A PLATFORM FOR STAKEHOLDERS IN AFRICAN FORESTRY

STRENGTHENING ADAPTATION POLICIES AND AFOLU BASED CLIMATE CHANGE MITIGATION INTERVENTIONS RELEVANT TO AFRICAN FORESTRY AND PEOPLE: FRANCOPHONE AFRICA STUDY



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Cover photos: Charcoal making kiln in moist forest setting: south western Côte d'Ivoire (Left); Young Jatropha plantation mixed with onion, Burkina Faso (Middle); Charcoal making kiln in semi-arid setting: Western Burkina Faso (Right). Credit: Martin NGANJE.

Strengthening adaptation policies and AFOLU based climate change mitigation interventions relevant to African forestry and people

Francophone Africa study

Nganje, Martin

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Acronyms and abbreviations

AFB	Adaptation Fund Board
AFF	African Forest Forum
AFOLU	Agriculture, Forestry and Other Land Uses
AMCEN	African Ministerial Conference on Environment
APFNP	Association des Propriétaires de Forêts Naturelles et Plantations (Côte d'Ivoire)
AU	African Union
BMUB	German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety
CA	Copenhagen Accord
CAR	Central African Republic
CBD	Convention on Biological Diversity
CCAA	Climate Change Adaptation in Africa
CDM	Clean Development Mechanism
CED	Center for Environment & Development
CEEAC	Economic Community of Central African States (French)
CER	Certified Emission Reduction
CIFOR	Center for International Forestry Research
COMIFAC	Central African Commission on Forests (French)
CONAGESE	Conference of the National Council for Management of the Environment (B/Faso)
COP	Conference of Parties
CSRS	Centre Suisse de Recherches Scientifiques (Côte d'Ivoire)
DECC	UK Department of Energy and Climate Change

DRC	Democratic Republic of Congo
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ERND	Environnement, Ressources Naturelles and Développement
FAO	Food and Agricultural Organization of the United Nations
FIP	Forest Investment Program
VPA/FLEGT	Voluntary Partnership Agreement/Forest law Enforcement Governance and Trade
FMTE	Forêts des Marais Tanoé-Ehy (Côte d'Ivoire)
GCF	Green Climate Fund
GEF	Global Environment Facility
ICRAF	International Center for Research in Agro-forestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IITA	International Institute of Tropical Agriculture
INDC/NDC	Intended Nationally Determined Contribution/ Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
LCDS	Low Carbon Development Strategies
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LECB	Low Emission Capacity Building
MAPs	Medicinal and Aromatic Plants
MEDD	Ministère de l'Environnement et du Dévéloppement Durable du Burkina Faso

MEEMF	Ministère de l'Environnement, de l'Ecologie, de la Mer et des Forêts
MEGECC	Ministry of Environment, Green Economy and Climate Change (Burkina Faso)
MRU	Mano River Union (Côte d'Ivoire, Guinea, Sierra Leone and Liberia)
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Climate Change Adaptation Plan of Action
NEPAD	New Partnership for Africa's Development
NTFP	Non-Timber Forest Product
ONE	National Environmental Agency of Madagascar
PDDAA	Detailed Program for Agricultural Development in Africa (French)
PES	Payment for Ecosystem Service
PNIA	National Program for Agricultural Investment (French)
PPP	Public Private Partnership
PRIA	Regional Program for Agricultural Investment (French)
REDD+	Reduced Emissions from Deforestation and Forest Degradation
R-PP	Readiness Preparation Plan for REDD
SCCF	Special Climate Change Fund
SDC	Swiss Agency for Development and Cooperation
SDSR	Rural Sector Development Strategy (French)
SFID	Société Forestière et Industrièlle de Djoum
SP-CONEDD	Permanent Secretariat of the National Council on Environment & S-Development
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
WCS	Wildlife Conservation Society

WRM	World Rainforest Movement
WWF	World Wildlife Fund

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Rabetaliana – President of the Board of “ONE” and also Secretary General of “MEEMF” and her collaborators, Mr. Roger Luc Andriamanalina – Deputy Head of the National REDD+ Coordination Office and his collaborators, Mr. Mon Rakotondrasoa Hasinarijaona Laza – WWF Program Officer and Focal Point REDD+, Assistance Head of Office WCS – Madagascar and her collaborators. For Cameroon; Mr. Martin Tadoum – Technical Coordinator of COMIFAC, Dr. Leonard Usongo – IUCN Country Program Coordinator and his collaborators, Dr. Richard Eba’a Atyi – Central Africa Regional Coordinator of CIFOR and his collaborators, Mr. Norbert Sonne – WWF Forest Coordinator and GFTN manager, Dr. Wassouni – National Coordinator REDD+ and his collaborators, Dr. Denis Sonwa – senior CIFOR/IITA/ICRAF scientist, Mr. Bruno Ewusi – Assistant Director General ANAFOR, Dr. Roger Ngoufo – Director CED, Mr. Moustafa – WWF Head of Office Djoum and collaborators, Dr. Defo Louis - WWF Coordinator Ngoyla Mintom REDD+ project, Mme. Koutouek Ngomo Carine – Assistant Head of Forestry Post in Djoum, the Site manager – SFID / Djoum… and others. The consultant expresses gratitude to all these and those who could not be named.

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Executive summary

This study presents the results of an investigation on the role that forests and trees can play in helping African societies adapt to climate change and mitigate greenhouse gases from the atmosphere. In this regard, it seeks to strengthen and further develop the forest – climate nexus, a key issue for Africa's future development. The study was framed around eight sub-study areas and carried out through visits to five sampled Francophone African countries based on geographical location and forest type. They include: Burkina Faso, Côte d'Ivoire, the Democratic Republic of Congo, Madagascar and Cameroon. Respondents were drawn from six institutional groups, namely; government, intergovernmental organisations, international organisations, research organizations and agencies, civil society organisations, and the private forestry sector. The study revealed that there are three key determinants for the wider adoption of adaptation and mitigation interventions. They revolve around fiscal, technological and governance factors. Conditions for effective implementation of adaptation and mitigation interventions meanwhile were noted to revolve around organisation, legal and regulatory aspects, government coordination and a competent extension service. These elements surfaced in all the sub-studies of this investigation, prompting policy related proposals around fiscal, institutional and legal/regulatory benchmarks. Pertinent among others, of such open-ended benchmarks, are proposals for: promotion of multi-sectorial and multi-stakeholder platforms upstream, and forums downstream, as high impact governance pathways, facilitated by federating government bodies for transparent planning, sharing of experiences and harmonization of programs; creation and support of a carbon knowledgeable extension service to sensitize on carbon across the forestry, agriculture and energy divide, as well as; a national carbon agency to regulate and supervise schemes that engage carbon development, accounting and marketing.

CHAPTER 1 Introduction

BACKGROUND

The Intergovernmental Panel on Climate Change (IPCC) has estimated that more than one-third of the world's remaining forests may be negatively affected by climate change over the next century (IPCC, 1995). This will diminish the quantity and quality of goods and services that forests and forest ecosystems deliver to society (FAO, 2011a), with developing countries to be affected the most, due to their intimate dependence on forests and forest ecosystem resources. Little justification is necessary for the vulnerability in Francophone sub-Saharan African countries, most of whose population depends on their dwindling 2,979,770 km² of forests out of a sub-Saharan total of 6,132,660 km² (FAO global forest resources assessment, 2015). The root cause is poverty, which inspires the use of low intensity farming techniques such as clearing forests with fire, but also from logging, all contributing to the climate change dilemma (Chavez-Tafur et al, 2014). Most Francophone African countries have been aware of their dwindling forest resources and the increasing climate stress. This had prompted their promotion of large-scale afforestation efforts such as the "Operation Green Sahel" of Cameroon. The program used mostly free prison labor for the extensive planting of Acacia tree species in the late sixties and seventies in the northern half of the country. This is similar to Burkina Faso's government-led "Operation Industrial Afforestation", which promoted exotic tree species in about the same period as the Cameroon effort. Assessments of these extensive government-led afforestation efforts have revealed their maladaptation and mixed results. The Burkina Faso assessment revealed that: technically, the productivity recorded in the field was lower than the expected species growth rate, while economically and socially, the costs of afforestation were higher than expected (Republic of Burkina, 2012). In Cameroon, with the exception of occasional vestiges, the bulk of the afforestation effort has been decimated by wild fires. While these large public afforestation efforts were meant to buffer the impact of climate change, provide timber and fuel-wood, they had little or no available labor beyond the planting stage. Also, they did not engage local partnerships in their conception such as in the choice of tree species nor in their implementation such as in fire prevention and suppression, hence their mixed results.

Notwithstanding unfortunate lessons from non-participatory public reforestation efforts, several sub-Saharan Francophone countries later made significant strides to reduce vulnerability to climate change with the support of research organizations such as ICRAF. Nowhere was this more pertinent than in Sahel countries, plagued by severe droughts in the 1970s and 80s. With the support of ICRAF, government institutions in these countries worked with their rural populations to identify and prioritize favorable and tolerant tree

species, document the traditional management practices for adult field trees, quantify the annual production of some non-timber forest products, and document the interactions between several tree species and crops on farms. Results of the assessment of interventions led to technological adaptations and adoptions of processes such as hedgerows, windbreaks, and fodder banks in recommended parklands and in alley cropping farms. Participation in agro-silvicultural processes firmly took root, associated with practices such as: tree and crop rotations, coppicing, enrichment planting etc. Parklands, developed and maintained through these participatory processes still exist, and constitute durable carbon sinks (MEDD – Burkina Faso, 2011).

CONTEXT

This study was implemented within the context of the African Forest Forum (AFF) project on African Forests, People and Climate Change.

