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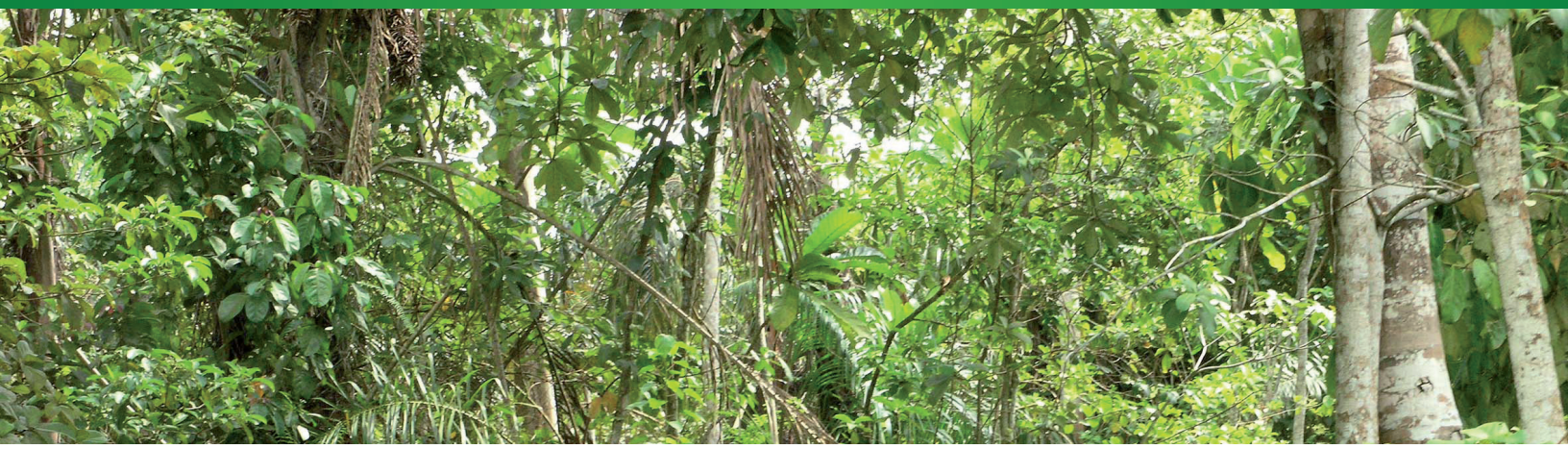
CLIMATE CHANGE MITIGATION ACTIVITIES IN THE TROPICAL MOIST FORESTS OF WEST AFRICA



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Climate change mitigation activities in the tropical moist forests of West Africa

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Acronyms and abbreviations

ACP	African, Caribbean and Pacific Group
AFF	African Forest Forum
AGRHYMET	Centre for Agro-Meteorology and Operational Hydrology
AR	Afforestation/Reforestation
AVR	Accreditation and Verification Regulation
CARPE	Central Africa Regional Program for the Environment
CCBS	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CFP	Community Forest Partnership
CfRN	Coalition for Rainforest Nations
CFRT	Community Forest Retention Trust Account
CI	Conservation International
CO_2	Carbon dioxide
COMIFAC	Central Africa Forests Commission
ECS	Enhancement of Carbon Stocks
EPA	Environmental Protection Agency
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FCMC	Forest Carbon Markets and Communities
FCPF	Forest Carbon Partnership Facility
F-MRV	Financial Monitoring, Reporting and Verification
FPIC	Free Prior Informed Consent
GCCA	Global Climate Change Alliance

GGWSSI	Great Green Wall for Sahara and Sahel Initiative
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHGs	Greenhouse gases
GIS	Geographic Information System
ICRAF	International Centre for Research in Agroforestry
IPCC	Inter-governmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
LLC	Limited Liability Company
MA	Mitigation and Adaptation
MDG	Millennium Development Goals
MRV	Monitoring, Reporting and Verification
NASA	National Aeronautics and Space Agency
NGOs	Non-Governmental Organization
NIS	National Implementation Strategy
NTFPs	Non-Timber Forest Products
PCB	Project Coordination Body
PDD	Project Design Document
PES	Payment for Environmental services
PIN	Project Idea Note
PNG	Papua New Guinea
PPP	Public-Private-Partnership
PROFOR	Programme on Forests
REALU	Reduction in Emission from All Land Use

REDD	Reduced Emission from Deforestation and Forest Degradation
RER	Reference Emission Rate
RIL	Reduced Impact Logging
R-PIN	Readiness Program Idea Note
RPP	REDD Preparatory Proposal
SFM	Sustainable Forest Management
STEWARD	Sustainable and Thriving Environment for West African Regional Development
tCO_2e	tons of carbon dioxide equivalent
TFAP	Tropical Forestry Action Plan
TMF	Tropical Moist Forest
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational Scientific and Cultural organization
UNITAR	United Nations Institute for Training and Research
USAID	United States Agency for International Development
USD	United States Dollar
VCS	Voluntary Carbon Standard
WCMC	Wildlife Conservation and Management Committee
WTO	World Trade Organization
WWF	World wide Fund for Nature

Executive summary

Tropical moist forests (TMFs) occur in humid tropical areas, usually with 1,500 mm or more of precipitation and a dry season (or seasons) of three to four months or less. There is an interrupted belt of TMFs along the West African coast characterized by dense mass of evergreens and oil palms. The Upper Guinean TMFs extend from Guinea and Sierra Leone in the west through Liberia, Côte d'Ivoire and Ghana all the way to Nigeria and a few hundred kilometers inland from the Atlantic coast. The World Wide Fund for Nature (WWF) designated the Upper Guinean forests, which it calls the Guinean moist forests, as one of its Global 200 critical regions for conservation. The WWF divides the Upper Guinean forests into three eco-regions, including the Western Guinean lowland forests that extend from Guinea and Sierra Leone through Liberia and southeastern Côte d'Ivoire as far as the Sassandra River, Guinean montane forests found at higher elevations in the highlands of central Guinea, northern Sierra Leone, and eastern Côte d'Ivoire, and the eastern Guinean forests that extend east from the Sassandra River through Côte d'Ivoire and Ghana to western Togo, with a few isolated enclaves further inland in the highlands of central Togo and Benin.

The TMFs and climate change have significant impacts on national economies and social systems. Customary law often gives residents the right to use trees for firewood, fell trees for construction, collect forest products and rights for hunting and grazing or clearing of forests for agriculture. There are also ‘protected forests’, where uncontrolled clearings and unauthorized logging are forbidden. However, with the current developmental dilemma facing West Africa, degradation of the TMF appears imminent unless developers start to work ‘outside the box’ to find innovative green solutions to identified problems.

Loss of TMFs occurred greatly in countries with higher population growth. Rapid and uncontrolled population accentuates social, economic as well as environmental problems. Actual rate of deforestation varies from one country to another. In Guinea, Liberia and the Ivory Coast, there is almost no primary forest cover left unscathed. In Ghana and Nigeria, the situation is much worse, and nearly all the rainforests are cut down. At the present trend of deforestation, experts estimate that the rainforests of West Africa may disappear by the year 2020. Moist forests and woodlands are declining primarily as a result of increased wood fuel collection, clearing of forests for agriculture, illegal and poorly regulated timber extraction, land tenure conflicts, increasing urbanization and industrialization.

In the face of the rapidly diminishing forest and biodiversity, REDD+ represents an opportunity for partnership between developing and industrialized countries for the benefit of the global climate system. Developing countries would participate by undertaking REDD+ actions while industrialized countries participate by sharing the costs associated with the

actions. REDD+ can also lead to direct social benefits, such as jobs, livelihoods, land tenure clarification, carbon payments, enhanced participation in decision-making and improved governance. For all these benefits, complementary stand of the African Forest Forum (AFF) to assist African nations willing to embark on REDD+ is a vital and welcome agenda.

Forest-based Plan Vivo-accredited project in the West African TMFs is currently lacking. REDD+ readiness activities in the TMFs of Ghana, Liberia and Nigeria were, therefore, discussed, with information provided on Cote d'Ivoire, Guinea Bissau and Sierra Leone to the extent available. The objective was to integrate all information on the West African humid forests to catalyze initiatives at national, regional and international levels, which may foster the adoption of REDD+ principles throughout the eco-region.

As resources dwindle and the agricultural frontier expands, pressure to convert the TMFs will increase. Thus, the forest situation in tropical West Africa presents enormous challenges, reflecting the larger constraints of low income, weak policies and inadequately developed institutions.

Successful implementation of REDD+ in the sub-region is, however, linked to the reliability of historical forest database, programmes aimed at restoring the fragile ecosystem, the indigenous peoples experience, institutional capacity and economic potential that improve the well-being of local communities. It may be useful for AFF to evolve programmes aimed at periodically compiling and publishing data on national forest budget allocations and disbursements for comparative evaluation and encouragement to do better.

Greater leverage through REDD+ is achievable through improved forest and environmental education, clear definition of local project needs and priorities that are sensitive to the landscape and implementation that ensures long-term confidence in the demand for REDD+ units while avoiding leakages or displaced pressures. AFF could inject momentum in REDD+ demonstration and awareness raising by helping to generate videos, mimeos and documentaries on threatened ecosystems and the degraded habitats, and the reasons for their protection and restoration.

Climate change mitigation using REDD+ can be triggered through motivational apparatus following map-based analysis of the degraded eco-zones, consultations to identify country needs and priorities as well as identification of opportunities and multiple benefits. The concept could be enhanced through funding and cash incentives, better fire control and management, clean and lean development technologies and agro-forestry. The sustainability indices include equity, value addition forestry, policy reforms and setting up networks of protected areas in contiguous countries.

AFF should get involved in negotiations that make Carbon Revenue from REDD+ projects equal or greater than Opportunity Cost of other land use options. This is because if REDD payments do not match or surpass the lost opportunity cost of competing uses, the

associated activities may not be justified. However, a one-size-fits-all approach to monitoring biodiversity in REDD+ projects would not only be difficult to develop, but would likely fail given vast differences in forest ecology and threats across West Africa. Instead, local sites should be encouraged to develop monitoring programs based on a generally approved roadmap.

