological Diversity (2009) and by the FAO (2008) discuss the interactions between forests, water and wetlands and their management for mankind's benefit. The first publication is a review of ecological, economic and policy linkages for water, wetlands and forestry. The second publication is as one of the thematic studies implemented for FAO's Global Forest Resources Assessment 2005 (FRA 2005) to highlight the role of water-

related ecosystems such as wetlands and forestry in providing solutions to freshwater supply problems. The Zaragoza conference held in October 2011, is, on the other hand, more explicit and has shared cases demonstrating the types of innovative policies, projects and initiatives that generate the economic, social and environmental benefits that the green economy should deliver.

It is imperative to take the discussion one further step, beyond these two publications and the Zaragoza conference. A new approach is proposed, on how to practically do things right, in order to achieve a greener economy while exploiting our water, wetlands and forest resources in careful way. The threats posed by human's encroachment of these vital ecosystems can be transformed into an opportunity. This would include, for example, prioritization of organic agriculture and the proactive identification of Globally Important Agriculture Heritage Systems (GIAHS).

UNEP defines the green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.

A framework for the mainstreaming the concept of the green economy in water, wetlands and forests exploitation

Examples of how things are going wrong, compelling to act fast are provided in the CBD publication cited above and include the deforestation in Zambia, the impact of deforestation on health and the impact of the loss of forest and vegetation cover on the hydrological balance in the Pangani, Tanzania. The case of forestry as a streamflow reduction activity in South Africa is cited in FAO publication.

A proactive approach is proposed, offering a framework for managing the gradual exploitation of the continent's natural resources in a predictable and responsible

fashion. The approach builds on the concept of a green economy and seeks to maximise the resulting benefits. It is also expected that in this way, irreversible losses will be avoided. Exploitation could then proceed in a sustainable manner, catering for the needs of future generations.

In order to achieve this, two important actions are proposed:

1. ***Classify all wetland and forest areas according to their ecological value.***

Typically, an area that is recognised as a Ramsar site would be given the highest value and declared as unfit for development activities such as timber exploitation or agriculture. It will therefore be a 'no go' area. This approach is similar to the one adopted by South Africa in classifying the country's river reaches according to their ecological value, in order to determine the ecological water requirements. In this case, the classification will extend to all ecosystems, including forests and wetlands. The difference with the South African approach is that the classification guides which area could be developed in priority (that is the area with the lowest ecological value) and which one should be, as far as possible, be preserved in its natural condition (this is the area. It is to be noted that this classification can be undertaken at any scale, the most manageable being most likely at catchment level. This is also the scale that is recommended in order to extend the analysis to this ecological unit. It is possible that a forest area spans across two catchments, this would not, however, preclude the classification.

2. ***Implement a technical guideline for the gradual exploitation of forest and wetland areas and which consists of:***

- i. The mapping of the resources in the area; including an inventory of the current and potential goods and services, which have justified the classification (as in point 1 above)

ii. A study of the role of forestry and wetlands in the hydrological processes in catchment in which they are located and an investigation on the potential impact of the exploitation on these processes;

iii. An economic analysis of the benefits of the proposed exploitation, with economic valuation of environmental costs and benefits, including the intrinsic value of ecosystems as well as any possible (positive or negative) externalities. The analysis needs not to be competitive (as the exploitation of wetlands and forests is not necessarily in conflict with ecological goods and services). The analysis would therefore be more than a routine cost benefit analysis, and should include:

- A cumulative or joint benefits analysis (from the activity contemplated in addition to the ecological good and services that will be maintained or enhanced);
- The payment and or rewards for ecological services;
- Any positive or negative externality, as relevant.

iv. The identification of mitigation actions against the perceived losses or impacts that the exploitation might cause.

v. The development of a sustainable exploitation plan encapsulates all the above.

The plan should prioritise ecological options; most of which also hold the potential for climate change adaptation:

- Organic agriculture which provides economic and ecological benefits should receive preference over any other form of agriculture,

- Agriculture heritage systems as defined by the FAO's Global Important Agriculture Heritage Systems (GIAHS) – potential candidate GIAHS sites should be proactively identified, protected and promoted.

The plan should include a realistic and positive involvement of local communities and address their possible apathy towards ecological concerns as they will, most likely, have other pressing survival priorities for their livelihoods.

Towards a sustainable exploitation plan

The following steps are proposed to implement these actions:

1. Test the guidelines on a representative pilot case, in a consultative process with interested and affected parties within a selected catchment. The criteria for the selection of the pilot catchment would include the size (which has to be manageable) and the existence of areas with ecological value, varying from high to low.
2. Start exploitation of those forest and wetland areas that have been classified as having the lowest ecological value (Table 1). However, an area with a higher ecological value will receive priority for the preparation of an exploitation plan if it is located near communities which are likely to exploit its resources.
3. Apply the guidelines as the need to exploit areas of a higher ecological value increase with time.
4. *Monitor and evaluate* the impacts and benefits and revise as appropriate. It will be important to be transparent in reporting on this process so that the public, the interested and affected parties are all involved.

Table 1 provides a conceptual overview of how the gradual exploitation of forests and wetlands would proceed.

Table 1: Proposed framework for the gradual exploitation of forest and wetland areas

<i>Priority for exploitation</i>	<i>Baseline status: growing pressure</i>	<i>Increased pressure:- (population/ climate) in XX years (Phase 1)</i>	<i>Increased pressure: (population/ climate) in XXXX years (Phase 2)</i>
Ecological value of forestry or wetland			
1 – Very high value (such as a Ramsar site)	No go zone	Unlikely to be exploited	Could be partially exploited
2 – High value	Unlikely to be exploited	Could be exploited partially	Next in line for exploitation
3 – Medium value	Could be exploited partially	Next in line for exploitation	Prime candidate for exploitation
4 – Low value	Next in line for exploitation	Prime candidate for exploitation	Already exploited
5- Very low value	Prime candidate for exploitation	Already exploited	Already exploited

Note: As stated in the guideline above, the decision to exploit will be guided by an economic analysis considering expected economic benefits against or/and in addition to ecosystem goods and services, including the intrinsic value of forests and wetlands.

Conclusion: a way forward

The interdependence between water resources, wetlands and forests and the increasing need to exploit them call for a practical approach that embraces the principles of a green economy. This is true for Africa. The approach presented in this paper is work in progress and is still at a conceptual stage. It will be developed and tested, first, on wetlands for agriculture development. Lessons will be integrated for up scaling and could be

applied to forests, in a quest to maximise the wide range benefits accruing from their sustainable exploitation. When classifying these resources, it is proposed that it is done at the scale of a catchment. It represents a hydro ecological unit where the classification and subsequent prioritisation

for exploitation could take place using the steps presented in the exploitation plan.

Thus, this generic approach is raw in its current format, but stands to be improved as it is tested. While the science that will support its implementation might not provide a ready-made, step by step recipe, it is only in learning by doing that sufficient know-how will be acquired to ensure that future generations do excel at managing and exploiting profitably our water, wetlands and forestry resources in a sustainable fashion. Monitoring and evaluation as well as documenting experiences will therefore be important steps in rolling out the proposed approach.

Once it has proven its worth, this approach should be embedded into African countries policies and laws. Ideally, embracing the

principles of a green economy should become a prerequisite for attracting financing. Failing to take such action, the consequences will be irreversible and the loss of benefits to future and present generations important. It is therefore advocated this approach receives due consideration.

References

AgroEcological Investments Management (May 2010). The investments Advantages of organic Agriculture. (Also available at http://www.slideshare.net/GLB68/investment-advantages-of-organic-agriculture?src=related_normal&rel=1802773)

Blumenfeld, S., Lu, C., Christophersen, T. and Coates, D. (2009). Water, Wetlands and Forests. A Review of Ecological, Economic and Policy Linkages. Secretariat of the Convention on Biological Diversity and Secretariat of the Ramsar Convention on Wetlands, Montreal and Gland. CBD Technical Series No. 47. (also available at <http://www.cbd.int/doc/publications/cbd-ts-47-en.pdf>)

Department of Water Affairs, South Africa (1998). National Water Act, Act 36 of 1998

FAO (2008). Forests and Water. FAO Forestry Paper 155 (also available at <http://www.fao.org/docrep/011/i0410e/i0410e00.htm>)

http://upload.wikimedia.org/wikipedia/commons/2/21/Africa_satellite_orthographic.jpg

http://www.un.org/waterforlifedecade/green_economy_2011/info_briefs_tools.shtml

http://www.worldwaterforum6.org/fileadmin/user_upload/pdf/Zaragoza3-5oct.pdf
Huang, Lily. "Rise of the Bugs." *Newsweek.* 29 June 2009

Koohafkan, P. and Altieri, M.A. (2010) FAO. Global Important Agriculture Heritage Systems. (also available at <http://www.fao.org/nr/giahs/en/>)

Pangani River Basin Management Project,
<http://www.panganibasin.com/project/index.html>

UNEP :

<http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx>

Van Rooyen, A.F. (1998). Combating desertification in the southern Kalahari: connecting science with community action in South Africa. *Journal of Arid Environments.* Volume 39, Issue 2, June 1998 pp 285-297. (also available at <http://www.sciencedirect.com/science/article/pii/S0140196398904074>)

Vittor *et al.* The effect of deforestation on the human-biting rate of *Anopheles Darlingi*, the primary vector of *Falciparum malaria* in the Peruvian Amazon. *American Journal of Tropical Medicine and Hygiene.* 74(1), 2006. pp 3-11

World Water Assessment Programme. (2009). The United Nations World Water Development Report 3: Case Study Volume: Facing the Challenges. Paris: UNESCO, and London

Links

Forests in a green economy: A synthesis

Produced during the International Year of Forests, this synthesis addresses the value of forests and their role in transitioning to a green economy. The synthesis lays out compelling information for the forestry sector, governments, private sector and civil society to invest in forests to aid the realization of a more socially inclusive, low-carbon and resource efficient economy.

For the whole review, visit:

<http://www.unep.org/greeneconomy/ResearchProducts/tabid/4605/Default.aspx>

Source: www.unep.org > Green Economy > Research Products

Redefining our economic systems: Could a forest be worth more than a gold mine?

This is the theme of a talk covered by National Geographic at TEDx Yerevan. The speaker posed this question since the Republic of Armenia's economy is heavily reliant on copper and gold mining. The issue is significant because the region is one of the 34 most endangered global hotspots for biodiversity. In addition, resources like forests and water are becoming scarce as a result of unsustainable management and climate change, while several strategic industries are heavily reliant on the benefits provided by natural capital.

Speaker: Jason Sohigian

For the link to the article and YouTube video visit: <http://bit.ly/sohigian>

Source: Jason Sohigian. Deputy Director, Armenia Tree Project, 65 Main Street Watertown, MA 02472 USA. Tel: (617) 926-TREE x14. Email: jason@armeniatree.org
Website: www.armeniatree.org

Forests, Fragility and conflict – Overview and case studies (June 2011)

Forests, Fragility and conflict provides a critical review and synthesis of some of the key issues and post-conflict policies associated with forests, fragile states and conflict. The synthesis offers guidance on

how these issues might be addressed in future policy discussions.

Authors/Partners: Emily Harwell (lead consultant), with Arthur Blundell and Douglas Farah

For the review, visit: <http://www.profor.info/profor/knowledge/forests-fragility-and-conflict>

How effective are protected areas in conserving biodiversity?

The paper argues that protected areas may not be the most effective means of conservation. It reviews an article newly published in *Forests Ecology & Management* that was co-authored by CIFOR Scientist Manuel Guariguata, which found that community-managed forests experienced lower annual deforestation rates and less variation in rates of forest cover loss than protected or state owned "parks". The findings, he argues, highlight the need to incorporate local people into the management of natural resources from design to implementation of REDD+.

Author: Terry Sunderland. Senior Scientist, Center for International Forestry Research

For the whole review, visit:

<http://www.cifor.org/online-library/polex-cifors-blog-for-and-by-forest-policy-experts/english/detail/article/1222/how-effective-are-protected-areas-in-conserving-biodiversity.html>

Source: CIFOR's Forests Blog: blog.cifor.org

Rio+20 - United Nations conference on sustainable development

Rio+20, United Nations Conference on Sustainable Development, will be held in Rio de Janeiro, Brazil, on June 4-6, 2012.

For further information, please visit: <http://www.uncsd2012.org/rio20/>

Source: Rio+20 Newsletter

African elephants to benefit from new \$100 million fund

Global conservation experts aim to raise US\$100 million over the next three years to ensure the long-term survival of African elephants in the face of increased poaching and a thriving illegal trade in ivory.

For the whole article, visit: <http://www.ens-newswire.com/ens/aug2011/2011-08-22-01.html>

Source: Environment News Service (ENS) 2011

International encyclopedia of medicinal plants volume 1 to 18

International Encyclopedia of Medicinal Plants is an amazing compendium consisting of a series of eighteen volumes, covering A to Z of medicinal plants. It is a remarkable compilation of information on herbal medicine, chemistry, pharmacology, healing

properties, treatment of ailments and biology of medicinal plants of the world. It also covers herbs from all over the world, giving their location, cultivation, history of herbal medicine and the herbal traditions of different cultures.

Editor in chief: Vijay Verma

For further information, please see:

<http://www.thebooksplanet.in/collections/frontpage/products/international-encyclopaedia-of-medicinal-plants-volume-1-to-18>

Source: The Books Planet

[thebooksplanet@yahoo.com]

Theme and Deadline for Next Issue

The theme of the next edition of *Nature & Faune* is **"The Forest-Agriculture interface: a zone for enhanced productivity?"**. The New Partnership for Africa's Development (NEPAD) declared in a statement that research on economic growth and poverty reduction has shown that the most effective way to reduce poverty sustainably is to raise the productivity of, and returns from, resources on which the poorer people depend for their livelihoods. In almost all African countries, these resources are agricultural land and labour, and off-farm rural labour. Thus agricultural growth is not only essential for Africa to feed itself as its population expands, but also for the wider development of Africa.

African countries are striving to reach and maintain a path of economic growth through agriculture-led development that reduces mass poverty, food insecurity and hunger. As targets for a successful implementation, the Comprehensive Africa Agriculture Development Programme (CAADP) takes on the Millennium Development Goal (MDG) of reducing poverty and hunger by half by 2015, through the pursuit of a 6 percent average annual growth in the agricultural sector, and allocating an average of 10 percent of national budgets to the sector.

However in Africa, as in other economically-deprived regions, the greatest cause of deforestation has been the conversion of forest land to agriculture. By definition, an interface is a boundary across which two-independent systems meet and act on, or communicate with each other. Areas in which the conversion of forest land to agriculture occurs (i.e. the most direct and visible aspect of the **forest-agriculture interface**) are often of great ecological importance; they need to be managed wisely to avoid unnecessary destruction of forests, while at the same time be able to meet the livelihood requirements of those that live there. Moreover, conversion and use of

forests can result in better food and energy supply, rural employment and income opportunities, expanded agro- and forest industries, and an improved trade and foreign exchange balance. Furthermore, it is worth noting that forest ecosystems contribute tremendously to agricultural productivity, by protecting soil against degradation and erosion, maintaining river bodies, and assuring regular rainfall patterns.

Sometimes however, the pursuit of short-term gains may lead to serious long-term losses to both the environment and the livelihoods of many people, especially those in the rural areas. This is oftentimes the case in most developing countries where the need for economic growth has driven governments into the mining of natural resources, including forest and agricultural lands with disastrous long term effects on the environment and people's livelihoods. With the rising price of fossil fuels, the looming threats of climate change, land use patterns may change in favor of biofuels production. In Africa, this is a potential new source of pressure on land, agriculture and forestry.

The next edition of *Nature & Faune* will explore this complex interface between forest and agriculture in Africa. Articles that address the prospects of achieving the Millennium Development Goals which requires balance between economic, social and environmental aspects in decision-making, and achieving synergies between forest, agricultural and energy land uses will be most welcomed. We invite you to submit manuscripts that describe the working of the forest-agriculture interface in your countries and examine options for stabilizing this zone.

Mostly forest-agriculture interface describes the zone (physical or economic) where forest systems meet agriculture systems and interact, often contentiously and negatively. The next edition of *Nature & Faune* wants to explore how to get positives out of this, and manage/mitigate the negatives. Therefore

we call for articles that contribute to the debate of evaluating best practices, and offer pragmatic measures to ensure productive interface between forestry and related land based sectors such as energy, agriculture and water.

Please submit manuscripts that consider the scientific knowledge behind these issues and which seek to understand the role of the landowner and his decision-making process

which will likely influence the perceived conflicts between forest and agriculture, and impact on the collaboration among stakeholders. Of interest also are papers that consider the policy implications of the above issues, including policies that address land tenure and land use decision making process.

In order to facilitate contributions from potential authors, we have created guidelines for the preparation of manuscripts for Nature & Faune. Short and succinct papers (maximum 3 pages) are preferred. Please visit our website or send us an email to receive a copy of the *'Guidelines for Authors'*.

Email: nature-faune@fao.org and Ada.NdesoAtanga@fao.org
Website: <http://www.fao.org/africa/publications/nature-and-faune-magazine/>

Deadline for submission of manuscript(s) and other contributions is 30th April 2012

Guideline for authors, Subscription and Correspondence

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Nature & Faune

Enhancing natural resources management for food security in Africa

Volume 26, Issue 1

The forest sector in the green economy in Africa

Editor: Foday Bojang
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Message to Readers

Maria Helena Semedo¹

The African Forestry and Wildlife Commission (AFWC) is dedicating the present edition of **Nature & Faune** publication to the 2011 International Year of Forests - "Forests 2011". This is the second consecutive edition of the publication to be dedicated to Forests 2011. The first was the June 2011 edition.

With its special focus on "**The forest sector in the green economy in Africa**", this issue shows many ways in which the forestry and natural resource sectors can contribute to the needs of the green economy in Africa. A green economy is defined as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities². The Global Citizens Center, led by Kevin Danaher, defines green economy as a global aggregate of individual communities meeting the needs of its citizens through the responsible, local production and exchange of goods and services.

The present edition highlights the significance of the forestry sector to the overall economy and its importance overall in the region's land use, demonstrating its potential to make a difference in improving (or worsening) an economy's green

credentials. It is an important message about forestry and greenness.

You will discover how forestry helps greenness and what challenges it faces in doing this with regard to energy, water, carbon management, biodiversity management and conservation. The articles envisage how forestry will continue to deliver its economic, environmental and social functions in Africa while interacting with other sectors in making the collectivity of sectors to build up a "green" overall economy.

Mr. Gueye in the editorial, provides an overview of what a green economy can do to decrease poverty in Africa and why that is important. The author goes on to make some suggestions on winning the "hearts and minds" of the general public to support the greening of forest management and its influence on other sectors of the economy.

The special article featured in this issue, by Mr. Marshall and Mrs. Mkumbo is on fisheries. The story of Lake Victoria's fisheries is a fascinating one, and is a cautionary tale of how not to carry out initiatives that have uncontrollable environmental impacts. That some of the predicted 'disasters' have not turned out that way is a relief.

How do we go about changing things to achieve green economics in forestry? This is the question posed by Mr. Chipeta in an 'Opinion Piece'. The premise is that the green economy needs to pay for itself. This needs difficult adjustments.

Mr. Wencélius, in another 'Opinion Piece' makes strong points about national forest programmes and what the forest sector can contribute to the green economy. He argues that national forest programmes can be important tools for the "greening" of the forestry sector in Africa.

Authors contributed articles that showcase different approaches and actions in integrating sustainability in economic

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² *UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers, www.unep.org/greeneconomy*

sectors. A team of eight scientists in a collaborative effort presents the contribution of community forestry in Cameroon to the green economy and highlight the current and future challenges in integrating community forestry into the process of greening the national economy.

On the other hand, a team of four researchers analyse the governments of countries of Central Africa sub-region regarding their Sustainable Forest Management practices.

Mr. Heath presents his country, South Africa, under the regular feature 'Country Focus'. He reveals that despite its "low forest cover" status, South Africa ranks as the third most biologically diverse country in the world. Mr. Heath goes further to declare that the forest sector of South Africa has preempted the drive to a green economy through the implementation of forest certification, and is therefore well-placed to support a national

green economy strategy and ensure best possible use of forest and forest products.

According to Mr. Boroto of FAO, the organization is active in promoting and aiding efforts of countries to transition to a green economy. He proposes a methodology (still under development) for the sustainable exploitation of water, wetlands and forests in the context of a watershed and towards a greener economy in Africa. If adopted, it could assist in 'doing things better', through practical steps.

I welcome you all to this edition of *Nature & Faune*, which marks the end of the International Year of the Forests 2011.

We treasure your ongoing support as we all work together to achieve the transition to a green economy that is a major pathway to promoting sustainable cycles of production and consumption while ensuring the health and integrity of Africa's ecosystems, and our continued survival and wellbeing.



Editorial

Forests in a green economy transition in Africa

Moustapha Kamal Gueye¹

Natural capital assets, both renewable and non-renewable, are estimated to account for 24 per cent of sub-Saharan Africa's total wealth. This includes sub-soil assets (39 per cent), cropland (36 per cent), timber resources (9 per cent), pastureland (8 per cent), non-timber forest (5 per cent) and protected areas (3 per cent)². A number of studies have underscored the larger gains to be made by expanding investments to enhance natural capital (Millennium Ecosystem Assessment, 2005; The Economics of Ecosystems and Biodiversity, 2010). Given the natural resource-dependence of most African economies, capitalizing on Africa's natural capital will play a critical part in the continent's transition to a green economy.

A green economy can be defined as one that results in improved human well-being and social equity, while significantly reducing

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² World Bank. 2006. *Where is the Wealth of Nations? Measuring Capital for the 21st Century*, The World Bank: Washington, D.C.

environmental risks and ecological scarcities³. In a green economy, growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. These investments need to be catalyzed and supported by targeted public expenditure, policy reforms and regulation changes. This development path should maintain, enhance and, where necessary, rebuild natural capital as a critical economic asset and source of public benefits, especially for poor people whose livelihoods and security depend strongly on nature.

Forests represent critical assets to economic activity and livelihood in Africa

African forests account for 23 per cent of the continent's total land area - close to 675 million hectares - and represent about 17 per cent of global forest area. Forests provide a basis for livelihoods to people, serve as carbon sinks and stabilize global climate, regulate water cycles and provide habitats for biodiversity while hosting a wide variety of genetic resources. These various ecosystem functions and services make African forests a vital asset to society and to the national, regional and global economy.

In 2010, Central Africa accounted for 37 per cent of Africa's total forest area, Southern Africa for 29 per cent, North Africa for 12 per cent, and East and West Africa for 11 per cent respectively. The five countries with the largest forest area were (Democratic Republic of the Congo, Sudan, Angola, Zambia and Mozambique), while countries reporting the highest percentage of their land area covered by forest were Seychelles (88 per cent), Gabon (85 per cent), Guinea-Bissau (72 per cent), Democratic Republic of the Congo (68 per cent) and Zambia (67 per cent)⁴.

³ UNEP (2011): *Toward a Green Economy – Pathways to Sustainable Development and Poverty Eradication*. Available at: <http://www.unep.org/greeneconomy/>

⁴ FAO. 2010. *Global forest resources assessment, 2010 – Main report*. FAO Forestry Paper 163. Rome, Italy.

Forestry contributes 6 per cent of GDP in Africa on average, and up to 13 per cent in tropical African countries. In Eastern and Southern Africa, the average annual forest income is about 22 per cent of household income⁵. They provide significant timber and non-timber forest products, thus supporting both local communities and national economies. Fuel wood supplies represent a significant proportion of household energy needs for cooking and heating for the vast majority of African, particularly in rural area. Africa accounted for 33 per cent of global fuelwood removals in 2010⁶.

For Africa, forest resources are important export commodities, with timber products alone accounting for 60 per cent of export earnings for Gabon and about 50 per cent for the Central African Republic⁷, making it essential for these countries to ensure a sustainable management of the resource. Furthermore, forests are important providers of ecosystem services such as climate regulation, carbon sequestration, watershed protection, and habitat for species that provide bush meat for communities and tourism opportunities. In central Africa rural communities obtain a critical portion of the protein and fat from forests, in particular from bushmeat⁸. While employment data is relatively uncertain due

to limited accounts of non-formal employment, in 2005, some 571,000 people were reportedly involved in the primary production of goods in forests in Africa.⁹

Well-managed forests and proper use of their vital supporting functions can therefore yield real economic benefits for Africa and have knock-on effects on poverty.

Yet despite these huge ecological, economical, social and health benefits, forests are still being destroyed at an alarming rate – 13 million hectares annually – often for limited private and short-term gains because of over-harvesting and pressures from other land uses, including crop farming and livestock husbandries. Over the past decade, forest cover stabilized in North and Central America and expanded in Europe. Forest cover expanded in Asia, mainly due to large-scale afforestation in China, which offset continued deforestation in South-east Asia. Africa and South America experienced the largest net loss of forests during this period¹⁰. Over the last two decades, agricultural expansion and timber extraction were the main proximate causes of tropical deforestation.

African forests can and should be an important driver towards a green economy

Forests can be a critical driver in a transition to a green economy when the myriad of economic, social and environmental benefits they can deliver are realized. While still at a slow pace, there is growing recognition among policy makers and local communities of the need to maintain, sustainably use and invest in forests in order to prevent the loss of forest-based biodiversity and ecosystem goods and services that support the livelihood of populations and to enhance their potential to reduce carbon emissions .

⁵ Vedeld, P., Angelsen, A. Sjaastad, E., and Kobugabe Berg, G. (2004). *Counting on the environment forest incomes and the rural poor. Environmental Economics Series, Paper No. 98, World Bank Environment Department, World Bank, Washington, D.C.*

⁶ FAO. 2010. *Op Cit.*

⁷ Gumbo, D. 2010. *Regional review of SFM and policy approaches to promote it – Sub-Saharan Africa. Background Paper for the Forests chapter, Green Economy Report.*

⁸ Nasi, R., Brown, D., Wilkie, D., Bennett, E., Tutin, C., van Tol, G., and Christophersen, T. (2008). *Conservation and use of wildlife-based resources: the bushmeat crisis. Secretariat of the Convention on Biological Diversity, Montreal, and Center for International Forestry Research (CIFOR), Bogor, Indonesia.*

⁹ FAO. 2010. *Op. Cit.*

¹⁰ UNEP. 2011. *Forests in a Green Economy: A Synthesis. Available at: <http://www.unep.org>.*

The vital importance of forests to society and new economic values that are emerging in the context of the fight against climate change and the loss of biodiversity offers Africa new opportunities to transform the management and use of its forest resources to advance its development agenda. In 2010, Africa contributed 21 per cent of the global total of carbon in forest biomass, with Central Africa containing the largest amount of carbon in forest biomass. However, overall, with the exception of North Africa, all African subregions experienced a decline in carbon stocks in forest biomass between 1990 and 2010 because of the loss of forest area¹¹.

Beyond direct benefits, African forests support a growing ecotourism industry. Overall, tourism, which relies primarily on the continent's natural and cultural wealth, directly and indirectly contributes an estimated 8.3 per cent to GDP and 5.9 per cent to employment in Africa¹². In the Great Lakes area, about \$US20 million is generated annually from tourism based on gorilla viewing and other activities¹³.

Today, investments in forests remain low and forest related activities are predominantly extractive. It has been estimated that an approximate US\$ 64 billion is invested annually in the forest sector¹⁴. Of this, approximately 28 per cent is spent on forest management and the rest is invested in forest product processing and trade. The UNEP Green Economy Report suggests that an additional investment of 0.034 per cent of global GDP each year (equivalent to US\$ 40 billion in constant 2010 dollars per year) could raise value

added in the forest industry by US\$ 600 billion in 2050. This is 20 per cent more than value added under the business as usual (BAU) scenario which models growth under assumptions that mirror the current economic policy climate. Under the green economy scenario, additional investment is undertaken in reforestation and forest conservation. Under this scenario, concomitant increases in sustainable productivity enhancing improvements in agriculture and carefully targeted tree planting ensure that poor farmers are not displaced and there are increased income earning opportunities in rural areas.

Governments are increasingly recognizing the importance of sustaining and possibly enhancing the natural and cultural assets from which new income, employment and growth opportunities are arising. Translating such recognition into action requires new investments in protected areas, reforestation efforts and rehabilitation of valuable ecosystems. In Kenya, for example, resource valuation efforts that indicated a value to the economy of the Mau forest complex — including tourism, hydropower, agriculture and the tea industry — of possibly as much as \$US1.5 billion a year, triggered a multi-million shilling restoration initiative to reverse the trend of decades of deforestation¹⁵.

New policies and initiatives are needed to sustain and enhance the contribution of forests in Africa

To enhance the contribution of forests to society and economies of Africa governments, the international community and other actors need to scale up initiatives and reform policies in order to create incentives to maintain and invest in forests and to modify rent-seeking behavior.

¹¹ FAO 2010. *Op. Cit.*

¹² World Travel and Tourism Council. 2009. *Travel and Tourism Economic Impact, sub-Saharan Africa.*

¹³ Gumbo, D. 2010. *Regional review of SFM and policy approaches to promote it – Sub-Saharan Africa. Background Paper for the Forests chapter, Green Economy Report.*

¹⁴ Tomaselli, I. 2006. *Brief study on funding and finance for forestry and forest-based sector, United Nations Forum on Forests.*

¹⁵ Nellemann, C., E. Corcoran (eds). 2010. *Dead Planet, Living Planet – Biodiversity and Ecosystem Restoration for Sustainable Development. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal.*

Examples of these enabling conditions include national regulations, smart subsidies and incentives, information management, supportive international markets, and the promotion of community-based and participatory forest management. At the regional and international level, African governments can take new initiatives to send signal to markets and to renew their commitments to working individually and collectively to strengthen frameworks of governance and management of forest resources.

In the context of 2011 as the International Year of Forests, new regional and international initiatives are being spearheaded by African countries to enhance forest conservation and sustainable management. On May 31 through June 3, 2011, at the initiative of the Republic of

Congo, leaders of more than 35 nations covering the world's three major rainforest regions - the Amazon, the Congo and the Borneo-Mekong forest basins - met in Brazzaville at the Summit of the Three Rainforest Basins and agreed to prepare an action plan on sustainable management of forests for signature next year at the Rio+20 Summit meeting in Brazil. The recognition at highest political level that forests contribute to the livelihoods of more than one and a half billion people and that forests function as a cross-sectoral service utility through carbon sequestration and storage, water and pollination services for food production and provision of sustainable construction material and renewable energy, amongst others, provides a new momentum to national, regional and global efforts for conservation and sustainable use of vital forest resources.

ANNOUNCEMENTS

IUFRO-FORNESSA regional congress-
ITTO/AFF forest policy day
Nairobi Kenya, 25 – 30 JUNE 2012

***THEME: FORESTS AND TREES SERVING
THE PEOPLE OF AFRICA AND THE WORLD***

OBJECTIVES AND CONGRESS THEMES

The first IUFRO regional congress in Africa will be held in partnership with the Forestry Research Network of Sub-Saharan Africa (FORNESSA), the International Tropical Timber Organization (ITTO), the World Agroforestry Centre (ICRAF), and the African Forest Forum (AFF). The Congress will provide a platform for African forest scientists, forest managers and policy makers and their colleagues from other parts of the world to share and exchange information and experiences on critical issues affecting forest and wildlife resources in Africa. The overall goal of the congress is to demonstrate how forest science is impacting on livelihoods, environmental management and development in Africa.