The implementation was based on the following key assertions:

(i). sub-Saharan Africa is expected to face significant impacts from climate change, both on economies and the social systems ;

(ii). forests and trees can play a crucial role in helping to adapt to climate change and mitigate greenhouse gases from the atmosphere ; and

(iii). strengthening and further developing the forest / climate nexus therefore is a key issue for Africa's future development.

The overall Goal of the project is to enhance the capacity of stakeholders to strengthen the role of Africa's forests and trees to adapt to climate change and mitigate its adverse effects in various landscapes in ways that will enhance livelihoods, sustain biodiversity and improve the quality of the environment.

The project mainly focuses on strengthening the basis for policy and advocacy, capacity building and skills development; and learning, knowledge generation and information management.

Two specific objectives contribute towards the preceding overall goal, namely:

(i). improve knowledge and capacity of African stakeholders in managing forests and landscapes in the context of climate change ; and

(ii). inform and contribute to the shaping of policies and initiatives relevant to forests and climate change.

WORKING OBJECTIVES OF THE STUDY

This study was undertaken around eight research areas, which contribute towards attainment of the preceding project objectives. They include :

Study Area 1: Evaluation of prospects for wide adoption of promising practices on adaptation measures.

Study Area 2: Analyses, documentation and sharing of relevant forest-related mitigation approaches in AFOLU as applied in the African context.

Study Area 3: Assessment, documentation and sharing information on the impact of applicable AFOLU mitigation activities on food, fuel and fibre production.

Study Area 4: Assessment of applied policies in forest NAMAs and identification of best practices.

Study Area 5: Identification and evaluation of policies and activities in African countries that incorporate both, adaptation and mitigation characteristics.

Study Area 6: Assessment of carbon policies & practices at national & sub-regional levels supporting /constraining development of initiatives on carbon.

Study Area 7: Assessment of key African institutions that have the potential to effectively address governance of climate change in forestry.

Study Area 8: Assessment of potential high-impact pathways and mechanisms to address governance of climate change in forestry.

METHODOLOGY

The approach adopted for collection and presentation of data for this study, undertaken in Francophone African countries, was harmonized by the African Forest Forum Secretariat (AFF) through an inception workshop in Nairobi, with a similar study in Anglophone African countries. The selected countries, based on forest vegetation, geographical location, presented in the order in which they were visited, include; Burkina Faso, Côte d'Ivoire, Democratic Republic of Congo, Madagascar, and Cameroon.

Three non-quantitative research methods were employed to collect information for the study, namely :

(i). consultation of secondary data, including of national and regional level documents related to forests and climate change policies on adaptation, mitigation and forest related land-use policies and measures such as the REDD+ and AFOLU mechanisms ;

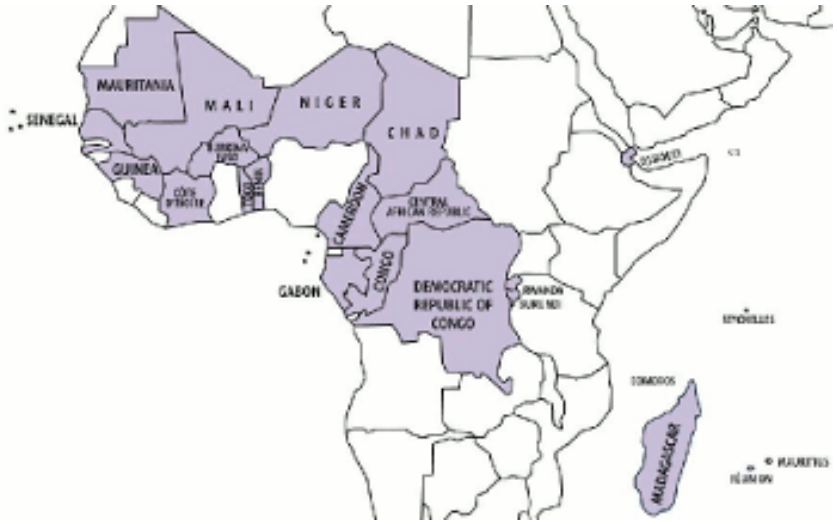

Figure 1. Map of Francophone countries of Sub-Saharan Africa

(ii). visit to selected countries for interviews and discussions with stakeholders guided by cause-and-effect, descriptive, open-ended questions, developed around the eight study areas of the study – see annex 1. In all countries visited, discussions and interviews were held with senior level personnel in government ministerial departments responsible for forests, agriculture, waters and hydraulics, environment and climate change policy development and implementation; intergovernmental organizations, country-level development partners; representatives of civil society, and the private sector in forestry. Municipal authorities and representatives in research organizations working on forests and climate change were engaged in two countries; Côte d'Ivoire and Cameroon. All exchanges provided the opportunity to share contact level information for follow-up exchanges ; and

(iii). exchanges on Skype and email for follow-up clarifications with respondents.

The data gathering tool for the study contained twenty eight questions framed around its eight study areas. While government respondents were encouraged to respond to most questions, other respondents did not have to attend to all of them. Each country contributed three most complete reports on the questionnaire sheet. These most complete responses provided by a total of fifteen key respondents at three experts per country, were from: the government department responsible for forests and the government department responsible for environment and climate change. The third respondent was selected either from the private forest sector (such as in Côte d'Ivoire), development partner organization (such as in Cameroon) or civil society organization (such as in Burkina Faso), based on their knowledge and involvement with the climate change and forest debate and related projects. All such 'key respondents' had a working session with the researcher of this study either physically or through Skype, during which the logic of the questionnaire was explained.

Other respondents, who provided answers to single study areas, did not go through the questionnaire. Their contributions were captured during discussions with the researcher. The data gathering tool is attached as annex of this report.

Analysis of questionnaire responses involved a qualitative approach. An effort to enhance reliability was pursued through the use of: (a) adequate, systematic and sequential documentation during the data collection, (b) development of a verifiable data base, and (c) use of triangulation during exchanges on Skype. More specifically, responses for each question were grouped around a common theme to reduce variability, and then coded. The coded categories were described through narratives. Their numerical compositions were plotted against exploratory factors (enablers, inhibitors, determinants) in matrices. The matrices led to the development of graphs. The graphs provide trends of the most and least important categories against exploratory factors.

Respondents for the study were drawn from six different groups of organizations as depicted on the table 1.

Table 1. Summary data on respondents interviewed

Affiliation of respondents	N° of respondents	Professional constituency of respondents
Government	30	Government Ministries: Forestry, Environment, Agriculture, Water/Hydraulics.
Intergovernmental organizations	5	COMIFAC, MRU, Africa Great Green Wall for the Sahara and Sahel Initiative.
Research agencies and organizations	7	CIFOR, ICRAF, IITA, CSRS.
International organizations	8	FAO, IUCN, WWF, WCS.
Civil society, Mayors, Divisional Officers & community organizations	25	ERND, CED, Ngoyla-Mintom REDD+, FMTE community, Boni Biofuel community.
Private sector	10	AGRITECH – Biofuels (B-Faso), SFID-Djoum, Afrique-Comfort Vannerie – Cameroun, APFNP-Côte d'Ivoire.

LIMITATIONS AND PRESENTATION OF STUDY REPORT

The production of this report was not without difficulties, mainly centered on the collection of primary data. Most government agencies and ministerial departments to whom emails were sent announcing the visit of the researcher did not respond and declined having received the communication when the researcher arrived for exchanges. Due to the short in-country stay, this implied that some of the exchanges and interviews had to be rescheduled and others had ultimately to be continued on Skype and telephone. Other than prolonging the time for the study, this apparently did not have an incidence of the quality of the study and report.

As indicated in section "Working objectives of the study" above of this report, this study is essentially framed around eight sub-studies. The presentation of the results of each sub-study follows the same format: (a) assessment of status and challenges, (b) analysis and interpretation of results, (c) opportunities and prospects, and (d) Sample policy indications in open-ended benchmarks. The first section of each sub-study i.e. 'status and challenges', is enriched with a mix of secondary and primary data sources and ends with trends captured in graphs under 'analysis and interpretation of results'. The last section, i.e. open-ended benchmarks, presents policy-level proposals targeting three areas: institutional, legal/regulatory and fiscal. The section is inspired by the work of John Ambler, (Ambler, 1999). The result of the first sub-study is presented immediately after further characterization of the study below.

Areas of Study: Description and presentation of results of the study

This section presents all the eight sub-study areas of the investigation. An attempt is made to provide background information pertaining to each study area in terms of overall status in Francophone African countries before analyzing and presenting results. Because the Francophone countries visited for this study were a sample, more or less representing all Francophone African countries, the results are not presented on a per country basis, but rather collated to guide policy development in all such countries. However, specific differences in results, due to remarkable differences in forest vegetation and landscape types, such as Sahel versus Mangrove landscapes, are captured and explained under the data presentation graphs that display results of the study areas under chapters 2 to 9.

CHAPTER 2 Promising practices on forest-based adaptation

ASSESSMENT OF STATUS AND CHALLENGES

According to the Intergovernmental Panel on Climate Change (IPCC, 2007b), adaptation to climate change is the adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities (Ravindranath, 2007). Ecosystem-based Adaptation (EbA) meanwhile, described as "the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change" was adopted as an official climate change adaptation process at the Convention on Biological Diversity (CBD)'s COP 10 in Nagoya, Japan in 2010 (Andrade et al, 2011). As an ecosystem, forests benefit from this inscription and since the 11th climate change COP in Marrakesh, they have progressively materialized as strategic in international efforts to address climate change (Chia et al, 2014). Forest-based adaptation (FbA) is now recognized to address forests' inherent endurance to the impacts of climate change, and their management or manipulation in ways expected to help forest dependent societies endure the impacts of climate change and climate variability (Locatelli et al, 2008).