The main benefits of REDD+ are embedded in its capacity to: (i) enhance economic potential of stakeholders; (ii) draw on indigenous peoples experience in evolving best practices; (iii) enhance map-based identification of the threatened moist forest habitats in each country; (iv) secure tree and forest tenure and rights to the use of timber and other forest resources; (v) improve information and knowledge of forest resource assessment; and (vi) equip institutions responsible for forest resources to implement REDD+ projects effectively.

Strong potential for up- and out-scaling REDD+ in the TMFs of West Africa are found in: (i) environmental education - forest and environmental education must be enhanced because development and sustainability are at stake; (ii) broad policy reforms that raise the profile of climate change for capacity development; (iii) clear understanding of environmental services to be paid for; (iv) eco-labelling to sustain forest management practices; (v) stakeholder involvement and participation that calls for consensus and cross-sectorial coordination; and (vi) making Free Prior Informed Consent (FPIC) on on-going processes, rather than a single event, and adequate time allowed for their careful management.

AFF could also look into operational and organizational barriers to further development of community-based Forest Groups and suggest remedies while injecting motion required for promoting forest regeneration concessions. It is also desirable to strengthen institutions (e.g. Forestry Departments and Commissions) established to manage West African TMFs to develop advance deforestation tracking system.

In the future, how large emission reductions from REDD+ would be depends on a significant number of assumptions. One critical variable is the amount of funding available for REDD+. The other critical variable is the possibility of international leakage, i.e. how reduced deforestation in one country or site might lead to increased emission in non-participating areas. As a matter of fact, REDD+ design, objectives and promotion deserve careful attention to avoid risk of displaced pressure and secure increased implementation.

AFF could help to develop minimum standards in the readiness phase of REDD+ in Africa to safeguard and ensure stakeholders' agreement on the mode of monitoring and measuring carbon pools. This will build market confidence in the long-term sustainability and demand for REDD+ units.

AFF could also help to establish reliable baselines and robust monitoring approaches for advancing REDD in the West African sub-region, including the need for investment in

inventory and ground truthing capacity as well as remote sensing. Communities can be empowered if they have the means to monitor carbon stocks and make decisions. Accounting for benefit from REDD+ would relate to the emission reductions of the project minus leakage. Credits will be awarded if emissions from deforestation can be kept below the historical baseline reference emission rate. Thus, in areas where local land tenure rights are recognized, projects can result in clear benefits to local communities.

REDD+ funds could be used to finance a multitude of different policies and measures, such as forest protection policies, improved enforcement of protected areas, expansion and better implementation of participatory forest management, and land reform processes like tenure reform surrounding the issue of landlords and tenant farmers.

Finally, exploiters of forest products must commit to responsible and sound practices, and assume more of the costs of their impacts. With these practices, and if stakeholders work in concerted efforts, the TMFs may continue to yield biological, economic and social benefits well into the future. It is desirable that AFF should inaugurate recognition awards to model West African countries doing well in promoting the sustainability of TMFs.

CHAPTER 1 Introduction

CLIMATE CHANGE AND MITIGATION IN TROPICAL MOIST FORESTS OF WEST AFRICA

To better understand the forest/climate change nexus and enhance national and sub-national capacity to address REDD+ activities in the tropical moist forests of West Africa, current status of the tropical rainforests found in the sub-region was investigated.

West Africa spans a suite of vegetation/ecological zones ranging northward in latitude from tropical rainforest to desert shrub, and exhibit environmental problems, such as rapid deforestation of the moist tropical forests, land modification and desertification in areas proximal to the Sahel. There are two clear eco-geographical areas: first, the Sahel countries, comprising Burkina Faso, Cape Verde, Gambia, Guinea-Bissau, Mali, Mauritania, Niger and Senegal, which make up the dry region, and second, the countries of the Gulf of Guinea including Benin, Cote d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone and Togo, which make up the humid region. Preponderance of tropical moist forests, in the sub-region is found in Sierra Leone, Liberia, Ghana and Nigeria. These are precincts lying approximately between 5° and 10° N, and 15° and 13° W. They cover a total land area of 1.8 million km^2 of which 28.6% fall within the high forest zone.

Climate characteristics of the sub-region are subject to tropical variations resulting in high annual temperatures and heavy rainfall, which steadily decline towards the Sahara desert. The Guinean moist forests are greatly influenced by the dry winds from the Sahara and the cool currents of the Atlantic, creating a climate that is more seasonal, including over 1000-2000 mm of annual rainfall. The habitat type is tropical and subtropical moist broadleaf forests found in Guinea, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo and Benin. Along the coast lies the Atlantic equatorial coastal forest where the climate is wet with heavy rainfall all year round.

The principal processes of land cover modification result from clearing of the natural vegetation for agriculture, grazing, logging and degradation from other unsustainable cultural practices. West Africa has a high annual negative rate of forest area change (Annex 1). In terms of area, Nigeria and Côte d'Ivoire have by far the greatest negative annual loss of forest cover while Niger in the Sahel even has the highest annual deforestation rate from unsustainable fuelwood collection. Forest surveys for West Africa suggest clearance of around 56% of the forest zone; estimated losses for Côte d'Ivoire, Ghana, and Liberia range between 64% and 70%. Estimates of total land conversion range between 88 million ha, from the digitized land use map, to 122.8 million ha, from extrapolation of forest data (Gorniz, 1985).

Global commitment to stabilize greenhouse gases to levels that would not dangerously interfere with the world climate system, particularly through REDD+ mechanism is critical to technological innovation and initiatives aimed towards sustainable development. REDD+ is a tool for reducing emissions from deforestation and forest degradation. It also assists the conservation and enhancement of forest carbon stocks as well as to promote sustainable management of forests.

When forests that would have been lost or degraded are retained or restored through REDD+, they deliver multiple benefits in addition to protecting or enhancing carbon stocks. These ecosystem-based benefits may include conservation of forest biodiversity, water regulation, soil conservation, timber, forest foods and other non-timber forest products. REDD+ can also lead to direct social benefits, such as jobs, livelihoods, land tenure clarification, carbon credit payments, enhanced participation of local communities in decision-making and governance.

A properly designed REDD+ mechanism would be a cost-effective approach to simultaneously conserve forests, slow climate change, protect biodiversity, foster sustainable development, and maintain important ecological services provided by healthy forest ecosystems. However concerns still remain over how REDD+ will be implemented and whether benefits will be fairly shared among stakeholders.

In this study, carbon emissions mitigation proposals through both environmental education and reforestation policies, replacing forest clearing in the tropical moist forests of West Africa, were examined. The forest eco-types are endangered and could be paid for to enhance multiple benefits that need to be identified and evaluated in terms of ecosystem and social benefits (Annex 2) with the idea of REDD+.

OBJECTIVES OF THE STUDY

As stipulated in the Terms of Reference, the objectives of the study were to:

- review and evaluate national and sub-national REDD+ activities implemented in tropical moist forests of West Africa;
- evaluate the potential and pre-conditions for increased implementation of national and sub-national REDD+ activities in tropical moist forests of West Africa;
- identify and describe best REDD+ practices and approaches in tropical moist forests of West Africa and evaluate their potential for up-scaling; and
- identify, analyze and evaluate other relevant climate change mitigation activities in tropical moist forests in West Africa and their potential for up-scaling.

METHODOLOGY

Data collection was based on desk-study (bibliographic research) and information obtained from websites. Local forest managers familiar with the terrain were also interviewed to validate and dig out vital primary information and documentation sources.

CHAPTER 2 Tropical moist forests in West Africa

CHARACTERISTICS, EXTENT AND TRENDS

The West African sub-region have limited forest resources (approximately 11% of the total land area) because of large populations (e.g. in Benin, Nigeria and Togo), agricultural clearing and long-term export of wood products (e.g. in Côte d'Ivoire); also dry influences on countries close to the Sahara (FAO, 2000). Therefore, the forests in West Africa represent only 13% of the total forest cover of the continent and 2% of the world forest area. Côte d'Ivoire, Ghana and Nigeria have TMFs with rich biodiversity (UNEP/WCMC, 2011) while Guinea-Bissau is well forested (Annex 3) with 60% of its land area covered by forests.

The lowland TMFs is the main source of timber, and contains the greatest biodiversity of the vegetation types found in West Africa. The complexity of the lowland forest belt is its source of wealth, but it also makes successful forest management difficult. In Ghana, seven vegetation types are included within the lowland forests, each with its distinct associations of plant species, structure and physical environment (Dykstra *et al*., 1996).

Wet evergreen forests occur in the West African TMFs with the highest annual rainfall and poorest heavily leached soil. This is followed in the north by moist evergreen forests with annual rainfall between 1,500-1,700 mm, which is the most important formation for timber production, being rich in commercial species, such as utile (*Entandrophragma utile* Dawe & Sprague), African mahogany (*Khaya ivorensis* A. Chev.) and wawa/obeche (*Triplochiton scleroxylon* K. Schum.) which readily attain heights greater than 50 m. The evergreen or semi-evergreen tree species in West Africa include *Afzelia africana* Sm., *Aningeria altissima* (A.Chev.) Baehni, *Aningeria robusta* (A. Chev.) Aubr. Pellegr., *Chrysophyllum perpulchrum* Mildbr. ex Hutch. & Dalziel, *Cola gigantea* A. Chev., *Khaya grandifolia* C. DC. and *Mansonia altissima* (A. Chev.) A. Chev.. Other important species are *T. scleroxylon*, *Celtis mildbraedii* Engl., *Holoptelea grandis* (Hutch.) Mildbr., *Sterculia* spp. and *Milicia excelsa* (Welw.) C.C. Berg. Dry semi-deciduous forests occur at the northern fringe of the moist semi-deciduous forests, where the annual rainfall drops below 1,500 mm. These variants of lowland forests occur in comparable environmental conditions throughout West Africa.