Congress Themes:

- Forests and Climate Change
- Forests and Water
- Forest Policy, Governance and Trade
- Forest Biodiversity and Conservation
- Agroforestry, Energy and Food Security
- Education, Training and Institutional Capacity Building

REGISTRATION

Conference registration fees of US\$200.00 per person will be charged with discounted rates for students (US\$120.00). This fee will cover congress material, inaugural cocktail, coffee breaks and lunches on session days,

congress dinner and in-congress field trip. On-line registration on (www.fornis.net).

FINANCIAL SUPPORT

IUFRO through various donors is offering financial support to a limited number of participants from developing countries. Selection criteria are: a) approved abstract(s) (presentation of paper or poster); b) below 45 years. Female scientists are particularly encouraged to apply for support.

SUBMISSION OF ABSTRACTS

If you wish to submit a paper or a poster related to any of the congress themes, please send your abstract of 300 – 350 words to: DR. JOE COBBINAH, CHAIR, CONGRESS SCIENTIFIC COMMITTEE

E-MAIL:

iufrofn2012@yahoo.com ; E-MAIL: [jacobbinah@csir-forig.org.gh](mailto:jcobbinah@csir-forig.org.gh)

DEADLINES: Submission of Abstracts: 31 December 2011; Notification of Acceptance: 29 February 2012

PRE-CONGRESS TRAINING

IUFRO's Special Programme for Developing Countries (IUFRO-SPDC) will organize two pre-congress training workshops taking place on 23 and 24 June 2012. Topics: -
a) Preparing and Writing Research Proposals
b) Communicating Forest Research - Making Science Work for Policy and Management
Participants of the congress who are interested in joining one of the training workshops are encouraged to express their interest through a special expression of interest form available on the congress website.

Special Feature

The fisheries of Lake Victoria: Past, present and future

Brian E. Marshall¹ and Oliva C. Mkumbo²

Lake Victoria is the largest tropical lake in the world. With an area of almost 70,000 km² it is the world's second-largest (natural) body of freshwater but supports what may be the world's largest inland fishery, yielding about one million tonnes per annum. This fishery in turn directly or indirectly supports several million people and is a major contributor to economic growth and food security in East Africa. In spite of this, the fishery of Lake Victoria is surrounded by controversy and criticism largely generated by a non-native predator, the Nile perch *Lates niloticus*, which was introduced into the lake 50-60 years ago. A cursory search of the internet reveals many, sometimes hyperbolic, articles on the destruction of the Lake Victoria ecosystem (the "dying" lake), the impoverishment of local communities

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through the loss of their livelihoods, malnutrition of children resulting from the export of fish, and so on. What then is the situation in Lake Victoria? Are its fisheries sustainable or are they in imminent danger of collapse?

Early history of the fisheries

Commercial fishing on Lake Victoria began with the introduction of gill nets in 1905 and the opening up of new markets when the railway reached Kisumu in 1908. The fishery initially targeted the endemic tilapias *Oreochromis esculentus* and *O. variabilis*. However, their stocks rapidly collapsed; and the catches fell from around 25 fish per net in 1910 to seven in 1920 and two in 1940 (Kudhongania & Chitamwebwa, 1995). Colonial officials from the three territories surrounding the lake disagreed acrimoniously on what should be done, with the result that no management measures could be agreed upon (Jackson, 2000), and the endemic tilapias are now commercially extinct in the lake. In an attempt to rectify this situation a number of non-native tilapias were introduced but only one of them, the Nile tilapia *Oreochromis niloticus*, became successful but only after Nile perch became abundant (Ogutu-Ohwayo, 1995).

Attention then turned to the 500+ endemic haplochromine species that made up some 85% of the fish biomass in the lake (Kudhongania & Cordone, 1974). Although widely utilised by local people, these were regarded as "trash fish" by British colonial officials (Anderson, 1961), and the introduction of Nile perch was proposed as a means of converting them into a more valuable product³. After extensive discussions and in the face of opposition from scientists then working on the lake, it was agreed that they should be introduced into the lake. Nile perch were therefore officially stocked into the lake in 1962-63 but there is compelling evidence, however,

³ Eccles (1985) implied that these officials were mostly concerned with the angling qualities of Nile perch and never considered the potential value of haplochromines as human food.

that staff of the Uganda Game and Fisheries Service had already introduced them unofficially as early as 1955 (Pringle, 2005).

The impact of Nile perch

Only about 400 Nile perch were introduced into the lake (Pringle, 2005) and they were at first of little importance; and for about 10 years after their introduction, they comprised less than 1.0% of the demersal biomass (Kudhongania & Cordone, 1974). This changed when the population began an exponential growth phase a few years later, and by the 1980s, the Nile perch had become the most abundant species in the lake (Table

1). Nile perch was introduced to utilise haplochromines, which they did so effectively that these fish almost disappeared during the 1980s, and there were fears that the entire community could become extinct. Other native species declined as well and the only one to increase during this period was the small endemic, sardine-like cyprinid *Rastrineobola argentea* ("dagaa"). Why the introduced Nile tilapia also increased during this time having been a minor component of the fish community is unexplained; perhaps the haplochromines competed with it and their disappearance allowed it to flourish.

Table 1. The proportion (%) of major fish taxa captured in trawls (1969-71) and different types of gear (1988-93) in Lake Victoria

	1969-71		1988-93		
	Trawl	Trawl	10-mm seine	51-mm seine	Gill nets
<i>Lates niloticus</i>	0.1	80.0	13.1	97.9	97.2
<i>Oreochromis niloticus</i>	0.2	14.4	22.8	1.9	1.0
<i>Rastrineobola argentea</i>			39.1		
Haplochromines	83.0	0.1	5.8	0.1	+
Other species	16.7	5.5	19.2	0.1	1.8

Data from Kudhongania & Cordone (1974) and Ogutu-Ohwayo (1995). The symbol + denotes a proportion of <0.1%.

Not surprisingly, the almost instantaneous destruction of some 90% of the lake's fish biomass brought about major ecological changes. Most strikingly, the lake appeared to have become eutrophic with the appearance of a water hyacinth infestation and dense algal blooms. The algal blooms were implicated in massive fish kills and contributed to the extensive and prolonged deoxygenation of the deeper waters of the lake. Of course, Nile perch was not responsible for the eutrophication of the lake, which was the result of increased nutrient loading to the system from the growth of the human population in its basin (Verschuren *et al.*, 2002). There is evidence that eutrophication began in some parts of the lake as early as the 1950s (Stager *et al.*, 2009) and it is likely that the changes brought about by Nile perch disrupted the ecosystem and accelerated the appearance of eutrophic characteristics.

The eutrophication of parts of Lake Victoria has been identified as one of the major threats to its fisheries, even though it is known that eutrophic systems can be highly productive. Nutrient enrichment has undoubtedly contributed to an increase in fisheries productivity and the deleterious effects of eutrophication are now less obvious than they were two decades ago. The concentrations of chlorophyll *a* have decreased across the lake, although still high in some areas, transparency has increased in open waters, and no fish kills have been reported since the late 1980s (Sitoke *et al.*, 2010). The water hyacinth infestation that caused such alarm has now been reduced to nothing more than a localised nuisance through biological control (Wilson *et al.*, 2007).

The most widely condemned impact of Nile perch was, however, the destruction of the

endemic haplochromine population. This is indeed a highly regrettable outcome and was probably never considered at the time these fish were introduced into the lake. But there is some hope; the intensive fishery for Nile perch has allowed some haplochromine species to recover. Most of the recovering species are generalised benthic feeders (Kishe-Machumu *et al.*, 2008) and the original trophic diversity may never reappear. Nonetheless, morphological changes have occurred in these haplochromines, and a new adaptive radiation may be about to begin, which is predictable, given that rapid speciation in haplochromines has occurred in the past.

The present state of the Lake Victoria fisheries

Nile perch dominated the fisheries in the 1980s and caused considerable problems as the fish were very large and unsold catch needed to be smoked to be preserved, leading to deforestation and a loss of quality. The situation was saved by the development of the export industry, which began in 1991 and now accounts for most of the Nile perch caught in the lake. This industry is now worth about USD 350 million per annum and makes Lake Victoria unique in being the only artisanal inland fishery that contributes significantly to global fish markets. The export industry has been criticised on the grounds that fish are no longer available to local markets and was therefore leading to malnutrition (WRI, 2001). There may have been some truth in this assertion when Nile perch were the only fish being caught, but it now constitutes less than 30% of the catch (Table 2). The rest of the catch consists primarily of tilapia and dagaa, and haplochromines in Tanzania, all of which are available in local markets.

Table 2. The average annual fish catch (thousands of tonnes) from Lake Victoria, 2005-08

	Nile perch	Dagaa	Tilapia	Haplochromines	Others	Total
Kenya	40.1	73.0	12.7	3.3	4.1	133.3
Tanzania	133.1	342.3	23.6	98.3	3.0	600.4
Uganda	91.9	98.5	26.4	2.3	2.1	221.3
Total	265.1	513.8	62.7	103.9	9.2	955.0

Data from Lake Victoria Fisheries Organisation catch assessment survey reports.

Another criticism of the fishery is that it has not benefited local populations; this was expressed forcibly by Vitule *et al.* (2009) who wrote “[Gozlan] writes as if this introduction were a great success from the standpoint of fishermen. This is simply wrong. It was very successful from the standpoint of a few wealthy corporations. Most of the fishermen who had subsisted on the lake before the introduction of the perch were driven out of business, with terrible social

consequences.” The facts belie this conclusion. The total number of people directly dependant on fishing almost quadrupled over 30 years (Table 3) even though the total population in the basin only doubled over the same period (UNEP, 2006). This confirms that there has been a migration of people to the lake to take advantage of the opportunities offered by the growth of the fishery.

Table 3. Employment in the fisheries sector around Lake Victoria, pre- and post-Nile perch

	c. 1978	c. 1989	2008
No. of boats	11,100	21,987	69,400
Catch per boat (t yr ⁻¹)	7.91	23.06	14.41
Direct employment	52,800	105,500	199,200
Secondary employment ^a	158,400	316,500	597,600
Total employment	211,200	422,000	796,800
Total fishers + dependents ^b	1,056,000	2,110,000	3,984,000

Data for 1978 and 1989 are adapted from Reynolds et al. (1995) while 2008 estimates are taken from reports of the Lake Victoria Fisheries Organisation.

^a*Reynolds et al. used secondary: primary ratios of two and three in 1978 and 1989 but noted that this was a conservative estimate and we have used an estimate of three here.*

^b*Reynolds et al. suggested that each employee supported two dependents but this seems improbably low and we have used four here. The number of dependants may be higher than this.*

Indirect indicators can also be used to assess the impact of the fishery. For example, in 2000 only 4,000 fishing boats (10% of the total) were propelled by outboard motors, but by 2008 there were 14,000 of them with motors (20% of the total) (LVFO frame survey data), which suggests a considerable measure of improved prosperity. While most attention focuses on Nile perch, it should be emphasised that the lake now provides a large quantity of fish other than Nile perch (Table 2), in part a consequence of the nutrients that made it eutrophic. In 1980, when the population of the lake basin was around 15 million the catch of all fish was around 120,000 t which amounts to 8.0 kg per capita; now the population is around 40 million but the non-Nile perch catch is around 750,000 t or 18.8 kg per capita. These fish, almost all sold fresh or sun-dried, are available locally at a more affordable price and have created an extensive industry servicing both local and regional markets.

Nile perch is by far the most valuable fish in the lake and commands a higher price than any other species and therefore an important cash crop for fishermen around the lake. African fishermen, like most other people, need cash for their daily activities and the post-Nile perch development of the fisheries in Lake Victoria has allowed a great many of them to enter the cash economy.

What of the future: are the fisheries sustainable?

The human population in the Lake Victoria is amongst the fastest-growing in the world (Uganda's population is growing at >3% per annum) and the demand for fish will inevitably increase. This, in turn, will lead to increased fishing intensity on a lake that already supports around 200,000 legal fishermen, as well as an unknown but certainly large number of illegal ones. Concerns about overfishing are already growing and these can be expected to increase in future as pressures on the fishery increase.

The Nile perch has been a particular source of concern because of its diminishing proportion of the total catch; in 1990 it made up about 70% of the total catch but only 30% in 2005-08. In fact, the catch of Nile perch has remained relatively constant around an average of 260,000 t over annum since 1990 and its declining proportion in the catch reflects an increased catch of other species, notably dagaa and haplochromines. While there is still a danger that Nile perch will decline, the species has displayed extraordinary resilience in the face of intense fishing (gillnets increased by 1.6 times and long line hooks by 3.2 times between 2000 and 2008). Large individuals have become relatively rare and the size of first maturity in females has decreased from around 80 cm TL to 50 cm. Fish are maturing earlier but their mortality rates have increased as has the production/biomass ratio. How long they can maintain this is unknown at present and concern about this species is certainly justified, as fisheries based on top predators are usually the first to collapse. The other species are smaller and at lower trophic levels, have higher relative fecundity and production/biomass ratios, and are therefore of less concern. The ecosystem of Lake Victoria seems to be rather more stable than it was 20 years ago and these smaller fish seem to be able to support a productive fishery at present.

The three countries around the lake have made an effort to coordinate management policies through the Lake Victoria Fisheries Organisation and are developing a system of co-management through the development of Beach Management Units (BMUs) around the lake. These units are expected to involve local communities in the management and conservation of the stocks in their areas and it is hoped that the participation of the fishing communities will prove more effective than the top-down management approach that had hitherto been employed. Much remains to be done, however, as few fishermen have experience in community management and they still require both financial and technical support from outside

sources. The BMUs have formed National and Regional Networks and it is expected that with time, they will become strong institutions to work in partnership with the Government Institutions and the Private sector for sustainable management of the fisheries of Lake Victoria

References

- Anderson, A.M. (1961). Further observations concerning the proposed introduction of Nile perch into Lake Victoria. *East African Agricultural and Forestry Journal* **26**: 195-201.
- Eccles, D.H. (1985). Lake flies and sardines: a cautionary note. *Biological Conservation* **33**: 309-333.
- Jackson, P.B.N. (2000). Freshwater fishery research organisations in central and eastern Africa: a personal recollection. *Transactions of the Royal Society of South Africa* **55**: 1-81.
- Kishe-Machumu, M., Witte, F. & Wanink, J.H. 2008. Dietary shift in benthivorous cichlids after the ecological changes in Lake Victoria. *Animal Biology* **58**: 401-417.
- Kudhongania, A.W. & Cordone A.J. (1974) Batho-spatial distribution patterns and biomass estimates of the major demersal species in Lake Victoria. *African Journal of Tropical Hydrobiology and Fisheries* **3**, 167-181.
- Kudhongania, A.W. & Chitamwembwa D.B.R. (1995). Impact of environmental change, species introductions and ecological interactions on the fish stocks of Lake Victoria. In: T.J. Pitcher and P.J.B. Hart (eds) *The Impact of Species Change in African Lakes*. Chapman and Hall, London: pp. 19-32.
- Ogutu-Ohwayo, R. (1995). Diversity and stability of fish stocks in Lakes Victoria, Kyoga and Nabugabo. In: T.J. Pitcher and P.J.B. Hart (eds) *The Impact of Species Change in African Lakes*. Chapman and Hall, London: 59-81.
- Pringle, R.M. (2005). The origins of the Nile perch in Lake Victoria. *BioScience* **55**: 780-787.
- Sitoki, L., Gichuki, J., Ezekiel, C., Wanda, F., Mkumbo, O.C. & Marshall, B.E. (2010). The environment of Lake Victoria (East Africa): current status and historical changes. *International Review of Hydrobiology* **95**: 209-223.
- Stager, J.C., Hecky, R.E., Grzesik, D., Cumming B.F. & Kling H. (2009). Diatom evidence for the timing and causes of eutrophication in Lake Victoria, East Africa. *Hydrobiologia* **636**: 463-478.
- UNEP (2006) Lake Victoria, Africa's largest lake. In: Africa: *Atlas of our Changing Environment*. United Nations Environment Programme, Nairobi, pp. 48-51.
- Verschuren, D., Johnson, T.C., Kling, H.J., Edgington, D.N., Leavitt, P.R., Brown, E.T., Talbot M.R. & Hecky R.E (2002). History and timing of human impact on Lake Victoria, East Africa. *Proceedings of the Royal Society, London B* **269**: 289-294.
- Vitule, J.R.S., Freire, C.A. & Simberloff, D. (2009) Introduction of non-native freshwater fish can certainly be bad. *Fish and Fisheries* **10**, 98-108.
- Wilson, J.R.U., Ajuono, O., Center, T.D., Hill, M.P., Julien, M.H., Katagira, F.F., Neuenschwander, P., Njoka, S.W., Ogwang, J., Reeder, R.H. & Van, T. (2007). The decline of water hyacinth on Lake Victoria was due to biological control by *Neochetina* spp. *Aquatic Botany* **87**: 90-93.
- WRI (2001). Trade-offs: Lake Victoria's ecosystem balance sheet. In: *A Guide to World Resources: People and Ecosystems, the Fraying Web of Life*. World Resources Institute, Washington, DC, p. 21.

Opinion Piece

Greening the African forest economy - Can Africa's lean earnings from forest products exports pay for it?

Mafa E. Chipeta¹

1. This is an opinion piece on Africa's capacity to launch a green economy in the forestry sector. However, instead of a trend analysis to show progressive progress (or rather lack of it) in African forestry's economic strength to adopt green ways and yet be economically vibrant, I adopted a cross-sectional approach. I looked at only year 2009 data, which I present in this note, with some bullet point observations on what it all says about Africa's state.
2. Although a green forest economy starts in the forest and ends with the consumer of forest goods and services, I have chosen only the one segment which can earn the most income – the mainstream forest products and have looked at whether it can finance “greening”.² I did this because unless forestry has prospects of adequate subventions from other sectors, it is mainly the sector's

¹ The author (emchipeta@gmail.com) is a retired FAO staff; he is a forester by training but with a career that also spanned general agricultural and food security policy engagements.

² There will be cries that I have ignores non-timber forest products (NTFPs) and services (such as tourism) – but NTFPs rarely generate incomes of great macro-economic significance; for tourism, the attribution of income due to forest habitat is not easy to tease out.

own capacity to generate financial resources from producing, processing and trading its own products and services that can enable it to contribute to national consumption and to reinvestment, including into meeting the cost of “going green” in response to the current climate change.

Going Green Has a Cost

3. Going green does not come cheap. Major industrial countries are resisting going green or are having to impose taxes on their industries in order to fund going green. Even then, some of their industries are resisting, for fear that the higher costs of producing in a “green environment” will make their products too costly to compete. One outcome of this is that some are trying to escape compliance – in the case of manufacturing and utilities, they are paying other countries to grow trees or other carbon sinks so that they can continue to pollute – it is cheaper for them to do this than to go green immediately.
4. What then of Africa, whose economy is reported to be weak? It is public knowledge that sector public budgets are inadequate for even routine management of the resource - many African countries are dependent on donor supplements for forestry even without additional complications of coping with climate change and pursuing greater greenness.
5. This aside, what other costs would have to be met? In general, the costs to meet in having Africa's forestry go green are about starting to sail in *uncharted waters*, in the following perspective: almost all glitches have been removed from the tried and tested “non-green” economy, which therefore runs as smoothly as a sewing machine. Introducing a new economy brings in a lot of unfamiliar things and therefore higher costs. Some of these include re-tooling for the new forestry; costs of complying with stricter environmental

standards in the field, in processing and trade; costs of transporting products to market with a minimal carbon footprint; higher unit costs of lower-intensity and more selective harvesting; additional precautions to reduce damage to residual elements of ecosystems; costs of stricter monitoring evaluation and reorientation etc – I could go on and on.

6. What do the numbers reveal? I give all data for Africa in comparison with the world and with other regions. I show what the Africa figures mean in money terms at its present level and then I compare with what they would show if Africa tried the first steps to increase earnings from exports. The low-hanging fruit in this case is to add value to the raw logs that Africa exports without processing. As an easy way out, I have reduced complication by focusing only on conversion to sawnwood and wood-based panels (mostly plywood) to see orders of magnitude in improvement of earnings from forestry.
7. The above is driven by a conviction that if Africa wishes to begin to talk seriously of greening forestry, it must make more decent money by adding value to what it produces. Failure to do this will leave it with no resources to fund its own greening; such a situation would raise some fundamental issues of African pride: can Africa continue to beg others to green its own forestry sector when it is so well endowed? Is Africa to beg for forest salvation as much as it begs for food? Is there no limit to what Africa must depend on others for, even where its own resources can easily generate the funds for carrying out its own development?

Africa's Forest Economy in World Context

8. Analysis of summary data on production, trade and consumption for Africa are revealing. Even though the broad results can be defended, the calculations used are crude and therefore the author

invites those with curiosity, especially university students, to cooperate in expanding the analysis and refining it for more serious use in policy work (cross-sectional data for the 2009 were used¹)

Do Timber Exports Earn Enough?

9. Thereafter, we look at export earnings for Africa, with Scenario 0 being the actual Yearbook published value of exports. An additional three scenarios are then built assuming for all three the world average ratio of suitable size logs in total industrial roundwood being 75% to sawnwood and 25% to veneer/plywood. The revenue increase to Africa for each scenario is calculated assuming its current exports of raw round logs are entirely converted into sawnwood and plywood/veneer; the rough and ready scenarios are as follows, with the results given in Table 1 below:
 - a. Scenario 0: actual published earnings from exports in current breakdown of raw logs vs processed products.
 - b. Scenario 1: where saw/veneer logs make up 55% of total industrial roundwood, as per the global average;
 - c. Scenario 2: where saw/veneer logs make up 43% of total industrial roundwood, as per the Latin America average (Latin America is also dominated by tropical ecosystems, as is Africa; it is also in the developing-countries category);
 - d. Scenario 3: where saw/veneer logs make up 61% of total industrial roundwood, as per the Asia average (Asia has a greater proportion of temperate timber countries – especially china, Japan) but also has

¹ All data used are from the 2009 version of the FAO "Forest Products" Yearbook, available under FAOSTAT on the internet.

enough tropical ecosystems to be worth comparison with Africa, especially given that many of its countries fall into the “developing” category).

10. It is obvious that with the change being only in diversion of raw sawlog exports to domestic processing, the incremental earnings are not comprehensive of how much more the whole sector could earn if other improvements were initiated.



Table 1: Possible Increases in Earnings from Diverting Logs Currently Exported Raw to Domestic Processing in Africa

Scenario	Breakdown of Industrial Roundwood (IR)	IR (million cum)	Volume		Value (US\$ million)		
			Sawnwood (SW) (75%)	Panels (PN) (25%)	Sawnwood (SW) (75%)	Panels (PN) (25%)	Total
Scenario 0: Data from FAO Yearbook	World IR:	1424	(published data all cells)		24147	24697	48844
	• Total IR						
	• Saw/veneer (SV) logs	782					
	• % (SV) logs	55	Calculated				
	Africa – total IR	72	(published data all cells)		858	483	1341
	Increment - over baseline				0	0	0
Scenario 1: SV at 55% as derived from world ratio in yearbook – prices being averages of import and export unit values at \$391.5/cum SW; \$816.0 PN – applied assuming 50% net yield.	Africa – total IR	72					
	Africa SV 55% share – to domestic processing	29	21	8	4110	3264	7374
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone ¹				-	-	1313
	New Africa total income SW + PN				4968	3747	7402
	Increment - over baseline					-	-
Scenario 2: SV at 43% as derived from Latin America ratio	Africa – total IR	72					
	Africa SV 43% share – to domestic processing	31	23	8	4502	3264	7766
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone				-	-	1313
	New Africa total income SW + PN				5360	3747	7794
	Increment - over baseline					-	-
Scenario 3: SV at 61% as derived from Asia ratio	Africa – total IR						
	Africa SV 61% share – to domestic processing	44	33	11	10960	4488	15448
	+ Africa original SW + PN income				858	483	1341
	- Original log export income now foregone				-	-	1313
	New Africa total income SW + PN				11818	4971	15476
	Increment - over baseline					-	-

¹ The reduction of SW and PN imports is not factored in; it might lead to double counting of benefits.

Africa's Challenging Earnings Situation

11. All data considered, the following can be highlighted about Africa's situation and from it readers can judge its readiness or otherwise to afford a "green forestry economy" within a reasonable timeframe and without relying on begging for help:
- a. In mainstream forest products production, Africa does not feature among the global top five, except for fuelwood, where Ethiopia (4th) and DRC (5th) come in. Fuelwood is almost completely not traded internationally and therefore cannot contribute to meeting any greening costs that require foreign exchange;
 - b. In mainstream forest products trade, Africa does not feature at all among the global top five;
 - c. There are no data on non-timber forest products and services of forests: it is assumed that they are mostly of local rather than macro-significance;
 - d. Africa is globally significant only for fuelwood in both production and consumption – but this is a little-traded commodity which brings hardly any earnings for investment into forest management;
 - e. Africa's share of global production and apparent consumption is for all the products included here below 5%; very often it is around 1%. Given that Africa's share of the global population is around 15%, this is a clear signal of under-consumption and sub-par production contribution;
 - f. For the five products considered (Industrial roundwood, Sawnwood, Wood-Based Panels, Wood Pulp, Paper & paperboard) , Africa has a trade surplus only for industrial roundwood and wood pulp. It has major deficits for sawnwood and paper/paperboard. Overall, Africa earns about US\$1.6 billion annually for the surpluses (roundwood and wood pulp) and spends US\$4.1 billion annually for the deficit products (sawnwood, panels and paper/paperboard). *With Africa spending far more than it earns from forestry, the chances of auto-funding the routine sector development are pretty poor, let alone investing further for "sector greening";*
 - g. The trade is concentrated in/dominated by a few countries: in general North Africa (Egypt in lead) and South Africa lead in imports; South Africa/Swaziland and humid Central Africa (one country or two for each product) lead in exports – the rest of the countries are very insignificant in trade but generally are net spenders on forest products imports;
 - h. It is of interest to see that sawnwood and panels could be made from the very logs which Africa continues to export in raw, unprocessed form. However, the volume of logs Africa exports (1.7 million cum), would after processing losses cover perhaps only 10-15% of the volume of imported sawnwood and panels (8.5 million cum). There is clearly a structural deficit, apart from likely mismatch between Africa's need for relatively large volumes lower-value construction products and its export of more costly decorative products. The need is thus not just to process logs currently exported raw but to harvest more all round to meet African demand and to earn enough to reinvest, including in the greening of forestry.

The Apparent Major Positive Impact of Processing Logs in Africa

12. Although the scenarios in Table 1 are rough and ready, they are good enough to show that attention to domestic processing could make a big difference to earnings. Just by attending to converting saw/veneer logs domestically, the current earnings of \$1,7 billion would be increased by about \$6 billion under scenario 1, \$6.4 billion under scenario 2 and \$14.1 billion under the third scenario. The main difference among the scenarios is the ratio of saw/veneer logs to total roundwood, which in Africa is relatively low.¹

13. A key thing to note is that in all three new scenarios (1 – 3), the earnings are far higher than Africa spends on imports of forest products and so, presumably, would have increased capacity for discretionary expenditure on reinvestment including into greening the forest economy.

So What Next?

14. Africa is rich in resources but is poor in economy. There should be a contradiction in this but it is the reality. A continent with enough timber to process and earn so much that it could reinvest at will is, instead, still dependent on foreign aid even for routine SFM activities. With the advent of climate change, Africa is under pressure to also play its part and it hasn't the money to pay for it. Will it beg for aid again? Or will it, this time round, change its policies so that they can (sustainably) transform its resources into investable capital surpluses?

15. For decades now Africa has been exporting roundwood, initially almost solely to Europe but now also to Asia. Major timber countries like Nigeria offer lessons – they exported most of their forest as raw materials and now are major importers of processed products: does this have to be repeated for all the other forest countries before Africa learns? For those who may consider the figures given above fanciful, the answer is not just to criticise them but to support further and more refined analysis so that serious policy discussions and decisions can be possible.

16. The answer is also not to run away from the hard financial returns that wood industries can generate and instead to praise non-timber forest products as the most valuable outputs of Africa's forests. Much is made of how harvesting NTFPs leaves the ecosystems unharmed for Africa's future generations to admire. Yet the same countries that exhort Africa to practice low-impact NTFP harvesting instead of logging continue to import from Africa the very timber they condemn as harmful; if the mushrooms and forest vegetables were so good and important, why are foreign investors not importing them rather than the ecologically destructive timber? – the buyers from these regions continue to prefer African timber to African NTFPs – they must have good reasons for this.

¹ Africa ratios of SV logs are depressed by the relatively major harvests of pulpwood in South Africa and Swaziland.

National forest programmes: Tools for the green economy in Africa

François Wencelius¹

This paper presents a brief reminder about national forest programmes (nfps) and a brief look at what the forest sector can contribute to the green economy. It argues that nfps can be important tools for the “greening” of the forestry sector in Africa.

Key Features of National Forest Programmes

National forest programmes (nfps) emerged some fifteen years ago as potentially powerful frameworks for planning and action in the forestry sector at the country level. They have been designed as dynamic and iterative processes responsive to change, providing strategic orientation to the forestry sector and ensuring coordinated implementation of sustainable forest management by all stakeholders in the forest sector.

National forest programmes are based on several principles usually clustered around the following three pillars:

- **National sovereignty and country leadership**, meaning that national states are managing and using their forests in accordance with their own environmental policies and development needs, and that countries assume full responsibility when preparing and implementing their nfp. This implies national ownership, firm commitment and strong political will by decision

makers regarding sustainable forest development;

- **Consistency within and integration beyond the forestry sector.** Within the sector, means mainly (i) coherence among the economic, social and environmental roles of forests and objectives assigned to the sector, (ii) synergies among all stakeholders, and (iii) consistency of policies with their legal, fiscal and institutional instruments on one hand and with operational implementation measures on the other hand. Beyond the forestry sector, means (i) “vertical” integration into overarching macroeconomic and financial policies and national strategies (e.g. sustainable development, poverty eradication) and into decentralized arrangements and structures, and (ii) “horizontal” coordination and synergy with all the sectors related to the forestry sector, whether they are impacting or impacted by the latter (the agricultural sector, the mining sector, and the energy sector, are but to name a few);
- **Participation and partnership**, meaning that all stakeholders of the forestry sector participate in policy formulation and programme preparation, and become partners to implement joint activities. This goes with functional participatory, coordination and cooperation mechanisms, together with active and continuous capacity building initiatives.

National forest programmes in Africa are being developed and implemented in a variety of contexts and through different processes, depending on the level of socio-economic development, the government structure, the type and condition of forest resources and the importance of the forest sector in the country. Over the last ten years or so, nfps in Africa have been strongly influenced by policies, strategies and programmes related to reducing poverty, hunger and environmental degradation,

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with a strong focus on non-state stakeholders' participation.

The Green Economy and the Forestry Sector

The green economy concept provides a fresh and global approach to sustainable development, which would “improve human well-being and social equity, while significantly reducing environmental risks and ecological scarcities”. In order to achieve the transition towards a green economy, the UNEP “Green Economy” report is proposing a comprehensive set of policy reforms and investment opportunities in 10 central sectors of the economy, including the forestry sector which is given great visibility.

Looking at the forestry sector through the lens of the green economy, however, does not provide a really new picture of its different roles. Forests are indeed seen “as “factories” producing private goods from timber to food, as ecological infrastructure producing public goods from climatic regulation to water-resource protection, and as providers of innovation and insurance services (forest biodiversity being key to both)”. The greening of the forest sector is expected to meet both societal demands for products and ecosystem services, and “critical livelihood needs of local communities by providing a stream of fuelwood, construction materials, food sources and medicinal plants”. The guiding principles spelled out for this are very much in line with those of nfps.