This study area required that respondents in the sampled Francophone countries, i.e. Burkina Faso, Côte d'Ivoire, the Democratic Republic of Congo, Madagascar and Cameroon should identify the five most promising practices of forest-based adaptation measures, based on experiences with their NAPAs and INDCs (now referred as NDCs). Each respondent was then required to identify three inhibitors for the wider uptake of each of their five promising adaptation practices. This study area received recorded responses mainly from the 15 key respondents of the study. A preliminary list of nine forest-based adaptation practices received additions by respondents making a total of eleven practices. They include: forest landscape restoration, assisted reforestation, controlled forest clearing, tree-based wind-breaks, controlled forest grazing, tree-based fire-breaks, tree stabilization of sand dunes, tree-based erosion control, establishment of arboretums, tree-based medicinal & aromatic plantings (MAPs), and tree-based stabilization of river-banks and shore-lines. Respondents matched their preferred forest-based climate change adaptation practices with impediments that did not contribute towards their wider spread and uptake. The list of impediments was also improved by respondents and includes: exclusion of women and youth, poor social infrastructure such as absence or dysfunctional cooperatives and self-help initiatives, insufficient land (in terms of availability and suitability), high technological requirement, conflicting policies and programs, high labor requirements, high

frequency of maintenance, inadequate incentives, resource-use conflicts, inadequate extension services, poor governance, poor knowledge and skills, poverty and high costs, and little or no upfront funding. Practices identified as priority forest-based adaptation interventions were analyzed and regrouped into five pertinent practices, namely: "locally managed natural forests", "locally managed tree plantations", "forest landscape restoration", "forest enrichment schemes", and "local protective tree-strips". The preliminary assessment revealed that some of the forest-based climate change adaptation practices such as "tree-based wind-breaks" received no reaction from respondents, even as "tree stabilization of sand-dunes" was identified as pertinent only by respondents in Burkina Faso.

Narratives of the reorganized forest-based adaptation practices is presented as follows.

Locally managed natural forests

This category can be described as the management and use of natural forests by communities for specific objectives such as in the supply of goods and services that reduce their vulnerability to the negative impacts of climate change and climate variability. It regroups controlled forest clearance such as against the use of fire for clearing, and controlled forest grazing through i.e. rotational foraging in the face of dwindling pastures and fodder. Such forests include the natural woodlands around the Karité or Shea butter (*Vitellaria paradoxa*), the Néré or Dawa-dawa (*Parkia biglobosa*) and the Arabic gum (*Acacia Senegal*), all found in the Sahel rangelands and parklands of several Francophone African countries. They also include the natural forests around the Kola nut (*Cola nitida*, *C. acuminata*), Allanblackia (*Allanblackia parviflora*) and several others species in the Madagascan Island, and the Congolian and Guinean Moist Forests of Francophone countries.

Locally managed tree plantations

This category entails tree planting schemes for industrial, semi-industrial, commercial and livelihood objectives such as the supply of industrial wood, poles, energy but also for non-timber forest products expected to act as safety-nets in the face of the negative impacts of climate change, responsible for dwindling food supplies. Locally managed tree plantations include plantations of highly adapted mango species (*Mangifera indica*) visible around homesteads in the Sahelian parklands of several Francophone African countries. They also include fruit tree-based home gardens planted in humid forest Francophone countries.

Forest landscape restoration

This category concerns the rehabilitation of forestlands degraded by the effects of climate such as coastal erosion. The multiple efforts by coastal communities and especially civil society organizations to restore coastlines eroded by forces loyal to climatic change, by planting mangrove tree species, falls within this category. It also includes using adapted

indigenous tree species in the restoration of hill-sides and mountain slopes, whose trees had previously been cut and exploited by mining complexes such as in energy production for the manufacture of cement, animal feed and related products. If not rehabilitated, such areas, usually associated with the initiation of mud and landslides, propagate insecurity in the face of climate-based turbulences.

Forest enrichment schemes

This scheme concerns the introduction of desired tree species in natural forests. The objective is to enhance a particular function or functions of the forest in order to reduce its vulnerability to the effects of climate change as well as that of the neighboring communities and wildlife. This category is also applicable when undesired pioneer species colonize forests, after openings by logging operations or after windblown tree events. Such species must be eliminated and replaced to reduce the incidence of i.e., wild fires, a threat in the case of pioneers such as the *Chromolaena odorata* shrub.

Figure 2. Finished Rattan products as garden furniture in Cameroon
Source: Martin NGANJE

An exemplary enrichment species is the Rattan, which has the silvicultural advantage of producing multiple and quick sprouts after cutting, and the functional potential to replace timber in a multiplicity of wood-fiber roles, including the furniture industry (Figure 2), and therefore of environmental and economic interest.

Local protective tree-strips

This category includes tree-based fire breaks, tree-based stabilization of sand dunes and tree-based stabilization of river banks. Contrary to forest restoration which is reactive adaptation, forests may not necessarily have been part of the landscape in the case of protective tree-strips, which is both reactive and anticipatory adaptation. Examples include tree planting on natural highlands and mountains such as the savannah slopes of the Mt. Nimba of Côte d'Ivoire or parts of the Cameroon mountain range. While this scheme can act as a carbon sink, the adaptation objective is to reduce the risk of potential mud and landslides that can be provoked by unusually heavy or torrential rain.

Interview results for this study area, are captured in Figure 3. The graph displays information on obstacles to the wider adoption of the promising forest-based adaptation practices selected by key respondents. It also depicts the comparative level of impediment by each obstacle on the priority forest-based adaptation practices.

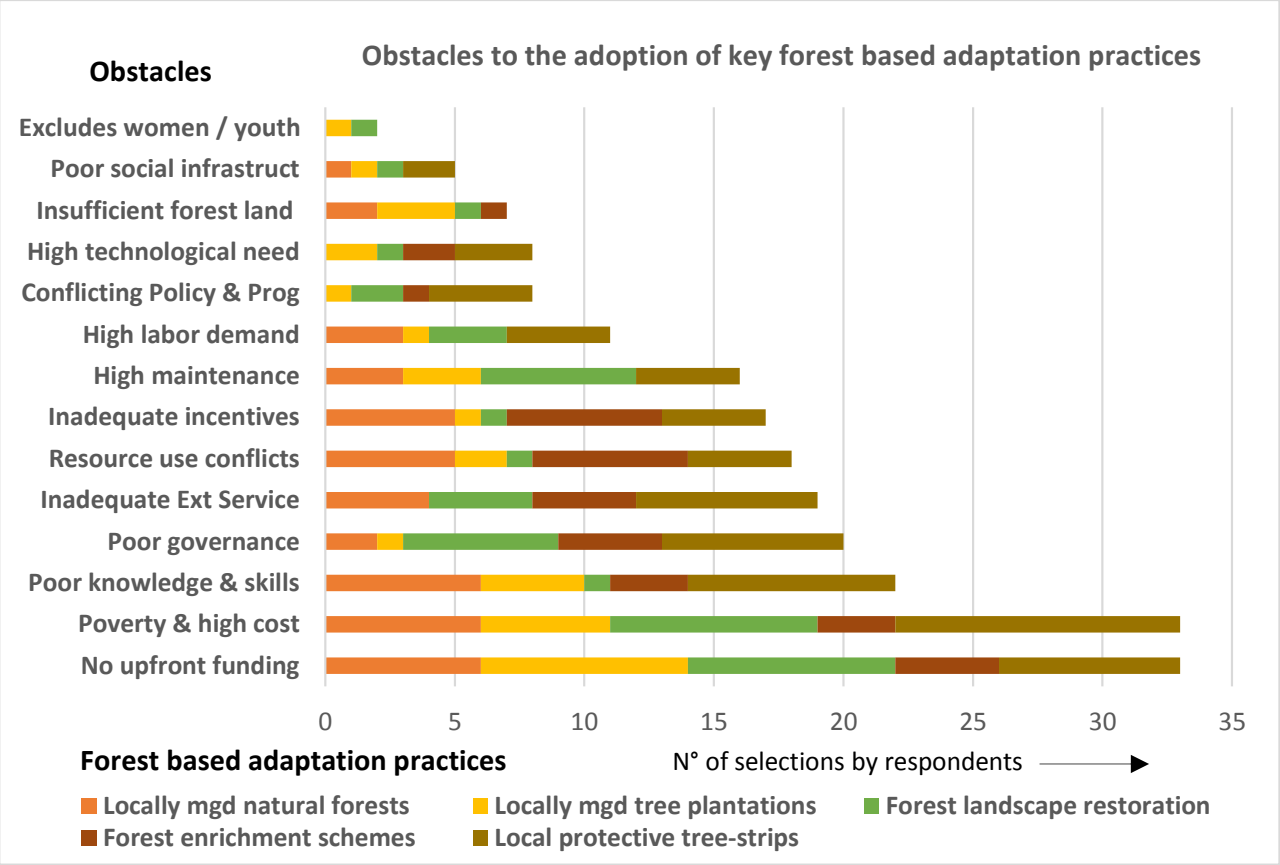

Figure 3. Obstacles to the wider adoption of five key forest-based adaptation to climate change practices, according to the experiences of respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

ANALYSIS AND INTERPRETATION OF RESULTS

- An analysis of the graphic display of results on Figure 3, reveals that; each of the five forest-based adaptation to climate change practices is impacted by at least ten of the fourteen obstacles to their wider adoption, with “forest landscape restoration” affected by all fourteen obstacles, and “forest enrichment schemes” affected by the lowest number of obstacles to its wider adoption i.e. ten out of the fourteen impediments.

- Six of the fourteen obstacles to wider adoption, have an effect on all five forest related climate change adaptation practices. They include: “no upfront funding”, “poverty and high cost to undertake the practice”, “poor knowledge and skills related to the practice”, “poor governance”, “resource-use conflicts”, and “inadequate incentives”.