PLANTATION DEVELOPMENT IN WEST AFRICA

In the humid part of West Africa, countries have significant areas of forest plantations, mostly for industrial purposes (e.g. Côte d'Ivoire, Benin and Nigeria). According to FAO (2000), the area of plantations for high-grade hardwood timber similar to that which is

extracted from the humid forests is insufficient to have any impact on the supply of such timber in the foreseeable future. Forest plantations in West Africa account for more than 20% of all African plantations. However, the statistics on planted forests are not reliable in several countries (FAO, 2000) because of lack of inventories, frequent fires, lack of maintenance and/or uncontrolled clearing (e.g. Guinea, Ghana, Liberia and Chad).

SOCIO-ECONOMIC IMPORTANCE OF TMFS

Tropical Moist Forest ecosystems provide services that are beneficial to humans and their wellbeing. Forest services are known to give us clean water, hold soils firm and help to reduce landslides, take harmful gases out of the air, and provide a safe place for millions of species of plants and animals to live. People living in or near tropical forests can turn to this wealth of plants and animals for food, medicine and materials with which to build their houses. Protection, sustainable management and enhancement of ecosystems, which act as carbon sinks and reservoirs to greenhouse gases are, therefore, imminent.

Healthy forests play important roles in the lives of millions, and possibly billions of people. They disgorge clean water into streams and reservoirs, dish up hundreds of edible plants and animals, dispense a potent brew of medicines and stand ready to supply industrial and local needs for timber, and fuelwood and charcoal. By definition, degraded land and degraded forests cannot do these jobs properly. Water becomes soiled, valuable plants and animals vanish and supplies of timber and fuelwood dwindle.

Tropical Moist Forests provide a range of important ecosystem services and deliverables linked to the need to reduce deforestation and forest degradation. The environmental functions of forests and woodlands include protecting catchment, purifying water and regulating river flows, which, in turn, ensure the supply of water for hydropower generation. Forests and woodlands help to prevent soil erosion from water and wind and, thus, are critical for agriculture and food production. They supply timber, wood for energy, construction materials and non-timber forest products (NTFPs), including food and medicines. Other services include provision of shade, habitat functions, grazing, cultural (sacred groves, shade, peace trees and plants, meeting places, boundaries and training areas) and aesthetic values. The overall value of these goods and services is immense, and it has been suggested that if the value of carbon sequestration is added, the local value of forests could easily support flourishing local livelihoods, while allowing forest-adjacent communities to maintain their security (Akande, 2008). Suffice to say that the social and institutional aspects of these benefits are relevant to the distribution of REDD+ revenues.

THREATS TO TROPICAL MOIST FORESTS

Tropical Moist Forests in West Africa that were estimated at more than 1.5 million km^2, in early 20^{th} Century, are currently less than 0.3 million km^2 (FAO, 2005a), and this makes

them among the most degraded tropical ecosystems on the planet. The main causes of forest degradation, apart from natural disasters, are poverty and pressures of economic development. Economic gains and short-term benefits that are pursued at the expense of the integrity of ecosystems and the vulnerable communities they support.

There is enormous pressure on the limited forest resources in West Africa from conversion to other uses. Increasing human population is causing degradation of the environment at an alarming rate. The biodiversity is affected by the destruction of natural habitats. This implies that attention is urgently needed on the TMF ecosystems, among all other major habitats, because they face a great danger of being destroyed. Climate change is likely to increase this vulnerability. Areas experiencing unusually high rainfall, due to climate change, risk having most of their soils becoming waterlogged as a result of flooding.

Degradation of forests by fire

The moist forests are considered as endangered. These forests have been severely reduced by logging, fires, clearing for agriculture and mining activities. Intensive hunting, coupled with a shrinking habitat, has significantly reduced wildlife populations in the TMFs.

The TMFs remained relatively free of large-scale human-caused fires probably because of their closed canopy structure until the canopy started opening up from unsustainable logging practices. It is on record that about half of the annual global burnt area (300 to 400 million ha) between 2002 and 2003 were in Africa (FAO, 2005b). Open fire was used in small-scale agriculture; shifting agriculture and as a cultural aid to hunting. Thus, the resilience or immunity of tropical rainforests to fire is being eroded.

Forests are also being converted to industrial scale plantations such as oil palm and rubber, and fire is often employed to remove unwanted biomass. Logging helps to dry out the soil and vegetation thereby creating flammable debris that increases the vulnerability of TMFs to fire. The unfortunate aspect is that many TMFs, once burnt, enter a cycle of increasingly frequent fire events until they have been converted to fire-tolerant grasslands and savannahs (Bellefontaine *et al.,* 2000).

Unsustainable deforestation/over-harvesting

Forests have come under increasing pressure from human activities in recent decades, leading to significant losses of forest areas. Urbanization is a cause of forest destruction. People use biomass as their sole source of energy, thereby, contributing to the decrease of forested and wooded areas and promoting deforestation. This will also lead to a reduction of carbon sequestration.

Deforestation in the sub-region is closely associated with demographic conditions: the highest levels of deforestation have occurred in countries with higher population growth rates and higher population densities (FAO, 2005a). Human settlement and economic

activities result in infrastructural development (roads), increased agriculture, bush fires, overharvesting of timber and NTFPs; all these activities impact on environmental change. According to FAO (2005a), the high population density in Nigeria (92 person km^{-2}) has resulted in a great local demand for wood products, which often leads to intense political pressure to convert the forests to agriculture.

FAO (2005c) reported that Ghana documented a decline in natural forest areas between 1980 and 1990 at an annual rate of 138,000 ha. Other countries have been significantly degraded prior to this period but corresponding statistics revealed the annual rates for Liberia, Nigeria and Sierra Leone at 25,000, 119,000 and 12,000 ha, respectively, during 1980-1990. Pressure from increasing population and its resultant impact on forest degradation have been two of the most important factors influencing the evolution of policies.

Cultural agricultural practices

Over 70% of the population in the sub-region is engaged in agriculture, and because of the rapid increase in population and the continuing extensive use of bush-fallowing and land rotation, forest lands in the sub-region are under severe pressure.

CHAPTER 3 National and sub-national REDD+ activities in tropical moist forests of West Africa

THE REDD+ MECHANISM AND PROCESSES

National REDD+ strategy development includes national dialogue, institutional strengthening and demonstration activities. The objectives involve paying governments, companies and forest owners in developing countries to keep their forests instead of cutting them down, and rewarding them for the resulting reduction in greenhouse gas (GHG) emissions. These efforts are continuously being supported by voluntary contributions (Annex 4), such as those administered through the World Bank's Forest Carbon Partnership Facility (FCPF), UN-REDD Programme and other bilateral arrangements. Eligibility for access to funds is based on demonstrated national commitment to REDD+ strategy development.

STATUS OF NATIONAL AND SUB-NATIONAL REDD+ PROJECTS

While there is yet no success story about REDD+ implementation in West Africa, interests in REDD-related projects are considerable in Ghana, Nigeria, Senegal, Liberia, and Sierra Leone. National level roundtables were held with all segments of society concerned with REDD (Private Companies, NGOs, Governments, Traditional Leaders) in Ghana and Liberia (Table 1). National carbon stock mapping for Liberia and Ghana is progressing while all the countries in the sub-region are also considering Low Carbon Economy Option for the future.

Table 1. Status of national and sub-national REDD+ activities in countries with tropical moist forests of West Africa

Country	Success story of REDD+ project	Level of implementation	Other REDD+ related interests/activities
Benin	None	--	Benin has observer status to the UN-REDD Programme's Policy Board.
Côte d'Ivoire	None	--	Observer status to the UN-REDD Programme's Policy Board. In Cote d'Ivoire, forest productivity restored nine (9) years after logging and with the protection of brush fires, the number of new stems increased 2.3-2.5 fold. Increase in productivity, according to Catinot (1994), from 1-1.5 m^3 ha^{-1} yr^{-1}. to 2-3 m^3 ha^{-1} yr^{-1} occurred where rainfall is about 700 mm year-1 while growth of 3-3.5 m^3 ha^{-1} yr^{-1}. is found in moist areas having about 1,500 mm rainfall yr^{-1}.
Ghana (n)	None	--	First country in West Africa to successfully prepare an approved R-PIN in 2009 to secure FCPF status. Observer status to the UN-REDD Programme's Policy Board. Carbon incubator in West Africa was established in Accra. Participation in the World Bank Forest Carbon Partnership to facilitate Ghana's preparedness for REDD+ done. National level roundtables on REDD+ held and National Carbon Committees established. Ghana-EU Voluntary Partnership Agreement was signed to ensure good forest governance that will curtail illegal logging and illegal chainsaw operations. Design and implementation of MRV system is in its early stages. National carbon stock mapping on-going.
Guinea Bissau	None	--	National objective is to reduce deforestation and forest degradation in Tarrafes-de-Cacheu Natural Park. To-date, the country has been able to assemble national, sub-national and local projects and articulate World Bank REDD baseline scenario.
Nigeria	None	--	Admitted to UN-REDD and FCPF with observer status in 2011. Country secured fund from UN-REDD directed towards the

			development and implementation of national REDD+ strategies. Hosted an innovative "REDD+ University" – REDD+ capacity building. Oil giant Shell, in Nigeria's Niger Delta, attempted to bankroll REDD+, a false solution to climate change that puts forests in the carbon market and was denounced as potentially the largest land grab of all time. Endorsed the Great Green Wall for Sahara and Sahel Initiative (GGWSSI).
Sao Tome & Principe	None	--	In the REDD+ framework, COMIFAC had been organizing workshops and supporting capacity building projects in Sao Tome and Principe.
Liberia	None	--	National level roundtables on REDD+ held and National Carbon Committees established. R-PIN successfully prepared for FCPF status. Conservation International (CI) and its partners in Liberia, like the Community Forest Partnership (CFP), are helping to build a green economy where development can happen without environmental compromise. National carbon stock mapping on-going. CFP has been helping to revitalize palm-oil plantations. CI encourages reduced slash and burn practices. CI and its partners are helping Liberians to generate revenue from keeping forest standing. Buchanan Renewables buy unwanted rubber trees in value addition schemes like fuel substitution. Wonegizi - Ziama Corridor is a newly proposed trans-frontier project activity focused on the Liberia side. The project site consists of a high forest habitat of about 35,000+ ha having an Elephant corridor, chimps, pygmy hippo and picathartes. It is a traditional community and reserve land anticipating about USD1.5 million as annual revenue under REDD+.
Sierra Leone	None	--	R-PIN prepared and efforts are ongoing to be included in the next batch of FCPF and UN-REDD countries.
Togo	None	--	Not enough information for sustainable forest management nor sufficient technology and technical support, qualified and trained people, funding and resources to pursue REDD+ programmes.