The following key areas of investment, identified for the “greening” of the forestry sector, are also very much in line with what is expected under sustainable forest management: protected areas, payment for environmental services (PES), improved forest management and certification, planted forests, and agroforestry. The same goes with the important enabling conditions put forward in order to back-up and catalyze these investments: forest governance and policy reform, tackling illegal logging, mobilizing green investment, leveling the

playing field (fiscal policy reform and economic instruments), improving information on forest assets, and making REDD+ (Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon, sustainable management of forest and enhancement of forest carbon stocks) a catalyst for greening the forest sector.

Nfps for the “Greening” of the Forestry Sector

Since they were designed to advance sustainable forest management, nfps should also fit the “greening” of the forest sector in Africa at the country level very well. For this, however, some issues should be emphasized and the way nfps are run should be enhanced.

Issues to focus on

In order to meet the requirements of the greening of the forestry sector, the following particular substantial aspects should be focused on during the successive phases of the nfp standard cycle.

Analysis of the forestry sector. The country-led assessments of the forestry sector, based on which the nfp process is expected to start, should focus on the drivers of forest loss in order to serve the needs of a potential REDD+ regime. Particular attention should be paid to capturing and valuing the full range of marketed and non marketed goods and services from both natural forests and plantations. Finally, all efforts are needed to provide the Government and other stakeholders with comprehensive information on forest assets to help them set priorities on forests against those on agriculture and other sectors.

Policy formulation. Before embarking on developing national forest policies, time and energy should be spent on how to address key issues that are crucial for many African countries (e.g., land tenure, rights of forest dependent people, unacceptable practices in

the sector, including elite capture and corruption). A clear consensus is also needed on how to balance public and private goods together with community requirements; a clear understanding should be sought of respective roles of the different stakeholders, with a focus on the informal sector (which is a key actor in the forestry sector of many African countries) and the role to be conferred to the private sector (e.g., co-managing protected areas, expanding and managing forest plantations).

When developing national forest policies (i.e., a vision for the forestry sector, realistic objectives to be met in a reasonable timeframe, and relevant strategies and action plans), determined efforts are needed to ensure coherence with other sectors' policies with a focus on those aiming at the greening of the agriculture and energy sectors, and the development of biodiversity "offsets" (e.g., to compensate for mining and infrastructures policies). Real commitment should be made to actually integrate international endeavors that are crucial in the African context (e.g., engaging in the REDD+ regime, implementing Forest Law Enforcement Governance and Trade (FLEGT) schemes to tackle illegal logging).

Implementation. Instead of trying to "reinvent the wheel", the implementation of national forest policies should concentrate on scaling-up the economic mechanisms and markets that have been tested and proven successful in many African countries (e.g., certification, PES, benefit sharing schemes). If not already there, a focus is needed on developing instruments adapted to the countries' circumstances like realistic legislation and fiscal/subsidies systems, decentralized institutions and capacity building and information sharing initiatives; particular attention should be paid on efficient mechanisms to compensate local communities for forgone revenues, which is essential for the upcoming REDD+ regime. Finally, strategies to mobilize green investment are essential (e.g., attracting private investment seeking long term growth and security, warranting public

investment to complement private or community investment resulting in positive return for the society as a whole).

Monitoring and evaluation. The set of indicators to assess nfps implementation and achievements should be adjusted in order to meet the requirements of the green economy. A focus is needed on measuring (i) changes in consumption and markets of forest goods and ecosystem services, and in ownership of forest land and enterprises, (ii) improvements in forest governance, (iii) investments in sustainable forest management, and (iv) actual sustainability of the greening of the forestry sector.

Improvements in Running nfps

The National Forest Programme Facility (Facility), that supports nfp processes in 70 partner countries of which half are African countries, carried out with FAO an in-depth survey worldwide in 2010 in order to better understand how nfps work in practice. The preliminary key findings of and recommendations derived from this survey regarding the operational aspects of nfp processes are reproduced below. The detailed conclusions from this survey will be provided under the upcoming joint FAO/Facility publication "NFPs in practice".

Governance, intersectoral cooperation, and leadership. Most African countries have established structures and assigned personnel in order to run their nfps, but few succeeded in coordinating all forest-related initiatives which have proliferated at the country level recently. Having often allocated inadequate resources to nfps, several countries end up having parallel structures and processes for different initiatives thus hampering consistency within the forest sector.

Other sectors show only limited interest in participating in nfp processes, since they rarely see the benefits of doing so. Moreover, other sectors do not fully consider the outcomes of nfp processes in their respective policies or planning processes, mainly because the contributions

of forest products and services to local livelihoods and wider economic development are still insufficiently recognized. On the other hand, forest agencies do not fully understand the views of other sectors and how they work.

Finally, agencies heading nfp processes have a leadership problem in many countries. Most of the time, nfps are run by forest administrations that lack the power and capacity to coordinate change across sectors. Important emerging forest-related issues, such as climate-change and tenure reform, are almost always located in other ministries. In order to provide leadership and coordination within and beyond the forest sector, the steering body of the nfp must have the authority, capacity and determination to lead the process at the national level.

Options to address these issues include:

- positioning the structure in charge of the nfp process at the highest level possible, the best being to have it as an inter-ministerial body;
- providing this structure with adequate administrative support, budget, and human resources;
- making it mandatory that the nfp process is included in overarching frameworks and processes at the national level (e.g., poverty eradication, sustainable development, and climate change);
- encouraging joint activities by several ministries, such as to address key environmental, land-use planning or household energy issues of common interest;
- involving nfp coordinators in the development of policies and strategies in other sectors that are affecting the forest sector.

recognized. In most African countries, the participation of local groups and the private sector in forest-related decision-making is increasing. However, insufficient access to information and a lack of organization and capacity still hinders the involvement of certain stakeholder groups in nfp processes (especially indigenous peoples, women and local community groups). In order to increase stakeholders' participation, nfps should ensure:

- sufficient involvement of high-level political players and decision makers representing the forest sector and other
- sectors, so that key nfp recommendations are actually taken up;
- adequate involvement of technicians, to make sure that nfp recommendations can be implemented in the field;
- proactive capacity building and information sharing initiatives, so that that the potential of civil society actors, including indigenous groups and women, is fully realized;
- a balanced involvement of private sector stakeholders, representing the different categories of forest related enterprises.

The nfp has a greater chance to contribute to the green economy of African countries, when the above suggestions for adjusting the substance and enhancing the nfp process are made.

Stakeholder participation. The importance of involving public and private stakeholders at all levels in nfp processes is now broadly

Articles

The forest sector in the context of green economy in Africa

Rao Matta¹

With more than 75 percent of the population living directly off the land, nowhere is the concept of green economy- our wise use and stewardship of ecological resources- is more relevant than in Africa. The continent is bestowed with immense natural wealth, yet it is directly and immediately vulnerable to ecological shocks and scarcities than any other region. It also often suffers first and the most when such crises arise.

In its simplest meaning, a green economy is one which is low carbon and resource/energy efficient. It builds on and enhances the earth's natural capital and endeavours to mitigate ecological scarcities and environmental risks. Thus the transition to a green economy is seen as a major pathway to promoting sustainable cycles of production and consumption while ensuring the health and integrity of ecosystems, and thereby, our continued survival and wellbeing. In pursuit of this path, preference might be given to programmes and actions that:

- Maintain ecosystem integrity and resilience²

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² Based on the belief that our biosphere is a closed system with finite resources and a certain capacity for self-regulation and self-renewal. The economic system therefore must respect the integrity of ecosystems and ensures their resilience.

- Make efficient use of natural resources
- Reduce emissions and other forms of pollution
- Renew, recycle and reuse
- Sustain processes spatially and temporally
- Internalize externalities or negative effects
- Promote equity and fairness in resource utilization and distribution of negative impacts.

Effective management of ecological assets

Viewed from the above principles, Africa already has many elements of a green economy in place. Although it harbours about 15% of the world's population, it represents only a small fraction (3.6%) of the total CO₂ emissions. Even of this meagre quantity, five nations (South Africa, Egypt, Nigeria, Algeria, and Libya) account for 80 percent it, which exemplifies the tiny carbon footprint that Africa has on the globe.

However, the biggest concern for Africa would be effective management of its ecological resources, be it improving the efficiency and sustainability of their usage or ensuring equity and fairness in the distribution of ensuing benefits. In particular, there has been a steep, three-fold increase in population in Africa between 1961 and 2005. And as the populations continue to grow at a much faster rate than the capacities of the ecological systems and the institutions that support them, there is tremendous pressure on natural resources. While some of these resources are used, often with short-sighted goals and interests, some of them are also liquidated, for example, for export, legally and illegally, to support demand elsewhere.

Continued exploitation of natural resources could result in collapse of productive ecosystems and a permanent loss of sustainable revenue streams. There are also considerable differences within and across nations in terms of production and resource mobilization. Massive resource transfers are occurring from rural areas to urban centres

often resulting in staggering social and economic inequities. Similarly, just two nations, South Africa and Nigeria, account for half of sub-Saharan Africa's GDP. The net result of this uneven development pattern is Africa's continued inability and low capacity to meet basic requirements such as food, shelter, health, and sanitation. Growing poverty and inequities and fewer economic opportunities in rural areas also often manifest into civil and political unrests.

Thus effective management of Africa's ecological assets, including enhancing their productivity, is key to improving the well-being of its citizens. In particular, adoption of appropriate policies to promote efficiency in resource production and utilization can help the region minimize the loss of its natural assets while advancing the prosperity its people.

Forest sector in the context of green economy

It is particularly in this context of effective management of natural resources that forests and woodlands in Africa have a vital role to play. Such a role extends not only in improving the quality of life of people living in the region but also helping other nations by serving as part of the global commons that absorb harmful greenhouse gases.

Forests and woodlands in Africa already support the livelihoods of millions of people besides rendering several critical environmental, social, and cultural services. Africa has a high per capita forest cover at 0.8 ha per person compared to a global average of 0.6 ha. Their relative contribution to sub-Saharan Africa's GDP is highest compared to any other region and as such, they form the foundation for economic development in many countries. More than this formal part that goes into official statistics; the informal and unaccounted-for part of their contribution towards energy, health, food, fodder and other household needs is immense and far reaching. For instance, more than 80 percent of the population in sub-Saharan Africa depend on forests and woodlands for their fuelwood

and other energy needs. Millions of households are also engaged in community forestry and small and medium-size forest enterprises. Particularly in rural areas that lie in the vicinity of forests, the indigenous, poor, and the most disadvantaged people depend on forests for their daily subsistence and long-term survival. Forests are thus crucial to achieving the Millennium Development Goals.

Forests and woodlands are also key components of the environment and perform a wide range of essential ecosystem functions such as mitigating the impacts of climate change, regulating water supplies, and buffering floods and droughts. For example, the forest complex of the Fouta Djallon highlands of Guinea, sometimes called as the "water tower of West Africa" is vital to maintaining the water flow of river Niger, river Senegal and river Gambia. Forests also harbour a large number of flora and fauna, many of which are endemic. The Congo basin is home to the world's second largest continuous block of tropical rainforest.

For these reasons, augmenting forest resources and enhancing their contribution to people through their sustainable utilization should lie at the heart of any green economy agenda. Yet forests and woodlands are often the subjects of disregard and low value in several countries. While low budgets and inadequate investments continue to plague the forest sector, weak governance and disincentives often drive deforestation and forest degradation. During the last decade alone, the continent lost about 3.4 million hectares of forests per year. As the health of a forest deteriorates, its functions and services are severely threatened. This undermines poor people's ability to survive and aggravates their dependence on forests, which ultimately leads to the formation of a vicious cycle of poverty and resource degradation chasing each other to the detriment of both. Continuation of this pattern can soon lead to the permanent loss of a valuable renewable resource that supported Africa for centuries.

Realizing the full potential value of forests and woodlands

The green economy approach can be a powerful means to turn the tide in favour of forests and help countries and communities realize their full potential value and progress toward a sustainable future. Specific reasons that underpin this argument include:

- Wood being intrinsically natural, recyclable, reusable, and biodegradable, it holds tremendous potential for increased use in a green economy. Such prospectus range from their use in green buildings and green infrastructure to bio-energy to recyclable parts in other applications. Many unique characteristics of wood¹ lend it to be an excellent substitute for many products that are cheap but harmful to the environment and economy.
- Forests are now at the centre of global responses to combating climate change, particularly mitigation. Associated financial incentives could change the current dynamics hugely in favour of forests. By enhancing forest stocks and ensuring their sustainable management, Africa can in fact hold the key to climate related forest financing in future.
- Africa is likely to suffer the most from human-induced climate change. For increased resilience and reducing the vulnerability, not only the loss of primary forests needs to be reversed but forest area needs to be further expanded. Agroforestry particularly holds promise as a significant component of sustainable agriculture and food security.
- Investments in forestry also offer some unique advantages such as low capital and technology requirement and

- flexibility to adapt to diverse conditions and capacities that are relevant to Africa. Forestry thus can be an engine for rural economic development.
- The strong focus on efficiency in green economy can also help to improve forest revenues. By bringing the systems of forest fees and charges better in line with market realities and by promoting effective processing, value-addition, and marketing of forest products, forest enterprises can substantially enhance the value of and income from forests. Management and technological advances can particularly help Africa leapfrog some of outmoded and resource intensive modes of production.

The way forward

However, much needs to be done to spur dramatic changes in the way policy makers view forests and to gain a wider acceptance of the role of forests in fostering green economy. It includes, foremost, policies and programmes to provide entrepreneurs the requisite incentives to promote forestry and sustainable utilization of forest resources. It also includes removal of perverse incentives that result in deforestation and degradation and conversion of forests to other uses. Creating appropriate revenue streams for forest ecosystem services such as carbon sequestration that typically have no market can also encourage forest landholders and managers to protect and restore forests. Open and decentralized systems of management can help promote efficiency and transparency and offer a diversified range of opportunities for local entrepreneurs. Importantly, as the old adage -“what gets measured gets managed”- emphasizes, systematic resource inventory and monitoring systems are also sorely needed.

¹ E.g., cyclic, solar, and safe. Cyclic: Different from a linear process of resource extraction, manufacture, consumption and disposal to a system where resource remains in perpetual use.

Bioenergy, REDD+ and the Green Economy in Africa

Monika Bertzky¹, Val Kapos², Punjanit Leagnavar³ and Martina Otto⁴

The relationship between bioenergy development and REDD+ (Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon, sustainable management of forest and enhancement of forest carbon stocks) is complex, dynamic and varies on global, regional and local scales. In Africa, activities relating to both bioenergy and the emerging REDD+ mechanism have the potential to contribute to the role of the forest sector in a Green Economy, increasing opportunities for employment as well as local economic development. The need for land for both these uses requires countries to prioritise and make choices on land use based on an

understanding of potential synergies and trade-offs. There are cases where bioenergy activities can contribute to REDD+ objectives and REDD+ can support improved (more sustainable) bioenergy development and use. However, each may also impede the other. What do governments in Africa need to consider in order to make the most of the synergies and minimise the conflicts?

Bioenergy and REDD+ in Africa

Traditionally, bioenergy use in Africa has predominantly been at a household level through the use of wood and charcoal for heating and cooking. More recently, however, a number of African countries have explored and begun to develop their potential for modern bioenergy production and use. Types of modern bioenergy development include a transition from traditional to more efficient charcoal use, liquid biofuels, solid and gaseous biofuels and bio-electricity. This development is projected to increase particularly with liquid biofuels as African demand for biofuels for transport is expected to increase in the medium term (IEA, 2011)ⁱ. Several African countries, such as Kenya and Uganda, have used agro-ecological zoning (AEZ) to investigate the national potential for growing biofuel crops; additionally, several countries have begun extensive planting programs (e.g. *Jatropha* in Mozambique). Some Southern African countries play a role in international trade of wood/ forestry residue biomass for wood pellets (IEA, 2011)ⁱⁱ. Locally, medium-scale biogas systems are now in use. Such developments may reduce oil import bills, modernise the agriculture sector, create job opportunities and support local economic development. Interest in REDD+ is also increasing in Africaⁱⁱⁱ. While Africa's contribution to CO₂ emissions is small, it accounts for almost 20% of global net CO₂ emissions from changes in land-use and land management, mainly forest degradation and deforestation^{iv} v. While the details of the REDD+ mechanism are still under discussion, including the form of financing and the specific actions it will support under different national circumstances, countries

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are moving ahead with their REDD+ preparation and pilot activities are underway. For example, Tanzania, Zambia, Nigeria and the Democratic Republic of Congo are active participants of the UN-REDD Programme. In most cases REDD+ actions will need to encompass a broad range of interventions and sectors, including the establishment of protected areas, development of forest management plans and techniques, and work with local communities to enhance livelihoods and reduce pressures on, and exploitation of forest resources. Overall, REDD+ provides an opportunity for sustainable economic growth in forested African countries.

Dynamics: Bioenergy and REDD+

Bioenergy development and REDD+ both have the potential to contribute to economic growth. However, both encompass many distinct approaches and therefore consideration needs to be given to their potential synergies and to the ways in which their activities and impacts may conflict. Where modern bioenergy development reduces pressure on forests and/or improves their management, for example by substituting traditional biomass (thus reducing local deforestation) with other more efficient technologies such as biogas and clean burning cookstoves, it can contribute to achieving the objectives of REDD+. However, where bioenergy development requires significant amounts of new agricultural land it may increase pressures on forests and emissions from forest conversion thereby conflicting with REDD+ objectives. Conversely, REDD+ programs may directly contribute to bioenergy development by providing funds to support initiatives that reduce pressure on forest by reducing use of wood fuel. However, REDD+ programs may also inhibit bioenergy development by reducing the land available for cultivation and/or restricting use of forest resources for bioenergy. Whether there are synergies or conflicts depends very much on how measures to support REDD+ or promote modern bioenergy development are implemented.

Several projects are currently using bioenergy approaches to contribute to REDD+ objectives. For example, UNEP has partnered with local organizations and communities in Douala-Edea, one of Cameroon's largest estuaries, to work towards reducing pressures on their mangrove forests (over 36,500 ha). Between 1980 and 2006 the mangrove forest area in the region was reduced by about 30%^{vi}; the need for wood fuel for fish smoking and processing activities being among the main causes for this degradation and loss^{vii}. The joint project between UNEP and local communities aims at promoting sustainable utilization, management and conservation of mangrove ecosystems through the promotion of the use of improved energy-saving smoke houses. The project is expected to reduce wood consumption by about 32%^{viii}, and fish smoking time four-fold with considerable positive impact on the mangrove ecosystem. At the same time, the project has the potential to help reduce health problems caused by indoor combustion while supporting the local economy. Another way in which bioenergy can contribute to REDD+ objectives is through sustainable production of woody biomass through reclamation or restoration of degraded forest. By helping to reduce forest related emissions or enhancing forest carbon stocks, projects such as these can contribute to achieving REDD+ objectives. Other forms of bioenergy development, such as large-scale agricultural production of feedstocks for liquid biofuels, can conflict with REDD+ objectives, principally through their demand for and use of land. The growing demand for land for the production of biofuel crops is reflected in a number of large-scale land deals in Africa^{ix}. These and other biofuel production efforts may depend either on the conversion of forest land or a change in the use of existing agricultural land. The latter can lead to indirect land use change (ILUC) as the previous use and production systems are displaced to new areas^x. In the case of Brazil, for example, bioenergy crops such as sugarcane (bioethanol) and soybean (biodiesel) are expected to contribute to 41% and 59% of

all Amazonian indirect deforestation^{xi}. Conversely again, planning and action under REDD+ can create barriers to bioenergy development by constraining the use of land and forest resources.

The long-term balance between REDD+ and bioenergy development will depend on how economic incentives for conservation, sustainable management and enhancement of carbon stocks compare with the potential gains from bioenergy development and other forms of land use. Understanding how sustainable bioenergy development and REDD+ affect each other and identifying ways of meeting both sets of needs is therefore crucial. Where such solutions are found, multiple benefits can be gained, including assuring continued supply of ecosystem services provided by forests, such as regulation of water quality and quantity, soil conservation and pollination, all of which can contribute to sustainable production of biofuel feedstocks.

REDD+ and bioenergy in a Green Economy

A Green Economy is one that not only improves human well-being and reduces inequalities, but also reduces environmental risks and ecological scarcities^{xii}. Building a Green Economy requires recognition of the importance of the many goods and services provided by the natural environment and the dependence of human well-being upon them, and active consideration of their values in decision-making. Another of the key steps in the transition to a Green Economy is making energy production and use both more efficient and less dependent on fossil fuels. Improvements to agricultural productivity and sustainability are also vital. Between them, REDD+ and modern bioenergy development can help contribute to a Green Economy.

Countries are faced with different options for future land use planning on their way towards a Green Economy. Different options for implementing bioenergy development and REDD+ have different impacts on society, environment and

economy. Careful examination of the synergies and trade-offs is essential to effective decision-making. For example, REDD+ is likely to play a particularly strong role in maintaining ecosystem services that contribute both to bioenergy development and to other economic activities and local livelihoods, but benefits for energy security may be limited. Bioenergy development clearly plays an important role in ensuring energy efficiency and reduced dependence on fossil fuels. Depending on the approaches used, it can also contribute to agricultural innovation. However, these developments may result in the loss of biodiversity and ecosystem services. Both bioenergy and REDD+ systems can provide local communities with economic opportunities if carefully designed and implemented with social inclusion and development in mind. In Africa, particular attention will be needed regarding resource rights and land tenure systems, which are complex and dynamic. Involving stakeholders in the planning process, in particular women and marginalized communities that often do not receive fair representation, will be important to help ensure the success and sustainability of land use under a Green Economy in Africa.

Opportunity cost will be another important factor in future land use planning processes. In some cases, where tension between land uses exists, the conversion of forest, for example to oil palm, may be more profitable to landowners than conserving forests under a REDD+ scheme (Butler *et al.* 2009)^{xiii}. However, under a Green Economy, minimising harmful effects of economic development on the environment is desirable. To ensure sustainability of a Green Economy, innovative policies may be needed to create a balanced policy environment that supports conservation policies without inhibiting economic development.

Conclusion

Globally, bioenergy has been seen as an important part of the solution to reducing global emissions of greenhouse gases. Many countries have also promoted bioenergy

development (particularly liquid biofuels for transport) as facilitating economic growth and energy independence. REDD+ is another important approach to reducing emissions and can also contribute to local economic growth. REDD+ and bioenergy development can be complementary where more efficient bioenergy production and use reduces pressures on forest, and where REDD+ offers support for enhancing forest carbon stocks and sustainable use of forest residues. This potential is important in Africa, where many communities rely on local forest resources for energy. However, increasing demands for bioenergy feedstocks add to the demand for agricultural land, and thus potentially compete with other land uses, exerting pressure on forest. Careful and integrated land use planning is needed to ensure that this mixed relationship between bioenergy production, forestry, and forest conservation has positive outcomes for climate change mitigation, society and environment. Careful and integrated national planning and innovative policies are essential to ensure that both REDD+ and bioenergy development contribute to a Green Economy in Africa.

Reference

International Energy Agency (2010). Technology Roadmap: Biofuels for Transport. http://www.iea.org/papers/2011/Biofuels_Roadmap.pdf

International Energy Agency (2010). Technology Roadmap: Biofuels for Transport. http://www.iea.org/papers/2011/Biofuels_Roadmap.pdf

Henry, M., Maniatis, D., Gitz, V., Huberman, D., and Valentini, R. 2011. Implementation of REDD+ in sub-Saharan Africa: state of knowledge, challenges and opportunities. *Environment and Development Economics*, 16 (Special Issue 04): 381-404.

Houghton, R. A. 2003. Revised estimates of the annual net flux of carbon to the

atmosphere from changes in land use and land management 1850-2000. *Tellus B*, 55 (2): 378-390.

IPCC 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC. <http://www.unepwcmc.org/resources/publications/>

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC. <http://www.unepwcmc.org/resources/publications/>

Feka N. Z., 2005. Perspectives for the sustainable management of mangrove stands in the Douala-Edea wildlife reserve, Cameroon; p 107

Cotula, L., Vermeulen, S., Leonard, R. and Keeley, J., 2009, LAND GRAB OR DEVELOPMENT OPPORTUNITY? AGRICULTURAL INVESTMENT AND INTERNATIONAL LAND DEALS IN AFRICA, IIED/FAO/IFAD, London/Rome.

Ernst and Young (2011). *Biofuels and Indirect Land Use Change: A Case for Mitigation*. <http://www.endseurope.com/docs/111005a.pdf>

Lapola D M et al 2010 Indirect land use changes can overcome carbon savings from biofuels in Brazil Proc. Natl Acad. Sci. USA 107 3388-93

United Nations Environment Programme (UNEP) 2010. *Green Economy: A Brief For Policymakers on the Green Economy and Millennium Development Goals*. <http://www.rona.unep.org/documents/part>

[nerships/GreenEconomy/GREENECO-MDGs_Policymakers_Brief.pdf](#)

Butler, Rhett A., Koh, Lian Pin., Ghazoul, Jaboury (2009). REDD in the red: palm oil

could undermine carbon payment schemes. Conservation Letters 2 (2009) 67–73



Africa's forests and climate change – what to do?

Mafa E. Chipeta¹

Most of the world agree that global warming is real and it is important also for forests and forestry. Therefore foresters need to come to grips with it, and seem to be doing so, with a passion. In fact the danger for African forests appears to be that climate change has largely diverted the attention of us foresters away from good old-fashioned Sustainable Forest Management (SFM) towards talking about mostly about carbon and how to REDD this, REDD that and REDD the other – here and everywhere. It would be an exaggeration to say that climate change forestry has fully displaced the pursuit of SFM but it has largely done so in many cases instead of being treated as complementary; foresters appear to have forgotten or are deliberately ignoring the fact that if SFM is well implemented, it will get them all that REDD wants and then much more.

This diversion of attention from SFM is a worry but is for another day. This time, the focus is instead on an opportunity which can *secure funding for a greener forestry economy* based on the shared interest of two sectors in climate change as a bridge for co-operation. It is being proposed that Africa develops its enormous fossil-fuel resources

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for power/energy generation and pays the penalty for pollution arising from this into funding for the continent's own carbon-capture forestry directly and but also funding agricultural productivity enhancement that also leads to carbon sequestration by reducing pace of deforestation and forest/woodland degradation.

The permanence of climate change

1. On matters of climate, only change is constant and permanent. Those who have flown over the Sahara will have seen evidence of major rivers that existed there in the past but are no more. Come another few million years, we may see the Sahara rivers full again and the desert in bloom while the lush Amazon and the Congo become a distant memory, having been converted to new deserts. A future may be possible where we could face sweltering heat at one of the poles and ice on the present equator. We should therefore never be surprised when climate changes.
2. Moreover, the impacts of climate change are not necessarily negative: it is scientific fact that over the past millions of years the earth has had repeated ice ages alternating with periods of warmth. Indeed we have climate change to thank for some very important resources which drive economic development today: (a) the petroleum now powering our economies comes from luxuriant vegetation that bloomed in many parts of the world (some of which are now deserts) from which the oil has been distilled over geological time; (b) some of the best agriculture in the world is on alluvial soils deposited as periodic ice-age glaciers retreated each time the world became warm again; and (c) some of today's major hydropower-generating plants are located where ice deepened mountain gorges.
3. Why then are we panicking? *We panic not because the climate is changing but because we are here to see it and to face its effects. Unlike earlier climate reversals into cold or hot eras, the current global warming is happening when the world is no longer under-populated but instead is crowded*

with people whose "comfort zone" as they know it is threatened. Communications technology has also developed so well that mass hysteria can be generated in no time and society can be herded into making cloned responses. We are busy scrambling to protect what we are used to. The climate we are used to may not be the ideal way for earth to exist but by now we have designed everything we do and how we do it to suit it, due to the prevailing temperatures having been stable for so long in human history terms. The changes being forced on us by the current climate change may in the greater scheme of things be a mere natural "reset" button opening up new opportunities for the earth – the only problem being that the "better future" so achieved may not have mankind as a central player.

4. Box 1 records some expected agricultural impacts, showing that Africa may be particularly hard hit by the current cycle of global warming. Given Africa's comparatively severe economic and capacity constraints, the region can only avoid being brought down (in the short term) if it takes bold steps which do not rely on unrealistic and non-feasible levels of external help to carry out. Given the severe debt-induced dislocation of major world economies, it is in any case not reasonable for Africa to expect much external assistance to propel it forward, hence the Africa-centred suggestions which follow in the last section of this note.

Climate change and Africa's forestry and agriculture

5. Even before the climate alarm was raised, Africa's forests were being cleared at alarming rates. The primary challenge for the sector in the region is the prospect that within decades no meaningful expanses of forest and woodland may remain in Africa. This arises from the fact that our agriculture (whether for food, biofuels or fibre production) is the least productive in the world and consequently our farming clears more of forests or woodlands per unit farm output than in other regions. The pressure on forests and woodlands will

persist as long as we practice low-input/low-output agriculture: against a realistic global average of 5 tons per hectare, cereals in Africa at present yield only 1.0 – 2.0 tons per hectare while the developing country average is some 3.5 tons/ha. *Obviously, with such low productivity of cereals, we in Africa are deforesting our land at 3 to 5 times the rate we should be causing if our agricultural productivity were raised.*

6. The current round of global warming could exacerbate this problem. We as African foresters are already worrying: in addition to faster forest loss, are our natural forests going to die, fail to regenerate or grow fast enough?; will forest/woodland fires, pests and diseases become even more frequent than now? will the familiar deciduous evergreen or savanna woodland species be replaced by different types or even (God forbid) by mere shrubs? *It is worth stressing that we are talking of the near future (i.e. the coming years and decades); in millions of years time, it is a matter of indifference whether Africa will have become the top agricultural performer – that will not save its forests from threats that are occurring now and can be worsened by the current cycle of global warming.*
7. Unfortunately, most of our forests currently suffer benign neglect – indeed, we often plead poverty to justify our failure to achieve SFM, including of our protected areas. Yet nowadays it is often not shortfalls in SFM that we foresters talk about - we are busy using our limited capacities to negotiate and prepare projects for capturing carbon or to adapt to a warmer world. *For us in Africa, "climate change forestry" has far too often come to replace rather than to supplement mainstream SFM of the whole resource.* If we were at least putting the talk of REDD and other climate change forestry into practice, perhaps things would not be so bad; the reality however, is that carbon investments are largely occurring outside our region. We are not investing our own money in it and we are singularly unsuccessful in attracting foreign funds

too. Unlike the HIV/AIDS sector, where funds for combating the pandemic are routinely used to also upgrade general health services, we are yet to systematically use climate change as a bait to attract greater sector funding for application to generalized SFM achievement.

8. FAO/IIASA modelling shows that Africa will be the hardest-hit region by the current cycle of global warming. Therefore its already catastrophically low levels of farm productivity could go even lower and become more unpredictable. While our high birth rates are already driving rapid deforestation (including in environmentally fragile locations), adverse climate could by lowering farm productivity accelerate this further. If this were to happen, we in Africa would further lose capacity to contribute to climate mitigation and to effectively adapt to climate change.
9. To the fundamental question of how, despite climate change, Africa can save its remaining forests and woodlands so that they can continue to make their economic, social and environmental contributions in future, the most important answer must be that *our countries must prioritise raising agricultural productivity in order to arrest further clearing, denudation and other reduction of forests, woodlands and other tree cover*. In the very long term (geological time) we can of course pray that future climate reversals will favour Africa, but that is a subject for another day. Some school of thought would say that it is true that there has been climate change before but there has never been human induced climate change before, which is what we have now.