- The most negatively affected practice by the obstacles of adoption is, “local protective tree strips”. This is followed by: “forest landscape restoration”, “locally managed natural forests”, “forest enrichment schemes”, and, “locally managed tree plantations”.

- The most negatively affected practice i.e. “local protective tree strips” is affected most by the “poverty and high cost obstacle”; the second i.e. “forest landscape restoration” is affected most by “no upfront funding”, the third, “locally managed natural forests”, by “poor knowledge and skills” etc. These obstacles are all on the high end of the graph in Figure 3.

- As depicted on the graph of Fig. 3, nine obstacles had more than ten selections each, rendering them the most prohibitive among all obstacles for the wider adoption of the five key forest-based adaptation measures to climate change. They include, in order of importance :

  (i). no upfront funding ;

  (ii). poverty and high cost of forest-based adaptation measures ;

  (iii). poor knowledge and skills of implementing stakeholders ;

  (iv). poor governance ;

  (v). inadequate extension services ;

  (vi). existence of resource-use conflicts ;

  (vii). inadequate incentives ;

  (viii). high cost of maintaining forest-based adaptation schemes ; and

  (ix). high demand in labor by adaptation schemes.

Based on the results of the preceding assessment, and all things being equal, wider adoption of the main climate change adaptation measures will be significantly achieved if:

(a) there is up-front funding support, (b) provisions are made to tackle the general poverty of stakeholders, (c) the relevant knowledge and skills of implementing stakeholders is improved, (d) governance processes are improved, (e) extension services are made more adapted and functional, (f) resource-use conflicts are identified and resolved, (g) provisions are made as incentives to encourage participation in the adaptation schemes, (h) fiscal and other measures are taken to reduce the cost of establishing and maintaining forest-based adaptation schemes, and (i) policy and organizational support is provided to reduce the high labor demand of climate change adaptation schemes.

- The exclusion of women and youth from climate change adaptation schemes is the only exploratory factor to receive less than five selections from respondents as an obstacle for the wider adoption of such schemes. According to the graph on Figure 3, the exclusion of women and youth is an obstacle only for two of the five forest-based adaptation schemes, namely; (a) locally managed tree plantations, and (b) forest landscape restoration. This is interpreted to mean that the exclusion of women and youth from these two adaptation schemes has a negative impact on their wider adoption, and little or no impact when women and youth are excluded from the other three adaptation schemes i.e. from forest enrichment schemes, local protective tree-strips, and locally managed natural forests. Incidentally most of these schemes are implemented by the youth, constituting a reason why youth should not always be placed in the same group as women, as women overshadow the youth in the 'eyes' of research respondents.

OPPORTUNITIES AND PROSPECTS

Opportunities for the technical and financial support of adaptation policies and programs are accessible under the UNFCCC. Two bodies are responsible for administering such funds, (a) the Global Environment Facility (GEF), and (b) the Adaptation Fund Board (AFB). Funds administered by the GEF include: the GEF Trust Fund (which supports vulnerability and adaptation assessments as part of national communications); the Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF). The Adaptation Fund Board (AFB) meanwhile administers the Adaptation Fund (AF) under the Kyoto Protocol. The AF is financed mainly through a 2 % levy on each Certified Emission Reduction (CER) certificate issued by the UNFCCC (Tubiello, 2011).

Following recommendations of the UNFCCC's Ad-hoc working groups on long-term commitments and post-2012 Kyoto Protocol in 2010, developing countries were designated to contribute towards internationally monitored emission reductions through projects approved and funded as NAMAs. This responsibility upgraded adaptation with the Copenhagen Accord (CA-6) proposing *'new and additional, funding to enable and support enhanced action on mitigation, adaptation, technology development, technology transfer*

and capacity building'. The funding level for such activities is detailed in the Copenhagen Green Climate Fund (GCF), approved in Cancun, at the level of USD100 billion annually between 2012 and 2020, and representing the cost of fighting climate change in developing countries through adaptation and mitigation actions (Tubiello, 2011).

Several bilateral donors and foundations have pledged and some are already funding climate change adaptation initiatives, for the most part, with a focus on Africa. They include: The French Global Environment Facility; the Canadian and UK cooperation for the Climate Change Adaptation in Africa (CCAA); the USA collaboration on technology with South Africa (and other developing countries); the G8, including the UK's pledge of at least US$ 1.5 billion, some of which may include loans; the Rockefeller Foundation program on climate adaptation for agriculture in Africa (with the planned support of the Shell and Gates Foundations). In Africa, the African Development Bank leads investments that include climate adaptation and mitigation efforts (AMCEN, 2008).

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the analysis of research results and opportunities for the wider adoption of forest-based climate change adaptation practices, this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks to promote the wider adoption of such practices, as follows.

Institutional

(i). Enhance the capacity of forestry extension personnel in forest-related climate change adaptation measures through the "training of trainers" approach, in order for them to build the capacity of adopters of climate change adaptation measures.

(ii). Establish linkages between research institutions and local organizations such as cooperatives among those striving to adapt to climate change so as to reduce the cost of research while improving effectiveness of the research output.

Legal/Regulatory

(i). Provide legal status for promoted local institutions such as cooperatives and related self-governing user groups among those striving to adapt to climate change.

(ii). Reduce the regulatory obstacles that those striving to adapt to climate change face, when attempting to sell their sustainably produced or sustainably harvested products.

Fiscal

(i). Earmark funds for community organization and start-up support at the local level, with the aim of creating a conducive environment for collaboration between different groups

impacted by climate change, including women and youth and to enhance their commitment to forest-based adaptation schemes. This should include the promotion of producer and service providing cooperatives.

(ii). Earmark funds for the promotion of forest-based climate change adaptation technologies that would be beneficial, socially acceptable and easy to implement by those impacted and striving to adapt to climate change.

CHAPTER 3 Forest Related Mitigation in AFOLU

ASSESSMENT OF STATUS AND CHALLENGES

According to the Intergovernmental Panel on Climate Change (IPCC, 2007b), mitigation of climate change is any human undertaking likely to enhance carbon sinks and capable of reducing the sources of greenhouse gases (Swart & Raes, 2007; Chia-Loh et al, 2014). Mitigation within the context of Agriculture, Forestry and other land uses – generally referred to, as AFOLU, is foremost, the human endeavor to reduce greenhouse gases from (a) the agricultural effort – usually associated with deforestation and forest degradation; (b) from the forestry effort – usually associated with logging; and (c) from the effort of 'other land uses' mostly associated with livestock grazing and biomass removal for energy supplies. In order to avoid double counting within the AFOLU context, this demand side mitigation is usually associated with the supply side mitigation effort of carbon sinks enhancement (Smith et al, in Edenhofer et al, 2014).

Under this study area, respondents in Burkina Faso, Côte d'Ivoire, the Democratic Republic of Congo (RDC), Madagascar and Cameroon were asked, based on their experiences, to indicate the five most relevant forest-related mitigation approaches within the context of AFOLU. A preliminary list of eleven forest-related mitigation approaches received additions by some respondents making a total of fourteen approaches. They include: well managed forest protected areas, organized forest fire management, subjugated illegal forest activities, afforestation and reforestation, sustainable forest grazing, integrated climate change and forest land-use planning, tree crop farming i.e. rubber, planned urban forestry, planned agro-forestry or forest gardens, planned rangelands with trees, sustainable harvest of forest products, sustainable ecotourism, forest concession management, and sustainable biomass development and use.

Respondents were also asked to identify the three most impeding factors for the wider uptake of each of their previously selected appropriate forest-related mitigations approaches. The list of impediments, similar to the adaptation barriers of 'promising practices on forest-based adaptation', includes: poor social infrastructure such as inexistent or inefficient cooperatives and self-help groups, exclusion of women and youth, insufficient land, conflicting policies and programs, high labor requirements, high technological requirement, high frequency of maintenance, inadequate incentives, resource-use conflicts, inadequate extension services, poor governance, little or no upfront funding, poor knowledge and skills, and poverty and high costs. Schemes identified by respondents as

priority forest-related mitigation approaches within the context of AFOLU, were analyzed and reorganized around eight pertinent approaches, namely: forest protected areas, afforestation and reforestation, forest concession management, tree crop farming schemes, avoided deforestation measures, sustainable forest rangelands, sustainable municipal / community forests, and urban forestry schemes.

Description of the reorganized forest-related mitigation approaches within the context of AFOLU is presented as follows.

Forest protected areas (IUCN Category VIII)

Forest protected areas are conservation instruments upheld by legislation and containing viable samples of forests and their related biodiversity. Longstanding, well conserved forest protected areas usually contain mature primary forests constituting one of the best atmospheric carbon removal mechanisms and a significant carbon sink. The management of such spaces however, is expensive due to the intensive pressure, including encroachments and advocacy for their exploitation to meet the needs of national and international communities. It is the cost of their management, including their expansion and strengthening of their networks that is usually associated with financial compensations within the framework of the relevant climate change schemes. The type of forest protected areas targeted under this scheme does not concern the IUCN category 1 (strict nature reserves) nor category 2 (National Parks) but rather IUCN category 6 (Resource Reserve) and especially IUCN category 8 (Multiple-use Management Area).

Afforestation and reforestation

Afforestation is essentially tree planting on land which was not 'formerly' forested, even as reforestation refers to tree planting on recently cleared land i.e. prior to 1990 (Mizuno, 2007). As an example, degraded land can be restored or reforested as a project within the Kyoto Protocol's CDM scheme. Within this framework, reforestation activities are expected to justify that land for the activity has forests which are below the forest thresholds adopted for the definition of forest by the host country, including that all young natural forest stands and all plantations on the target land are not expected to be at the level of the minimum crown cover and minimum height chosen by the host country to define forest (Mizuno, 2007). Also, justifications have to be provided that the land has not been temporarily un-stocked as a result of human interventions such as harvesting or through natural causes before 1990. For afforestation more specifically, project activities are expected to demonstrate that within at least 50 years, the vegetation on the land has been below the thresholds of forest, as defined and adopted by the hosting country (Mizuno, 2007).