The UN-REDD Programme assists developing countries to prepare and implement national REDD+ strategies and mechanisms. These actions help countries develop the capacity to implement REDD+ strategies and become "REDD-readiness"; and provide practical experience and lessons learned that can inform the international dialogue on post-2012 REDD+ mechanism. To-date, Nigeria is the only country so far in West Africa that had direct support to National Programmes from UN-REDD. The fund is directed towards the development and implementation of national REDD+ strategies.

As a capacity-building process, Nigeria hosted an innovative REDD+ university-backed workshop with the objectives of:

- enhancing understanding on the REDD+ mechanism among Nigeria's stakeholders;
- facilitating stakeholder engagement and dialogue around forest conservation and REDD+, with emphasis on Cross River State as the demonstration state for REDD+ in Nigeria; and
- stimulating preparatory discussions and arrangements for the implementation of the Nigeria REDD+ Readiness Programme, including options for expanding the scope of REDD+ to other States.

Countries like Benin, Cote d'Ivoire and Ghana have observer status to the Policy Board of UN-REDD Programme. They also participate in regional workshops and knowledge sharing facilitated by the Programme's interactive online workspace.

Carbon Incubator in West Africa was established in Accra, Ghana, to facilitate start-up projects across the sub-region with technical and financial support. Guinea is signatory to the 'Accra Declaration', which resulted from a FAO/ITTO workshop held in Accra, Ghana, in July 2008, which explored the problems and possible solutions to the illegal extraction of forest resources in tropical West Africa. National objective of Guinea Bissau is to reduce deforestation and forest degradation in Tarrafes-de-Cacheu Natural Park. To-date, the country had been able to assemble national, sub-national and local projects and articulate World Bank REDD Baseline Scenarios.

Programme on Forests (PROFOR) supported an effort to analyze the forests sector in five countries (Cote d'Ivoire, Ghana, Guinea Conakry, Liberia and Sierra Leone) and defined elements toward an effective West African forests strategy to ensure conservation and sustainable use of forests, the maintenance of forest ecosystem services, and the fair and equitable allocation of revenues and benefits from forest resources. The Global Climate Change Alliance (GCCA) also provides technical and financial supports to target developing countries to integrate climate change into their development policies and budgets and to implement adaptation and mitigation interventions. It provided support to regional organisations representing developing countries, with an emphasis on capacity building,

applied research, technical assistance and promoting the exchange of experience between the countries. Some of the available technical and financial support is channelled through the GCCA's Intra- African, Caribbean and Pacific (ACP) Group of States, and the West African component of the programme is presented in Annex 5.

CHALLENGES TO IMPLEMENTING REDD+ ACTIVITIES AND PROJECTS

Many investments in primary forest production have long gestation periods and are highly capital intensive. Thus, many investors would hesitate to be involved in projects that would tie down their resources for long periods especially in the face of political and economic instability. Silvicultural techniques and forest management practices in West Africa are critical and the choice between natural and artificial regeneration systems for the TMFs gave rise to many debates and conflicts among early foresters who worked in the region (Wagner and Cobbinah, 1993). The situation is further aggravated by the present high cost of capital where potential investors would have to compete for funds available at fairly high rates of interest. Table 2 lists at country specific levels other key challenges militating against quick adoption of REDD+ practices in the region.

Table 2. Challenges to effective REDD+ activities in countries with tropical moist forests of West Africa

Country	Success story of REDD+ project	Challenges
Benin	None	High population density. Management of industrial plantations for C-stock difficult. Needs environmental education and reforestation policies.
Côte d'Ivoire	None	Serious forest fire problem. High annual loss of forest cover. Education and Funding to arrest the danger of fire. Clearing for agricultural and long-term export of wood products.
Ghana	None	Harvesting of fuelwood and charcoal to over 75 % of energy demand. Agricultural expansion through shifting cultivation and

		encroachment by farmers on protected forests. Forest degradation and deforestation leading to loss of approximately 65,000 ha of forest every year.. A growing population, unsustainable farming practices. Illegal logging and chainsaw operations. Tenure arrangements a potential issue for investors since 90% of land is controlled by traditional customary tenure system. Wildfires and lack of robust monitoring systems. Irregular inventory of forest resource. Lack of reliable data for accurate quantification of carbon stock changes in sustainably managed forests. Need for satellite monitoring. Inadequate incentive to ensure sustainable forest management. High costs associated with SFM/Forest certification. Need to create institutional structures and financial arrangements to manage REDD+ financing.
Guinea Bissau	None	High Forest, low deforestation country. Needs continuous environmental education for sustainability. Need to identify rural development problems to improve environmental initiatives. Institutional and project articulation for GHG reporting, reference emission levels and MRV system.
Nigeria	None	Poor forest inventory. Public ownership of forest dominates while there are few recorded privately owned plantations. High annual loss of forest cover. Poor people rely largely upon natural resources for their subsistence, and those resources are harvested unsustainably. Estimated population of 140 million puts human pressure on the land and on the environment. Illegal logging and flitching frequent. Management of industrial plantations for carbon-stock

		enhancement difficult. Needs include: protected area management, community conservation work, education and training and empowering stakeholders to know how to measure carbon units on their own. Poor land use planning and classification systems make it difficult to know which areas have been very degraded and need to be restored. REDD+-type projects have already resulted in land grabs, violations of human rights, threats to cultural survival, militarization, scams and servitude. At 50% reforestation rate scheme, Salami (2011) projected that Nigeria could sequester 5,923 million tCO2e yr^{-1} amounting to USD M88,251 per year when calculated at a unit cost of USD5 $tCO2^{-1}$. There is, therefore, need to embark on mass reforestation schemes at the federal, state and local government levels. Of significance at the Cross River State, Nigeria, is the Mbe n Afi Mountains Community Reserve. A community and forest reserves focused on Cross River rich gorilla habitat comprising Forest elephant, chimps and drills. There is a 50,000 ha focus area of Community lands off the reserve where REDD+ may provide about USD 1.6 million annually.
Liberia	None	War ravages leading to displaced pressure. Low forest, high deforestation country.
Sierra Leone	None	War ravages leading to displaced pressure. Low forest, high deforestation country.
Togo	None	High population density putting pressure on the low TMFs available.

OTHER CLIMATE MITIGATION ACTIVITIES IN TMFS IN WEST AFRICA

Since, no REDD+ implementation successes are yet to be recorded in West Africa, the REDD-related activities performed as warm-up plans are presented in Table 1.

CHAPTER 4 Potential and pre-conditions for increased implementation

LESSONS FROM REDD+ ACTIVITIES THAT HAVE BEEN IMPLEMENTED

As earlier stated, no REDD+ project had been successfully completed in the West African region. REDD+ pilot activities are either at the RPP proposal stage or, at best, at the incipient stage of implementation as found with Nigeria and Ghana.

Experience from projects successfully implemented in other areas of the world, however, showed that REDD+ and other sustainable land management activities for mitigation have potential benefits, including critical ecosystem services for forest-dwelling indigenous peoples and local communities, but a number of conditions are important for realizing these co-benefits. For example, indigenous peoples are likely to benefit more from REDD+ and other sustainable land management activities for mitigation where they own their lands, where the principle of free, prior and informed consent is allowed, and where local identities and cultural practices are recognized and included in policy-making processes (UNEP/WCMC, 2011; Gregersen, 2012). Involving local stakeholders, in particular women, and respecting the rights and interests of indigenous and local communities will be important for the long-term sustainability of the efforts undertaken to reduce deforestation and forest degradation.

Capturing the mitigation potential of REDD+ requires a flexible, phased approach for implementation in order to accommodate:

1) the diverse capabilities of REDD+ countries;

2) an expanded scope of REDD+ to include conservation, sustainable management of forests and enhancement of forest carbon stocks; and

3) the short-term constraints of the current global financial crisis.

Economic potential of REDD+ could be significant. In Indonesia, REDD+ had shown a potential total value of USD 2 billion yr^{-1} while the projection for REDD+ projects in the Cross River State of Nigeria is in the tune of USD 200 million yr^{1}. Actual costs can be realistically estimated only by careful, country-by-country analyses, and by taking a more holistic approach to the assessment of REDD+ costs and benefits. As a tentative guide, Annex 6 shows the estimated cost of various readiness activities (Hoare *et al.,* 2008).

The hope is that those who pay the greatest price for halting deforestation would gain the greatest benefits. There is also a need to clarify land, tree and carbon stock tenure; improve technical expertise and capacity for carbon mapping and agreed carbon stock values; bring together national and sub-national project level approaches in an acceptable manner.

There is a wealth of experience with MRV for REDD+-type activities at the sub-national scale based on both the voluntary markets and the CDM. Given the extent of the experience, methodologies, standards, and guidelines that exist for monitoring and reporting such sub-national-scale activities, these methodologies and standards based on good science and IPCC good practice guidance, are designed to attain estimates of carbon units with high levels of accuracy and precision. For example, CO_2FIX - Forest Accounting Software; and FORCARB2 are reliable and cheap predictive software tools to visualize forest management impacts on carbon sequestration in trees to inform local decision-making (Dougill *et al.,* 2012). Communities can be empowered if they have the means to monitor carbon stocks and make decisions. Standards for verification and verifiers can be built on the existing CDM model.