Box 1: Under the Current Global Warming: Africa Will Be Hit Hard

Under the current cycle of temperature change, global mean surface temperature is projected to rise in a range from 1.8°C to 4.0°C by 2100. Modelling continues on expected changes and impacts, of which a pioneering effort was under the FAO/IIASA Agro-Ecological Zones (AEZ) methodology. Examples of some indicative results (all being in the future tense, being projections) of this and other modelling efforts are given below:

A. On balance:

- FAO reports that climate-change impacts are not location-neutral; for example, between 2000 and 2004, around 262 million people were affected by climate-related disasters but of these, *98 percent lived in developing countries*.
- It appears climate change will favour altitudes where the industrialised countries that currently dominate agricultural surpluses. *Developed countries will largely benefit since cereal productivity is projected to rise in Canada, northern Europe and parts of Russia*. In contrast, many of today's poorest developing countries are likely to be negatively affected - *most severely affected will be sub-Saharan Africa due to its inability to adequately adapt through necessary resources or through greater food imports*.
- The unequal current patterns will be worsened (most hunger in the "developing tropics" but most food surpluses in the "developed temperates") - *access to food will, even more than now, depend on capacity to purchase, not to produce*.
- If the developing countries remain dominated (especially in Africa) by low-input/low output farming, the future for forests and other natural vegetation will be bleak: new land clearing could accelerate even more and destroy biological resources and economically productive vegetation too.

B. Positive:

- Global agricultural potential is likely to increase with increases in global average temperature up to about 3°C, but above this is likely to decrease.
- Some change may be positive for instance reduced plant water use and "CO₂ fertilisation" (CO₂ is a limiting factor of plant growth, increasing CO₂ also increases plant yields).
- At higher latitudes (i.e. far from the equator) cold climates would benefit from higher temperatures, and new agricultural land may become available at high latitudes and high elevations - there could be significant expansion of suitable land with production potential for cereals.
- China's (more temperate) rainfed cereal production potential of 360 million tons could increase by 15%.

C. Negative:

- At lower latitudes (i.e. closer to the equator), especially the seasonally dry tropics, crop yield potential is likely to decrease for even small global temperature increases, which could increase risk of hunger; there are likely to also be more frequent droughts and floods.
- About 11% decrease in cultivable rainfed land, with consequent decline in cereal production. Sixty-five developing countries, representing more than half the developing world's total population in 1995, will lose about 280 million tons of potential cereal production valued at US\$ 56 billion, equivalent to some 16% of the agricultural gross domestic product of these countries in 1995 (if price averages US\$ 200 per ton).
- Increase in arid and moisture-stressed lands: in Africa the 1.1 billion hectares of land with growing period of less than 120 days could, by 2080, expand by about 50 - 90 million hectares - this reduction in the area suitable for agriculture and in length of growing seasons and yield potential, will increase risk of hunger.
- It has been estimated that the aggregate negative impact of climate change on African agricultural output up to the 2080-2100 period could be between 15 and 30 percent.
- Sub-Saharan Africa's share in the global number of hungry people could rise from 24 percent to between 40 and 50 percent, depending on model scenarios. The dependence of developing countries on food imports will increase.
- India (being largely tropical) could lose 125 million tons, equivalent to 18% of its rainfed cereal production
- By 2050 the world's population will be 34 percent higher than today, with nearly all the increase being in developing countries. To meet the necessary increase in food production, the use of fertilisers, energy, and greenhouse gas emissions especially of livestock (meat supply) will be considerable.
- If there is diversion of considerable grain to biofuels, there could also be considerable risk to food security.

An opportunity for foresters to grasp?

10. "Never let a crisis go to waste" is an adage Africa could usefully heed in matters of climate change response. It is necessary to see the silver lining in what is far too often portrayed in the gloomiest of terms – there must be developmental opportunities to craft from the climate change crisis. But to do this will require action across sectors: the proposal below is for exploitation of one African resource to generate funding for anti-climate change actions in forestry directly and through agriculture.

11. The proposal is that we demonstrate to our governments that given our abundant fossil fuel reserves (coal, petroleum), we should develop our power (energy) generation capacity based on these fossil resources (and perhaps some biofuels) rather than trying for currently less cost-effective renewable alternatives (solar, wind)¹. However, given their heavy carbon footprint, the fossil-fuel-based power generation industries should be forced to buy the right to pollute by financing carbon capture or reduction of current levels of carbon release through forestry and agricultural actions within Africa. This mechanism would thus serve as direct funding for a green economy in forestry.

12. This would be the key to securing assured funding for forestry and agricultural productivity enhancement i.e. the linking of exploitation of Africa's large reserves of fossil fuels (both coal and petroleum) to Africa's own

agricultural and forestry development through climate change mechanisms. This decision to require an intra-Africa sectoral link is political and is therefore the more difficult part; the mechanics of funding transfer pose no difficulties, since this would be merely an all-Africa variant of tried and tested carbon-trading regimes that are already being applied at global level. The logic is as follows:

- a. Africa needs to develop its energy generation so as to allow industrialisation and better human livelihoods;
- b. The easiest and least costly way to generate energy in Africa will be exploitation of coal and petroleum reserves²;
- c. Since coal and petroleum power generation is a fossil carbon emitter activity, Africa will need to buy the right to use them for power generation: the power sector would therefore be obliged to pay for this right of use (which is thus a right to pollute). *The global danger level is in fact negligible – Africa has only about 2% of global power generation and so even if this is multiplied five-fold, the net global impact will be minor;*
- d. The beneficiary of the payments should, however, not be the general global carbon budget –or the corporate carbon budget of non-African parties, but Africa's finance-starved carbon-sink sectors i.e. payments from the African power industry should go to fund:
 - o accelerated agricultural productivity enhancement measures;
 - o afforestation and forest conservation under an "Africa-REDD" regime (as one of the ways of mitigating climate

¹ Other regions continue to use these fossil fuels to much greater degrees than Africa; there is a worrying tendency for African countries to be easily pressured away from using their coal for power while being encouraged to export it so that others can then use it in no less polluting ways than if it had been burned in Africa in the first place.

² With biofuels as next least costly supplements; renewable solar and wind technologies will for long be so much more expensive in Africa as elsewhere, while nuclear is technologically too much of a challenge in the region.

change is reforestation, which would not only mitigate climate but also have the enormous benefit of creating jobs on a large scale. Reforestation could and should be a priority where payments from the African power industry should go); and

- ecologically sound biofuel production under high-productivity approaches ranging from sugar, starches, biological oil fuels, and wood (efficient charcoal and firewood).
13. Global carbon-trading mechanisms already exist but we in Africa have only captured a marginal share of the market to date: We need to correct many weaknesses if the intra-Africa carbon trading funding mechanism proposed above is to work. Here are some of the weaknesses we faced under the Kyoto regime which we must defeat if we are to succeed: our small producers are disorganised; our institutions are weak; we have failed to be entrepreneurial in the post-Kyoto carbon environment; and our costs have been too high for certifying how much carbon we have conserved (by avoiding deforestation), how much we have freshly captured (by plantation in concentrated or scattered / dispersed fashion). It has not helped that we also failed to develop low-cost assessment / certification procedures for carbon valuation, as a result of which we continue to rely on experts from distant countries, whose cost is often unaffordable for our small-scale operations.
14. Do we as African foresters have the will to capture the above opportunity?; are we confident enough about our REDD science to sell it to the economic leaders?; can we sell an Africa-focused REDD to the power sector so as to simultaneously uplift and make more “green” our own sector directly and through agriculture? What can we do to make an Africa carbon trade regime

work when we have failed so far to capture a decent share of the global trade in carbon both under the Kyoto and successor regimes? Finally, shall we be able to place all this under the SFM umbrella, which is where it really belongs, rather than being an outlier flying at a tangent?

Selected reading

Climate change 2000: synthesis report, by R. Watson and the Core Writing Team, eds. Cambridge, UK. Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press.

Global climate change and agricultural production: direct and indirect effects of changing hydrological, pedological and plant physiological processes. FAO, 1996

World Agriculture towards 2015/2030: An FAO perspective. FAO, Rome, 2003.

Impact of Climate Change, Pests and Diseases on Food Security and Poverty Reduction. Background Document: Special Event at 31st Session of the Committee on World Food Security. 23-26 May 2005 [Brief prepared by Anna Carla Lopez, Food Security and Agricultural Projects Analysis Service, FAO Rome].

Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. Summary for Policy Makers (Final draft). (Fourth Assessment Report; Under Government Review). Working Group II to the Intergovernmental Panel on Climate Change.

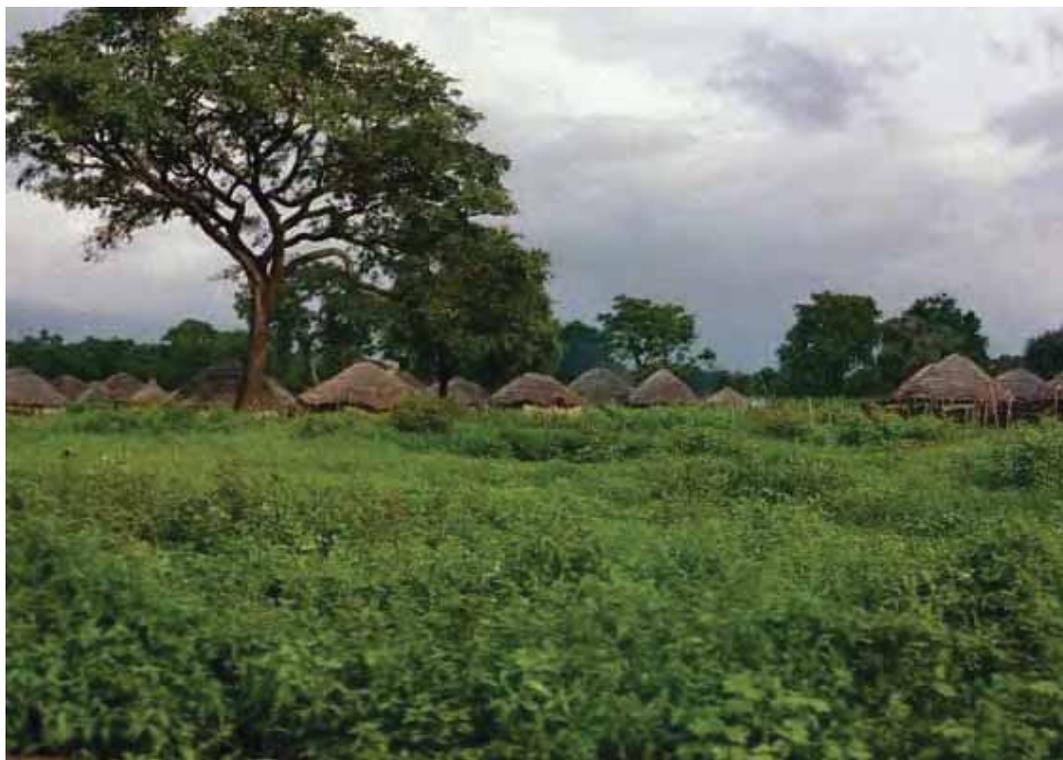
<ftp://ftp.fao.org/docreg/fao/011/i0765e>

How to Feed the World in 2050 – FAO. http://www.fao.org/fileadmin/template_s/wses/docs/expert-paper/how_to_feed_the_world_in_2050.pdf

Agriculture and Environment Challenges of the Twenty-First Century: A Strategic Approach for FAO. Doc COAG/2009/3: 21st Session of the FAO Committee on Agriculture. Rome 22-25 April 2009

Impact of Climate Change on Food Security and Implications for Sustainable Food Production. Document CFS: 2003/INF/12. FAO, Rome

Welcoming Remarks by Mrs Sebueng Chipeta. SADC Regional Workshop on Forests and Climate Change and the SADC Forest Protocol. (Gaborone, Botswana, 12 May 2009).



Timber legality definition: Does consistency matter for EU FLEGT partner countries?

Richard Gyimah¹

Summary

Demand side timber procurement policies such as the EU FLEGT Action Plan could impact positively on timber-producing African countries' efforts in attaining a green economy through Voluntary Partnership Agreement (VPA). Although VPAs have the potential of ensuring responsible purchasing, there is a need for setting consistent minimum requirements for "legal timber". Agreement on such standards could help contribute effectively to sustainable forest management in VPA partner countries using VPA as a trade instrument. The concept for legal timber definition in VPAs is good and respect sovereignty issues; however this paper argues that it has a downside of not clearly setting consistency in the minimum requirements for legal timber.

Introduction

In recent times, global interest in timber legality is increasing. There are strong indications that verification of timber legality can contribute to better governance and forest management and conservation and, also, help ensure that forests contribute to economic growth and poverty reduction in a sustainable manner. Countries that have signed the Voluntary Partnership Agreement (VPA) are using the concept as a governance tool to ensure that their forests become part of a green economy. This may

manifest in several ways which include among others: (i) securing legal rights to timber harvest and use; (ii) reducing illegal access and trade in timber products; (iii) increasing revenue to the state and recognized beneficiaries through improved collection of relevant forest fees and taxes; and (iv) VPA partner countries will secure market share of timber products traded with the European Union (EU).

The objectives of the EU procurement policies have been to ensure that purchases and import of timber products do not contribute to forest degradation and loss in the exporting countries, while at the same time providing leadership and helping to set standards in the timber product markets. The coming into force of the EU Forest Law Enforcement Governance and Trade (FLEGT) Action Plan² has demonstrated that VPA³s have the potential to meet the objectives of both private and public timber and timber products procurement policies. As many countries develop procurement policies to avoid the use of illegally sourced timber and timber products, illegal logging may reduce at both national and global scales. It is also increasingly becoming apparent that VPA may contribute to the realization of sustainable forest management practices. This is because through VPAs legality issues such as use rights to forest, compliance to harvesting and environmental regulations and social obligations, which are all fundamental requirements for sustainability, may be clearly defined and enforced through stakeholder engagements.

Legality definitions from VPAs are an indication of the set of core laws which are not only relevant to partner countries but

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² A plan that was approved by the European Union Council in October 2003 and which aims at supporting timber producing countries; favouring the purchase of legally harvested timber; and promoting sound timber products procurement policies and support for private initiatives.

³ A bilateral trade agreement based on EU FLEGT action plans that govern trade in legal timber products between the EU and producer country.

are also acceptable to major stakeholder groups. More importantly, the bilateral nature of VPAs allows exporting and importing partner countries to negotiate what constitutes legal timber. Although defining “legal timber” in the context of individual VPAs respects sovereign rights of countries concerned, this paper argues that this practice has the downside of leading to a lack of *consistency as regards common, minimum requirements* for the concept.

Legality Standard Development through the EU FLEGT Initiative

The EU FLEGT initiative (EU-FLEGT Briefing Note 2, 2007) provides guidance to prospective VPA partner countries on (i) What elements should be included in a legality definition; (ii) the process for deciding which laws are to be included in a definition for legality, through wide consultation with all interested parties; and (iii) adopting definition for legality (or implementing policies based on an explicit definition of legality). Examples provided by the Briefing Note as those likely to be included in the definition of legal timber are:

- Granting of and compliance with rights to harvest timber within legally-gazetted boundaries;
- Compliance with requirements regarding forest management, including compliance with relevant environmental, labour and community welfare legislation;
- Compliance with requirements concerning taxes, import and export duties, royalties and fees directly related to timber harvesting and timber trade;
- Respect for tenure or use rights to land and resources that may be

affected by timber harvesting rights, where such rights exist;

- Compliance with requirements for trade and export procedures.

However, the lack of clearly stated minimum requirements for timber legality has allowed countries that have signed VPAs with the EU to fashion definitions suitable for individual countries, thereby encouraging an open-ended definition for legal timber.

Comparative Analysis of Timber Legality Elements in Selected VPA Partner Countries

Five selected countries, namely Ghana, Liberia, Cameroon, Republic of Congo (ROC-Brazzaville) and Indonesia have all signed and agreed to implement VPAs, though at different times. Ghana was the first to initiate a VPA in September, 2008 and Indonesia and Liberia are the most recent ones of these countries to sign VPAs, in May 2011. Apart from Indonesia and Liberia all the other countries have shown further commitment by ratifying the agreement. Currently all these countries are at the system development phase of their respective implementation planning process. From the EU side, the import of FLEGT licensed products will be mandatory in the Region from year 2013. The speed with which any of the VPA partner countries may show leadership in implementing this trade instrument would be influenced by country-specific definitions of “legal timber”, and the compliance system put in place. Table 1 provides indicative numbers of key legality subject areas/principles used in the five countries studied.

Table1: Legality Principle /Subject Area used per Voluntary Partnership Agreement (VPA) Partner Country

VPA Partner Country	Timber Legality Principles/Subject Areas used in the Definition	Total Number of Key Principles/ Subject Areas
Ghana	<p>(i) Source of timber including land ownership: Examples of areas for compliance include forest management plans and written consent of landowners; clear delineation of boundaries of various forest zones.</p> <p>(ii) Allocation of timber rights: A key element for compliance is transparent and competitive timber rights allocation process.</p> <p>(iii) Timber harvesting operations: Examples of areas for compliance include forest resource inventory, timber harvesting within productive and approved areas; logging and environmental standards.</p> <p>(iv) Transport: Examples of areas for compliance include timber transport documentation and time of transport.</p> <p>(v) Processing: Examples of areas for compliance include timber processing standards and health and safety issues.</p> <p>(vi) Trade: Examples of areas for compliance include registration of business and acquisition of export license.</p> <p>(vii) Fiscal obligations: Examples of areas for compliance include payment of stumpage fees, ground rent, export levies, and corporate income taxes.</p>	7
Republic of Congo (ROC- Brazzaville)	<p>(i) The necessary administrative pre-conditions for every forestry enterprise: Examples of areas for compliance include valid license for company's business; clear delineation of boundaries of subdivision of forestry concession.</p> <p>(ii) The right of access to forest resources within areas of operation: Examples of areas for compliance include grant of certificate of exploitation of natural forest; land title deeds for plantation; operational license, etc.</p> <p>(iii) Social obligations associated with individual concessions, such as the use of local labour, or the participation of local communities and indigenous people.</p> <p>(iv) Forest management, harvesting and processing of timber: Examples of areas for compliance include preparation of management plans and inventory report; logging standards; environmental impact studies; timber processing standards.</p> <p>(v) Transport and sales of timber: Examples of areas for compliance include timber transport documentation; identification and traceability of marketed products.</p> <p>(vi) Fiscal obligations: Examples of areas for compliance include payment of all relevant taxes and social security contributions.</p>	6
Cameroon	<p>(i) Forest management, harvesting, and processing operations: Examples of areas for compliance include forest management and logging rules; industrial requirements; health and safety in forestry operations.</p> <p>(ii) Transport: Examples of areas for compliance include timber and derived product transport documentation; regulatory marking of timber to certify legal origin.</p> <p>(iii) Social obligations include among others compliance with employment, social security and labour laws.</p>	5

VPA Partner Country	Timber Legality Principles/Subject Areas used in the Definition	Total Number of Key Principles/Subject Areas
	<p>(iv) Environmental obligations: Examples of areas for compliance include biodiversity and environmental protection.</p> <p>(v) Administrative and fiscal obligations; Examples of areas for compliance include legal authorization of logging/processing forestry entity to operate; payment of relevant business and forestry tax obligations.</p>	
Liberia	<p>(i) Legal eligibility to operate in the forestry sector includes for example the forest contract or permit holder is a legally recognized business, community or an individual.</p> <p>(ii) Allocation of rights to harvest forest includes for example compliance with the National Forestry Reform and Community Rights laws.</p> <p>(iii) Social obligations of contractors to local people include for example compliance with benefit sharing requirement and negotiated social agreements.</p> <p>(iv) Forest management standards for operations and harvesting to ensure sustainability (v) Environmental obligations include for example compliance with environmental impact assessment.</p> <p>(vi) Regulation of timber transport and traceability obligations include for example compliance with timber products transport documentation and chain of custody requirements.</p> <p>(vii) Timber processing requirements include for example compliance with relevant laws and regulation governing transformation and recording of timber products to ensure traceability</p> <p>(viii) Workers rights, health, safety and welfare in forestry operations.</p> <p>(ix) On-time payments of all taxes and forest fees as required by law.</p> <p>(x) Export and trade requirements include for example official registration of exporter; shipment of logs and timber products are in compliance with chain of custody system</p> <p>(xi) Transparency measures and information disclosure include for example making trade statistics information regularly available to the public.</p>	11
Indonesia	<p>(i) For state-owned natural and plantation forests, the principles cover: (a) the legal status and of forest areas to be harvested, and right to utilize the forest; (b) compliance with the legal requirements for harvesting; and (c) compliance with the environmental and social aspects related to harvesting.</p> <p>(ii) For privately-owned forests, the principles cover: the ownership of the timber as it relates to the area harvested, the logs, and the trading of logs; cross checked for traceability.</p> <p>(iii) Other timber harvesting permits: regulation of logging from non-forest zones (e.g. agricultural landscapes) that may or may not lead to forest conversion.</p> <p>(iv) In addition, there is a general legality standard covering the management of the supply chain timber, from the forest through processing to the point of export.</p>	7

Observations from some VPA Partner Countries on Legal Timber Definition

In countries that have signed VPAs, existing relevant national laws have served as the pillars around which timber legality has been defined and framed. However, it has been observed that:

- Liberia has a relatively lengthy legality definition that includes a principle on transparency measures and information disclosure (see VPA Briefing Note, 2011). This principle arguably relates more to the overall VPA governance rather than timber legality. Although, in theory, the elaborate definition of legality for Liberia has the potential to enhance good forest governance, one may have to wait and see how effective the VPA implementation plays out in Liberia.
- In Ghana and Indonesia some laws relating particularly to source of timber and access to timber right were found to be inconsistent and/or conflicting, rendering the definition of legality prone to different interpretations. For instance, the laws of Ghana recognize and accept timber confiscated by the Government in its supply chain, once originally illegal timber has gone through the required court procedures and issued with a certificate of purchase (Ghana VPA Document, 2008). This, however, appears to defeat the spirit and intent of the legal timber definition. In Indonesia, unlike the other VPA partner countries, the legality standards recognize differences in scale and size of timber production. The standards have been designed to meet timber from large-scale enterprises, focusing on the export market; and timber from small to medium scale enterprises which focus on the domestic market (Indonesia Forestry Production Development's Regulation, 2009).
- Further, Indonesia distinguishes between private (or communal) and publicly owned forests in the demonstration of legal compliance (VPA Briefing Note, 2011). It is a composite standard, providing separate criteria

and indicators for four different forest classifications: state forest, management unit-based; state forest, non-management unit-based; state forest, community managed; and propriety rights forest and non-forest areas (VERIFOR and FAO, 2009). By recognizing such differences within a standard there is a higher likelihood that the system will complement broader national development strategies of meeting the needs of small to large scale enterprises.

- Cameroon (VPA Briefing Note, 2010) and Congo Brazzaville (VPA Briefing Note, 2010) appear to include fewer principles for the legality definition (Table 1), however, most of the essential elements necessary to impact on timber legality are covered.

Potential Benefits of Adopting Consistent Minimum Timber Legality Definition

Country specific conditions allow for some differences in defining timber legality. This notwithstanding, consistent minimum requirements for timber legality, common to all VPA partner countries from the beginning of the negotiations is being advocated with the view of providing the following benefits:

- Stronger and better basis for VPA impact monitoring across the different VPA partner countries;
- VPA partner countries better placed to draw informed lessons through VPA implementation in the different countries;
- Terminology for concepts such as principles, criteria, indicators and verifiers, as used to define legal timber, would be well spelt out, commonly understood and agreed upon in order to reduce ambiguity;
- Layout and design of the timber legality definition/matrix would be standardized for easy adoption in all VPA partner countries;
- Facilitating common understanding of timber legality among African countries and thereby promoting regional trade in legal timber would be promoted;

- Engagement by the EU with the different partner countries would be less time consuming and more efficient as regards the use and allocation of manpower and financial resources;
 - Potential “leaks”, based on differences in the definition of legal timber and country-specific differences in the interpretation of applicable laws, would be reduced.
4. be considered as “legality plus” (e.g. workers’ rights, and health and safety issues).
 5. Controversial sources of timber that may compromise implementation of the principles of timber legality should be avoided (e.g. legally disputed production forest areas and confiscated timber).

Recommended Guiding Policy Notes on Timber Legality Standards

1. VPA partner countries should be given assurance that, although timber legality limits exploitation to what is sustainable in a green economy, the VPA provides opportunity for timber industry players to stay in business, adopt better traceability systems and efficient wood utilization practices that will ensure optimal economic and environmental benefits from the forest resources.
2. Supply side requirements for timber legality, if not guided by consistent minimum requirements, may show large differences (implicit or explicit) amongst producer countries. This could potentially distort trade and erroneously place VPA as a “convenient” market instrument for demand side countries at the expense of promoting sound policies and sustainable forest management in the producer countries.
3. Clear policy statements about timber legality based on defined, consistent minimum requirements for legal timber which positively impact forest policies, sustainable forest management and trade should be well articulated in the VPA process. Elements that do not directly impact on timber legality but enhance broader forest governance can

References

FLEGT Briefing Notes Series. 2007. Briefing Notes Number 02- What is legal timber? Prepared by an expert group convened by European Commission. 2 pp.

Indonesia Forestry Production Development’s Regulation. 2009. Director General of Forestry Regulation Number P.6/VI-Set/2009- Standards and Guidelines on Assessment of Performance in Sustainable Production Forest Management and Timber Legality Verification. Jakarta, Indonesia. 46 pp.

VERIFOR and FAO. 2009. Meeting the challenge of timber legality verification. A policy brief prepared for VERIFOR and FAO. Rome. 10pp.

Voluntary Partnership Agreement (VPA). 2008. FLEGT VPA between Ghana and the European Union. Accra, Ghana. 50 pp.

VPA Briefing Note. 2010. FLEGT VPA between Cameroon and the European Union. Yaoundé, Cameroon. 11 pp.

VPA Briefing Note. 2010. FLEGT VPA between Republic of Congo and the European Union. Brazzaville, Congo. 21 pp.

VPA Briefing Note. 2011. FLEGT VPA between Indonesia and the European Union. Jakarta, Indonesia. 10 pp.

Sustainable Forest Management based on State Practice in Central Africa Countries

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Summary

This piece of writing briefly reviews the interpretation of the concept of sustainable forest management (SFM) deduced from state practice in some Central Africa countries. This assessment of SFM practices draws upon the earlier and highly variable definitions of sustainable development. It demonstrates that some progress has been made in terms of the more nuanced meanings of SFM now adopted by States in Central Africa. This reflects the fact that it is difficult to find a good balance between the three functions (economic, social and environmental) which structure the concept of SFM. Congo Basin countries seek to translate SFM by institutionalizing and implementing forest concessions, protected areas and community forestry. However, these efforts have been hindered by some governance shortcomings.

Background

In 1991 Sharachchandra Lele published a review of the concept of 'Sustainable Development' (SD) which by then had

been widely adopted by both governmental and nongovernmental organizations (NGOs) as a new paradigm of development. This critical review highlighted the lack of consistency in its interpretation, and a number of weaknesses which had led to inadequacies and contradictions in policy making in *inter alia* the forest sector (Lele, 1991). The concept of SD resulted in a proliferation of meanings – already over forty definitions by the late 1980s (Pearce et al., 1989). These did not reflect a simple exercise in academic or practical clarification but a highly political process of 'different interests with different substantive concerns trying to stake their claims in the sustainable development territory' (Dryzek, 1997).

Balancing the economic, social and ecological functions of tropical forests is challenging. Consequently, forest sustainability is often reflecting conflicts of interests and power unbalanced amongst forest stakeholders (Davenport et al., 2010). As a result, Tladi (2007) proposes a variation in approaches to integrating the three pillars of sustainability that have emerged from the SD discourse. These various approaches are distinguishable on the basis of the three functions that take priority in the case of trade-offs between them i.e. in terms of the economic, environmental and social welfare benefits of forests.

Central Africa is the second largest continuous block of rainforests on the planet after the Amazon Basin. Although degraded in some areas, forest cover is relatively well preserved overall (Eba'a Atyi et al., 2009). In 1999, the Heads of State of Central Africa sub-region expressed their joint commitment to work towards SFM through the Yaoundé Declaration. This positive political will to promote SFM was further shored up in 2005 by the adoption of the Brazzaville Treaty on Conservation and SFM in Central Africa. This article reviews the current meaning of SFM based on actions of individual countries within the Congo Basin.

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It draws on legal materials and conduct of national governments.

Sustainable Forest Management in Central Africa

The concept SFM, calls for a realistic balance between the economic, social and ecological functions of forests in the development of policies, attendant regulations and implementation strategies. The achievement of this balance is often tricky in view of the trade-offs between these three functions of sustainability. This is why the authors prefer to use the explanatory model of Tladi (2007) on the variable integration of the underlying functions of the concept of SD. To further clarify his model, Tladi (2007) provides two explanations. First, SD is based on the integration of the three underlying functions of sustainability. Consequently, there is no exclusion of any of the three functions. The economic and social functions have an anthropogenic origin because both place human needs over and above longer-term ecological sustainability.

The transposition of Tladi's theoretical explanatory model of SD to the forest sector in Central Africa sub-region suggests the following: given that the concept of SFM includes the ecological, social and economic functions, there are three variations of forest sustainability. These are determined by the three functions of forests, in the event of trade-offs between them. The first variation presupposes that in a forest area where the management option favours economic returns as for example the case with most forest concessions - the economic function tends to prevail over the two others; but without excluding them completely. In reality, the aim is to reduce the social and ecological functions in the case of conflict with the dominant economic function in forest concessions. The second variation implies that in a forest area where the SFM option is social with the aim of prioritizing devolved authority for forest management - as is the case with community forest and Co-management of some forest areas - the social function may be prioritized more than the two others. In the case of trade-offs, the

ecological and economic function must yield to the social function in this context. The third variation presupposes that in a forest area intended for conservation, - such as protected areas the ecological function will take priority over the other two functions.

The variation in the integration of the functions of SFM derived from Tladi's explanatory model of sustainable development tends to reflect with States practice as outlined in most legislation in Congo Basin countries. In most of the forest legislation and attendant regulations currently in force in several Central African countries, a fundamental distinction is made between forest concessions; protected areas and community forest. These forest classifications reflect to certain extent, the distinction of three functions of SFM through the allocation of forest areas for specific purposes. Forests are commonly classified according to their purpose or use (Bigombé & Dabiré, 2002; CBFP, 2006). Production forests such as forest concessions have a prevailing economic function. They provide economic benefits to private sector operators and generate taxes for the State to help public finance and other development activities and also a portion of Forest Annual Fees Area to some local councils and communities (Cerutti *et al.*, 2010). Accordingly, it would be logical to give priority to economic production activities in a forest allocated for timber harvesting, in the case of a trade-off between the three underlying functions of sustainable management. However, this does not mean that the social and ecological functions should be systematically banned. In fact, the difficulty to find a suitable balance between the three functions of sustainable forest management may actually favour the adoption of a legislative/regulatory process to allocate/classify forest areas. In contrast, in a forest area earmarked for protection, the ecological function should prevail in the event of trade-offs with two other functions (economic and social). In effect, in any type of protected areas, the conservation of plant and wildlife species should take the upper hand over social and economic values. But

again, this does not imply the total exclusion of the social and economic functions. In some countries efforts have been made to foster greater engagement with communities living around protected areas with the aim of ensuring more effective protection whilst allowing small-scale extraction of Non wood forest products to meet subsistence needs and household income. The aim is to ensure that all stakeholders around the protected area comply with the main purpose of protecting the forest area by giving priority to the ecological function.