Forest concession management

A forest concession is a territory on which a forest exploitation agreement has been developed to be implemented through one or many forest exploitation units for a specific time period, which may be renewable (Cameroon forest law N° 94-01 of 1994). Forest concessions are characterized by the development and implementation of a management plan. Processes for their allocation are different in the different Francophone countries. In Cameroon for example, the government starts by publishing a list of forest estates open for managed exploitation. During the public adjudication process, an ad-hoc committee examines applications received and selects a bidder, based on a set of criteria. This is followed by putting together a field team to consult communities around the future concessions. The wishes of communities are collated, followed by the development of a contract with the selected concessionaire. The contract is made amongst others, of roles and responsibilities including the concessionaire's social corporate responsibilities towards neighboring communities. The duration of the concession contract varies from 5 years in less forest countries such as Rwanda and Burundi to 25 years in others such as the DRC. In some Francophone moist forest countries, community forests for the exploitation of timber are referred as community concessions. They are administered through renewable five year contracts based on simple management plans, covering surface areas usually less than 5,000 ha, per community forest concession. In Francophone countries of the Sahel such as Burkina Faso, forest exploitation and management contracts are usually awarded for the removal of fuel-wood with responsibilities for restoration. All concessionaires are susceptible to the payment of different types of taxes to government.

Tree crop farming schemes

This concerns planting trees with a high potential for carbon sequestration while targeting their production of other useful products. Because of the other goods and services produced by such schemes, it is expected that they will attract more care, leading to a long lifespan on the landscape. Examples include plantation species such as the Rubber tree (*Hevea braziliensis*), Cocoa (*Theobroma cacao*), Cola Nut (*Cola nitida*, *C. acuminata*) and several others in Francophone humid forest countries, as well as fruit tree species raised in plantations in countries of the Sahel. Tree crop farming schemes in this study area, also include planned agro-forestry and planned forest garden schemes. While agro-forestry is essentially the introduction of trees and shrubs into a crop farming system, forest gardening is the introduction of agricultural crops into a "planted tree scheme" per this study. The description of forest gardens usually includes the introduction of agricultural crops into the natural forest and tree environment (Wiersum, 2004).

Avoided deforestation measures

According to this study, avoided deforestation measures are policies, laws and their various decrees and decisions of application, which provide the legal *quitus* against illegal forest exploitation practices. These measures provide the required environment for meaningful carbon sequestration and forest related climate change mitigation schemes. Avoided deforestation measures also include local conventions and agreements signed between actors for the development and implementation of forest-related climate change mitigation interventions. For example, ongoing REDD+ development projects around forest communities require beneficiaries to sign agreements with the promoters and supervisors of such schemes, specifying roles and responsibilities and how conflicts would be resolved between parties. The WWF-administered and European Union funded Ngoyla-Mintom REDD+ project in Southern Cameroon, framed around a payment for ecosystem services (PES) initiative and visited during this study, recently witnessed the signing of such an Agreement between four surrounding forest communities, WWF and government representatives.

Sustainable forest rangelands

Trees have the potential to modify the microclimate in drought-prone environments such as Sahelian parklands, into more graze friendly rangelands. Species such as the Rain tree (*Pithecolobium saman* / *Samanea saman*), which can thrive in semi-arid landscapes fulfills the function of providing animal fodder and shade, while providing a cool environment appreciated by range livestock. Most rangelands in Francophone African countries with Acacia tree species fall in this category. However, because pasture or fodder trees are frequently removed legally or illegally for domestic energy needs, the planned restoration of these spaces with tree species capable of contributing towards carbon sequestration, and organization for their effective management such as through local conventions, constitutes a viable dry forest-related mitigation approach within the context of AFOLU.

Sustainable municipal / community forests

This category concerns natural or planted forests owned by municipal councils or communities for production or protection purposes. In this case, there is secure tenure as the land is owned by the municipal council or community, which facilitates the development of PES schemes. While existing municipal and community forests are vestige schemes from colonization times, the evolving decentralization and decongestion in the management of forest resources in several Francophone countries provides an opportunity for more forest landscapes to be ceded by governments for municipal and community management.

Urban forestry schemes

This scheme includes botanic gardens, urban floral sanctuaries, planted trees and hedges in open public places such as parks, traditional cultural centers and related spaces, and along avenues and roads in urban centers. In addition to potential PES schemes, urban forestry schemes serve the purposes of research and education, recreation and tourism, scenic beauty, shade, wind-breaks, cultural and spiritual purposes, and for the provision of non-timber forest products through their fruits and seeds. The choice of tree species depends on the desired objective of the urban forestry scheme. Moreover, such schemes are managed by different types of organizations, including the private sector, municipal councils, universities and research centers, specific government ministerial departments, and civil society organizations.

Interview results for this study area, are captured in Figure 4. The graph displays information on the obstacles for the wider adoption and uptake of forest-related mitigation approaches in AFOLU by key respondents. It also depicts the comparative level of impediment by each obstacle on the priority forest-related mitigation approaches.

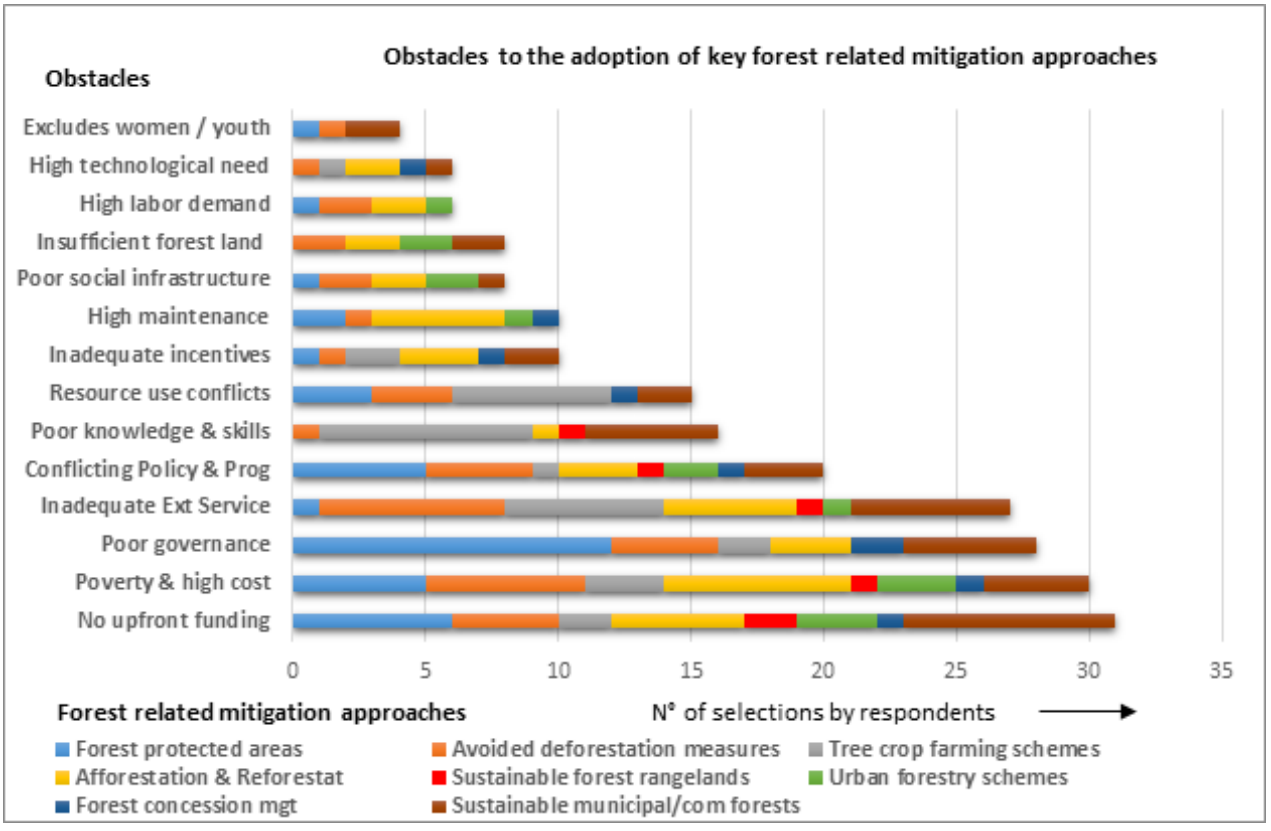

Figure 4. Obstacles for the adoption of eight key forest related mitigation approaches in Agriculture, Forestry and Other Land Uses (AFOLU) according to the experiences of respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

ANALYSIS AND INTERPRETATION OF RESULTS

- An analysis of the graphic display of results on Figure 4 reveals that each of the eight forest-related mitigation approaches in AFOLU is impacted by at least five of the fourteen obstacles for their wider adoption, with “afforestation and reforestation” affected by all fourteen obstacles, and “sustainable forest rangelands” affected by the lowest number of obstacles for its wider adoption i.e. five out of the fourteen impediments.

- Three of the fourteen obstacles for wider adoption, have an effect on all eight forest-related climate change mitigation approaches. They include: “no upfront funding”, “poverty and high cost”, and “conflicting policy and programs related to the approach”.

- The most negatively affected approach by the obstacles of adoption is, “sustainable municipal and community forests”. This is followed by : “afforestation and reforestation”, “avoided deforestation measures”, “forest protected areas”, “tree crop farming schemes”, “urban forestry schemes”, “forest concession management” and finally “sustainable forest rangelands”.