PRECONDITIONS FOR INCREASED IMPLEMENTATION

To deal with the various challenges highlighted in section 3.3 requires: (i) improvement policy and advocacy; (ii) capacity building and skill development; and (iii) learning, knowledge generation and information management. The key issues must promote the topics discussed below.

Reliability of forest database

Only a few countries carried out an evaluation of their forest resources at the national level during the 1990s (e.g. Benin, Burkina Faso, Guinea-Bissau, the Gambia, and Nigeria). Other West African countries made earlier national forest assessments (Senegal in 1985, Sierra Leone in 1986, Chad in 1988, Togo in 1975 and Liberia in 1981). The remaining West African countries have undertaken partial assessments covering only parts of their national forests. Consequently, the documented forest areas for some West African countries are based on national expert estimates (e.g. Chad, Ghana, Liberia, Mauritania, the Niger, Sierra Leone and Togo).

Indigenous people's experience

Local and indigenous peoples' experience in forest management makes them indispensable partners in REDD+. Their knowledge could significantly contribute to monitoring and reporting of REDD+ results. Other important issues include improving forest staff training, conducting educational programmes for the public on sustainable agricultural practices and agroforestry techniques, promoting alternative energy sources and energy saving techniques, and improving the use of wood products (FAO, 2000).

Resolution of tenure and allied challenges

An important and also critical issue is the lack of clear and unambiguous legislation on tree and forest tenure, and rights to use timber and other wood resources from forests. Customary land tenure regulations often discourage tree planting by tenants, who may be strangers, because planting and owning trees traditionally entail title to the land (Westergren 1995).

Institutional capacity

Forestry institutions in most West African countries are poorly equipped to implement REDD+. Many countries have the administrative and technical capacity to carry out forest plantation work but the maintenance and commercialization of plantations are also impacted by the lack of financial means (FAO, 2000).

REDD+ as a unique opportunity

REDD+ is to be seen as a unique opportunity relying on some old approaches of protecting the ecosystem. Effort must be made to learn from the past while moving forward. Development of reference levels may require evaluation of biomass equation for TMFs. If we understand land-use dynamics of TMFs in West Africa, it will be easy to identify opportunities for reducing greenhouse gas emissions.

Economic attractiveness and funding

The challenges faced now are to find ways to make forest conservation economically attractive both to local people and on the national level. The goal is to build up the highest possible stock of carbon. Funding for capacity building and government REDD+ programs will have to be available up-front. Funding to develop REDD+ capacity is unlikely to come from private markets.

Up-front funding is needed to help with project development and implementation costs and could come from private investors, multilateral agencies, government (domestic or international) or philanthropic donors.

Governance issues

There should be an open call for increased involvement of stakeholders in the decision-making process and emphasize that distribution of benefits must reach the people who are local forest stewards. Olawoye (1994) reviewed the issues of gender implications of land and tree tenure in Nigeria and noted that for women to plant a few trees around their compounds or on the family farms, will require educating the male decision makers of the communities about the advantages to be gained.

Consultation with local stakeholders

Consultation with local stakeholders ensures the appropriate people are included in and support the project. Community-based monitoring based on local knowledge, combined with scientific knowledge (e.g. remote sensing), could feed into national measurement, reporting and verification of REDD+.

Fire management

Forest fires are considered one of the greatest constraints to conservation and sustainable forest management. Uncontrolled fires, in conjunction with shifting cultivation, result in poor herbaceous vegetation, which could be controlled through appropriate stakeholder consultation.

Titular problems

Risk that the host country will interfere with the project, e.g. via expropriation (of land, forest or units), imposing new taxes, revoking permits, etc. must be low. Land and forest tenure, and use rights as well as laws regarding carbon unit ownership and transfer should be clear and transparent.

Testing REDD+ through pilots

The key messages and dilemmas include how: (i) to evolve a new unique REDD+ that build on previous experience; (ii) the concept will be transformational in a world where change is incremental; and (iii) to obtain targeted interventions and broad sectorial coordination where policies shall be bias towards projects. Actors may appear to know a lot already but must be prepared to learn while doing.

Benefit and cost-sharing

The way in which benefits and costs are shared is likely to be a key factor in developing REDD+ systems that are sustainable in the long term. It is frequently argued that ensuring benefits reach those actors most affected by REDD+ policies, such as the forest dependent poor, is the only way to ensure that forests are effectively protected.

Forest and environmental education

Sustainability of the environment can only be achieved when the forest resource users are well educated to ensure continuity in the supply of goods and services offered by the forest while preserving the intrinsic quality of the environment. Capacity building and institutional requirements are essential as well as identification of the institutions' needs and roles. Depending on the country, the institutional stakeholders could be Forestry Commission, Forest Fringe-Communities, Traditional Authorities/Land owners, District Assembly, Civil Society, Environmental Protection Agencies (EPA, Research Institutions, Minerals

Commission, Petroleum Oil companies, Timber Industry, Universities, etc.). Capacity needs include inventory capabilities (e.g. GIS capabilities) and capacity to work with local communities.

Location and landscape of REDD+ projects

Landscape of REDD+ projects varies significantly: Third party certification has a major influence - CCBS: Climate Community and Biodiversity Standards - Voluntary carbon standard (VCS) may be applicable.

Design, objectives and priorities of REDD+

The extent, to which REDD+ provides ecosystem benefits and the possible risks, will depend in part on how REDD+ is designed. For example, the inclusion of forest conservation as a REDD+ activity will be broadly beneficial to biodiversity, whereas the inclusion of carbon stock enhancement in the REDD+ framework might in some cases lead to policies that increase carbon sequestration at the expense of biodiversity and water regulation services. Design and implementation of community-based projects for payment for ecosystem services include the need for:

1) links to strong existing local institutions;
2) clear land tenure arrangements;
3) community control over land management decision-making;
4) up-front and flexible payment schemes;
5) capacity building for community monitoring; and
6) awareness raising using visual simulation tools to support decision-making by highlighting the long- and short-term benefits of management options (Dougill *et al.,* 2012).

Confidence in long-term demand for REDD+ units

Confidence that a market will exist for REDD+ units in the future is important. Most governments will be unlikely to support REDD+ if it is seen as high risk or not in the country's interest. The conditions must be implementable by current and future governments and must survive future changes in government. It is essential to support demand for REDD+ units and maximize price. Options to ensure permanence include buffer accounts, risk-discounting and insurance.

Avoiding risk of displaced pressures

There is risk of displaced pressures, whereby protection of high-carbon forests leads to additional pressure to convert or degrade lower carbon ecosystems that may be important for biodiversity or flood regulation, such as wetlands.

It may also be useful to provide incentives for all rainforest countries and forest ecosystems for the fear of deforestation moving to unattended sectors that will scuttle the goal of avoided GHG emissions from deforestation and forest degradation. Incentives must be at a scale required to solve the problem, otherwise, it may not out-compete other legitimate economic activities that drive deforestation.

Monitoring and measuring carbon pools

Building civil society capacity for monitoring and measuring carbon pools is critical. Minimum standards should be developed in the 'readiness' phase of REDD+ to help make sure that these safeguards are honoured. As countries move forward with REDD+, their development priorities and policies on the multiple benefits of forests will need to be formulated.

Financial monitoring, reporting and verification

These are as important as monitoring, reporting and verification of carbon emissions. The use of Reforestation Funds to subsidize plantation development, coupled with weak mechanisms for accountability, gives room for corruption.

CHAPTER 5 Best REDD+ practices and approaches: potential for up- and out-scaling

Some tropical forests in Asia and Latin America have recorded positive restoration efforts through REDD+, but the same could not be said of West Africa since there is no record yet of successfully implemented REDD+ project. REDD+ activities in the TMFs of West Africa is at its incipient stage of adoption. Creative efforts of Wetlands International IUCN, UNESCO and USIAD are recognized, but there is need for more directed commitments of stakeholders, including governments, bilateral and multi-lateral agencies, NGOs and the local communities themselves, to foster improved performance through innovation and creativities 'outside the box'.

Best practices are traced to Trinidad and Tobago, Kine Bay in Papua New Guinea, Vietnam and Indonesia, etc. The various reasons and objectives for REDD+ activities in these regions are highlighted with the hope that lessons learnt, when feasible, could be adapted to the West African situation. They therefore recommended Reduced Impact Logging (RIL) to decrease under-storey disturbance and potential carbon enhancement.

USAID is implementing a Forest Carbon Markets and Communities (FCMC) project in coordination with projects of Central Africa Regional Program for the Environment (CARPE) and Sustainable and Thriving Environment for West African Regional Development (STEWARD) in West and Central Africa. The objective is to better understand the role of shifting cultivation in relation to forest degradation and deforestation drivers in West and Central Africa, and the issues, opportunities and constraints associated with shifting cultivation. As REDD+ may be moving toward reductions in emissions from all land uses (REALU), a better understanding of forms of shifting cultivation can help planners identify and promote systems that sequester carbon in different ways.

The Go-REDD+ issue entitled, "Lessons from REDD+ on how to become a forest-adding country" (Gregersen, 2012) showcased how Chile, China, India, the Republic of Korea and Viet Nam have managed to add millions of hectares to their forest estates in recent decades. It also suggested what and what not to do under a REDD+ mechanism. In Africa, projects with success stories that already obtained Plan Vivo certification are found in Malawi (Trees of Hope), Uganda (Trees for Global Benefits) and Mozambique (Sofala Community Carbon) (Dougill *et al.,* 2012).

The principal criterion for participating in a Plan Vivo project is clear ownership/tenancy/recognized user rights of land, whether as an individual or formal user group. Projects are coordinated by a project coordinating body (PCB) that works closely with local government authorities to support project objectives. The PCB is responsible for marketing Plan Vivo certificate, handling policy matters, database management, coordinating project activities and annual reporting to the Plan Vivo Foundation. The PCB, typically, has a team of field staff responsible for training and capacity building, community engagement and leading carbon-monitoring activities. Plan Vivo Foundation staff are involved in the verification of annual reports, whereas projects are validated by third parties who are approved by Plan Vivo according to clear guidelines. Carbon accounting periods are calculated between 25 and 100 years, and usually front-loaded, being paid to participants during the first 10 years of accreditation. This compensates for the costs of altering land-management practices and provides money prior to the delivery of additional economic benefits from trees, such as from fruit harvests, non-timber forest products and/or increased crop yields owing to improved soil fertility (Garrity *et al.,* 2010).