Another example is that in most Congo Basin countries, there is a clear distinction between the permanent forest estate and the non-permanent forest estate (CBFP, 2006). The latter is reserved mainly for agro-forestry and community forestry activities with local communities. The permanent forest estate is intended for production and conservation purposes. Tladi's explanatory model can also be applied at the ground level. From this perspective, it is possible to note that stakeholders in a forest arena act according to their main interests. However, given that such interests are often conflicting, management and use decisions have to be in line with the nature of the legal classification of the forest to be used. In the context of a protected area set up where the surrounding local population claim historical rights to the land the theory of co-management of natural resources (Borrini-Feyerabend et al., 2004) can enable the various stakeholders (park managers, local communities, NGOs, and the local and national government administration) to arrive at a minimum consensus which can reconcile the main objective of the forest (conservation), with the secondary objective :promotion of the rights of local communities (Haller & Galvin, 2008). In practice, the blurred boundaries between protected areas and customary agroforestry landscapes are porous, and subject to continuous re-negotiation (Wardell & Lund, 2006). This does not imply abandoning the other forest functions, but rather seeks to

find solutions and trade-offs between them. In the case of certifying a forest concession, the evaluator first tries more or less to give priority to the economic function before considering the ecological and the socio-cultural functions. This was confirmed by comparing the social function inside and outside a certified concession to two other concessions without certification managed by three different economic operators (Cerutti et al., 2011). This comparative study showed that quality of living standards and the respect of the rights of the local communities and national employees had not significantly improved even in the certified concession. Social claims persist even in forests that have been certified in spite of many promises made during forest certification (Cerutti et al., 2011).

Concluding remarks

The transposition of Tladi's model drawing on the concept of sustainable development to SFM in Congo Basin countries demonstrates that some progress has been made to translate such generic principles into operational principles at the ground level. State SFM practices distinguish between the economic, social and ecological forest functions in most national forest legislation and regulation, with forest areas generally allocated for specific purposes. The key task is how to achieve a balanced approach to SFM according to each of the three priorities outlined by Tladi in the different forest areas. According Eba'a Atyi et al. (2009), the progress of Central Africa countries towards SFM comes from the implementation of forest management plans, advances in forest certification and trends of greater involvement of forest dependent communities in SFM, as well as the sharing of benefits generated by all stakeholders. However, these efforts have been to date undermined in the Congo Basin countries by continuing governance challenges (especially illegal logging, corruption) and the unregulated operations of the informal sector, coupled with limited access to information.

References

- Bigombé, L.P & Dabiré, A.B. 2002. *Gérer autrement les conflits forestiers au Cameroun*. Yaoundé : Presses de l'UCAC.
- Borrini-Feyerand, G., Kothari, A., Oviedo, G. 2004. *Indigenous and Local Communities and Protected Areas: Towards Equity and Practices for Co-managed Protected Areas and Community Conserved Areas*. Gland: IUCN.
- CBFP. 2006. *The Forests of Congo Basin: State of the Forest 2006* available at www.cbfp.org
- Cerutti, P.O., Assembe-Mvondo, S., German, L., Putzel, L. 2011. Is China Unique? Exploring the Behaviour of Chinese and European Firms in the Cameroon Logging Sector. *International Forestry Review* Vol. 13 (1): 34-39.
- Cerutti, P.O., Lescuyer, G., Assembe-Mvondo, S & Tacconi, L. 2010. The Challenges of Distributing Forest related Monetary Benefit to Local Governments: A Decade of Logging Area Fees in Cameroon. *International Forestry Review* Vol.12 (2): 130- 138.
- Davenport, D., Bulkan, J., Hajjar, R & Hardcastle, P. 2010. 'Forests and sustainability'. In, Rayner J, Buck A, Katila P (Eds). *Embracing Complexity: Meeting the Challenges of International Forest Governance*. Vienna: IUFRO World Series Volume 28, p. 75-92.
- Dryzek, J.S., 1997. *The Politics of the Earth* OUP, New York.
- Eba'a Atyi, R., Devers, D., De Wasseige, C., Maisels, F. 2009. 'State of the Forests of Central Africa: Regional Synthesis'. In, De Wasseige C, Devers D, De Marcken P, Eba'a Atyi R, Nasi R, Mayaux Ph (Eds). *The Forests of Congo Basin: State of the Forest 2008*. Luxembourg: CBFP, p 17- 44.
- Haller T & Galvin M. 2008. 'Introduction: The Problem of Participatory Conservation'. In, M. Galvin M, Haller T (Eds.) *People, Protected Areas and Global Change: Participatory Conservation in Latin America, Africa, Asia and Europe*. Bern: NCCR North-South, p 13- 34.
- Lele, S.M., 1991. Sustainable development: a critical review. *World Development* 19 (6): 607-21.
- Pearce, D., Markandya, A & Barbier, E.1989. *Blueprint for a Green Economy*. London: Earthscan.
- Tladi D. 2007. *Sustainable Development in International Law: An Analysis of Key Environ-Economic Instruments*. Pretoria: Pretoria University Law Press.
- Upton C & Bass S. 1995. *The Forest Certification Handbook*. London : Earthscan.
- Wardell, D.A. & Lund, C. 2006. Governing access to forests in northern Ghana. Micro-politics and the rents of non-enforcement. *World Development* 34 (11): 1887-1906.

Community forestry and the challenge of aligning with Cameroon's green economy

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Initiated more than two decades ago through forest legislations and policy reforms in Cameroon, community forestry has experienced mixed opportunities partly due to its evolution. After humble beginnings, it is now better established due to a review of the legal framework. With the demand for environmental standards, it attempts to align with the green economy. In Cameroon, the reforms aimed, among other objectives, at implementing a forestry based on people

(Bigombe, undated). According to the International Tropical Timber Organization (ITTO), these reforms concerned the institutional, legislative and regulatory frameworks and a new mapping of forest territories (Minsouma, 2008). The participation of local communities in forest resource management was at the centre of this reform via the introduction of decentralized forest management concepts. In its approach, community forests encompass (i) communal forests; (ii) community forests; (iii) the annual forest royalties; and (iv) community managed hunting zones (Oyono *et al.*, 2007). One of the main expectations is to transform these efforts into a dynamic process to empower rural communities in forest resources management; this will ultimately contribute to improving their livelihood options and foster local development. This dual objective of ensuring the balance between conservation and development matches the approaches of both sustainable development and green economy. The contribution of this natural resource management model to the green economy is poorly understood.

This paper presents the contribution of community forestry to the green economy and describes the current and future challenges in terms of integrating or aligning community forestry objectives to those of Cameroon's green economy.

A. Contribution of community forest to the green economy

Community forest produces goods and services that contribute to improving the economic and social conditions of rural households, and sustainable natural resources management (MINFOF 2009). Overall, the forestry sector is one of the main drivers of development in Cameroon with a contribution of over 6% to the GDP (COMIFAC, 2010). Paradoxically, the annual income bracket of community forests currently logged makes only a small contribution to this activity, ranging between 1,500,000FCFA (€2,288) and 25,000,000 FCFA (€38,135) (Oyono *et al.*,

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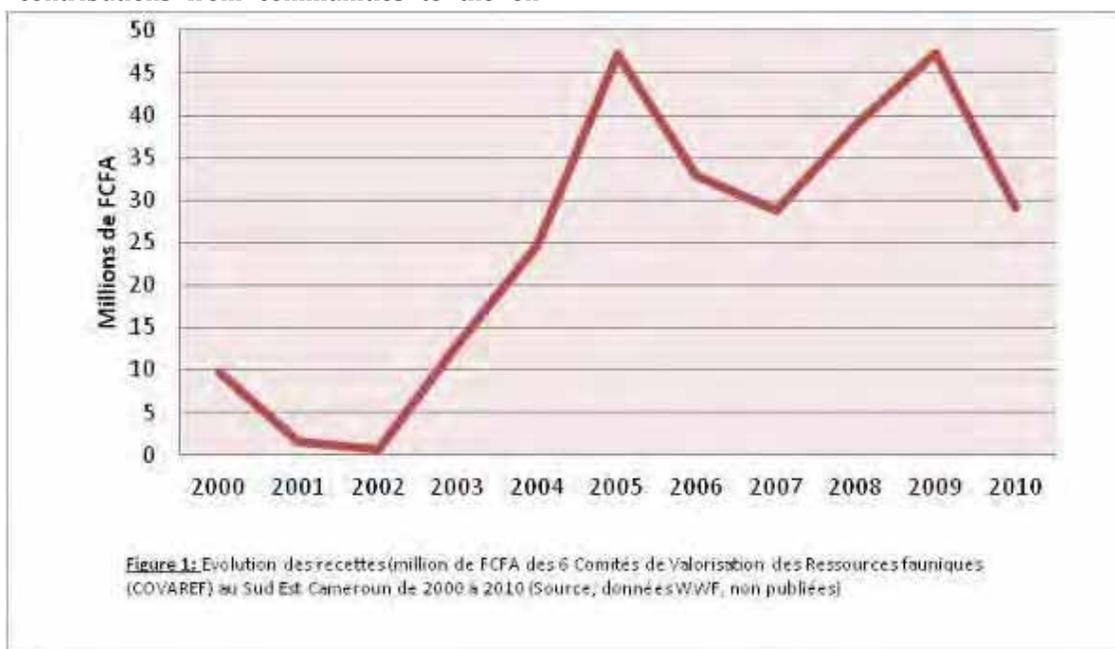
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2007). Because community forestry plays an increasingly significant social and economic role, an ecological combination is therefore needed for this sub-sector to fully play its role within the green economy and this requires sustainable resource use as well as a reduction of environmental waste.

According to the law, a Simple Management Plan (SMP) is one of the major requirements for communities to obtain and manage community forests. The revision of exploitation guidelines for community forests has resulted in authorizing communities to exploit the forest during the initial two years, helping them to receive revenues that permit the elaboration of the required management plan. . The mechanism for acquiring and appropriating community forests in savannah areas is based on the fact that forests can also be established in non-forest zones. This mechanism therefore encourages communities to reforest degraded areas, and also to help communities to have a better control of their resources, including wildlife. Several thousand trees have already been planted in the north by communities to green some savannah areas. Community forestry is thus no more exclusively dedicated to timber management. In the south-east region for example, over 20% of incomes generated by Community Hunting Zones (ZICGC) have been reinvested as contributions from communities to the on-

going fight against poaching. The bulk of funds received by local communities are devoted to the development of social infrastructure such as building schools or health centers. From 2000 to 2004, the 16 ZICGCs exploited in the South-East, have generated about 43,000,000 FCFA. Experts from the World Wide Fund for Nature (WWF-Jengi Project) have constituted the following percentages in terms of achievement by COVAREF (Bigombé Logo *et al.* 2005): 33.27% for the operation of the segments of Community Wildlife Management Committees (COVAREF); 18.90% for the building of headquarters for the various sub-branches of COVAREFs ; 14.40% for education; 8.31% for the establishment of community farm fields; 5.18% for village water pumps; 6.62% for the purchase of equipment (vehicles, bicycles, etc.) 3.13% for the material support to Baka Pygmies; 0.80% for village electrification; 3.10% for habitat improvement; and 6.25% for the safety of some ZICGCs (Oyono *et al.*, 2007).

Between 2000 and 2010, six COVAREFs have benefited from 274 million FCFA (about €417,310), with a general progressive increase over time (**Figure 1**).



The legal framework also restricts the negative impact of community forest exploitation on the ecology of the landscape; if it now forbids the physical transport of wood collected from community lands, it also restricts the hauling trails to a width which will not allow the entry of heavy trucks. Some of the communities have also started processing wood waste, thus reducing raw material loss. This is the case for the Model Forests of Dja and Mpomo (FOMOD) in the Eastern region of Cameroon, where these residues are transformed into pens. Other communities around Mambele, recycle wood residues into coal, which are then sent to urban markets located hundreds of kilometers from the production zone. In the Lomié area in the Dja-Odzala-Minkebe trinational landscape (TRIDOM) between Cameroon, Gabon, and Congo Brazzaville, the communities in Makobitol and Nemeyong have also created Common Initiative Groups (CIG). They organize the logging and sale of wood from community forests and the allocation of revenues to applicant-households. These funds are used for the purchase of equipment and the construction of houses, to the tune of €330, 1/9 being given to the technician in charge of building the roofs. Moreover, the members of the community are authorised to recycle the poor quality wood as building material or to sell it.

Even if land title issues remain a trial for the communities who wish to adopt a community forestry approach, the softening of the legal framework is certain. In fact, this has enabled the establishment of the first community forests belonging to indigeneous Baka people from Mambele, in the eastern region of Cameroon. In addition to using the resources, these populations can peacefully practice their rituals which also facilitate a sound management and maintenance of community lands, since the people want to safeguard the areas where these rituals are practiced. We often overlook this function of community forestry which enables culture to be perpetuated, and this holds true for the forests of indigeneous populations in the East of Cameroon and the sacred forests in

the western and north-western regions of Cameroon where all the economic, ecologic and social functions of green economy are fulfilled.

B. Current and future challenges of community forestry

In Cameroon, the number of community forests has increased over the years. In 2008, the number of simple management plans approved by the Ministry in charge of forestry, was 174 out of a total 402 applications received (Minsouma, 2008). The greater concentration is found in the eastern region and is explained by the high local demand for timber. According to Smith (2010), 75% of domestic wood consumption of wood logged in Cameroon comes from artisanal logging. This wood comes not only from community forests, but also from individual logging permits. Special attention should therefore be given to this sub-sector, notably at the ecological level.

The legal framework governing the establishment of community forests has been reviewed, however the financial capacity of communities to mobilize funds is subject to doubts. Indeed, most of the funds used to support the finalization of Simple Management plans come from international partners. In the absence of these funds, the process will halt and annul the efforts made by communities to manage their forests in a sustainable manner. Ezzine *et al.* (2009) show that the financial support to community forests should be continuous until they become established as small forest enterprises, since an interruption of this support will lead to a lower performance than that of the self-managed forests. The funds required for the exploitation of community forests are actually very high to the extent that communities prefer subcontracting to minimize market-related risks. Such transactions no longer guarantee environmentally friendly management by the new loggers. The initial exploitation of the forest often experiences problems due to the delay in delivering annual operating certificates and waybills which enable

communities to sell in remote markets. This could be due to bureaucratic red tape, perhaps because the State wants to reclaim its control over community forests (Ribot et al., 2006) or to the prevailing corruption in the forest sector.

The contribution of community forests to the sustainable management of wildlife weighs heavily on the incomes collected by communities. This is the case in community-managed hunting zones where this could hinder local development. According to Oyono *et al.* (2007), the emergence of 'new local authorities', the empowerment of management committees through decentralization dynamics, were viewed by traditional authorities as a *coup d'état*. This leads to disunity among villages, or an institutional dualism and increasing conflicts between groups, thus having a negative impact on the dynamics of local community forest management. Concerning Forest Management Units (UFA) one of the essential correlations to community forest is the management by the communities of the annual forest royalty. Indeed, the new decree improves their involvement through the creation of a roadside committee by granting it a measure of authority, namely, that its Chairman can invite resource people to the Committee's meetings. This approach is also stipulated in the provisions for the logging of communal forests which also strengthened the aspects of community forestry by improving the representativity of communities; traditional chiefs are henceforth part of the monitoring committee. Moreover, 30% of the incomes generated by the logging of communal forests are devoted to the development of roadside village communities.

Conclusion

The community forestry approach was established to improve the integration of communities in the management and control of their zones. These areas include forest landscapes as well as other ecological sites that can be subjected to direct or indirect forestry activities. Community forestry was more confined to the management of

community forests from the point of view of wood cutting and sale. It somehow escapes the integrated approach of sustainable wildlife and wood species use in the same space. In purely forest zones, wildlife community management has appeared more efficient and the incomes generated by community-managed hunting zones are more invested in social infrastructures, as compared to those generated by the logging and sale of wood. Community forests have begun initiating an optimization of the management of their resources with an improved local organization of those entities, a maximum use of the resource collected and a timid recycling of wood waste. Community-managed game zones located at the periphery of protected areas have continuously produced incomes and have been involved in poaching control activities. In the absence of sustained self financing, these results remain fragile since the communities exploiting the wood still heavily rely on external funding. In case the good performances of community forests do not materialize, especially in terms of the concretization of socio-economic effects anticipated after the review of the Manual of Procedures for the Attribution and Norms for the Management of Community forests, there is a risk that the State will reclaim these areas.

The proliferation of entities managing community incomes could, in the long run, lead to misunderstandings. At least three committees involved in community forestry have been recently put in place: the farmer-forest committee, the Community Wildlife Management Committee, the riparian committee. There is no effective coordination among these three committees even when they are established on the same surface area. The green economy supposes a good planning and thus an inevitable business plan for the activities related to the development of community forestry which should evolve in small enterprises. Therefore, it is important that the will of communities to envisage their local development plan and its implementation should not be inhibited by community

development plans conceived by municipal councils.

The experiences of community forests for the past twenty years reveal both the difficulties and potential of this approach. The low organizational capacity of communities slows down the progress, together with their isolation and various technical challenges. However, a dialogue has been initiated; populations have increased their involvement and are henceforth engaged in the debate on the future of their forests. There remains a lot to be done because the past failures during the inception period of the programme are viewed as part of the learning process leading to a greater involvement of populations in shaping the future of their forests. Efforts to capitalize on the enforcement of the 1994 Forestry Law should be envisaged to improve the orientation of future community management strategies and their actual contributions to the green economy in Cameroon.

References

- Bigombe Logo, P, (non daté) Foresterie Communautaire et Réduction de la Pauvreté rurale au Cameroun : Bilan et tendances de la première décennie. WRM in <http://www.wrm.org.uy/countries/Cameroun/Bigombe.html>
- Minsouma Bodo A. (2008). Politique de foresterie communautaire au Cameroun. Communication à l'atelier sous régional sur la gestion communautaire forestière et faunique en Afrique centrale, Lomié, les 7, 8 et 9 mai 2008
- Bekaye, M. (2011). Le contexte mondial et régional de l'économie verte: avancées et enseignements. Communication au Séminaire sur l'option stratégique de l'économie verte au Maroc- IRES- Rabat, 21 mars 2011
- Oyono, P. R. Ribot, J. C. Assembe, S. Bigombé Logo, P. (2007). Correctifs pour la Gestion Décentralisée des Forêts au Cameroun: Options et Opportunités de Dix Ans d'Expérience. Governance Brief, Center for International Forestry Research (CIFOR). Forests and Governance Programme. , Février 2007, Numéro 33(f)
- Nguenang, G. M. ; Delvienne, Q. Beligne, V. ; Mbolo, M. (2007). La gestion décentralisée des ressources forestières au Cameroun : Les forêts communales après les forêts communautaires.
- Bigombé Logo, P., Abbé Abessolo, J. et Koulbout, D.(2005) Vers une conservation bénéficiaire aux pauvres au Cameroun ? La gestion participative et le développement intégré des aires protégées de Lobéké, Boumba-bek et Nki au Sud-Est du Cameroun. Working Paper Series. IUCN/IUED/ RUIG-GIAN, Gland et Genève
- Pye Smith, C. 2010 Cameroon's hidden harvest, Center for International Forestry Research (CIFOR)
- Ribot, J. C., Agrawal, A., & Larson, A. M. (2006). Recentralizing while decentralizing: How national governments reappropriate forest resources. *World Development*, 34(11), 1864–1886
- Ezzine de Blas, D., Ruiz Perez, M., Sayer, J. A., Lescuyer, G., Nasi, R., Karsenty, A. (2009). External influences on and conditions for community logging management in Cameroon. *World Development* Vol. 37, No. 2, pp. 445–456, 2009
- COMIFAC (2010) Forêts du Bassin du Congo : sources de richesses et de réduction de la pauvreté. Bulletin d'information de la Commission des Forêts d'Afrique Centrale. No 008 Octobre 2010.
- MINFOF 1999: Manuel des Procédures d'Attribution et des normes de gestion des forêts communautaires, Yaoundé, Cameroun

Diversity, distribution and utilization of urban trees in Ibadan metropolis, southwest Nigeria

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Summary

In a study conducted to assess the diversity and distribution of trees in Ibadan, and their significance in their respective locations, 62 tree species were identified. The identified uses of the trees include their use as shade, windbreakers, edible fruits, fuelwood, ornamentals/landscaping, medicinal and fetish among others. The high tree diversity and population were attributed to the trees located in solitary and cluster forms in different locations within the metropolis, and as a result, Ibadan can be considered a green city. Owing to the benefits derived from the trees, majority of the respondents wants the tree to remain, suggesting people's positive response towards urban forestry. The paper concludes with advocating for planting of indigenous trees rather than exotics.

Introduction

Urban forestry refers to all forest tree crops, both public and private, which is found growing in cities, towns, and other urban communities. In another words, an urban forest is a forest or a collection of trees that grow within a city, town or a suburb. In a wider sense it may include any kind of woody plant vegetation growing in and around human settlements. Fuwape and Onyekwelu (2011) listed six types of urban forests in West African cities to

include (i) semi-private space like green space in residential and industrial areas (ii) designated parks, street trees and roadside plantations (iii) public green areas like green parks, botanical gardens, recreational gardens (iv) public and private tree plantations on vacant lots, green belts, woodlands and peri-urban tree plantations (v) rangeland, and forests close to urban.

Nigeria has been experiencing increased urbanization over the last five decades. The proportion of the population living in the urban centres has risen from 15% in 1960 to 43.3% in 2000. Total area taken up by urbanization in Nigeria during the same period increased by 131% from 2,083sq.km in 1976 to 5,444sq.km in 2000, with an average rate of urbanization estimated to be 3.7% per year (National Population Commission, 2004). The number of urban centres (settlements with population of 20,000 or more) increased from 56 in 1953 to 359 in 1991 and 450 in 2000. With urbanization come population explosion and its attendant adverse environmental consequences.

Ibadan is considered the largest indigenous city in West Africa, located in the south western region of Nigeria, with the population of 2,550,593 (NBS, 2007) within 11 local government areas. With the land area of 128km², the overall population density of Ibadan metropolitan area is 586 persons per km². Ibadan is an ancient city, with the name originating from 'Eba Odan', meaning a settlement beside the savanna. Historians put it that Ibadan was established in the forest region with many hills and close to the savanna region. Ibadan people belong to the Yoruba tribe, with a relatively high migrant population from other parts of Nigeria. Economic activities undertaken by people in Ibadan include trading, public service employment, and agriculture in decreasing order of importance. The city of Ibadan is located approximately on longitude 3°5' East of the Greenwich Meridian and latitude 7°23' North of the Equator.

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The fact that Ibadan was established in a forest region and once occupied by trees is evidenced in the names of some of the streets and areas within the city given after the trees formerly or still standing in those areas. These include *Idi-Ose* (*Ose* is local name for *Adansonia digitata*), *Idi-Ayunre* (*Ayunre* is local name for *Albizia odoratissima*), *Idi-Oro* (*Oro* is local name for *Irvingia gabonensis*), *Idi-Osan* (*Osan* is local name for oranges, *Citrus* spp), *Idi-mangoro* (*mangoro* is local name for mango, *Mangifera indica*), *Idi-Ishin* (*Ishin* is the local name for *Blighia sapida*) among many others. In most of these places however, the trees from which the area got its name have been felled. The same trend is also obtainable in other South-western cities, such as *Idi-Araba* in Lagos (*Araba* is local name for *Ceiba petandra*), *Idi-iroko* in Abeokuta, Ogun state (*Iroko* is local name for *Milicia excelsa*). However, with the increasing influx of migrants into Ibadan and improved economy, the city is expanding with more wild areas being opened up and buildings being erected, mostly for residential purposes.

With attention given to urban forestry in recent times, this study is therefore conducted to assess the biodiversity of the trees within Ibadan and their significance in the area.

Materials and Methods

A city-wide survey was carried out to identify different trees, their locations and an informal interview of the people working or living around the area, using a structured questionnaire, for any useful information about the tree. This was done between Thursday, July 28 and Tuesday, August 9, 2011.

Results

A total of 62 different tree species were identified during the survey. Table 1 shows the list of the most prominent trees within the metropolis. Generally, the significance of these trees in the different locations include their use as shade (shelter from sun for homes, cars), fresh air (oxygen released by

the trees), windbreaks, edible fruit, medicinal uses, landscape/ornamental purposes and fuelwood. The general trend observed was that trees with edible fruits are planted beside residential houses, while huge timber trees were found on roadsides and inside institutions. All the respondents to the questionnaires on the trees could not state who planted the roadside trees, but assumed that the landowner also automatically owns the tree; while only 5 of 45 respondents wanted the tree cut off due to adverse effects such as dropping dried branches that break car windscreens and destroy roofing sheets.

Discussions

This study has shown a comparatively high diversity and distribution of economic tree species within Ibadan Metropolis, therefore, Ibadan can be considered a green city. In addition to the secondary forests surrounding the Metropolis and Onigambari Forest Reserve located at the outskirts, urban forestry in Ibadan can be grouped into the following:

1. Forest belt within organised institutions such as research institutes, tertiary institutions, International research institutions, army barracks and some secondary (high) schools;
2. Forest patches in highly restricted areas such as the Government House, golf course, Government recreation centre called Agodi gardens and Government Reserved Areas (GRAs);
3. Trees in cemetery and a sacred grove, called '*Igbo Agala*' on one of the hills within the Metropolis;
4. Riparian forest escarpment along the River Ona and Eleyele dam;
5. Collection of scattered trees on roadsides, and inside individual residential compounds.

Furthermore, this study has demonstrated a high biodiversity and distribution of trees in Ibadan Metropolis, and this supports the finding of Konijnendijk *et al.* (2004) that green areas in urban centres have high biodiversity. For instance, as endangered as *Milicia excelsa* is, over 100 stands of it were encountered within Ibadan Metropolis.

The uses of these trees widely vary among the locations but the most common uses of the trees planted around residential areas are for shade from sun, as windbreakers and the edible fruits.

While waiting for commercial transport, commuters stay under tree shades in the heat of the day, even within schools, students are found playing under those trees during free periods. Often times, social events are organized under the shade of these trees, especially at weekends. At homes, during the heat of the day, people leave the house and get shade and cool breeze under the trees planted in their compounds. During the survey, most artisans, like automobile mechanics site their workshops in proximity to trees and many of them use the tree shade as their 'office' or they are found relaxing under tree shades when less busy. Vehicles are preferably parked under tree shades at home or at work.

The major observation on the trees located at roadsides is that bills and posters were nailed on them, indirectly serving as means of advertisement, but notwithstanding, they are mainly planted for ornamental/landscape purposes, while they also serve as shade for humans and cars.

Edible fruits appear to be the most important use of urban trees in Ibadan. And most tree planting inside residential areas are influenced by this. Furthermore, many other edible fruit-bearing trees along freeways are exploited by students, passersby, wandering insane people, urban poor, and artisans among many others. It is interesting to note that often times, conflicts were recorded between the tree owners and some people who have come to collect the fruits without permission. An important economic significance of these edible fruit-bearing trees is that they are often harvested and sold in markets during their fruiting season. Such examples include *Anacardium occidentale*, *Cocos nucifera*, *Mangifera indica*, *Citrus* spp, plantains and

bananas, *Spondias mombin* among many others.

Very many of these trees are still being used for medicinal purposes. This was confirmed by significant cases of bark slashing was observed on some of the trees, and this was also confirmed by some of the respondents, who cited the use of the bark of *Mangifera indica*, *Morinda lucida* and *Azadirachta indica* for treating malaria fever, *Melicia excelsa* sap used for treating arthritis and *Newbouldia laevis* bark and leaves used for treating haemorrhoids, eye and ear infections, paralysis and as abortifacients among other variant uses. This was confirmed by Osemeobo (1993) that about 40% of urban dwellers depend on traditional medicine for primary health care. And with the influx of more people into urban centres in Nigeria, the number of those depending on plant for medicinal purposes would have increased rapidly. Aside this, there is recent revolution on *Moringa oleifera* for its wide medicinal uses, and a lot of people are planting the tree at homes for personal use and for commercial purposes. The tree was found to have high medicinal values for treating malaria, jaundice, yellow fever, toothache, rheumatism, asthma and many other diseases, in addition to its high protein content. And in many cases, the tree barks are harvested for sale in the markets. There are many major herbal markets present in Ibadan, most popular of which is Bode market recording high sales of plant parts for herbal medicine. It is estimated that tens of thousands of Ibadan people are directly or indirectly involved in the harvesting, collection, transportation, processing and sale of plant parts for herbal medicine.

Another important use of the trees and their branches is as fuelwood by urban poor, and this becomes worse due to scarcity and price hike of fossil fuel (kerosene) and high cost of cooking gas. Perhaps the use of these trees as fuelwood is a major threat to the conservation of urban trees in Ibadan.

It was also noted that fetish materials and occultic activities were sighted under *Milicia excelsa*, confirming the widely-spread

superstition that the tree harbours some 'spirits' which are still worshipped by some traditionalists.

Summarily, the uses of these trees can also be grouped into three:

1. Ecosystem services: These include provision of shade to ameliorate high temperature, carbon sink, reduction of wind speed, mitigation of flood, mitigation of pollution, release of oxygen into the air, prevention of ultraviolet rays, soil protection and air cooling.
2. Socio-economic uses: These include their use for fuelwood, edible fruits and vegetables, car parking lots, wrapping leaves, medicinal uses, land demarcation, ornamental/landscape, and the use of the shades for parties and playgrounds.
3. Cultural uses: The act of worshipping some of the trees, evidenced by some fetish materials found under them.

These findings corroborate with earlier discoveries of Konijnendijk *et al.* (2004) who described urban trees as lungs of the cities. In addition, El Lakany (1999) reported that trees planted in erosion prone areas in Imo, Anambra, Abia, and Enugu states in Nigeria have enhanced water percolation during rainfall and reduced instances of runoff and soil erosion.

The effectiveness of urban forestry in conservation of trees in Nigeria was demonstrated in this study with just few of the respondents wanting the tree to be cut off. In such cases, they found it difficult to cut the trees because of the damage the falling tree can cause to surrounding electric cables and buildings. It could be concluded that most of the trees planted within the Metropolis are most likely to be preserved from deforestation.

However, the major threats to urban forestry in Ibadan Metropolis is tree felling to give way for construction purposes, old age, strong rainstorms and fuelwood exploitation by the huge population of the urban poor. Unfortunately, there are existing laws governing tree felling in the state, but

implementation is weak and most of the trees are left at the mercy of the land owners. However, a barrier to felling the trees is the damage the falling tree will do to nearby houses, roads and properties. There is the need for the government, through the State Ministry of Environment and Department of Forestry to give serious attention to urban tree conservation and public enlightenment on tree planting for environmental health.

Tree planting in Ibadan have received boost in the recent past with successive governments in Oyo state of which Ibadan is the capital, have done series of projects on landscaping of the city, which includes tree planting. Furthermore, the *Moringa oleifera* revolution have helped also in more tree planting, in addition to individual edible fruit-bearing tree planting at homes by individuals. However, there is the need to include strategic tree planting campaigns in Ibadan as part of the strategies for poverty alleviation, considering their economic and ecological significance.

However, it was observed that majority of the trees within the Metropolis; especially the ones with high population are mainly exotic trees, planted for ornamental purposes. Considering the likeliness that urban forestry is a key tool for tree conservation, planting of indigenous trees in these urban centres is strongly advocated. Incorporating trees in urban landscape improves biological conservation and biodiversity, while greenbelts and greenways can serve as biological corridors, reconnecting a city to its surrounding bioregion (Konijnendijk *et al.*, 2004).