- The most negatively affected approach i.e. “sustainable municipal and community forests” is affected most by the “no upfront funding” obstacle ; the second i.e. “afforestation and reforestation” is affected most by “poverty and high cost” ; the third “avoided deforestation measures” by “inadequate extension service” etc. These obstacles are all on the high end of the graph in Figure 4.

- It is remarkable how the forest-related mitigation approach of ‘forest protected areas’ is affected by the obstacle of “poor governance”, i.e. more than twice higher than the way it is effected by any of the other thirteen obstacles for the wider uptake of this conservation instrument and highly favored carbon sink. Moreover, according to Figure 4, the effect of the governance obstacle on the uptake of “forest protected areas” is higher than the highest effects by any of the other thirteen obstacles on any of the other seven forest-related mitigation approaches in AFOLU.

- As depicted on the graph of Fig. 4, seven obstacles had more than ten selections each, rendering them the most prohibitive among all obstacles for the wider adoption of the eight key forest-based mitigation approaches to climate change. They include, in order of importance:

  (i). no upfront funding ;

  (ii). poverty and high cost of forest-based mitigation approaches ;

  (iii). poor governance ;

  (iv). inadequate extension services ;

(v). conflicting policies and programs ;

(vi). poor knowledge and skills of implementing stakeholders ; and

(vii). existence of resource-use conflicts.

Based on the results of the preceding assessment, and all things being equal, wider adoption of main climate change mitigation approaches will be significantly achieved if : (a) there is up-front funding support, (b) provisions are made to tackle the general poverty of stakeholders, (c) the problem of poor governance is addressed including as it pertains to forest protected areas, (d) extension services are made more adapted and functional, (e) coordination measures are instituted to address conflicting policies and programs, (f) the relevant knowledge and skills of implementing stakeholders is improved, and (g) resource-use conflicts are identified and resolved.

- The exclusion of women and youth from climate change mitigation approaches is the only exploratory factor to receive less than five selections from respondents as an obstacle for the wider adoption of such approaches. According to the graph on Fig. 4, the exclusion of women and youth is not an obstacle for the wider adoption of five of the eight forest related climate change mitigation approaches, namely; forest concession management, tree crop farming schemes, afforestation and reforestation, urban forestry schemes, and sustainable forest rangelands. While this may be true for women, it is definitely not true for the youth who, from experience are usually involved in the implementation of such approaches. This constitutes a reason why youth should not always be placed in the same group with women, as the latter overshadow the former in the 'eyes' of research respondents.

OPPORTUNITIES AND PROSPECTS

Currently, forestry initiatives within AFOLU, targeting the CDM (compliance schemes) only include reforestation and afforestation (Mizuno, 2007). While it is possible to undertake compliance schemes out of the Kyoto Protocol, such prospects must be undertaken exclusively at the national level (Nasi et al, 2009). With the exception of a few forest AFOLU CDM projects such as the "Ibi Bateke agro-forestry project" in the DRC (which combines restoration of degraded forest lands with Acacia tree species and cultivation of cassava (R-PP de la RDC, 2010)), the environment for the implementation of CDM projects in Francophone African countries still requires significant capacitation. This among others is due to the lack of comprehensive studies on the effects of different land-use changes on carbon stock pools (Nasi et al, 2009). For example, Nasi and others made a first estimate of the variation of above-ground biomass under various land-use types in the Congo Basin. They estimated that: (a) oil palm plantation, (b) shifting cultivation, (c) intensive logging and (d) extensive logging will initially reduce an untouched forest biomass of 380 t ha^{-1}, to: (i) 1 t

ha^{-1}, (ii) 46 t ha^{-1}, (iii) 280 t ha^{-1} and (iv) to 370 t ha^{-1}, respectively, and that 20 years after disturbance, the reconstituted forest stock will be (i) 50 t ha^{-1}, (ii) 96 t ha^{-1}, (iii) 380 t ha^{-1} and (iv) 380 t ha^{-1}, respectively. This reveals that oil palm and shifting cultivation were more harmful in terms of carbon stocks per unit area than selective logging (Nasi et al, 2009). While such studies give an indication on the effect of land-use types on carbon, their results may not be generalized for all tropical forest types.

A wider range of forest mitigation interventions under AFOLU can be supported by voluntary schemes such as administered by the Voluntary Carbon Standard (VCS). Initiatives under this study area can be financed under REDD+ through a number of funding windows, including the Plan Vivo scheme. For example, the Ngoyla-Mintom REDD+ project in southern Cameroon visited during this study, whose activities include: sustainable agriculture (agro-forestry and intensive agriculture), forest conservation, assisted natural forest regeneration, and income generating activities (small animal husbandry, beekeeping, pisciculture and exploitation of NTFPs) with WWF implementation and EU funding, has opted for the Plan Vivo certificate scheme.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the analysis of research results and opportunities for the adoption of major forest related mitigation approaches in Agriculture, Forestry and Other Land Uses (AFOLU); this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks to promote the wider adoption of such approaches, as follows.

Institutional

(i). Develop projects and institute schemes whereby those who benefit from forest-related mitigation ventures would pay or compensate those who actually implement such schemes, including at national level.

(ii). Institute coordination platforms to check conflicting policies and programs and challenges related to poor governance for the adoption of climate change related mitigation approaches.

Legal / Regulatory

(i). Institute penalties for those who flout governance procedures and violate the rights and privileges of those engaged in forest-related climate change mitigation ventures including those striving to adapt to climate change.

Fiscal

(i). Encourage involvement and investment by the private sector in forest related mitigation schemes through collaboration agreements with communities who will benefit financially.

(ii). Earmark funds for community organization at the local level, with the aim of creating the conducive environment for collaboration between different groups, including women and youth engaged in the implementation of forest-related climate change mitigation schemes. This should include the promotion of service / labor related cooperatives.

CHAPTER 4 Impact of AFOLU mitigation activities on Food, Fuel and Fiber

Respondents were asked, based on their experiences, to propose the most applicable conventional AFOLU mitigation activities that inhibit food, fuel and fiber production as well as others in their national contexts that enable food, fuel and fiber production. The results are presented under section “Impact of conventional AFOLU mitigation activities on food, fuel and fiber”of this chapter. Because of respondents’ limited familiarity with the impact of the AFOLU end-use sub-sector i.e. land transport and passageway infrastructure (railways, motorways and line transmission passageways) and; urbanization from industrial complexes, commercial spaces and human settlements (resulting from movements from rural to urban cities), the effect of this sub-sector on food, fuel and fiber production was treated mainly through a literature study, whose results are presented in section “Impact of end-use AFOLU mitigation activities on food, fuel and fiber” of this chapter.

IMPACT OF CONVENTIONAL AFOLU MITIGATION ACTIVITIES ON FOOD, FUEL AND FIBER

Food production

Assessment of status and challenges

Based on analysis of the data in FAO (2010), the average annual area of forests and woodland burnt and reported in Africa between 2003 and 2007 stood at 83,180 km². In Francophone Africa, areas burnt are for the most part, the result of expanding traditional or commercial agriculture, an undertaking to improve pastures for extensive livestock husbandry, or an approach for hunting bush-meat on savannah landscapes. The level of agricultural mechanization in Sub-Saharan Africa (including Francophone African countries), along-side modern agricultural processes such as cutting-edge irrigation technology, integrated pest management, tillage management processes, improved pastures, rotations and catch-cropping is derisory compared to other continents. While there is an effort to modernize the agricultural sector, this study dwelled on the traditional and most common approaches observed on landscapes in Francophone African countries and captured in their AFOLU project related documents.

Applicable AFOLU activities in this section were organized around five activities, namely: sustainable agriculture, fruit tree orchards, tree-based fallow systems, mixed tree rangelands, and forest restoration schemes. The five activities cover the three AFOLU rural

sectors of forestry, agriculture and livestock husbandry. A preliminary list of seven determinants of the impacts on food production by the afore mentioned AFOLU activities developed by the researcher i.e. ability to create revenue/income, enhanced yields/revenue, engagement of women/youth, inhibition of wildfire spread, adequacy of policy/incentives, improved soil characteristics, less techniques/ease of execution; was improved by respondents, reducing the list to six determinants where, 'ability to create revenue/income' was eliminated and the six others refined as follows: (a) less technology and ease of application, (b) improvement of soil characteristics, (c) adequacy of policy and incentives, (d) inhibition of the spread of wildfires, (e) engagement of women and youth, and (f) enhancement of crop yields and revenue.

The organized AFOLU mitigation activities on food production are described as follows.

Sustainable agriculture

Sustainable agriculture is advocated as a farming scheme that is responsive to soil and biodiversity conservation (Nair et al, 2004). In this study, it is advocated as a mix of species with edible products and a good potential for carbon sequestration and therefore suitable for participation in an AFOLU mitigation scheme. The two patterns observed during field visits for this study are worth emphasizing, notably (a) the parkland pattern in Burkina Faso, made of tree species such as *Faidherbia albida*, and annual crops of sorghum, millet and maize, and (b) the cocoa agro-forests observed in southern Cameroon, made of a mix of cocoa trees, occasional perennial shade trees and annual crops of cassava and bananas. Both patterns have the potential to provide multiple revenue sources to their promoters while entertaining the possibility of participating in a carbon PES scheme. As an example, a study undertaken in Southern Cameroon in 2001 revealed that the total carbon in cocoa agro-forests of 304 Mg ha^{-1} was remarkably superior to that in food crop fields i.e. 85 Mg ha^{-1}. It also ranked third after biomass in the primary forest i.e. 541 Mg ha^{-1} and just below that under a long-term wood fallow of 460 Mg ha^{-1} (Duguma et al, 2001; Montagnini et al, 2004).