If REDD+ is to achieve significant and permanent emissions reductions, it will be important to provide alternative livelihood options, including employment, income and food security, for those people who are currently the agents of deforestation and degradation. Both intra-national and international leakage under REDD+ can have important consequences for both carbon and biodiversity, and, therefore, needs to be prevented or minimized.

REDD+ activities implemented at the sub-national level would have to bring the proof that they generate credible emission reductions that are additional to those emissions that would occur in the absence of the project. Projects would either have to adopt pre-existing regional emission reference levels (baselines) or establish their own emission reference level.

Credits will be awarded if emissions from deforestation can be kept below the historical baseline reference emission rate (RER). Thus, in areas where local land tenure rights are recognized, projects can result in clear benefits to local communities.

REDD+ has evolved to include sustainable forest management and reforestation. Reduced emissions from deforestation and forest degradation as well as conservation, sustainable forest management (SFM) and enhancement of forest carbon stocks (ECS) are all mentioned as important elements of action on mitigation of climate change in the Bali Action Plan.

Key elements to successful REDD+ project implementation experience are the essentials of:

1) project concept and feasibility - PIN;

2) financing plan;

3) project design - PDD;

4) project certification; and

5) project implementation.

Innovative funding could be derived through levy on international transport. Communities can also directly apply for funding, although national governments will issue certificates.

To develop a national REDD+ framework and guide the process of formulating national REDD+ strategy, issues like financial mechanisms and incentives, coordination of REDD+ activities, governance for REDD+ and capacity building at all levels should be enhanced and well considered in the national REDD+ strategy. Awareness raising at all levels should be enhanced to ensure that political support is in place, showing interest in REDD+ and understanding well the ecosystem co-benefits.

CHAPTER 6 Other relevant climate change mitigation activities and their potential for up-and out-scaling

Additional climate change mitigation activities to be considered, in this section, are to be classified into three main categories, i.e. the: (i) triggering features that make REDD+ attractive, (ii) enhancing features comprising management of technical and policy issues, and (iii) sustaining factors that make for continuity. Each step along the road to REDD+ may have implications for the quantity and quality of multiple benefits that result. Benefits depend on the location of REDD+ sites, activities undertaken, and national policies and investment plans put in place to implement REDD+.

TRIGGERING ACTIVITIES

Motivation

Climate Change Partnership with a willing and forward looking developed economy could help to support REDD+ pilot activities in moist tropical West Africa, including capacity building and national strategy development and implementation. In addition to climate change mitigation, REDD+ initiatives may enhance conservation of forest resources in the entire TMFs landscape management schemes. Financial flows from REDD+ actions and forest conservation might have socio-economic benefits, such as reducing poverty. REDD+ actions may also spark political change toward better governance, less corruption and more respect for the rights of vulnerable groups as well as boosting the capacity of both forests and humans to adapt to climate change and gain knowledge on ecosystems services and their values. An example would be recognition of forest and woodland resources as important carbon sinks for sequestration of carbon dioxide from the atmosphere.

Map-based analyses

Currently, several UN-REDD Programme countries are being supported to test different approaches, such as developing map-based analyses to aid in prioritisation of areas to secure both carbon stocks and additional multiple benefits. Centre for Agro-Meteorology and Operational Hydrology (AGRHYMET) could be useful for addressing REDD+ mapping needs in the region.

Consultations to identify country needs and priorities

Future activities include consultations to identify country needs and priorities, further map-based analyses, exploration of the role of valuation of multiple benefits and approaches of payment for ecosystem services, and development of a framework for understanding the consequences of land use decisions for biodiversity and ecosystem services.

Knowledge of opportunities and multiple benefits

As countries move forward with REDD+, their development priorities and policies on the multiple benefits of forests will need to be reactivated. The UN-REDD Programme, collaboration with FAO, UNDP and UNEP, supports countries in their efforts to integrate multiple benefits into their REDD+ strategies and development plans.

Reducing deforestation could present opportunities for biodiversity by slowing habitat loss and fragmentation, but could also result in harms if land-use change is displaced to other ecosystems with valuable biodiversity or ecosystem services. REDD+ could be used to enhance: (i) sustainable forest management, even for fuelwood utilization; (ii) avoided deforestation and conservation of forest carbon stock; (iii) good forest governance that curtails illegal logging; and (iv) reduced slash and burn practices.

Countries will need to make decisions about priorities and trade-offs with regard to multiple benefits when implementing REDD. REDD+ should conceptualize, before engagement, the threats for deforestation and the rate of deforestation/degradation and whether or not the size of the project area is large enough to be economically viable. It should also have idea of the habitat type and the carbon stock levels per hectare. What the residual biomass/carbon situation would be after deforestation and what are the land tenure and ownership of carbon connected with the target site. What is the potential contract period? 20 years? 30 years and what price can the project generate per ton of carbon?

ENHANCING FACTORS

Funding and cash incentives

Communities that wish to establish projects to conserve forest areas or manage them on a sustainable basis could seek funding to establish a Community Forest Retention Trust (CFRT) Account. Communities could draw on a prescribed percentage of this account to establish measures to combat emissions from deforestation and forest degradation. The remaining amount would be set aside in the CFRT account. A community could, then, draw upon the interest from the Account on an annual basis, based on the concept of being paid an annual ‘rent for environmental services’. Resources for capacity building should come from multilateral institutions and voluntary donors.

Education and awareness raising

Most human actions succeed through motivation which depends on clear understanding of associated issues. Environmental consciousness and appropriate response must be facilitated through proper environmental education. It is paramount to evolve a programme of assistance to forest and rural communities to help prevent illegal logging and illegal trade in tropical timber. Training on reduced impact logging (RIL) is necessary and, as such, local educational centres should be used to propagate know-how and best practice of harvesting by using low impact logging.

Fire control and management

Fire control and management in tropical forests is not an easy task. Many of the countries in which cultural use of fire is endemic are desperately short of the resources they need to address the unwanted outcomes: poverty remains the biggest obstacle to the effective implementation of integrated forest fire management. Thus, fighting fire in moist tropical countries will require a much greater injection of funds and expertise from the international community than has been available until now.

Clean and lean developments

Forestry dependent projects and processes must work towards pollution free, renewable and recyclable strategies to be environmentally friendly. The associated activities must not constitute health hazards to workers and must require low energy consumption and efficient resource utilization. With renewable resources, such as forestry, sustainable development is possible if the rate of harvest equals or is below the rate of replenishment. To achieve this, efforts should be pitched towards: (i) promotion of efficient logging regimes; (ii) arresting illegal logging/flitching; (iii) attraction of eco-labelling, which is a World Trade Organization (WTO) standard of approval; and (iv) encouragement of community stewardship in forest management. Where these mitigation issues are recklessly handled, environmental problems incidental to forest ecosystem disturbance are increased global temperature, air pollution, desertification, erosion, devegetation/illegal logging and flitching (Akande, 2008; Akande *et al.,* 2011; Akande *et al.,* 2011).

Appropriate technologies

The carbon sink facilities are already threatened in West Africa, and the agriculture and forestry options include conservation tillage, restoration of degraded lands, reforestation and diverse agro-forestry systems. Agro-forestry is seen as a sure way of converting several unproductive cocoa and food crop farms into multipurpose forest lands as in the participatory tree domestication programme in Cameroon managed by ICRAF (Pye-Smith, 2010).

SUSTAINABILITY INDICES

Equity

There is need to empower local people with equitable share of costs and benefits while embracing adaptive and holistic approach to forest management to enhance environmental and social values.

Value addition

The renewable natural resource sectors, where value addition remains weak, offer large investment opportunities in TMFs of West Africa. It is regrettable that some TMFs in West African countries still export round-wood to-date. That implies, shipping African jobs when other countries are looking in-ward. In view of the growing waste problems in African cities, waste recycling projects are recommended to achieve three objectives - income generation, job creation and environmental management for sustainable development. A Public-Private-Partnership (PPP) can be arranged if returns do not fully stimulate private sector's initiative.

Policy reforms

Stakeholders' commitment to the management and restoration of degraded and secondary forests should be improved. Forest governance must formulate and implement supportive policies with appropriate legal frameworks and institutional arrangements that will support integrated approaches to resource assessment, planning and management.

Network of protected forest areas in contiguous countries

Safeguarding biodiversity is key to increasing the trans-boundary conservation reserve network and ensuring its lasting protection. The vision must assist tropical West Africa to create network of protected forest areas in contiguous countries while also helping to increase awareness about the importance of forests for the goods and services they provide. For example, fire and its effects do not respect political boundaries. Therefore, international coordination may be needed.

Participatory monitoring and evaluation

REDD+ would be up-scaled to guarantee participatory monitoring and evaluation as a basis for adaptive management and, at the same time, promote economic and financial viability.

UP-SCALING STRATEGIES

Conservation, rehabilitation and restoration of West African TMFs would be assessed on the basis of:

- whether the actions to be taken would lead to mal-adaptation, natural resource depletion or sustainable development;
- whether it would lead to social dislocation or economic growth;
- restricted employment or multiplier effects resulting from more efficient use of resources;
- creating buffer zones or heightened risks and hazards;
- despoliation of landscapes or landscape restoration; and
- threat to or preservation of cultural heritage and assets.

Forest regeneration concessions could be granted, at agreed cost per ha, following precedence established by the Indonesian Government with the granting of a 100-year forest regeneration concession for the 101,000 ha Harapan Forest in Sumatra. The concessionaire shall obtain verification for estimates of carbon stock of the forests and also for the potential sequestration of carbon by regeneration of the forests.

REDD+ funds could be used to finance a multitude of different policies and measures, such as forest protection policies: improved enforcement of protected areas; expansion and better implementation of participatory forest management; also land reform processes like tenure reform surrounding the issue of landlords and tenant farmers.