References

- El Lakany, H. (1999). Urban and Peri-Urban Forestry: Case Studies in Developing Countries. FAO Rome, 194 pp.
- Fuwape, J.A and Onyekwelu, J.C. (2011). Urban Forest Development in West Africa: Benefits and Challenges. *Journal of Biodiversity and Ecological Sciences* No. 1 Vol.1, Issue1: 77-94.

Konijnendijk, C.C, Sadio, S., Randrup, T.B. and Schipperijn, J. (2004). Urban and peri-urban forestry in a development context-strategy and implementation. *Journal of Arboriculture* 30(5): 269 – 276.

National Bureau of Statistics (2007). 2006 Nigerian Population Census. Available at www.nigerianstat.gov.ng

National Population Commission (Nigeria) (2004). National Policy on Population for Sustainable Development 2004, Abuja. National Population Commission.

Osemeobo, G.J. (1993). The Hazards of Rural Poverty: Decline in Common Property Resources in Nigerian Rainforest

Ecosystems. *Journal of Environmental Management* 38:201-212

United Nations (2006). World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, <http://esa.un.org/unpp>

United Nations (2007). Urban Population, Development and the Environment 2007. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

Table 1: List of prominent trees within Ibadan Metropolis

S/N	Biological name	Family	Local and common names	Uses
1	<i>Albizia odoratissima</i> (Linn. f.) Benth	Mimosaceae	Ayunre, fragrant albizia, Ceylon rosewood	Landscape, shade, fuelwood, windbreak
2	<i>Antiaris africana</i> Engl.	Moraceae	Oriro (oro), Antiaris, bark cloth tree, false iroko	Shade
3	<i>Azadirachta indica</i> A. Juss	Meliaceae	Dogoyaro, Neem	Shade, medicinal, fuelwood
4	<i>Cassia fistula</i> Linn.	Caesalpinaceae	Kasia, Cassia	Ornamental, windbreak
5	<i>Ceiba petandra</i> (Linn.) Gaertn.	Malvaceae	Araba, Kapok tree	Landscape
6	<i>Cocos nucifera</i> Linn.	Araceae	Agbon, Coconut	Edible fruit, fuelwood
7	<i>Elaeis guineensis</i> Jacq.	Araceae	Ope, Oil palm	Cooking oil
8	<i>Gliricidia sepium</i> (Jacq.) Walp.	Papilionaceae	Agunmaniye, Gliricidia, Mexican lilac	Shade
9	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Gmelina	Shade, fuelwood
10	<i>Leucaena leucocephala</i> (Lam) de Wit.	Mimosaceae	White leadtree	Fuelwood
11	<i>Mangifera indica</i> Linn.	Anacardiaceae	Mangoro, mango	Edible fruit, medicinal, windbreak
12	<i>Milicia excelsa</i> (Welw.) Benth	Meliaceae	Iroko	Shade, fresh air, fuelwood, fetish, medicinal
13	<i>Morinda lucida</i> Benth.	Rutaceae	Oruwo, brimstone tree	Medicinal, shade
14	<i>Newbouldia laevis</i> (P. Beauv.)	Bignoniaceae	Akoko, African border tree	Medicinal
15	<i>Oxytenanthera abyssinica</i> (A. Rich) Munro	Poaceae	Oparun, bamboo	Fuelwood, construction poles
16	<i>Peltophorum pterocarpum</i> (DC) Baker	Caesalpinaceae	Yellow flamboyant	Ornamental, windbreak
17	<i>Samanea saman</i> (Jacq.) Merrill.	Mimosaceae	Rain tree	Shade, landscape, windbreak, fuelwood
18	<i>Spondias mombin</i> Linn.	Anacardiaceae	Iyeye, Hog plum	Edible fruit
19	<i>Tabebuia rosea</i> (Bertol.) DC.	Bignoniaceae	Pink Trumpet tree	Ornamental
20	<i>Tectona grandis</i> Linn. f.	Verbenaceae	Teak	Food wrapping, shade, fuelwood
21	<i>Terminalia catappa</i> Linn.	Combretaceae	Furutu, Tropical almond	Edible fruit, shade, fuelwood

Local names were given in Yoruba language, which is the language spoken by Ibadan people.

Importance of savanna woodlands in rural livelihoods and wildlife conservation in southeastern Zimbabwe

Edson Gandiwa¹

Summary

Increasing human population, economic challenges, climate change impacts are intensifying reliance by local communities on savanna woodlands in tropical regions. Knowledge of the importance and value of savanna woodland ecosystems to rural livelihoods and wildlife conservation is therefore needed to enhance lasting benefits from them. Savanna woodlands are of economic, social and ecological importance in southeastern Zimbabwe. Recommendations for conserving woodland resources include the strengthening of control systems and enhancing community based natural resource management programmes.

Introduction

Zimbabwe is a landlocked country with a land surface area measuring 390,757 km². It is bounded by Zambia, Mozambique, South Africa and Botswana. The country's forest and woodland resources covering approximately 66 percent of the country's total land area fall into three broad categories namely; rainforest, indigenous woodlands and forest plantations (Mabugu & Chitiga, 2002).

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Woodland forms much of the natural vegetation, with bushland, which is natural vegetation comprising of native species dominated by shrubs and few trees, becoming more prominent in the drier regions in the south and west. Almost two-thirds of the country is covered with woodland (53%) or bushland (13%). The indigenous woodlands of Zimbabwe fall into three tenurial categories: (a) woodlands in protected areas and on state land, (b) woodlands in large-scale commercial agricultural farming areas and (c) woodlands in communal areas, consisting of small-scale farming areas owned by the state but allotted to families locally (Vermeulen, 1996). Woodland cover is most extensive in the State Forest Reserves, National Parks and Safari Areas, which together account for about 15% of the country's land surface area (Mabugu & Chitiga, 2002).

High population growth and limited land resources, combined with difficult economic circumstances, often aggravated by adverse weather conditions such as drought, constrain rural incomes. These factors tend to encourage people to increase reliance on natural woodlands for additional agricultural and pasture land. Rural communities also frequently increase harvesting of various woodland products for sale to supplement incomes (see below). The understanding of the dependency of households on woodland resources is critical in the development of sustainable management strategies.

Reducing the human pressure on biologically rich hot spots and conserving valuable genetic resources has been and still is a fundamental policy concern in many countries (Lepetu *et al.*, 2009). In the face of rapidly growing human populations in and around the bio-diverse regions of the tropical forests, including woodlands, sustainable use of forest products, both timber and non-timber forests products, is not easy. This paper attempts to contribute to the growing literature on the importance of woodland resources in savanna

ecosystems, in particular the semi-arid savanna ecosystem encompassing the Gonarezhou National Park (GNP) and adjacent communal areas in southeastern Zimbabwe.

Typical ecosystems in southeastern Zimbabwe

This paper focuses on the GNP and adjacent communal areas in Chiredzi and Chipinge districts, in southeastern Zimbabwe (Fig. 1). The study area lies within the Great Limpopo Transfrontier Conservation Area (GLTFCA). Established in the early 1930s as a Game Reserve, GNP was upgraded into a National Park under the Parks and Wildlife Act of 1975. GNP, which covers an area of 5,053 km², is located in southeastern Zimbabwe, between 21° 00'–22° 15' S and 30° 15'–32° 30' E.

Annual average rainfall in the southeastern lowveld of Zimbabwe ranges between 400

and 600 mm. The major vegetation type is mopane (*Colophospermum mopane*) woodland, which covers approximately 40% of GNP (Fig. 1). The vegetation of GNP and adjacent areas is typical of semi-arid mopane zone (Rattray & Wild, 1955) and is predominantly dry deciduous savanna woodland of varying species composition (Wild & Barbosa, 1968). The vegetation structure and composition is influenced by browsers, grazers, fire, rainfall and human activities (Tafangenyasha, 1997; Gandiwa *et al.*, 2011). The general appearance of vegetation types in GNP are woodland savanna (59%), scrubland dominated by shrubs with few trees (40%) and savanna grassland (1%). The plant checklist for GNP includes at least 924 species from 118 families and 364 genera, with 265 trees, 310 shrubs, 55 woody climbers and 137 grasses (*e.g.* Gandiwa & Zisadza, 2010).

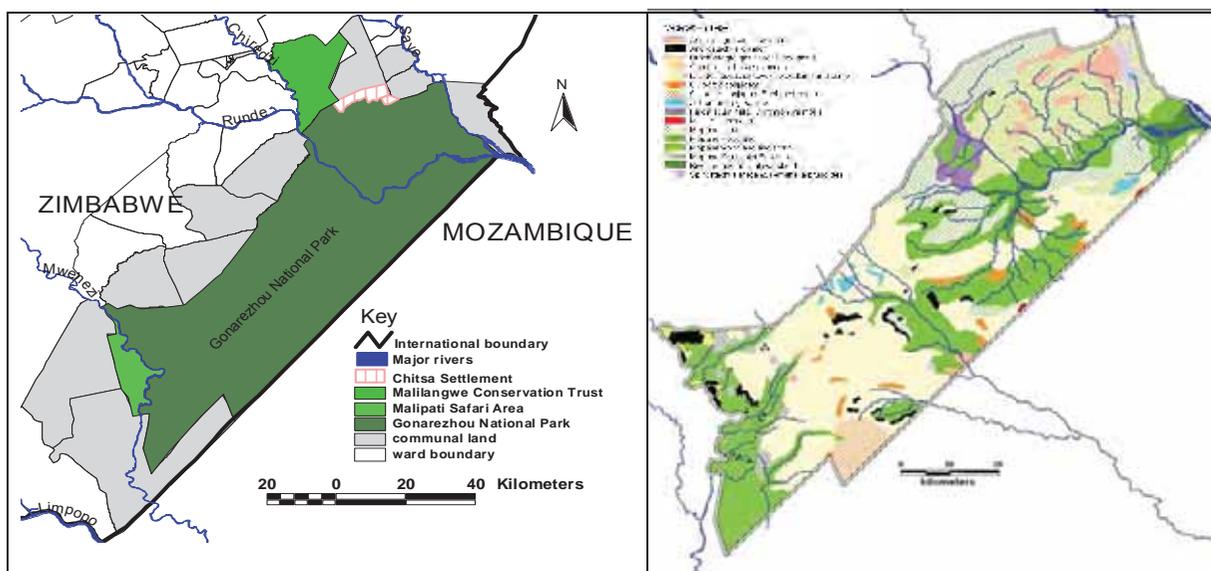


Figure 1: Left–Location of the Gonarezhou National Park and surrounding areas, source: Gandiwa & Zisadza (2010). Right–Vegetation map of the Gonarezhou National Park, southeastern Zimbabwe, source: Sherry (1977)

Importance of woodland resources in southeastern Zimbabwe

Like many forest and woodland resources in other areas across Africa, ecosystems in the

southeastern lowveld of Zimbabwe generate a wide range of timber and non-timber products and services (Mutenje *et al.*, 2011). Products and services include consumptive resources such as bark for rope, building

materials, fodder, fruits, fuel wood, fungi, bushmeat, gum, honey, insects, termites, leaf litter, medicines, mushrooms, roots, thatching grass, tubers, and wood for small artisanal crafts; social services such as cultural and spiritual benefits; aesthetic value; wilderness experience and recreation; employment; and ecological services such as carbon sequestration, grazing, shade, soil stabilization, water catchment, wildlife habitat and act as windbreaks. Some of the most valued fruits include those collected from *Adansonia digitata* and *Sclerocarya birrea*. Especially in periods of extreme weather events such as droughts and floods, woodlands becomes very important to the livelihoods of local communities in the study area and they form the only easily accessible safety net for food and income since external support, for example, in the form of food-aid support from the government and non-governmental organisations may not fully meet local communities requirements.

Mopane woodland products are key resources to rural communities and wildlife conservation in the southeastern Zimbabwe. Where mopane is dominant, it assumes economic importance especially as a source of browse for both domestic and wild animals. The “mopane worm”, which is actually the caterpillar of the emperor moth, *Imbrasia belina*, used as food, is one of the best-known and most economically important woodland resource products of the mopane woodland. For rural households in southern Zimbabwe, the annual harvest of mopane worms may contribute up to quarter of a household’s cash income, depending on the quantity of mopane worms harvested, the proportion that is sold, and the household’s other sources of income (Gondo et al., 2010). Mopane worms can therefore, contribute to improving rural people’s livelihoods in various ways, including: (i) supplementing seasonal shortages in cash or food; (ii) buffering families against unexpected shortages in food or income, for example, caused by droughts; (iii) supplementing expenditure on important things like education, food, health, clothing and agricultural tools; and

(iv) providing cash for investment in various productive enterprises, such as purchasing agricultural inputs (Gondo et al., 2010).

Natural resources management in Zimbabwe

According to a growing body of literature, rural communities across the developing world depend greatly on indigenous natural forest and woodland resources, which act as a buffer against poverty (e.g. Campbell et al., 2000; Twine et al., 2003; Shackleton & Shackleton, 2004; Makhado et al., 2009; Mutenje et al., 2011). For example, the majority of sub-Saharan Africa’s population relies on forest and woodland products for subsistence uses, cash income, or both (Timko et al., 2010). However, conservation of biodiversity and endangered species of plants and animals in protected areas is more challenging if local communities are heavily dependent on harvesting or hunting them for various products and subsistence needs (Lepetu et al., 2009). Some of the major threats to woodland conservation in southeastern Zimbabwe include effects of climate change, human settlement expansion and poor land use practices including overstocking of domestic animals, increasing local use of woodland resources for construction and fuel wood, unimplemented population reduction programmes which has led to increasing elephant populations, uncontrolled fires, infrastructural development such as power lines, and, to some extent, policy related activities related to land-use, settlement and human encroachment into conservation areas.

Protected areas in Zimbabwe, including the GNP, are often surrounded by communal areas. Protected areas are managed by the Zimbabwe Parks and Wildlife Management Authority on behalf of the government. Local communities adjacent to protected areas in Zimbabwe do not have direct and open access to natural resources inside protected areas. However, under the collaborative management programme of the general management plan for the GNP, provisions for local communities to access the

protected area and harvest woodland products such as thatching grass and access to areas of cultural and spiritual significance are provided for under special arrangements with the park management. The GNP acts as the source for wild animals whereas the adjacent communal areas act as the sinks. Communities adjacent to the GNP and other protected areas in Zimbabwe are expected to utilise and manage natural resources occurring within their boundaries. In communal areas, natural resources are commonly managed under the communal areas management programmes for indigenous resources (CAMPFIRE).

Zimbabwe's CAMPFIRE is a grassroots programme established in 1989 (Murphree, 1997; Logan & Moseley, 2002) following the amendment of the Parks and Wildlife Act in 1982. CAMPFIRE conceptually includes all natural resources (Metcalf, 1994), and its objectives are (Martin, 1986): (i) to initiate a programme for the long-term development, management, and sustainable utilization of natural resources in the communal areas; (ii) to achieve management of resources by placing the custody and responsibility with the resident communities; (iii) to allow communities to benefit directly from the exploitation of natural resources within the communal area, and (iv) to establish the administrative and institutional structures necessary to make the programme work.

Some of the recorded benefits of CAMPFIRE since its inception include; strengthening of capacity in terms of natural resources management; income to local communities from leasing trophy hunting concessions, harvesting natural resources, tourism, live animal sales, and meat cropping (Logan & Moseley, 2002). In addition, CAMPFIRE has created temporal and permanent employment, through community projects such as construction of schools and clinics; safari hunting industry, anti-poaching units as game scouts and also local village's benefits directly from cash dividends from the projects (Sangarwe, 1998; Mutandwa & Gadzirayi, 2007).

On the other hand, several challenges have also been faced under CAMPFIRE. For example, between 2000 and 2008, following the socio-economic challenges in Zimbabwe, CAMPFIRE was affected by a key external shock, i.e., the end of international donor funding for CAMPFIRE projects and rural development (Balint & Mashinya, 2008; Frost & Bond, 2008). This external shock destabilised local level CAMPFIRE institutions resulting in sharp decline in transparency, accountability, participation by the local people in some of districts with CAMPFIRE (Balint & Mashinya, 2008). Overall, Frost & Bond (2008) summarised the major challenges faced by CAMPFIRE as follows: (i) deepening poverty forces local people to rely more heavily on extracting natural resources, including wildlife, for both subsistence and commercial purposes; (ii) in some areas, wildlife areas in the communal lands are properly delineated; (iii) the organisational complexity of communal areas brought about by overlapping jurisdictions among different authorities such as traditional, spiritual and modern government institutions, results in challenges in achieving consensus on key issues, and (iv) property rights are not clearly defined; both individual and community land tenure are insecure hence creating uncertainty, competing interests, and opportunistic use of resources.

Besides the Parks and Wildlife Act of 1975 (amended in 2002) which focuses on wildlife and woodland resources management on both protected areas and communal areas, there exist other pieces of environmental legislation that focuses on woodland and forest resources management in Zimbabwe. These include: (i) The Forest Act of 1948 (amended in 1990) which authorizes the Forestry Commission of Zimbabwe to protect and conserve indigenous forests and regulate the harvesting of trees on both private and communal land; (ii) The Communal Lands Act of 1982 (amended in 1985) which places communal land under the control of Rural District Councils (RDCs); (iii) The Communal Lands Forest Produce Act of 1987 which

vests authority over the commercial utilization of forest and woodland products in the communal lands in the hands of RDCs, while allowing the subsistence use of such products by local communities, and (iv) The Environmental Management Act of 2002 which deals with environmental issues across all sectors, including basic environmental management principles and sustainability considerations in natural resources management (Chibisa & Rwizi, 2009).

It is unlikely that the central role of savanna bio-resources in the lives of rural households in southeastern Zimbabwe will diminish in the near future. Poverty, low incomes, and immediate survival needs often drive local people to overharvest, at the expense of sustainability (Mutenje et al., 2011). Sustainable use of local natural resources, including forests and woodlands, is therefore a central issue that needs to underpin rural development in southeastern Zimbabwe. The value of savanna woodland resources needs to be fully appreciated by the local people and government policy makers alike. Sustainable woodland utilisation is based on the respect of boundaries and authority rules determining who can use resources, and under what conditions. Therefore, there is need for the implementation of government laws and regulations (control systems), and also continued enforcement and monitoring of compliance by appropriate authorities in both the protected areas and communal areas (e.g. Campbell, 1996). At the same time there is need to strengthen programmes such as CAMPFIRE so as to encourage local management to adopt sustainable approaches on the utilisation of natural resources, and at the same time ensure that tangible benefits filter to the local people, who are required to collaborate in ensuring the sustainable management and use of the natural resources.

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References

- Balint, P.J. and Mashinya, J. (2008). CAMPFIRE during Zimbabwe's national crisis: local impacts and broader implications for community-based wildlife management. *Society & Natural Resources*, 21(9): 783–796.
- Campbell, B. (Ed). (1996). *The miombo in transition: woodlands and welfare in Africa*. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Campbell, B.M., Costanza, R. and van den Belt, M. (2000). Special section: land use options in dry tropical woodland ecosystems in Zimbabwe: Introduction, overview and synthesis. *Ecological Economics*, 33: 341–351.
- Chibisa, P. and Rwizi, L. (2009). Traditional crafts and rural livelihoods in Manicaland's semi-arid areas: Implications for biodiversity and environmental sustainability. *Journal of Sustainable Development in Africa*, 11(1): 16–40.
- Frost, P.G.H. and Bond, I. (2008). The CAMPFIRE programme in Zimbabwe: Payments for wildlife services. *Ecological Economics*, 65: 776–787.
- Gandiwa, E. and Zisadza, P. (2010). Wildlife management in Gonarezhou National Park, southeast Zimbabwe: climate change and implications for management. In: Bojang, F. and Ndeso-Atanga, A. (Eds). *Climate change implications for agricultural development and natural resources conservation in Africa*. *Nature & Faune*, 25(1): 95–104.
- Gandiwa, E., Chikorowondo, G., Zisadza-Gandiwa, P. and Muvengwi, J. (2011). Structure and composition of *Androstachys johnsonii* woodland across various strata in Gonarezhou National Park, south-east

- Zimbabwe. *Tropical Conservation Science*, 4(2): 218–229.
- Gondo, T., Frost, P., Kozanayi, W., Stack, J. and Mushongahande, M. (2010). Linking knowledge and practice: assessing options for sustainable use of mopane worms (*Imbrasia belina*) in southern Zimbabwe. *Journal of Sustainable Development in Africa*, 12(1): 281–305.
- Lepetu, J., Alavalapati, J. and Nair, P.K. (2009). Forest dependency and its implication for protected areas management: a case study from Kasane Forest Reserve, Botswana. *International Journal of Environmental Research*, 3(4):525–536.
- Logan, B.I. and Moseley, W.G. (2002). The political ecology of poverty alleviation in Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). *Geoforum*, 33: 1–14.
- Mabugu, R. and Chitiga, M. (2002). Accounting for forest resources in Zimbabwe. CEEPA Discussion Paper No 7, CEEPA. University of Pretoria, Pretoria, South Africa.
- Makhado, R.A., Von Maltitz, G.P., Potgieter, M.J. and Wessels, D.C.J. (2009). Contribution of woodland products to rural livelihoods in the northeast of Limpopo Province, South Africa. *South African Geographical Journal*, 91(1): 46–53.
- Martin, R.B. (1986). *Communal Areas Management Programme for Indigenous Resources* (April 1986, revised edition). Branch of Terrestrial Ecology, Department of National Parks and Wild Life Management, Harare, Zimbabwe.
- Metcalf, S. (1994). The Zimbabwe Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). In: Western, D. and Wright, R.M. (Eds). *Natural connections: Perspectives in community-based conservation*. Island Press, Washington, DC. pp. 161–192.
- Murphree, M. (1997). Congruent objectives, competing interests and strategic compromise. Paper presented at the Conference on Representing Communities: Histories and Politics of Community-based resource Management, Helen, Georgia, USA.
- Mutandwa, E. and Gadzirayi, C.T. (2007). Impact of community-based approaches to wildlife management: case study of the CAMPFIRE programme in Zimbabwe. *International Journal of Sustainable Development & World Ecology*, 14: 336–344.
- Mutenje, M.J., Ortmann, G.F. and Ferrer, S.R.D. (2011). Management of non-timber forestry products extraction: local institutions, ecological knowledge and market structure in south-eastern Zimbabwe. *Ecological Economics*, 70: 454–461.
- Rattray, J.M. and Wild, H. (1955). Report on the vegetation of the alluvial basin of the Sabi valley and adjacent areas. *Rhodesia Agricultural Journal*, 52: 484–501.
- Sangarwe, M. (1998). Evaluation and use of the economic incentives in the sustainable management of community-owned natural resources: The CAMPFIRE experience MSc thesis, University of Manitoba, Winnipeg, Manitoba, Canada.
- Shackleton, C.M., and Shackleton, S.E. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science*, 100: 658–664.
- Sherry, B.Y. (1977). Basic vegetation types of the Gonarezhou National Park, Zimbabwe. Project No. GNP/3Y/2. Department National Parks and Wildlife Management, Harare, Zimbabwe.
- Tafangenyasha, C. (1997). Tree loss in the Gonarezhou National Park (Zimbabwe) between 1970 and 1983. *Journal of Environmental Management*, 49: 355–366.

Timko, J.A., Waeber, P.O. and Kozak, R.A. (2010). The socio-economic contribution of non-timber forest products to rural livelihoods in Sub-Saharan Africa: knowledge gaps and new directions. *International Forestry Review*, 12(3): 284–294.

Twine, W., Moshe, D., Netshiluvhi, T. and Siphugu, V. (2003). Consumption and direct-use values of savanna bio-resources used by rural households in Mametja, a semi-arid area of Limpopo province, South Africa. *South African Journal of Science*, 99: 467–473.

Vermeulen, S.J. (1996). Cutting of trees by local residents in a communal area and an adjacent state forest in Zimbabwe. *Forest Ecology and Management*, 81: 101–111.

Wild, H. and Barbosa, L.A.G. (1968). Vegetation map of the flora Zambesiaca area. Supplement to *Flora Zambesiaca*, M.O. Collins, Harare, Zimbabwe.



Urban and peri-urban forestry in Kigali, Rwanda

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Summary

Urban and peri-urban forestry are important elements in Kigali City for economic, ecological and social values. To meet residents' demands, suitable tree species are planted. Although the management of trees is the mandate of department in charge of forestry and terrestrial ecosystems management, under the Ministry of Natural Resources, other stakeholders are involved. In addition, legal instrument exists to guide the planning, planting and management of trees and other vegetation in urban areas. However, pressure to convert green spaces to infrastructure exist. Though trees are beneficial for urban residents, they can also be dangerous and harmful if they are not well located or managed. Therefore, it is essential to provide technical guidelines for proper planning of urban forests in Kigali City and other peri urban areas for Rwanda.

Introduction

Forests are crucial to Rwanda and its people's well being, as all sectors of Rwanda's economy – water, agriculture, tourism, and power – depend on healthy forests. The advantages of forests

are thus manifold. Unfortunately, in Rwanda, most natural and manmade commercial forests are found in rural areas. Only 570 hectares of land area of Kigali have tree cover, most of them being agro-forestry, eucalyptus plantations and individual trees along the roads, rivers and homesteads.

Because of the rugged topography of Kigali some land areas are less suitable for infrastructural development, as they bear risks such as landslides, erosion, problems with road designs, construction, and maintenance. With proper planning, trees can be planted to reduce the environmental impacts as a part of urban planning

Rwanda urban forestry has concentrated on beautification and environmental services such as soil stabilizing, maintaining and stabilizing hydrological cycles, purifying the air, modification of micro-climate, shade provision, acting as wind break protecting building from damage and as a response to climate change. The trees also provide habitat for birds and other wildlife, increase land values, provide employment opportunities and amenity, insulate noise, reduce vehicle accidents by acting as blockage of rolling vehicles and intercept rainfall reducing run-off thereby functioning like retention/detention basins. The psychological impact of trees on people's moods, emotions and enjoyment of their surroundings may in fact be one of the greatest benefits urban forests provide.

Indeed, urban forestry being the careful planning, care and management of urban forests in urban setting for the purpose of creating or adding value to communities as well as for improving the urban environment, there is need to promote the practice as a critical part of the urban infrastructure, to meet needs and services for urban dwellers.

Urban and Peri-urban Forest Development in Rwanda

Forestry/tree management in Kigali City is divided into two categories namely urban forestry and peri-urban forestry. Peri-urban forestry involves planting in the urban

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fringe for various uses, whereas urban planting is essentially for beautification and offering other environmental services. According to Kigali City Master plan, areas considered to plant trees include: along the roads; along rivers and streams; public gardens and private gardens. In fact, due to small land sizes, Rwanda has embraced roadside tree planting in urban and peri-urban areas, where an amenity belt of appropriate tree species on both sides of the road reserves is established. These trees are important for aesthetic and shade effects to travelers along the highways and other public roads. In addition, a belt of amenity trees planted at the interface of road and private lands improve the scenery on both sides of the road and also mark the boundaries between the road reserves and private lands to avoid encroachment into the road reserves.

Urban and peri-urban forests constitute an important component of urban environment for the livelihood of urban population. Rwanda vision envisages that by 2020, thirty percent (30%) of the population will be residing in urban areas through the government settlement improvement program. To meet their needs, the government has developed strategies to develop urban and peri-urban forests in Rwanda, as stated in the National Forestry Policy (NFP). These comprise: identifying potential urban forestry service providers and agreeing on roles and responsibilities; including urban forestry in urban planning; developing guidelines for urban and peri-urban tree planting; developing a programme for urban forestry based on improved understanding of needs; creating awareness on value of urban and peri-urban trees; supporting urban authorities with technical support on tree nurseries and tree husbandry and in locating and developing sites in urban and peri-urban areas for tree growing; as well as involving the private sector in managing urban and peri urban forests for leisure and recreation purposes.

Apart from the NFP, environmentally sustainable development for urban and peri-urban areas is guided by the limitations imposed by Organic Law, which protect

natural resources such as forests and trees. Further, Kigali Conceptual Master Plan (KCMP) identifies land for forestry production. It also gives guidelines on ways to implement renewable management practices, with the primary emphasis to preserve and enhance scenic value. District Development Plans are the critical tools for implementing and prioritizing the KCMP.

Key players in Urban and Peri-urban Forestry

To ensure practice and success of urban and peri-urban forestry, all stakeholders need to come on board. In Rwanda, main stakeholders include government (through the agency in charge of forestry), municipal leaders, environmental policy makers, city planners, researchers, commercial arborists and urban and peri-urban dwellers.

The mandate of the Department of Forest and Terrestrial Ecosystems Management (DFTEM) within Rwanda Natural Resources Authority (RNRA), which is under the Ministry of Natural Resources (MINIRENA), is to conserve, develop and sustainably manage forest resources in Rwanda. In regard to urban forestry, the department gives a list of specific tree species to be planted within and around urban area. For the case of roadside tree planting, care is taken during selection of the tree species to ensure that they meet the required phenotype qualities for urban and peri-urban areas to combat accidents such as falling branches, wind falls etc. DFTEM also promote the many benefits urban trees provide, backstop, as well as offer appropriate technical information and advice, to accrue maximum benefits.

In Rwanda, mayors, assisted by various municipal officials, have been instrumental in the success and active urban forestry programmes. They work together with officers of RNRA/DFTEM, in charge of forestry at District and Sector levels, commercial arborists, as well as city planners. Their involvement and commitment is an important component in ensuring success of urban and peri-urban

forestry programmes, for the wellbeing of urban dwellers and urban environment. Individual urban and peri-urban dwellers are particularly involved in urban and peri-urban forestry through activities such as planting trees on their own land or home compound. In addition, during community work service commonly known as “umuganda”, and which is conducted every last Saturday of each month, the community is involved in preparing tree planting sites as well as planting, especially during tree planting season. Later, they are involved in managing the planted tree through e.g. weeding, pruning or thinning. This they do with guidance from the officer in charge of forestry in their respective jurisdictions.

Legal Issues in Urban Forestry

To ensure that there is effective, planned and systematic management of trees in cities, a measure of legal control is necessary. Indeed, laws are necessary as they guide in the selection of tree species and where they will be planted, spacing, protection of trees from removal or destruction as well as protecting residents from hazardous trees or one that on the long run may pose problems.

In Rwanda, legal instruments such as Forest National Policy, Ministerial Order and Organic Law emphasize the management, removal and conservation aspects of urban and Peri urban tree. For instance, as stated by Rwanda Organic Law, the State and the population are obliged to establish, maintain and manage parklands and green spaces. Further, the population has the obligation to conserve the environment by individual action or through collective activities, associations of the environment, in preparing green spaces and reserved areas and other activities that promote environment. Permits and licenses required for activities altering or impacting trees on peri and urban forestry are issued by RNRA.

Conclusions

Urban forestry provides substantial multitude of critical environmental functions that benefit Rwandan urban environment and dwellers. The benefits

accrued include aesthetic value, reduction of pollution, among others. Under pre-settlement days, most area of Kigali was forested. Because of the limited amount of forests, existing forests/trees need protection, and extensive areas of Kigali need to be reforested. Fortunately, KCMP advocate reforestation of extensive areas of Kigali especially around Lake Muhazi, and other large contiguous areas with steep slopes that are unsuitable for urban expansion. In addition, as residential uses are not allowed, opportunities for ecotourism might provide for education and research to better understand this important natural resource.