Fruit tree orchards

Preferred tree orchard patterns under this study, are those of hard wood fruit tree species. They include the Alphonso mango orchards planted in the parklands of the Sahel i.e. in Burkina Faso and Mali, and citrus fruit orchards planted in the more humid Francophone countries, such as Côte d'Ivoire, Cameroon, Madagascar and the DRC. Because this scheme is usually developed as a monoculture, the cost of maintenance especially against pests may be considerable, making it all the more pertinent for participation in a carbon PES scheme.

Tree-based fallow systems

Tree-based fallows imply standing trees during the active farming cycle, expected to continue during the fallow period. Trees may also be introduced during the inactive farming cycle. Both conditions are favored for this scheme, which is essentially a vestige indigenous farming system that enshrines traditional ecological knowledge and related practices. The scheme discourages promoters from using fire during both active and inactive farm cycles. It provides an opportunity for the return of native indigenous trees and enrichment with desired tree species such as Rattan, during the fallow period. The scheme must necessarily be planned, as implementers are expected to continue benefiting from resources of the land during the fallow period, such as the removal of food-based non-timber forest products, as well as fuel-wood. Implementation can for example lead to the development of specific forest types such as bamboo forests, with the landscape eventually developing into forest farms. The main orientation is to encourage the growth of trees with edible fruit and others on the landscape during the fallow period, so that fuel-wood removal does not negatively affect the carbon base. The carbon build-up must however be guided to continue up to a threshold that does not imperil agriculture during the farming cycle.

Sustainable forest rangelands

For description, see section “Assessment of status and challenges” of chapter 3, under “Description of the reorganized forest-related mitigation approaches within the context of AFOLU”.

Forest landscape restoration

For description, see section “Assessment of status and challenges” of chapter 2, under “Narratives of the reorganized forest-based adaptation practices”.

Interview results for this study area, are captured in Figure 5. The graph displays information on how key determinants comparatively impact AFOLU mitigation activities on food production.

Analysis and interpretation of results

- An analysis of the graphic display of results on Figure 5 reveals that each of the five major AFOLU mitigation activities is impacted by all six determinants for their success in food production, with fruit tree orchards receiving the highest relative impact for food production, and forest landscape restoration receiving the least relative impact for food production.
- The highest impacted AFOLU mitigation activity in relative terms by all determinants for food production is, “fruit tree orchards”. This is followed by: “sustainable forest rangelands”, then “sustainable agriculture”, “tree-based fallow systems”, and finally,

"forest landscape restoration". This trend reveals the AFOLU activities' relative importance for food production.

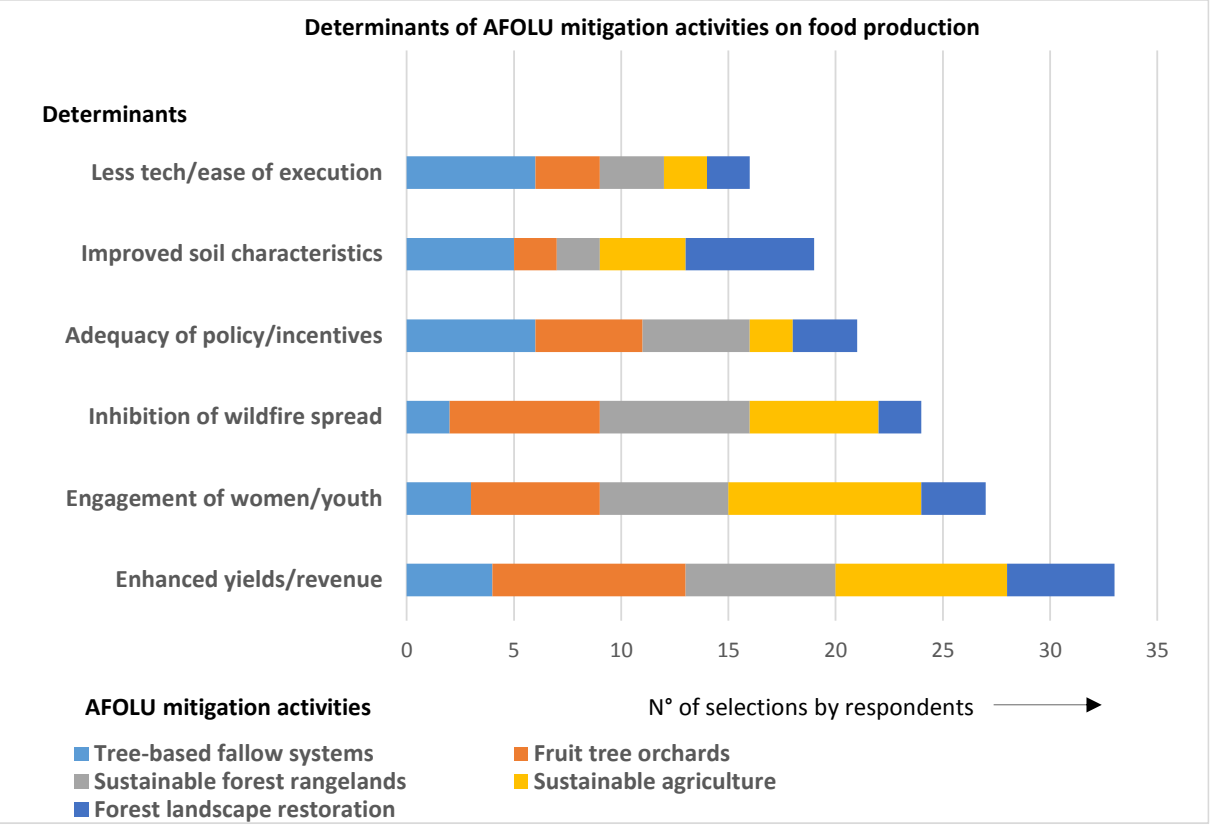

Figure 5. Determinants and relative impact of key AFOLU mitigation activities on food production, based on the experiences of respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

- The most positively affected AFOLU mitigation activity for food production i.e. "fruit tree orchards" is impacted most by the "enhanced yields and revenue" determinant; the second i.e. "sustainable forest rangelands" is impacted most by the "inhibition of wildfire spread" determinant; the third, "sustainable agriculture" is impacted most by the "engagement of women and youth" determinant; the fourth, "tree-based fallow systems" is impacted most by both; "less technology and ease of execution" and "adequacy of policy and incentives" determinants and ; and the fifth i.e. "forest landscape restoration" is impacted most by the "improved soil characteristics" determinant. This trend reveals the areas of strength of the different AFOLU mitigation activities.

- There are two remarkable situations: (a) the extent to which the "less technology and ease of execution" determinant, impacts "tree-based fallow systems", far more than it impacts any single one of the other four AFOLU mitigation activities, and (b) how the "engagement of women and youth" determinant impacts the "sustainable agriculture"

activity, far more than it impacts any single one of the other four AFOLU mitigation activities.

Fuel production

Assessment of status and challenges

According to the results of various studies captured in national and regional documents; fuel-wood and charcoal are by far the first energy source of households, representing approximately 80 % of the energy use in sub-Saharan African countries (Ministère de l'Environnement et de la Protection de la Nature – Cameroun, 2009; Bonkoungou et al. 2010). In Cameroon for example, fuel-wood is exploited at the rate of 10,5 million cubic meters per year while formal timber is produced at only 2,5 million cubic meters per year and artisanal timber at 0,5 million cubic meters per year (Ministère de l'Environnement et de la Protection de la Nature – Cameroun, 2009). According to Bonkoungou et al. (2010), the number of households using charcoal as their principal source of energy has tripled in most towns in the last five years. In Burkina Faso, for example, the consumption of charcoal passed from 6,913 tons in 1996 to 20,621 tons in 2000 (Ouédraogo, 2005). According to Bonkoungou et al. (2010), in 2004, firewood and charcoal represented an annual financial turnover of 8 billion francs CFA in Dakar, 15 billion francs CFA in Bamako and 12 billion francs CFA in Ndjamena. This increased demand from cities and towns in francophone African countries has given rise to the development of a multiplicity of networks for firewood and charcoal production, long distance transportation, large scale distribution, and small and medium scale commercialization. While these activities are known to create jobs, their impact alongside that of climate change on forest resources cannot be ignored.

Respondents in this study also provided answers on the most applicable AFOLU mitigation activities that impact fuel production. The proposed applicable AFOLU activities on fuel production were regrouped around five activities, namely: biofuel production schemes, biomass waste digester systems, tree-based fallow systems, bamboo forest schemes, and biomass energy saving schemes. A preliminary list of eight determinants of the impacts on fuel production by the proposed applicable AFOLU activities was proposed by the researcher i.e. ability to create revenue/ income, low cost of inputs/ labor, maximization of energy yield / revenue, supportive technical services, less technology and ease of application, adequacy of policy and incentives, inhibition of the spread of wildfires, and engagement of women and youth. The list was improved with the collaboration of respondents eliminating the ability to create revenue /income determinant, leaving a final list of seven determinants.

A description of the regrouped AFOLU mitigation activities on fuel production is presented as follows.

Biofuel production schemes

While this scheme essentially involves the planting of trees for the production of fuel energy mainly for domestic consumption, it also includes efforts that use products from tree-based species such as the Oil Palm (*Elaeis guineensis*) in moist forest Francophone African countries and Jatropha (*Jatropha curcas*) in the Sahel Francophone countries, for the production of biodiesel. A number of such initiatives are currently operational in Burkina Faso and Mali (in the case of Jatropha), and the DRC and Côte d'Ivoire (in the case of the Oil Palm). As an example, according to the World Rainforest Movement, (WRM, 2008); in October of 2007, a Chinese company signed a billion-dollar contract to set up more than 3 million hectares of Oil Palm plantations in the DRC, potentially to be used for the production of biofuel (Sonwa et al, 2010).