There should also be strengthened implementation of energy policies to rationalize sustainable use of forest resources for energy production.

To be sustainable, monitoring and evaluation systems and tools that the UN-REDD Programme adopts will be characterized by low maintenance and low cost systems, flexibility to respond to different information needs and accessibility to information. Monitoring will focus on whether the programme is achieving its stated actions and progress towards achieving stated results, and will be carried out internally. As part of the monitoring functions, periodic reviews and rapid assessments of performance of activities under the UN-REDD Programme should be undertaken.

CHAPTER 7 Conclusions and recommendations

Tropical moist forests (TMFs) occur in humid tropical areas, usually with 1,500 mm or more of precipitation and one or many dry seasons of three to four months or less. The TMFs and climate change have significant impacts on national economies and social systems. Rapid and uncontrolled population accentuates social, economic and environmental problems. Actual rate of deforestation varies from one country to another. In Guinea, Liberia and the Ivory Coast, there is almost no primary forest cover left unscathed. In Ghana and Nigeria, the situation is much worse, and nearly all the rainforests are cut down. At the present trend of deforestation, experts estimate that the rainforests of West Africa may disappear by the year 2020.

Moist forests and woodlands are declining primarily as a result of increased wood fuel collection, clearing of forests for agriculture, illegal and poorly regulated timber extraction, land tenure conflicts, increasing urbanization and industrialization. As resources dwindle and the agricultural frontier expands, pressure to convert the TMFs will increase. Thus, the forest situation in tropical West Africa presents enormous challenges, reflecting the larger constraints of low income, weak policies and inadequately developed institutions.

In the face of the rapidly diminishing forest and biodiversity, REDD+ represents an opportunity for partnership between developing and industrialized countries for the benefit of the global climate system. Developing countries would participate by undertaking REDD+ actions while industrialized countries participate by sharing the costs associated with the actions. REDD+ can also lead to direct social benefits, such as jobs, livelihoods, land tenure clarification, carbon payments, enhanced participation in decision-making and improved governance.

The main benefits of REDD+ are embedded in its capacity to: (i) enhance economic potential of stakeholders; (ii) draw on indigenous peoples experience in evolving best practices; (iii) enhance map-based identification of the threatened moist forest habitats in each country; (iv) secure tree and forest tenure and rights to the use of timber and other forest resources; (v) improve information and knowledge of forest resource assessment; and (vi) equip institutions responsible for forest resources to implement REDD+ projects effectively.

Strong potential for up- and out-scaling REDD+ in the TMFs of West Africa are found in: (i) environmental education - forest and environmental education must be enhanced because development and sustainability are at stake; (ii) broad policy reforms that raise the profile of climate change for capacity development; (iii) clear understanding of environmental services

to be paid for; (iv) eco-labelling to sustain forest management practices; (v) stakeholder involvement and participation that calls for consensus and cross-sectorial coordination; and (vi) making Free Prior Informed Consent (FPIC) on on-going processes, rather than a single event, and adequate time allowed for their careful management.

Greater leverage through REDD+ is achievable through improved forest and environmental education, clear definition of local project needs and priorities that are sensitive to the landscape and implementation that ensures long-term confidence in the demand for REDD+ units while avoiding leakages or displaced pressures.

Climate change mitigation using REDD+ can be triggered through motivational apparatus following map-based analysis of the degraded eco-zones, consultations to identify country needs and priorities as well as identification of opportunities and multiple benefits. The concept could be enhanced through funding and cash incentives, better fire control and management, clean and lean development technologies and agro-forestry. REDD+ funds could be used to finance a multitude of different policies and measures, such as forest protection policies, improved enforcement of protected areas, expansion and better implementation of participatory forest management, and land reform processes like tenure reform surrounding the issue of landlords and tenant farmers.

Finally, exploiters of forest products must commit to responsible and sound practices, and assume more of the costs of their impacts. With these practices, and if stakeholders work in concerted efforts, the TMFs may continue to yield biological, economic and social benefits well into the future.

KEY OBSERVATIONS AND RECOMMENDATIONS

From the current outlook, West African TMFs face many hurdles and challenges to effective adoption and successful implementation of REDD+ projects needed to mitigate climate change. Key recommendations that the African Forest Forum can consider to positively influence and upscale REDD+ readiness strategies in the sub-region are presented in Table 3.

Table 3. Key observations and recommendations to the African forest Forum

	Key observations	Status assessment	Recommendations to AFF
Learning, Knowledge Generation and Information Management			
A	The future of the West African TMFs is tied to the sharing of knowledge and skills on environmental issues.	It is valuable to analyze and raise awareness of national and international responsibilities concerning rights as they relate to REDD+. Most West African countries with TMFs will need enhanced capabilities in both current and evolving technologies in remote sensing and in methods for measuring and estimating carbon stocks in key pools.	AFF could help to establish reliable baselines and robust monitoring approaches for advancing REDD+ in the sub-region including the need for investment in inventory and ground truthing capacity as well as remote sensing. Communities can be empowered if they have the means to monitor carbon stocks and make decisions.
B	There is need for integrated evaluation of biomass dynamics related to TMFs at national levels	The UN-REDD Programme works with countries to address both ecosystem-based and social benefits as well as a range of other REDD+ relevant areas. West African countries with TMFs have opportunities to take advantage of this.	AFF could evolve programmes to periodically supply data on national forest budget allocations and disbursements for comparative evaluation and encouragement to do better.
Capacity Building and Skills Development			
A	REDD+ demonstration and awareness raising is crucial to the sustainability of the TMFs	There is need for up-front funding for capacity building. REDD+ would promote attitudinal changes to nature and concern for the environment as well as motivation for actively participating in environmental improvement and protection.	AFF should be involved in REDD+ demonstration and awareness raising by helping to generate videos, mimeo and documentaries on threatened species and the degraded habitats and reasons for their protection and restoration.
B	Stakeholder participation is a recipe to community-based forest ecosystem services and should be supported by strengthening organizational, administrative and operational/technical	A mechanism for engaging businesses, civil society and government in delivering a resilient low carbon future should be put in place. Government support and goodwill are also needed to plant trees on marginal lands, streets and	AFF could give recognition awards to model West African countries doing well in promoting sustainability of TMFs.

	capacities.	community lands.	
C	A policy and legislative framework and corresponding institutional arrangements are required to protect the community's rights to forest resources, promote access to markets, ensure proximity to markets, improves local expertise, give access to information, improves institutional capacity to manage resources, add value to products and services, increase the negotiation capacity of the local people and promote partnership.	Community-Based Forest Groups in different West African countries need to be encouraged and involved in REDD+ projects. Consultations must be held with stakeholders to identify key information needs and incorporate country priorities and possible pressures and threats.	AFF policies and advocacy should encourage downstream value addition to products coming out of the west African TMFs.
D	Forest regeneration concessions should be part of Forest management contractual agreements	When forests that would have been lost or degraded, are retained or restored through REDD+, they deliver multiple benefits in addition to protecting or enhancing carbon stocks.	AFF could contribute towards strengthening institutions (e.g. Forestry Departments and Commissions) established to manage West African TMFs to develop advance deforestation tracking system.
E	Potential national and sub-regional activities could strengthen the role of West Africa's moist forests and trees to adapt to climate change and mitigate its adverse effects in ways that will enhance livelihoods, sustain biodiversity and improve the quality of the environment	If REDD+ is pursued in locations with very high lost opportunity cost, then, the likelihood of failure is high. Areas with high return agriculture (e.g. soya and palm oil) will under normal conditions struggle to succeed.	AFF should get involved in negotiations that make Carbon Revenue from REDD+ projects equal or be greater than opportunity cost of other land use options. AFF should also look into operational and organizational barriers to further development of Community-Based Forest Groups in different West African countries and suggest remedies to these problems.
F	National strategies to tackle forest loss and associated climate change in TMFs of West Africa are likely to differ and will require diverse policies and measures suited to the country's economic, political, historical, cultural and environmental context.	Careful examination of existing policies and practices in order to understand the nature and extent of intervention required to influence the effectiveness of their involvement in the REDD+ mechanism is needed.	

G	There is a real level of poverty in most rural areas of tropical West Africa, and these communities are in desperate need of development and capital.	Better guidelines need to be developed for benefit sharing systems at local levels and significant REDD+ finance will be needed to broker and implement effective agreements.	
Improvement Policies and Advocacy			
A	There is no solution to climate change without forestry, and there is no solution to deforestation without the support of forest dependent communities. REDD+ should simultaneously address climate change and rural poverty while conserving forests, biodiversity and sustaining vital ecosystem services.	Countries must demonstrate political will, commitment and effective actions to improve skills, monitoring systems and infrastructure required for REDD+. A fair price should be paid for all the important goods and services produced by tropical forests.	AFF must continue to advocate for: ▸ sustainable management of TMFs so that harvesting for timber and other goods and services do not damage the forest; and ▸ avoidance plans in project design to tackle the risk of forest fire through establishment of fire monitoring committees, education and fire breaks.
B	There are uncertain tenure arrangements in many parts of West Africa. A review is necessary of the current land, tree and forest tenure systems, as well as the forest and timber laws, to give the right of ownership of trees to farmers who have the customary or statutory legal farming rights over any parcel of land	There is need to: ▸ provide incentives for private investment in development, sustainable management and conservation of forest resources; ▸ design REDD schemes that build on existing institutions and systems for dealing with undefined or unsecure property rights (including cases in which land tenure does not accurately reflect the existing community uses of land); ▸ appropriately manage the perceived balance of risks and benefits; and ▸ enable flexibility in improving communications between the different levels of institutional infrastructure.	AFF could educate on boundaries to rights and developments outside 60 m minimum distance to river banks and wetlands for biodiversity conservation.