Urban space is a practical and elemental resource to peoples' abilities to create both viable and livable environments. It is crucial to incorporate reforestation strategies and natural preservation areas into development plans, as well as establish agro-forestry, and reforestation programs in urban open spaces. If well planned and managed, peri and urban forestry will provide a multitude of critical environmental and social functions that benefit the urban environment and dwellers. Thus, emphasis is being laid on local participation in urban forestry initiative, building up of technical knowledge, information dissemination and exchange, as well as elaborating on environmental and productive functions of urban forestry. There is also a need to take an inventory of trees in urban systems and assess the benefits and challenges of managing such trees.

References

- EDPRS -Economic Development and Poverty Reduction Strategy, 2007. Economic Development and Poverty Reduction Strategy, 2008-2012
- Republic of Rwanda, 2010. Government Programme 2010-2017
- Republic of Rwanda, 2010. National Forestry Policy

Republic of Rwanda, 2000. Rwanda vision 2020

Republic of Rwanda, 2005. Organic law determining the modalities of protection, conservation and promotion of the

environment in Rwanda, NO. 04/2005 of 08/04/2005

Rwanda Ministry of Infrastructure, 2007. Kigali conceptual Master Plan



Liberia forest reform and benefit sharing

J. D. Waugh¹

Summary

The West African state of Liberia has emerged from a long period of civil strife as a vibrant, if fragile, democracy. Liberia has embarked on a process of decentralization and empowerment of rural communities. An important component of this process is the reform of the forestry sector.

Extractive industries, mainly mining and commercial forestry, constitute the backbone of the Liberian economy. During Liberia's civil wars (1989–1996 and 1999–2003), armed factions assumed control of these resources. United Nations sanctions intended to choke the money supply to armed groups included a ban on the export of logs and timber products. These sanctions, which were not immediately lifted at the conclusion of hostilities, threatened to become an economic bottleneck, and lifting them became a top priority of the new government. This created an opening for a forest policy reform process supported by international donors through the Liberia Forest Initiative (Altman, Nichols, and Woods 2012). This process culminated in the 2006 National Forestry Reform Law (NFRL) and the 2009 Community Rights

Law (CRL).² The reform closed loopholes that could be exploited for private gain, and began the process of addressing one of the principal underlying causes of conflict in Liberia: the concentration of wealth and power in urban elites, at the expense of the rural populations (Sawyer 2005).

Benefit Sharing Arrangements

A key element of the reform process was the decision by the government to share benefits from the forestry sector through revenue sharing, social agreements, and co-management arrangements. The National Forestry Reform Law (NFRL) stipulated that some revenues from logging concessions would be shared with the relevant forest fringe communities in the form of a National Benefit Sharing Trust. Regulations promulgated in support of the NFRL also require that “social agreements” be negotiated between logging concessions and affected communities, which provide material benefits, typically in the form of employment and the provision of some amenities such as improved roads and bridges, or the construction of schools and clinics. Moreover, under the Community Rights Law, the government is designating community forest lands where management and use of the forests will devolve to the communities directly.

Under the NFRL, 30 percent of the land rental fee charged to timber concessions is reserved for affected communities, and an additional 30 percent is earmarked for distribution to county (provincial) governments nationwide.³ Regulation 106-07, which elaborates the benefit-sharing arrangements, stipulated the National Benefit Sharing Trust as the mechanism for fund disbursement specified the representatives of community interests (FDA 2007, GOL 2011). Implementation of the Trust began in the second quarter of 2011.

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² *An Act Adopting the National Forestry Reform Law of 2006; Community Rights Law with Respect to Forest Lands*

³ *FDA regulation 111-10 details the organization and governance of the NBST*

Having benefit-sharing arrangements on paper does not always translate to meaningful benefits for communities. A World Resources Institute (WRI) study of Cameroon's social agreements, for example, found that relatively little of the revenues from logging reserved for villages actually translated into benefits during the period of study (Morrison et al. 2009). Dysfunctional social agreements (e.g., those that fail to meet either their stated goals or the expectations of participants) can debase social capital and erode trust—which can, in turn, contribute to conflict. One way to improve the functionality of social agreements is to quantify the opportunity costs that resource extraction and related activities create for communities, and to negotiate agreements based on agreed-upon valuations of such costs.

Regulations require that projects funded by Liberia's National Benefit Sharing Trust meet strict accountability requirements, which in turn depend upon effective decision-making capacity at the local level. Monitoring and evaluation provisions seek to create a learning environment based upon experience.

Challenges to Benefit Sharing

The first major challenge for benefit-sharing arrangements is the recipients' capacity and confidence to manage resources. In the case of Liberia, the long history of domination by urban elites has produced an entrenched, and self-fulfilling, belief that rural communities lack the ability to look after their own interests; therefore (it is argued), wiser people must make decisions on their behalf. Many communities have never enjoyed the opportunity to manage their own funds, and lack financial and administrative literacy.

A second challenge for benefit-sharing arrangements with rural communities is rent-seeking behavior¹. Influential members of society — the educated, politically

connected, and wealthy — often justify control by arguing that the community must be protected from economic predators. In practical terms, when the interests of the established order take precedence, subtler forms of rent-seeking behavior can divert resources while at the same time undermining the self-confidence of the community.

Among the remedies are transparency, awareness on the part of residents of a community's need to take responsibility for its own decisions, and increased sensitivity on the part of authorities to the necessity of allowing communities to make those decisions (and learn from their own mistakes). Care must be taken to manage conflict, which emerges when factions within communities disagree over the use of funds. Conflict management and monitoring and evaluation skills are essential to community development within this framework. Favorable conditions for learning and information exchange foster successful local governance outcomes (Andersson 2006) by promoting understanding and thus creating the space for consensus to emerge.

Benefit Sharing and the Green Economy

Benefit-sharing arrangements, as embodied in Liberia's post-conflict forest reform process, are helping to bring equity and accountability to the management of natural resources, and may serve as an important portal to participation in authentic democratic processes that will lead to a more resilient, sustainable society. The benefits available through social agreements and the revenue-sharing arrangements such as those facilitated by the National Benefit Sharing Trust may be relatively small, but if they create institutions that are "organized through processes of decision-making characterized by informed discourse among the people of a society" (Sawyer 2005), they can be instrumental in transforming Liberia. Liberia's experiment has implications beyond its borders. REDD+ projects, for example, involve the payment of carbon credits in exchange for activities that reduce

¹ *Economic gain through manipulation of rules rather than through adding value*

deforestation and forest degradation. To be effective these credits must benefit forest communities. Where forests are tied to communities through customary tenure, and where communities are dependent upon forests for their livelihoods, such payments compensate people for lost opportunities, and thereby function as financial benefit-sharing arrangements. But there are yet comparatively few examples of such arrangements in the African forest sector.

Conclusion and Recommendation

The threshold of a green economy in the forest sector is crossed when a society transitions from sharing benefits from resource decisions made at the top to sharing the actual decision-making. Co-management with central authorities and direct local management, based upon a practice of self-government afforded by benefit-sharing arrangements, will provide the critical ingredients for the development of sustainable livelihoods in the forest sector. In Liberia, the story is incomplete, and success is not assured. But the experiment under way has the potential to transform it from a country that had been written off by some as a difficult case into a leader in the evolution of an authentic African green economy.

References

Altman, S. L., S. S. Nichols, and J. T. Woods. 2012. Leveraging high-value natural resources to restore the rule of law: The role of the Liberia Forest Initiative in Liberia's transition to stability. In *High-value natural resources and post-conflict peacebuilding*, ed. P. Lujala and S. A. Rustad. London: Earthscan.

Andersson, K. 2006. Understanding decentralized forest governance: An application of the institutional analysis and

development framework. *Sustainability, Science, Practice and Policy* 2 (1), pp 25-35. <http://sspp.proquest.com/archives/vol2iss1/0507-010.andersson.html>.

FDA (Forestry Development Authority). 2007. National Forest Management Strategy. www.fda.gov.lr/doc/NFMgmtStrategy.pdf.

GOL (Government of Liberia). 2011. Regulation 111-10, National Benefit Sharing Trust Fund. Monrovia: Forestry Development Authority.

Morrison, K., Cerutti, P. O., Oyono, P. R., and Steil M. 2009. Broken promises: Forest revenue sharing in Cameroon. WRI Forest Note. November. Washington, D.C.: World Resources Institute. http://pdf.wri.org/broken_promises_forest_revenue_sharing_in_cameroon.pdf

Sawyer, A. 2005. *Beyond plunder: Towards democratic governance in Liberia*. Boulder, CO: Lynne Rienner.

Waugh, J. 2010. *Assessment and recommendation for a national benefit sharing trust fund*. Monrovia: Land Rights and Community Forestry Program, U.S. Agency for International Development.

———. 2011. *Implementing the National Benefit Sharing Trust Fund and social agreements: Issues and options for building capacity*. Monrovia: Land Rights and Community Forestry Program, U.S. Agency for International Development.

Waugh, J. and Murombedzi, J. (in press, 2012). Social benefits in the Liberian forestry sector: An experiment in post-conflict institution building for resilience. In *Strengthening Post-Conflict Peacebuilding through Natural Resource Management, Volume 6: Governance, Natural Resources, and Post-Conflict Peacebuilding*. Ed. C. Bruch, W. C. Muffet, S. Nichols), London, Earthscan.

Ten years of managing Kenyan top bar hives in south-western Nigeria

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Summary

Beekeeping (apiculture) is the maintenance of honey bee colonies, commonly in hives, by humans. A beekeeper (apiarist) keeps bees in order to collect honey and other products of the hive (including beeswax, propolis, pollen, and royal jelly), to pollinate crops, or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary or bee yard. This submission thus presents an experience on working with the Kenyan Top Bar Hive, factors to consider before site selection, safety tips in apiary management and how to test for good quality honey.

Introduction

I began to learn about bees in 1996 when I was taught apiculture as a topic in a course at a college of education in Nigeria; but my interest in it was aroused when I visited the departmental stand of Crop Protection and Environmental Biology, during the University of Ibadan Golden Jubilee exhibition in 1998. There, I met the late Olugbenga Adewumi Osaniyi who was a doctoral student working on bees for his thesis. He showed me the pollen trap,

smoker, langstroth hive, Kenyan top bar hive and some samples of good and adulterated honey. Two weeks later I told him I wanted to be a bee-keeper. He agreed to teach me bee-keeping on the condition that I would be his field assistant in inspecting hives and collecting pollen samples on weekly basis for sixty (60) weeks. I agreed to his terms immediately and got involved in beekeeping. In April 1999, he gave me a bee-hive, asked me to bait it with bee-wax and place it at any site accessible and safe. I got a site on the University campus, placed the hive under a gliricidia tree and first noticed bees inside it on 22nd October, 1999. That was how I started and since then, I have established several apiaries and consulted for several bee-keepers.

Lessons Learnt

For site selection, most of the site that have been able to withstand the test of time had rocks underneath and could not be used for arable farming but the surrounding area was cultivated with arable crops. The vegetation on site included shrubs, climbers and few trees. The site selected for the apiary measured an average of 40m² and five to ten hives were kept per site, but with a few cases of fifteen to twenty hives per site. The hives made from *Cordia milenii* (locally called omo) were found to withstand environmental conditions better than planks from other timber species used. Hives made from *Cordia milenii* are light to carry when dry and are not easily destroyed by rain. Although none of the timber species used was termite-proof, termites were controlled with spent vehicle engine oil. Hive stands were made with old tyres, concrete blocks, wooden and iron rods. Stacking two or three tyres before placing the hive has proved to be the most durable and cost effective method

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while used aluminium plates obtained from a lithographic printer was placed on the tyres before placing the hives on the plate. This was done to prevent amphibians, snakes and other reptiles that might make the cool inner side of the tyres as their habitat. Sometimes, swarms of bees were encountered inside the tyres, while swarms in the hives on top of such tyres had absconded. It was not clear if the initial colony had shifted their abode or it was an entirely different colony.

A new hive that is being expected to catch a swarm should be approached and opened with caution because cobras had been found twice in different empty hives while the cast-off skin of snakes had been found in the empty hives and sometimes in those that had active bee colonies. There were some situations in which the cast-off skin of snakes was used as nest by rats under the hive lid but whether it was brought by rats or by the snakes could not be ascertained. What had been observed under the hive lids include scorpions, rats, other small reptiles and cast-off skins of snakes.

When working on the hives, it was observed that the bees were extraordinarily aggressive towards the end of the year when the ambient temperature was high but they were more docile during the cool months of harmattan. When inspecting a bee-hive, care should be taken to open the hive lid facing the opposite direction; this would give any animal hiding underneath to jump out in a direction away from the beekeeper and not towards the beekeeper as would have happened if the hive lid had been opened with the lid facing the bee-keeper.

Different smoker fuels that have been tried include paper-mache, (Paper-mache is a composite material consisting

of paper pieces or pulp reinforced with starch made from cassava, it can be moulded into different shapes when wet but was formed into balls for smoker fuel) dry leaves and POME (Palm Oil Meal Exudate locally called “oguso”. This is chaff, a bye-product of processing *Elaeis guineensis* ripe fruits). I observed that POME burnt with a better whitish smoke than the other types of smoker fuels. I also observed that when working on the Kenyan Top Bar Hive (KTBH), the following steps made working on the hive easier. (i) observe the flight path and do not move across it; (ii) check the number of entry points that the bees are using; (iii) smoke from the busiest entrance; (iv) pump in the smoke and later remove the hive lid; (v) use the hive tool to knock the top bars starting from the right or left till you cease to hear a hollow sound. The bar that makes a “thud” sound signifies presence of a comb attached but not necessarily with honey; and (vi) start opening from the last two (2) hollow bars. Always make sure the first two bars starting from each side are not removed as the bees tend to hide under them, but if the bars are removed then the bees become more aggressive.

Gently raise the bars with the combs and harvest those that contain ripe honey in a bucket. If ever there is need to harvest from the first bar, it should be placed back as soon as possible. Try as much as possible to leave the site with as few bees as possible. When you get home after harvesting, remove the bees that are still attached to the combs and put them in a small container that contains water and drown them in it. Drowning the bees is better done in the evening because if you allow them to fly off, they will return within a short period with more workers and they may attack you. After straining with muslin cloth, allow

the honey to settle overnight, decant into glass or plastic bottles that are air tight and then keep the honey in a cool dry place.

So many domestic tests are done to ascertain the quality of honey and they include: (i) matchstick test. Here, a matchstick is dipped in the honey and is then ignited. If it does not ignite, then it is not good but the scientific basis of this is that you are actually testing for the moisture content and not the type of sugar; (ii) the bottles of honey turned upside down and if the honey does not spill out, this is taken as its authenticity. The thinking behind this is that honey is very dense and it tends to push up all impurities in it. Since the bottle has a narrow neck, then the debris is invariably used to seal the bottle's neck; (iii) some people use odour to confirm honey quality but this is subjective and is also a function of how the hive was smoked during harvesting; (iv) some people say unadulterated honey does not attract ants but I observed that the ants will cluster round a drop of honey on the ground.

Honey is used for a variety of consumptive and non-consumptive purposes and my opinion on testing for honey quality is pouring it in cold water.

A better quality honey will sink and not easily mix with the water while a lesser quality honey will disperse as it is being poured into cold water.

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Bibliography

Adjare, S (1990) Beekeeping in Africa. FAO Agricultural Services Bulletin.

Crane, E (1990) Bees and Beekeeping: Science, Practice and World Resources. Heinemann Newnes.

International Bee Research Association (IBRA) (1997) The Management of African Honey Bees including the design of low cost hives.

Wikipedia (2011) Beekeeping. Available at <http://en.wikipedia.org/wiki/Beekeeping>, accessed on 05 Dec, 2011.

A review of barriers to wealth creation and benefit sharing from forest based green economy in Zambia

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Summary

Expert knowledge and literature review were used to identify barriers to effective participation of rural communities, private sector and other stakeholders in management of wood and non-wood forest products in Zambia. Traditional and non-traditional forests occupy approximately 60% of Zambia's landmass, which has massive potential for economic contribution to both rural and urban communities. Key challenges and opportunities in wealth creation and benefit sharing from forest products are discussed. The conclusion is that enhancing wealth creation and benefit sharing among

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the rural communities and its key partners depend on legal framework reforms, systems development, stakeholder formal and informal relationships and connectedness.

Introduction

The Convention on Biological Diversity (CBD) provides a platform for conservation, sustainable use and equitable sharing of benefits from natural resources. It forms a basis upon which a 'green economy' would be developed. We adopted definition of green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). Therefore, green economy is inextricably linked to natural resource base, which creates it. Wealth creation is an integral part of natural resource management (Anderson, 2002), accompanied by equitable benefit sharing for improved livelihoods (Fisher *et al.*, 2008; The Economist, 2011). According to Chishakwe and Young (2003) benefit sharing encompasses a wide array of issues such as access to genetic resources, transfer of technology, financial matters, ownership and intellectual property rights, which are closely linked.

Due to the nature of the common pool resources, such as forests, rural communities tend to develop collective identity to maximize benefit from common interest of forest utilization as postulated by Berkes *et al.* (1989); Ostrom *et al.* (1999); Burger *et al.* (2001); Klandermans *et al.* (2002) and Ashmore, Deaux and Mclaughlin-Volpe (2004). Based on the common interest, collective action founded on shared experiences and expectations are developed (Meinzen-Dick, DiGregorio & McCarthy, 2004).

The interest based frameworks unite the participating stakeholders (Ury, Brett & Goldberg, 1988), belonging to institutions that can conduct effective and integrative bargain. As such, these institutions form communities of practice which have passion

and also interact, socially learning and practicing perfection in their resolve of the challenges they face (Wenger, 2004). Deforestation, caused by encroachment and agrarian activities, exacerbated by climate change, is probably the greatest challenge confronting forest management (Chundama, 1990). Assuming that events and mechanisms in forest management influence the ability to build wealth and equitably share benefits, we determined key barriers to both wealth creation and benefit sharing and means of removal of barriers.

Key barriers

Barriers are aspects that limit the success by potential beneficiaries in maximizing tangible benefits from forest products. It is assumed that removal of the identified barriers would increase forest management sustainability and permit increased economic benefits. Kajembe and Monela (2000) and Campbell *et al.* (2007) highlighted some barriers that existed within the sub-African region. These were summarized as: low inherent productivity of local forests despite diverse forest product types (including wood carbon storage), elite and external actors capture of values and benefits, restrictive regulations and high transactional cost of producers and traders, limited support by private sector for local forest enterprise development, and lack of strong local organization to demonstrate volumes and engagement. The present research identified (through *expert knowledge and literature review* in 2011) further barriers, including the following:

Failure to legitimize forest benefits

Zambia Forest Act and Policy have been in draft form since 1999 and 2007 respectively. Embodied in these pieces of draft legislation are aspects that would enhance community and private sector participation, increase legal benefits to the rural communities, and avoid rhetoric by interest groups but institute substance to stakeholders. Supportive aspects include: enhanced access to forest resources, commodity markets and equitable benefit sharing mechanisms. In a dynamic socio-

ecological environment imposed by climate change and volatility in global economy, absence of resilient legislation makes it difficult to explore alternative innovations for benefit generation particularly for rural communities. Due to absence of comprehensive legal instruments, Zambia has been unable to access revenue from carbon trading facility which could be used to cushion climate change impacts confronted by impoverished rural communities.

Forest resource ownership

Although, user rights are conveyed to various stakeholders including rural communities, forest resource ownership is principally under the state. Increased devolution of rights and power over forest management, through advocacy, may contribute to effective forest management and benefit sharing. Full ownership could be achieved through individual or collective community ownership of forests as is the case in Cameroon, highlighted by Kam Yogo (2010).

Inappropriate approaches and synergies to enticing rural community participation in benefit generation

Here we avail two examples: firstly relating to pricing of forest products and secondly, improper implementation of Community Based Natural Resource Management (CBNRM) programme. As a result of 'differential taxation' (Dalal-Crayton & Child, 2003), perpetuating forest products by emphasizing on quantities and not qualities, that do not have value added renders unattractive competitive commodity pricing, which lowers the economic benefits in favour of other commodities other than natural resources. CBNRM programmes, which are non-organic and non-sustainable in areas where stakeholder coordination has been inadequate, transparency and accountability not fulfilled to the constituencies and incentive driven mechanisms have been insufficient, and have stagnated (Mbewe *et al.*, 2005).

Reliance on rights based claims

In case of rural communities, claims of benefits are mostly based on their perceived rights. As forests are capable of providing various products, demanding different skills from users, a shift towards interest groups such as production based associations, unions and societies is more appropriate. Conditions that allow various interest groups to flourish have not been fully developed. In order to develop this condition there is need to allow for significant fusion between local indigenous technical knowledge and modern skills (Nyirenda *et al.*, 2010).

Opportunities

Despite barriers inhibiting wealth creation and benefit sharing, the following opportunities exist in respect to institutional governance, local representation, commercialization and entrepreneurship diversification perspectives. These are:

- Ardent use of information, communication and technologies (ICTs) that can enhance marketing of forest resources.
- Formulation and implementation of bylaw by local stakeholders to enhance effective forest management.
- At local level, there are diverse forest products which form a resource base for green economy. Gondo, Sola and Kurebgaseka (2002) have reiterated production potential of non-wood forest products in Zambia.
- National Decentralization Policy of 2004 provides plinth for federated local institutions for effective access and utilization of local forest resources.

With increased prevailing advocacy by the various civil advocacy groupings, it is envisaged by stakeholders that gender imbalance will minimize. For instance, women and youth should be involved more in resource based income generation and resource management (e.g. even in beehive setting and management, honey pre-processing and marketing).

- The role of social capital through such features as connectedness and collective action can assist in building capacity among the stakeholders and enhance their participation in wealth creation and equitable benefit sharing as suggested by Nyirenda *et al.* (2010). Social capital tends to lower the transaction costs for production, collection, pre-processing and marketing through such institutions as associations, cooperatives and social networks (*ibid.*).
- There is Government's pervasive interest in empowering the impoverished rural communities, who are among the significant agencies of forest degradation in Zambia and this interest could further be extended to green economy.

Recommendations

In order to increase wealth creation and improve equitable benefit sharing in forest resources in Zambia, the following are recommended:

- Enact appropriate legislation for forest resource management.
- Explore more of the business models in commercializing forest resources, focusing on those that promote market incentives that drive conservation and resource management simultaneously. One such example is the Community Market for Conservation (COMACO) model, which interfaces agriculture,

market driven incentives and natural resources conservation.

- Develop capacity in forest commodity interest groups in such spheres as commodity marketing, interest claims, performance monitoring and evaluation, appropriate forest resources extraction or processing technologies, and finance sourcing.
- For long term sustenance of forest resources, there is need to develop and implement land use and management plans. Most (n=63; 13.1%) of forest reserves in Zambia do not have forest management plans and their absence poses a major risk to posterity, though bylaws exist particularly in the eight community forest sites.
- Develop long term financial commitment by stakeholders, devoted to development of forest resources products.
- Define unit of management and benefits associated with forest management, across administrative (e.g. associations, trusts, clubs and unions) and geographical (e.g. zones) boundaries.

Conclusion

Scaling up of wealth creation and equitable benefit sharing from forest products in Zambia can be facilitated through removal of identified barriers. Much of investments of effort (e.g. financial and knowledge) are required in building institutional and technical capacities in array of stakeholders. Since interest groups particularly local institutions can not by themselves drive wealth creation and benefit sharing, there is need to enhance inter-stakeholder positive connectedness and relationships.

References

Anderson, J. (2002). *Nature, wealth and power: emerging best practice for revitalising rural Africa*. Nairobi: USAID / Africa Bureau (AFR/SD).

Ashmore, R.D., Deaux, K. and Mclaughlin-Volpe, T. (2004). An organizing framework for collective identity: Articulation and significance of multidimensionality. *Psychological Bulletin* 130(1): 80-114.

Campbell, B.M., Angelsen, A., Cunningham, A., Katerere, Y., Siteo, A. and Wunder, S. (2007). *Miombo woodlands: opportunities and barriers to sustainable forest management*. Bogor: CIFOR.

Dalal-Clayton, B. and Child, B. 2003. *Lessons from Luangwa: the story of the Luangwa Integrated Resource Development Project, Zambia*. London: International Institute for Environment and Development. (Wildlife & Development Series 13).

Fisher, B., Turner, K., Zylstra, M., Brouwer, R., de Groot, R., Farber, S., Ferraro, P., Green, R., Hadley, D., Harlow, J., Jefferiss, P., Kirkby, C., Morling, P., Mowatt, S., Naidoo, R., Paavola, J., Strassburg, B., Yu, D. and Balmford, A. (2008). Ecosystem services and economic theory: integration for policy-relevant research. *Ecological Applications* 18(8): 2050 – 2067.

Gondo, P., Sola, P., and Kurebgaseka, N. (2002). *Assessing the potential for production, commercialization and marketing of NWFPS by rural producers in Zambia to improve their livelihoods*. PFAP II. Lusaka: MTENR.

Kam Yogo, E.D. (2010). Possible impacts of modalities for obtaining community forests, on forest resources conservation and climate change in Cameroon. *Nature & Faune* 25(1): 86 – 89.

Meinzen-Dick, R., DiGregorio, M. and McCarthy, N. (2004). Methods for studying collective action in rural development. *Agriculture Systems* 82: 197 – 214.

Nyirenda, V.R, Chansa, W.C, Myburgh, J.W, Reilly, B.K., 2010. Social capital and community responses to natural resource management in the Luangwa Valley, Zambia.

Journal of Sustainable Development in Africa
12(8): 158 – 179.

UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. Synthesis for Policy Makers. Available from URL: www.unep.org/greeneconomy [Accessed: 25/08/2011].

Ury, W. L., Brett, J.M. and Goldberg, S.B. (1988). *Three approaches to resolving*

disputes: interests, rights and power. In getting disputes resolved. Designing systems to cut the costs of conflict. San Francisco: Jossey – Bass; pp. 3-19.

Wenger, E. (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal*. January – February 2004: 1– 8.

**Developing rural communities by
protecting tropical forests:
Contribution of community based
forest management in
Cross-River State, Nigeria**

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Summary

Wanton destruction of forests and its resources necessitated the introduction of Community Based Forest Management into Cross River State, Nigeria with the primary focus of guaranteeing the conservation and protection of the remaining tropical rain forest of the State. The Cross River State Community Forestry Project (CRSCFP) was designed to incorporate local knowledge into the project's decision making processes with the aim that sustainable economic benefits from the natural resource base were secured for the rural communities. Consequent to the participation of the communities in managing forests adjoining to their communities, they were paid royalties by the state government, which was used to fund various rural developmental projects. Having benefited from the proceeds of CBFM, the local communities see forests as their heritage that can further benefit from protection and management strategies.

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Most West African states have initiated decentralization programs, with devolution of natural resource management to local communities as an important component. Most national forestry services in the region now recognize the importance of community forestry, collaborative forestry, or joint forest management and have developed a critique of previous practices based on exclusionary top-down approaches (Amanor, 2003). UNEP (2011) defines a "Green Economy" as one that results in improved human well-being and social equity, while significantly reducing environmental risks. Community Based Forest Management (CBFM) means management of forests which supports the empowerment of local communities and the inclusion of all groups in the community (minorities, women, etc) in decision-making. In addition to serving as an effective strategy for sustainable forest, this participatory approach provides a platform and avenue for rural development (Papka, 1995; Banzhaf *et al.*, 2000). CBFM for sustainable development signifies partnership between communities, forestry agencies and other stakeholders working together for sustainable forest management and rural development (Hesse and Pippa, 2000; Amanor, 2003). For the partnership to be successful, communities must have security of long-term rights to the forest so that they are assured that they will receive benefits from the protection and improvement of the forest resources (Ribot, 2001). This link between local benefits and sustainable development appears to be strong, with improvements in "the quantity, quality, variety and security of forests", based on shared forest management responsibilities.

Currently the practice of CBFM is very limited in Nigeria. It is only in Cross River State that this practice is found. CBFM started in Cross River State in March 1991 with the commencement of a British Government Overseas Development Administration (now known as Department for International Development) assisted

forestry project (CRSFC, 2006; 2007). The project's primary focus was to guarantee the conservation of the remaining one third of tropical rain forest of the State (which includes both tropical moist and dry forest). Two thirds of the forest estate had already earlier been designated as Cross River National Park (CRNP) by decree 36 of the Federal Government of Nigeria. However, participatory forestry practice commenced fully only with the inception of the Cross River State Community Forestry Project (CRSCFP) in 1999. The CRSCFP was designed following extensive consultations and research between 1997 and 1998. The project's goal, as seen by the Cross River State Government, was primarily to ensure that sustainable economic benefits from the natural resource base were secured for women and men in the State, and the incorporation of local knowledge into the project's decision making processes (CRSFP, 1994; CRSG, 2005).

There are number of community based organizations (CBO) supporting community forestry in the State. Among them is Ekuri Initiative which started in 1992 as a cooperative body. The initiative was formally registered as a CBO in 1996 with the goal of conserving the Ekuri community owned tropical high forest (THF) as well as poverty alleviation. The success of Ekuri Initiative has started to inspire other forest communities like Etara Enyeyeng, Gabu, Okorshie in Cross River State to develop management options for their forest lands.

Besides conservation of forest resources and meeting the forest products requirements of the local people, CBFM also serves as income generation for the local people through benefit sharing and employment opportunities. Various community projects have been implemented through the proceeds from CBFM in Cross River State. This study therefore evaluates the financial benefits of the proceeds of CBFM to implement rural projects in selected communities of Cross River State, aimed at strengthening conservation efforts and

utilization of environmental benefits in sustainable forest management strategies.

Data collection

Data for the study was collected in 2009 through the use of questionnaires, interviews, and review of available literature and annual reports. The respondents were randomly sampled in the local communities in which CBFM were practiced. The names of the selected communities for the study included Ekuri, Abo-Ebam, Gabu, Okorshie, and Abu-Emeh (Fig. 1). The State Forestry Commission was also visited to obtain information on project implementation as well and to ensure that the proceeds between the communities and the government were shared.

Results and discussions

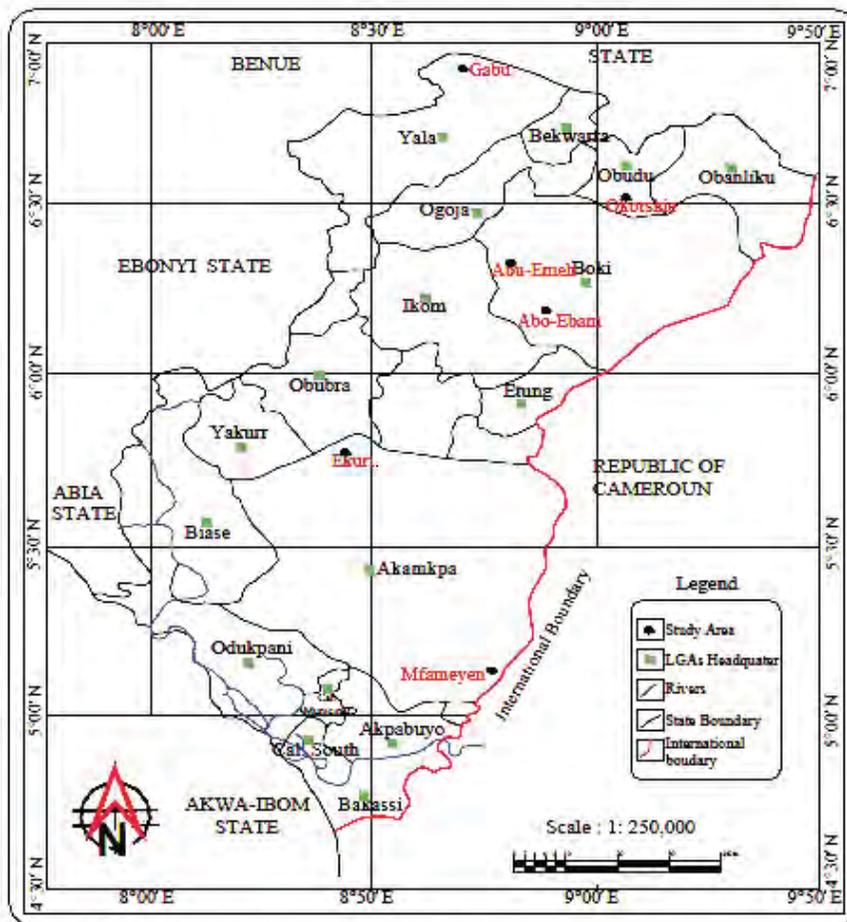
A wide range of NTFPs is planted, preserved, and exploited in the tropical forests around local communities. Some trees are used for carving canoes, mortars, culinary, and furniture items; some bear fruits that provide important foods and condiments, including *Irvingia gabonensis* (wild mango), *Elaeis guineensis* (oil palm), *Borassus aethiopicum* (borassus palm), and *Cola nitida* (cola). Rattans and grasses are used for weaving baskets and furniture. There is also wide range of medicinal plants. Other species provide chewing sticks used for dental cleaning and sponges. Trees are often preserved on the banks of streams and rivers and around headwaters to maintain water resources. Forests also provide bushmeat resources. Timber used for various constructions and building purposes is also obtained from the natural forests and plantations. In addition to being exploited for local consumption, many NTFPs are sold in urban markets. All these benefits yield both social and economic return to the people and the government.

The government restricted entrance and exploitation of products from the natural forests surrounding the local communities as well as the government established plantations. For effective protection and

sustainable exploitation of the forests, the government incorporated the local

communities with the agreement to pay royalty to the local communities involved in the joint management. The sharing formula for the proceeds obtained from the forest reserve between the government and the people was 50%:50%. The sampled communities used the proceeds obtained from CBFM to establish various

developmental projects. Despite of these contributions, many of the sampled local community dwellers informed that they want the government to increase the sharing formula to the advantage of the community. The main reason for this is that the people saw the natural forest as their heritage and belief they deserve larger percentage of accrued proceeds.



Source: Ministry of Lands and Survey, Calabar, Cross River State (2009)

Fig. 1: Map of the study area showing the study areas

As shown in Fig. 2, the highest relative percentage contribution (100%) of the proceeds obtained from CBFM activities to establish various community projects was observed in both Abo-Ebam and Abu-Emeh, although the highest total contribution of benefits (N1,450,000)

(USD9,667) obtained from CBFM to the projects in each of the communities was observed in Abu-Emeh (Table 1). The total of all the contributions of CBFM to implement rural projects was ₦ 4,128,000 (USD27,520) (equivalent of 78.6% of all the total proceeds from CBFM).

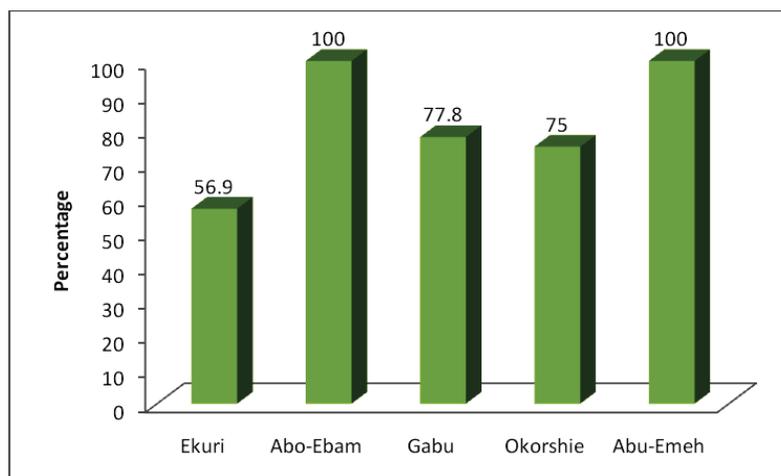


Fig 2: Relative percentage contribution of CBFM in selected communities in Cross River State, Nigeria

Table 1: Summary of contributions of CBFM to Community development projects in Cross River State, Nigeria

S/N	Community	Total amount of project costs (₦) for each of the rural communities (USD equivalent in bracket)	Total contribution of proceeds (₦) obtained from CBFM to implement projects in each rural communities (USD equivalent in bracket)
1	Ekuri	2,409,000 (16,060)	1,371,000 (9,140)
2	Abo-Ebam	990,000 (6,600)	990,000 (6,600)
3	Gabu	388,000 (2,587)	302,000 (2,013)
4	Okorshie	20,000 (133)	15,000 (100)
5	Abu-Emeh	1,450,000 (9,667)	1,450,000 (9,667)
Total		5,257,000 (35,047)	4,128,000 (27,520)

₦ 1 = USD150

The sampled communities implemented various community development projects using the proceeds obtained from CBFM. Some of these included road construction; building of schools, building of a civic center and a health center; implementation of skill(s) development (through various training); and promotion of a gender programme. The awarding of scholarships to girls who were indigene to the community deserves a special mention. In addition, scholarships were awarded also by the womens wing of the "Ekuri Initiative" for girls studying in the University, which thus contributed to furthering the academic excellence of the community. This initiative is a laudable project and should be further strengthened. Acknowledging that transportation plays a central role in the development of the rural economy a bridge was constructed on the Okokori-Ekuri road from CBFM proceeds in the Ekuri initiative and culverts installed in some communities have enhanced the transportation of people as well as their forest and farm produce. This has helped to improving the rural economy through the increase in the sale of products. In the Gabu community, roofing of primary school received the highest contribution from CBFM proceeds. The making of benches for primary schools and building of a church, and the construction of a local bridge, were fully covered by proceeds from CBFM for each of the communities participating in CBFM. Repair of a borehole also received a considerable amount of funding from the proceeds of CBFM in the Gabu community from the proceeds of CBFM.

CONCLUSIONS

Community Based Forest Management has a very great potential in conservation and protection of forest resources as well as contributing to poverty alleviation and implementation of development projects in developing countries. Invariably, the strategy will complement efforts toward attaining the green economy. Meanwhile, all stakeholders must show understanding of, and commitment to, the sharing of proceeds obtained from the forests. There should be a

coordinated, honest communication of the flow of information between all parties to ensure mutual confidence and effective partnership. The communities should not be seen as objects for achieving goals of the programme, but as partners.

REFERENCES

- Amanor, Kojo. S., 2003. Natural and Cultural Assets and Participatory Forest Management in West Africa. Conference paper series. International Conference on Natural Assesst held at Political Economy Research Institute and Centre for Science and Environment. 8 – 11 January 2003. 33 pp.
- Banzhaf, M., Boureima D., and Herman G., 2000. *From Conflict to Consensus: Towards joint management of natural resources by pastoralists and agro-pastoralists in the zone of Kishi Beiga, Burkina Faso*. Securing the Commons No. 1. London: IIED and London: SOS Sahel.
- CRSFC (Cross River State Forestry Commission) (2006): Cross River State Forestry Annual Report. 15 pp.
- CRSFC (Cross River State Forestry Commission) (2007): Cross River State Forestry Annual Report. 2 – 4 pp.
- CRSFP (Cross River State Forestry Project) (1994): Technical Report 'Overview of a planning process for sustainable management of the forests of Cross River State, Nigeria'. The Forest Development Department, Cross River State and the Overseas Development Administration, UK. 1 – 2 pp.
- CRSG (Cross River State Government) (2005): Cross River State Economic Empowerment and Development Strategy (CR – SEEDS) 2005 – 2007. Pp 29 – 30.
- Hesse, C., and Pippa T., 2000. *Who's Managing the Commons? Inclusive management for a sustainable future*. Securing the Commons No. 1. London: IIED.
- Papka, P.M., 1995. Community Participation

in Forestry Development in Nigeria In: E.A. Oduwaye (ed). Forestry and the Small Scale Farmer Proceedings of the 24th Annual Conference of the Forestry Association of Nigeria held in Kaduna, Kaduna State 30th October -4th November, 1995. Pp 1-17.

Ribot, Jesse C., 2001. *Local Actors, Powers and Accountability in African Decentralizations: A Review of Issues*. Ottawa: International Development

Research Centre of Canada Assessment of Social Policy Reforms Initiative. Ottawa, Canada.

UNEP, 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*. UNEP, Nairobi. www.unep.org/greeneconomy.



COUNTRY FOCUS: South Africa

South Africa's forest sector and the Green Economy



Mr Ronald N. Heath¹ presents his country, South Africa. He reveals that the forest sector of South Africa has preempted the drive to a green economy through the implementation of forest certification, and is therefore well-placed to support a national green economy strategy and ensure best possible use of forest and forest products. Mr. Heath goes further to declare that economic stimulus efforts can only provide short-term benefits to the forest sector and hence, the government of South Africa is crafting a long-term vision needed to enable it enhance the shift towards a green economy. Following is a short excerpt from what he shared with Nature & Faune.

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South Africa is generally regarded as a “low forest cover” country. However wooded vegetation covers more than a third of the country’s land surface area. Despite its “low forest cover” status, South Africa ranks as the third most ‘biologically diverse’ country in the world (<http://www.southafrica.info/about/geography/biodiversity.htm#ixzz1ff8vinYm>). The forest biome, although the smallest and most fragmented of all the biomes, has the highest plant diversity per hectare. The total forest resources in South Africa are extensive. Savannas, which are the largest biome in South Africa cover approximately 33% (42 million ha) of the total land surface of the country (Thompson et al. 2001), and contribute the majority of the wooded land area of South Africa (96%) (Shackleton et al. 2007).

The South African forest sector is set to contribute significantly to a national green economy through a focused approach on sustainable forest management, initiated in the mid 1990’s. A green economy is described as the process of reconfiguring businesses and infrastructure to deliver better returns on natural, human and economic capital investments, while at the same time reducing greenhouse gas emissions, extracting and using fewer natural resources, creating less waste and reducing social disparities.

The United Nations Environment Programme launched the Global Green New Deal that aimed at reducing carbon dependency and ecosystem degradation; promoting sustainable inclusive growth and creating new jobs. In response to this initiative, the South Africa’s government has committed itself to working towards the development of a National Green Economy Strategy. Within the framework of the National Green Economy Strategy, the timber and forestry sectors seek to make

significant contributions towards meeting green economy objectives (linked to climate change policies) through the reduction of greenhouse gas emissions and expansion of renewable energy objectives. Three key entry points to attaining green economy include: biomass energy, green infrastructure and building.

In 2008, 97.8% of all plantation areas in South Africa were certified (DAFF 2010). Although the certification of these plantations is a good incentive scheme, it must be emphasised that because of the high cost of implementation of this system, the participation of small growers is still limited. However, this could be addressed through the implementation of out-grower schemes or government support to small growers, and post settlement support to individuals who are rewarded with land through the land restitution processes.



Forest ecosystems and their biological diversity encompass not just trees and landscapes, but the multitude of plant and animal populations and microorganisms that inhabit forest areas and their associated genetic diversity. Although the management of planted forests aims to conserve key habitats by incorporating conservation and biodiversity management, the forest could assist in conservation and other ecological services through the establishment of corridors between these key habitats for the migration of fauna.

There was high profile national debate around introduced invasive species of plants and trees. Moreover, in the past, planted

forests were also criticized for their impact on water flow conservation. Through striving towards a green economy, the sector has transformed itself to a point where the management of the water resources and the plantation resources co-exist. Plantations have limited impacts on stream flow reductions and are playing a role in improving water quality. It has also been shown that plantations have a sponge effect on stream flow and could contribute to the attenuation of extreme water flow such as floods.

Even though the South African forest sector has made significant strides in support of a green economy, the challenge of the forest sector is to develop further the necessary characteristics through sustainable consumption patterns, recycling and recovery of products, increased supply of renewable energy and ecosystem services. Forest managers of all sorts and sizes need to be compensated at a level that enables them to manage sustainably. Compensation is not necessarily subsidy; it is better that prices of products and services are adjusted to reflect this.

References

Department of Agriculture, Forestry and Fisheries, South Africa 2010. Forestry Scientific Services. South African Forestry Facts. 2009

Shackleton, C.M., Shackleton, S.E., Buiten, E. & Bird, N. 2007. The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa. *Forest Policy and Economics*, 9:558-577

Thompson, M.W., Thompson, Vink, E.R., Fairbanks, D.H.K., Balance, A., and Shackleton, C.M., 2001. Comparison of extent and transformation of South Africa's woodland biome from two national databases, *South African Journal of Science* 97, pp. 179-182
<http://www.southafrica.info/about/geography/biodiversity.htm#ixzz1ff8vinYm>)

FAO Activities

A rational approach to managing water, wetlands and forests towards a greener economy for Africa

Ruhiza Jean Boroto¹

Summary

A methodology under development is proposed for the sustainable exploitation of water, wetlands and forests in the context of a watershed and towards a greener economy in Africa. If adopted, it will assist in 'doing things better', through practical steps.

Africa depends a great deal on the exploitation of its natural resources, including water, wetlands and forests. The continent is faced with population growth, an increasing pressure for economic development, and climate change that all affect natural resources. Carrying business as usual will exacerbate the destruction of the continent's ecosystems and the loss of the goods and services that they provide. A rational approach could reverse this trend and contribute to a greener economy in Africa.

The approach that is presented in this paper is work in progress. It consists of two key steps comprising (1) a classification of wetland and forest resources according to their ecological value, (2) a technical guide for the gradual exploitation of wetlands and forest resources focusing on maximizing the benefits of a green economy.

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This methodology is first being developed for wetlands and inland valleys and will be tested on two pilot cases. This paper is part of an early consultative process, comments and contributions from readers are therefore welcome.

Introduction

Increasing pressure on natural resources calls for a radical approach in their exploitation to prolong the benefits of the goods and services that they provide. Water, wetlands and forests can be managed more efficiently. In Africa, water, as a renewable resource, is under the threat of climatic changes that affects hydrological regimes with an impact on the normal course of human activities, of which the biggest water user is agriculture. Africa's forests are only renewable if their exploitation does not exceed their rate of regeneration. Otherwise, the reduction in natural forests means a loss in ecosystem goods and services, including those processes directly related to water, as part of the hydrological cycle. The reduced capacity of dwindling forests for carbon sequestration will also have an impact on the climatic conditions and on the resulting hydrological regime.

Wetlands are under increasing pressure for agriculture, especially for rice. They are fertile and hold water on and off season. Yet, they do play an important ecological role that is so important that some of them are classified as Ramsar sites.

Without explicitly mentioning the 'green economy', two recent publications namely by the Convention on Biological Diversity (2009) and by the FAO (2008) discuss the interactions between forests, water and wetlands and their management for mankind's benefit. The first publication is a review of ecological, economic and policy linkages for water, wetlands and forestry. The second publication is as one of the thematic studies implemented for FAO's Global Forest Resources Assessment 2005 (FRA 2005) to highlight the role of water-

related ecosystems such as wetlands and forestry in providing solutions to freshwater supply problems. The Zaragoza conference held in October 2011, is, on the other hand, more explicit and has shared cases demonstrating the types of innovative policies, projects and initiatives that generate the economic, social and environmental benefits that the green economy should deliver.

It is imperative to take the discussion one further step, beyond these two publications and the Zaragoza conference. A new approach is proposed, on how to practically do things right, in order to achieve a greener economy while exploiting our water, wetlands and forest resources in careful way. The threats posed by human's encroachment of these vital ecosystems can be transformed into an opportunity. This would include, for example, prioritization of organic agriculture and the proactive identification of Globally Important Agriculture Heritage Systems (GIAHS).

UNEP defines the green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.

A framework for the mainstreaming the concept of the green economy in water, wetlands and forests exploitation

Examples of how things are going wrong, compelling to act fast are provided in the CBD publication cited above and include the deforestation in Zambia, the impact of deforestation on health and the impact of the loss of forest and vegetation cover on the hydrological balance in the Pangani, Tanzania. The case of forestry as a streamflow reduction activity in South Africa is cited in FAO publication.

A proactive approach is proposed, offering a framework for managing the gradual exploitation of the continent's natural resources in a predictable and responsible

fashion. The approach builds on the concept of a green economy and seeks to maximise the resulting benefits. It is also expected that in this way, irreversible losses will be avoided. Exploitation could then proceed in a sustainable manner, catering for the needs of future generations.

In order to achieve this, two important actions are proposed:

1. ***Classify all wetland and forest areas according to their ecological value.***

Typically, an area that is recognised as a Ramsar site would be given the highest value and declared as unfit for development activities such as timber exploitation or agriculture. It will therefore be a 'no go' area. This approach is similar to the one adopted by South Africa in classifying the country's river reaches according to their ecological value, in order to determine the ecological water requirements. In this case, the classification will extend to all ecosystems, including forests and wetlands. The difference with the South African approach is that the classification guides which area could be developed in priority (that is the area with the lowest ecological value) and which one should be, as far as possible, be preserved in its natural condition (this is the area. It is to be noted that this classification can be undertaken at any scale, the most manageable being most likely at catchment level. This is also the scale that is recommended in order to extend the analysis to this ecological unit. It is possible that a forest area spans across two catchments, this would not, however, preclude the classification.

2. ***Implement a technical guideline for the gradual exploitation of forest and wetland areas and which consists of:***

- i. The mapping of the resources in the area; including an inventory of the current and potential goods and services, which have justified the classification (as in point 1 above)

ii. A study of the role of forestry and wetlands in the hydrological processes in catchment in which they are located and an investigation on the potential impact of the exploitation on these processes;

iii. An economic analysis of the benefits of the proposed exploitation, with economic valuation of environmental costs and benefits, including the intrinsic value of ecosystems as well as any possible (positive or negative) externalities. The analysis needs not to be competitive (as the exploitation of wetlands and forests is not necessarily in conflict with ecological goods and services). The analysis would therefore be more than a routine cost benefit analysis, and should include:

- A cumulative or joint benefits analysis (from the activity contemplated in addition to the ecological good and services that will be maintained or enhanced);
- The payment and or rewards for ecological services;
- Any positive or negative externality, as relevant.

iv. The identification of mitigation actions against the perceived losses or impacts that the exploitation might cause.

v. The development of a sustainable exploitation plan encapsulates all the above.

The plan should prioritise ecological options; most of which also hold the potential for climate change adaptation:

- Organic agriculture which provides economic and ecological benefits should receive preference over any other form of agriculture,

- Agriculture heritage systems as defined by the FAO's Global Important Agriculture Heritage Systems (GIAHS) – potential candidate GIAHS sites should be proactively identified, protected and promoted.

The plan should include a realistic and positive involvement of local communities and address their possible apathy towards ecological concerns as they will, most likely, have other pressing survival priorities for their livelihoods.

Towards a sustainable exploitation plan

The following steps are proposed to implement these actions:

1. Test the guidelines on a representative pilot case, in a consultative process with interested and affected parties within a selected catchment. The criteria for the selection of the pilot catchment would include the size (which has to be manageable) and the existence of areas with ecological value, varying from high to low.
2. Start exploitation of those forest and wetland areas that have been classified as having the lowest ecological value (Table 1). However, an area with a higher ecological value will receive priority for the preparation of an exploitation plan if it is located near communities which are likely to exploit its resources.
3. Apply the guidelines as the need to exploit areas of a higher ecological value increase with time.
4. *Monitor and evaluate* the impacts and benefits and revise as appropriate. It will be important to be transparent in reporting on this process so that the public, the interested and affected parties are all involved.

Table 1 provides a conceptual overview of how the gradual exploitation of forests and wetlands would proceed.

Table 1: Proposed framework for the gradual exploitation of forest and wetland areas

<i>Priority for exploitation</i>	<i>Baseline status: growing pressure</i>	<i>Increased pressure:- (population/ climate) in XX years (Phase 1)</i>	<i>Increased pressure: (population/ climate) in XXXX years (Phase 2)</i>
Ecological value of forestry or wetland			
1 – Very high value (such as a Ramsar site)	No go zone	Unlikely to be exploited	Could be partially exploited
2 – High value	Unlikely to be exploited	Could be exploited partially	Next in line for exploitation
3 – Medium value	Could be exploited partially	Next in line for exploitation	Prime candidate for exploitation
4 – Low value	Next in line for exploitation	Prime candidate for exploitation	Already exploited
5- Very low value	Prime candidate for exploitation	Already exploited	Already exploited

Note: As stated in the guideline above, the decision to exploit will be guided by an economic analysis considering expected economic benefits against or/and in addition to ecosystem goods and services, including the intrinsic value of forests and wetlands.

Conclusion: a way forward

The interdependence between water resources, wetlands and forests and the increasing need to exploit them call for a practical approach that embraces the principles of a green economy. This is true for Africa. The approach presented in this paper is work in progress and is still at a conceptual stage. It will be developed and tested, first, on wetlands for agriculture development. Lessons will be integrated for up scaling and could be

applied to forests, in a quest to maximise the wide range benefits accruing from their sustainable exploitation. When classifying these resources, it is proposed that it is done at the scale of a catchment. It represents a hydro ecological unit where the classification and subsequent prioritisation

for exploitation could take place using the steps presented in the exploitation plan.

Thus, this generic approach is raw in its current format, but stands to be improved as it is tested. While the science that will support its implementation might not provide a ready-made, step by step recipe, it is only in learning by doing that sufficient know-how will be acquired to ensure that future generations do excel at managing and exploiting profitably our water, wetlands and forestry resources in a sustainable fashion. Monitoring and evaluation as well as documenting experiences will therefore be important steps in rolling out the proposed approach.

Once it has proven its worth, this approach should be embedded into African countries policies and laws. Ideally, embracing the

principles of a green economy should become a prerequisite for attracting financing. Failing to take such action, the consequences will be irreversible and the loss of benefits to future and present generations important. It is therefore advocated this approach receives due consideration.

References

AgroEcological Investments Management (May 2010). The investments Advantages of organic Agriculture. (Also available at http://www.slideshare.net/GLB68/investment-advantages-of-organic-agriculture?src=related_normal&rel=1802773)

Blumenfeld, S., Lu, C., Christophersen, T. and Coates, D. (2009). Water, Wetlands and Forests. A Review of Ecological, Economic and Policy Linkages. Secretariat of the Convention on Biological Diversity and Secretariat of the Ramsar Convention on Wetlands, Montreal and Gland. CBD Technical Series No. 47. (also available at <http://www.cbd.int/doc/publications/cbd-ts-47-en.pdf>)

Department of Water Affairs, South Africa (1998). National Water Act, Act 36 of 1998

FAO (2008). Forests and Water. FAO Forestry Paper 155 (also available at <http://www.fao.org/docrep/011/i0410e/i0410e00.htm>)

http://upload.wikimedia.org/wikipedia/commons/2/21/Africa_satellite_orthographic.jpg

http://www.un.org/waterforlifedecade/green_economy_2011/info_briefs_tools.shtml

http://www.worldwaterforum6.org/fileadmin/user_upload/pdf/Zaragoza3-5oct.pdf
Huang, Lily. "Rise of the Bugs." *Newsweek.* 29 June 2009

Koohafkan, P. and Altieri, M.A. (2010) FAO. Global Important Agriculture Heritage Systems. (also available at <http://www.fao.org/nr/giahs/en/>)

Pangani River Basin Management Project,
<http://www.panganibasin.com/project/index.html>

UNEP :

<http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx>

Van Rooyen, A.F. (1998). Combating desertification in the southern Kalahari: connecting science with community action in South Africa. *Journal of Arid Environments.* Volume 39, Issue 2, June 1998 pp 285-297. (also available at <http://www.sciencedirect.com/science/article/pii/S0140196398904074>)

Vittor *et al.* The effect of deforestation on the human-biting rate of *Anopheles Darlingi*, the primary vector of *Falciparum malaria* in the Peruvian Amazon. *American Journal of Tropical Medicine and Hygiene.* 74(1), 2006. pp 3-11

World Water Assessment Programme. (2009). The United Nations World Water Development Report 3: Case Study Volume: Facing the Challenges. Paris: UNESCO, and London

Links

Forests in a green economy: A synthesis

Produced during the International Year of Forests, this synthesis addresses the value of forests and their role in transitioning to a green economy. The synthesis lays out compelling information for the forestry sector, governments, private sector and civil society to invest in forests to aid the realization of a more socially inclusive, low-carbon and resource efficient economy.

For the whole review, visit:

<http://www.unep.org/greeneconomy/ResearchProducts/tabid/4605/Default.aspx>

Source: www.unep.org > Green Economy > Research Products

Redefining our economic systems: Could a forest be worth more than a gold mine?

This is the theme of a talk covered by National Geographic at TEDx Yerevan. The speaker posed this question since the Republic of Armenia's economy is heavily reliant on copper and gold mining. The issue is significant because the region is one of the 34 most endangered global hotspots for biodiversity. In addition, resources like forests and water are becoming scarce as a result of unsustainable management and climate change, while several strategic industries are heavily reliant on the benefits provided by natural capital.

Speaker: Jason Sohigian

For the link to the article and YouTube video visit: <http://bit.ly/sohigian>

Source: Jason Sohigian. Deputy Director, Armenia Tree Project, 65 Main Street Watertown, MA 02472 USA. Tel: (617) 926-TREE x14. Email: jason@armeniatree.org
Website: www.armeniatree.org

Forests, Fragility and conflict – Overview and case studies (June 2011)

Forests, Fragility and conflict provides a critical review and synthesis of some of the key issues and post-conflict policies associated with forests, fragile states and conflict. The synthesis offers guidance on

how these issues might be addressed in future policy discussions.

Authors/Partners: Emily Harwell (lead consultant), with Arthur Blundell and Douglas Farah

For the review, visit: <http://www.profor.info/profor/knowledge/forests-fragility-and-conflict>

How effective are protected areas in conserving biodiversity?

The paper argues that protected areas may not be the most effective means of conservation. It reviews an article newly published in *Forests Ecology & Management* that was co-authored by CIFOR Scientist Manuel Guariguata, which found that community-managed forests experienced lower annual deforestation rates and less variation in rates of forest cover loss than protected or state owned "parks". The findings, he argues, highlight the need to incorporate local people into the management of natural resources from design to implementation of REDD+.

Author: Terry Sunderland. Senior Scientist, Center for International Forestry Research

For the whole review, visit:

<http://www.cifor.org/online-library/polex-cifors-blog-for-and-by-forest-policy-experts/english/detail/article/1222/how-effective-are-protected-areas-in-conserving-biodiversity.html>

Source: CIFOR's Forests Blog: blog.cifor.org

Rio+20 - United Nations conference on sustainable development

Rio+20, United Nations Conference on Sustainable Development, will be held in Rio de Janeiro, Brazil, on June 4-6, 2012.

For further information, please visit: <http://www.uncsd2012.org/rio20/>

Source: Rio+20 Newsletter

African elephants to benefit from new \$100 million fund

Global conservation experts aim to raise US\$100 million over the next three years to ensure the long-term survival of African elephants in the face of increased poaching and a thriving illegal trade in ivory.

For the whole article, visit: <http://www.ens-newswire.com/ens/aug2011/2011-08-22-01.html>

Source: Environment News Service (ENS) 2011

International encyclopedia of medicinal plants volume 1 to 18

International Encyclopedia of Medicinal Plants is an amazing compendium consisting of a series of eighteen volumes, covering A to Z of medicinal plants. It is a remarkable compilation of information on herbal medicine, chemistry, pharmacology, healing

properties, treatment of ailments and biology of medicinal plants of the world. It also covers herbs from all over the world, giving their location, cultivation, history of herbal medicine and the herbal traditions of different cultures.

Editor in chief: Vijay Verma

For further information, please see:

<http://www.thebooksplanet.in/collections/frontpage/products/international-encyclopaedia-of-medicinal-plants-volume-1-to-18>

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Theme and Deadline for Next Issue

The theme of the next edition of *Nature & Faune* is **"The Forest-Agriculture interface: a zone for enhanced productivity?"**. The New Partnership for Africa's Development (NEPAD) declared in a statement that research on economic growth and poverty reduction has shown that the most effective way to reduce poverty sustainably is to raise the productivity of, and returns from, resources on which the poorer people depend for their livelihoods. In almost all African countries, these resources are agricultural land and labour, and off-farm rural labour. Thus agricultural growth is not only essential for Africa to feed itself as its population expands, but also for the wider development of Africa.

African countries are striving to reach and maintain a path of economic growth through agriculture-led development that reduces mass poverty, food insecurity and hunger. As targets for a successful implementation, the Comprehensive Africa Agriculture Development Programme (CAADP) takes on the Millennium Development Goal (MDG) of reducing poverty and hunger by half by 2015, through the pursuit of a 6 percent average annual growth in the agricultural sector, and allocating an average of 10 percent of national budgets to the sector.

However in Africa, as in other economically-deprived regions, the greatest cause of deforestation has been the conversion of forest land to agriculture. By definition, an interface is a boundary across which two-independent systems meet and act on, or communicate with each other. Areas in which the conversion of forest land to agriculture occurs (i.e. the most direct and visible aspect of the **forest-agriculture interface**) are often of great ecological importance; they need to be managed wisely to avoid unnecessary destruction of forests, while at the same time be able to meet the livelihood requirements of those that live there. Moreover, conversion and use of

forests can result in better food and energy supply, rural employment and income opportunities, expanded agro- and forest industries, and an improved trade and foreign exchange balance. Furthermore, it is worth noting that forest ecosystems contribute tremendously to agricultural productivity, by protecting soil against degradation and erosion, maintaining river bodies, and assuring regular rainfall patterns.

Sometimes however, the pursuit of short-term gains may lead to serious long-term losses to both the environment and the livelihoods of many people, especially those in the rural areas. This is oftentimes the case in most developing countries where the need for economic growth has driven governments into the mining of natural resources, including forest and agricultural lands with disastrous long term effects on the environment and people's livelihoods. With the rising price of fossil fuels, the looming threats of climate change, land use patterns may change in favor of biofuels production. In Africa, this is a potential new source of pressure on land, agriculture and forestry.

The next edition of *Nature & Faune* will explore this complex interface between forest and agriculture in Africa. Articles that address the prospects of achieving the Millennium Development Goals which requires balance between economic, social and environmental aspects in decision-making, and achieving synergies between forest, agricultural and energy land uses will be most welcomed. We invite you to submit manuscripts that describe the working of the forest-agriculture interface in your countries and examine options for stabilizing this zone.

Mostly forest-agriculture interface describes the zone (physical or economic) where forest systems meet agriculture systems and interact, often contentiously and negatively. The next edition of *Nature & Faune* wants to explore how to get positives out of this, and manage/mitigate the negatives. Therefore

we call for articles that contribute to the debate of evaluating best practices, and offer pragmatic measures to ensure productive interface between forestry and related land based sectors such as energy, agriculture and water.

Please submit manuscripts that consider the scientific knowledge behind these issues and which seek to understand the role of the landowner and his decision-making process

which will likely influence the perceived conflicts between forest and agriculture, and impact on the collaboration among stakeholders. Of interest also are papers that consider the policy implications of the above issues, including policies that address land tenure and land use decision making process.

In order to facilitate contributions from potential authors, we have created guidelines for the preparation of manuscripts for Nature & Faune. Short and succinct papers (maximum 3 pages) are preferred. Please visit our website or send us an email to receive a copy of the *'Guidelines for Authors'*.

Email: nature-faune@fao.org and Ada.NdesoAtanga@fao.org
Website: <http://www.fao.org/africa/publications/nature-and-faune-magazine/>

Deadline for submission of manuscript(s) and other contributions is 30th April 2012

Guideline for authors, Subscription and Correspondence

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