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Annex 1. Change in forest cover of West African countries having tropical moist forests during 1990-2010

Countries	Forest area in 1990 (km2)	Forest area in 2010 (km2)	Proportion of change since 1990 (%)*
Benin	51,600	45,610	- 20.8
Cote d'Ivoire	102,220	104,030	1.8
Ghana	74,480	49,400	- 33.7
Guinea-Bissau	22,160	20,220	- 8.8
Liberia	49,290	43,290	- 12.2
Nigeria	172,340	90,410	- 47.5
Sierra Leone	31,180	27,260	- 12.6
Togo	6,850	2,870	- 58.1

* A negative number for "Annual change" and/or "total change" reflects deforestation. A positive number in these columns suggests that forest is re-growing or, more likely, plantations are being established.

Annex 2. Direct and indirect effects of REDD+ on ecosystem benefits

Benefit	Direct effects of REDD	Indirect effects of REDD
Biodiversity	Positive. Some forests will be higher in biodiversity than others, and some management practices will be more beneficial than others. Some risks if forests are managed only for carbon and if access is restricted.	May lead to increased conversion pressures in low carbon forests and non-forest ecosystems, with consequent loss of biodiversity
Water regulation	Positive. All forests provide water regulation. Some forests are more valuable than others in this respect (e.g. watersheds). Some risks of water depletion in the case of plantations on land not formerly forested	There may be some displacement of pressures to low carbon ecosystems that play a water regulatory role.
Timber	Restriction of logging practices may reduce production levels, but could ensure sustainability if appropriately implemented.	Timber pressure could be displaced to non-REDD countries
NTFPs	Mostly positive, although actions to restrict forest degradation may interfere with access	

Source: UN-REDD Programme (2009).

Annex 3. Forest resources and area change statistics in West Africa

Country/area	Land area ('000 ha)	Forest area in 2000					Area change during 1990-2000 (total forest)	
		Natural forest ('000 ha)	Forest plantation ('000 ha)	Total forest			('000 ha year^{-1})	Proportion (%)
				Area ('000 ha)	Proportion from total land area (%)	Area (ha) capita^{-1}		
Benin	11,063	2,538	112	2,650	24.0	0.4	- 70	- 2.3
Côte d'Ivoire	31,800	6,933	184	7,117	22.4	0.5	- 265	- 3.1
Ghana	22,754	6,259	76	6,335	27.8	0.3	- 120	- 1.7
Guinea-Bissau	3,612	2,186	2	2,187	60.5	1.8	- 22	- 0.9
Liberia	11,137	3,363	119	3,481	31.3	1.2	- 76	- 2.0
Nigeria	91,077	12,824	693	13,517	14.8	0.1	- 398	- 2.6
Sierra Leone	7,162	1,049	6	1,055	14.7	0.2	- 36	- 2.9
Togo	5,439	472	38	510	9.4	0.1	- 21	- 3.4
Total West Africa	733,359	83,369	1,710	85,079	11.6	0.4	- 1,351	- 1.5
Total Africa	**2,978,394**	**641 830**	**8 036**	**649,866**	**21.8**	**0.8**	**- 5,262**	**- 0.8**
Total World	**13,063,900**	**3,682,722**	**186,733**	**3,869,455**	**29.6**	**0.6**	**- 9,391**	**- 0.2**

Annex 4. Detail of funding sources, amounts and purpose

Source	Amount	Purpose
Multilateral		
World Bank BioCarbon Fund	USD 538 million tranche 1; USD 381 million tranche 2; Funds will be disbursed over the life of the fund (may be up to 2022)	Focus on AVR with some pilot REDD+ project Managed by World Bank
Forest Carbon Partnership Facility (FCPF)	USD 300 million over the life of the fund.	Readiness Fund to support readiness in 20 countries. Carbon Fund to buy REDD+ carbon credits. Managed by World Bank.
Congo Basin Forest Partnership	USD 230 million over several years.	Sustainable management of the Congo Basins Forests and Wildlife Partnership started September 2002 and is open ended.
Congo Basin Forest Fund	USD 100 million	REDD+ capacity building. Managed by Congo Basin Forest Fund secretariat.
The Forest Investment Program (part of the strategic climate fund)	USD 1 billion	Focus on forest conservation and sustainable forest management (SFM). Details under discussion and may include REDD+, AR, SFM agriculture, governance. The strategic Climate Fund is one of two funds established under G-8 Climate Investment Fund with USD 1 billion in pledged funding.
FAO National Forest Programme Facility	USD 48 million per year	Support country's national forest program process. Focus on capacity building and information sharing in operation since 2002.

FAO National forest Monitoring and Assessment Programme	Support per country	National forest and land-use monitoring assessment and reporting. Reports completed in 15 countries with 20 additional expected.
International Tropical Timber Organization (ITTO)	USD 16 million per year	Capacity building for SFM from sustainably managed forests.
MA project (cooperative project on mitigation of and adaptation to climate change in sustainable forest management in Baro America)	Up to € 40,000 per project proponents or their partners must pay 40% of the cost of the project.	Mitigation and adaptation Project proposals located in the baro-American region, Central America, Amazon, Andes and the Southern Core. CFOR administer the fund to support eligible projects and CFOR jointly coordinate MA projects CATIE. Oversees technical implementation of MA projects in the baro-American region. Forestry for sustainable economic development environmental conservation. Agreed increment global benefits from biodiversity and degradation and climate change.
Regional development banks.	USD 14 million per year	
GEF	USD 109 million	
Adaptation Fund	Several hundreds of millions USD per year	Adaptation measures in countries that are particularly vulnerable to the adverse effects of climate may include some forest related adaptation managed by the GEF and World Bank.
UN REDD program	USD 35 million	REDD+ readiness collaboration between FAO, UNDP and UNEP.

Bilateral		
Norwegian climate and forest initiative	Up to $500 million year^{-1} (total USD 25 billion).	REDD+ readiness, research and government programmes include funding to FCPF, Congo Basin Forest Fund, UN-REDD and other initiatives.
Australian International Forest carbon initiative	AU$ 200 million committed	Focus on monitoring and accounting supporting demonstration activities and market-based mechanism. Funds distributed to multiple sources including the Governments of Indonesia and PNG, the FCPF and the Asia Pacific Forestry Skills and Capacity Building Program. Managed by Department of Climate Change, Government of Australia.
Germany	Pledged 500 million (USD 788 million) for the 2009-2012 period and an additional 500 million every year after that (2008)	Global forest protection Funding managed by German aid and other agencies.
NGOs and Private sector		
Voluntary Carbon Market	Approx. USD 388 million in 2007	In 2007, REDD+ made up 5% and AR 10% of the total OTC voluntary carbon market which was valued at USD 258.4 million.
World Wildlife Fund (non-profit)	Uncertain	Capacity building, project design, standard development initiating agriculture and sustainable land management project development fund.
The Nature conservancy (non-profit)	USD 5 million to FCPF USD 38 million in project finance (total) USD 400,000-10.8 million project	Capacity building and REDD+ project development.
Katoomba Ecosystem	Currently USD 10,000-50,000	Technical financial and methodological support to payment for ecosystem

service incubator (Forest Trends non-profit)	project. Planning USD 75,000-150,000 project.	services projects (including some REDD+). 4 projects funded to data with plans to expand.
Climate Change Capital (private investment bank)	Uncertain	Investment in the emissions trading market. Planning a "Land Fund" to invest in agriculture land and forestry worldwide. No dedicated REDD+ investments.
Macquaria Group Limited (investment banking and financial services)	Pan to invest in six REDD+ demonstration activities over the next three years.	Invests in the emissions trading market. Recently partnered with Flora and Fauna International to develop REDD+ projects. Macquaria is an investment banking and financial services group.
Equator Environmental LLC	USD 100 million Eco-Products Fund-private equity fund	Invests in projects for generation and management of forest-based carbon credits and timber assets.
New Forests ply Ltd.	USD 50 million in assets	Invests in carbon credit and other environmental services projects including timber. REDD+ investments possible.
Terra Global Capital LLC	Trying to raise USD 150-250 million for a fund	Consulting and planning on raising a private equity to invest into agriculture, forestry and other land uses.
Sustainable Forest Management (private capital)	REDD+ project in Peru underdevelopment possibly other projects in identification stage.	Invests in forest carbon projects.

Source: Hamilton et al. 2008

Annex 5. Estimated cost of REDD readiness activities

Purpose	Estimated cost (USD)
Strategy Development	200,000 – 1,000,000
Establishment of relevant infrastructure **Stakeholder consultations** **Pilot testing**	700,000 – 1,500,000 150,000 – 2,000,000 250,000 – 500,000
Establishment of baseline, monitoring system, and inventory	1,000,000 – 6,610,000
Land-tenure reform **Land-use planning and zoning**	4,000,000 – 20,000,000 1,750,000 – 10,000,000
Development of capacity to provide support services for implementation activities, e.g. reduced impact logging, agricultural intensification, etc.	1,750,000 – $10,000,000
Forest policy and legislation reform **Tax reform (e.g. removal of subsidies/tax incentives)**	300,000 – 1,000,000 300,000 – 1,000,000
Standards and guidelines	50,000 – 1,000,000
Enforcement of planning and environmental requirements **Independent monitoring**	500,000 – 2,000,000 1,000,000 – 5,000,000
NGO capacity building	100,000 – 1,000,000
Effective optical system **Institutional reform clarification of responsibilities** **Treasury freeform** **Establishment of ability to process and manage payments to project beneficiaries.**	500,000 – 5,000,000 500,000 – 14,000,000 500,000 – 5,000,000 100,000 – 5,000,000

* Source: Hoare *et al.* (2008).

Annex 6. National historical deforestation status and GDP Capita^{-1} (USD) in West Africa

Country	Deforestation (ha)
High Forest, Low Deforestation Country	
Guinea Bissau	1,100
Low Forest, High Deforestation Countries	
Benin	1,500
Chad	1,100
Ghana	3,100
Guinea	1,000
Liberia	400
Mali	1,300
Mauritania	2,200
Niger	800
Nigeria	2,600
Senegal	1,900
Sierra Leone	500
Togo	900
Low Forest, Low Deforestation Countries	
Burkina Faso	1,500
Côte d'Ivoire	1,600
Gambia	2,100

* 2011 estimate

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