It should be mentioned that bioenergy and biofuel production may have benefits for rural incomes and therefore positively affect local and even national development. However, in order to prevent negative consequences on food availability and food prices, as well as on functional ecological processes including biodiversity, such initiatives should necessarily be planned at the appropriate local and regional scales, and in conjunction with a dedicated rural development policy (Tubiello, 2012) and implemented through instruments such as participatory climate sensitive land-use plans.

Biomass waste digester systems

This scheme involves the anaerobic processing of biomass from a multiplicity of sources including wastes (residues and byproducts) from the processing of timber, fiber from palm oil and coconut oil processing units, husk and seed-coat from rice and other grain processing cooperatives, litter from livestock husbandry units etc., to produce fuel such as Methane gas, highly desired as a source of domestic energy. Such schemes are wide-spread in Francophone African countries and range from small-scale biogas plants capable of supplying a few households, to larger units in institutions such as boarding schools, where the produced gas facilitates the preparation of meals for students.

Tree-based fallow systems

For description, see sub-section "Assessment of status and challenges" above of section "Food production" of this chapter.

Bamboo forest schemes

Bamboos are increasingly becoming important in sub-Saharan Africa generally, and in Francophone African countries particularly. One reason for this interest is the versatile nature of the species, which entertains several varieties adapted to the Sahel even as others are adapted to the humid forest environment, mountain landscapes and in the wet

lowlands just beyond mangrove species. Another advantage of the species is its ability to regenerate quickly and for most varieties, reach the maximum height of mature plants in less than one year (Hoang, 2007). In this context, it is a fast carbon sequestering species. A major weakness is that the bamboo has a 20 to 40 years cycle. If its regeneration is not planned, large areas occupied by the species may suddenly be lost to dieback (Hoang, 2007). Currently, bamboos are used in Francophone African countries amongst others, in the manufacture of furniture, decoration including house floorings and ceilings, as well as in the manufacture of charcoal for fuel energy production.

Biomass energy saving schemes

Wood removals for fuel production (fire-wood and charcoal) usually accounts for more than half of all wood removed from the natural forests of sub-Saharan African countries (FAO, 2011b). In the Sahel countries, biomass removals for energy production far exceeds that for other purposes i.e. 85 % in Burkina Faso (FIP – Burkina Faso, 2012). If this trend is not checked, the vision of using carbon as a yard-stick for measuring good forest management may never be achieved. This scheme encourages collaboration between industrial, small scale forest exploiters and local communities, enabling the latter to use industrial wood wastes and residue previously burnt around timber processing units, for the production of domestic energy. This scheme also includes biomass fuel energy efficient programs such as improved cooking stoves.

Results of the assessment of the impact of applicable AFOLU mitigation activities on fuel production are presented in Figure 6.

Analysis and presentation of results

- An analysis of the graphic display of results on Figure 6 reveals that with the exception of the “biomass waste digester systems” AFOLU mitigation activity, which is not impacted by the “engagement of women and youth” determinant, all the other remaining four AFOLU mitigation activities are impacted by all the determinants of their production of fuel. The “biomass energy saving scheme” has the highest relative rating while the “bamboo forest scheme” has the lowest relative rating among the major AFOLU mitigation activities. The “maximization of energy yield” determinant has the highest overall impact on AFOLU mitigation activities, while the ‘low cost of inputs and labor’ determinant has the lowest overall impact on AFOLU activities.

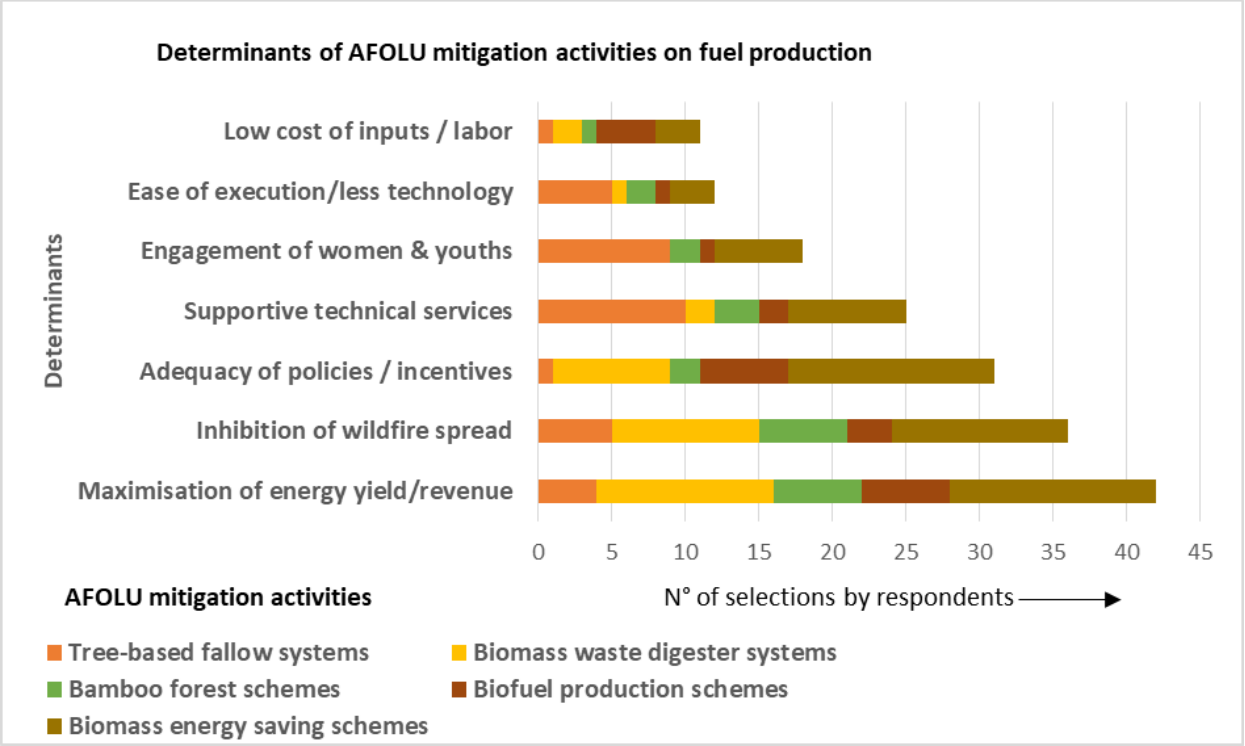

Figure 6. Determinants and relative impact of key AFOLU mitigation activities on fuel production, based on the experiences of respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

- The highest impacted AFOLU mitigation activity in relative terms by all determinants for fuel production is, "biomass energy saving schemes". Its high rating is based on the results of two determinants, namely: "maximization of energy yield and revenue" and the "adequacy of policy and incentives". While the high rating from the "maximization of energy yield and revenue" determinant is understandable, that from the "policy and incentives" determinant can be explained by the extensive "improved cooking stove programs" orchestrated by civil society organizations, targeting women in several African countries. In terms of performance, the "biomass energy saving schemes" is followed by: "biomass waste digester systems", then "tree-based fallow systems", "biofuel production systems" and finally "bamboo forest schemes".

- There are two remarkable situations: (a) the extent to which the "adequacy of policies and incentives" determinant, impacts on "biomass energy saving schemes" far more than it impacts any of the other AFOLU mitigation activities and (b) how the "engagement of women and youth" determinant had no impact on the AFOLU activity of "biomass waste digester systems". The reason could be that, respondents did not see the link between women and biomass digester systems, probably because of the level of technology involved in the production of biogas, different from liquid biofuel in palm oil production systems where women are most active.

Fiber production

Assessment of status and challenges

Fiber from timber, rattan, canes, cotton, sisal, rushes, and from other natural resources play an important role in the development of francophone African countries where such resources are nurtured. In Côte d'Ivoire for example, with an annual production of 5 million cubic meters in the 1970s, timber was the second export earner after coffee in the country. By 2000 however, timber production in the country had dropped to 1,8 million cubic meters per year (AGRIFOR Consult, 2006), and by 2008, timber was down to sixth place (5 %) among Côte d'Ivoire's industrial sector after agro-industries (33 %), chemicals (28,5 %), electric energy (8,9 %), water (8 %) and metals – 5,3 % (Fonds Monétaire International, 2009). For francophone countries of the Congo Basin, timber represented 6 % of the gross domestic product (GDP) of Cameroon in 2006; 5,6 % of the GDP of Congo in 2007; 3,5 % of the GDP of Gabon in 2009; 13 % of the GDP of Central African Republic in 2009; and 1 % of the GDP of the Democratic Republic of Congo in 2007 (de Wasseige et al. 2010). While diversification of the industrial sector and the discovery of fossil fuel have been responsible for the dwindling importance of timber, the sector continues to suffer from limited investments for renewal of forest resources.

Respondents of this research provided responses on the most applicable AFOLU mitigation activities that impact fiber production. The proposed applicable AFOLU activities on fiber production were regrouped around five activities: biomass waste recycling systems, agro-silvicultural systems, tree planting schemes, tree-based fallow systems, and bamboo forest schemes. A preliminary list of eight determinants of the impacts on fiber production by the proposed applicable AFOLU activities proposed by the researcher i.e. maximization of biomass yield / revenue, ability to create revenue/income, supportive technical services, ease of execution/less technology, adequacy of policy and incentives, inhibition of the spread of wildfires, low cost of inputs/labor, and engagement of women and youth. The list was improved with the collaboration of respondents eliminating the 'ability to create revenue /income' determinant, leaving a final list of seven determinants.

A description of the regrouped AFOLU mitigation activities on fiber production is presented as follows.

Biomass waste recycling systems

The wastes (residues & byproducts) targeted by this scheme are essentially the remains from industrial agricultural and forestry processing. They include: the molasses and straw from the manufacture of sugar; chaff and sludge from the manufacture of beer; fiber and shells from the manufacture of palm oil and other vegetable oils; husks, brans, straw and pods from the processing of rice and other seeds and grains; wood shavings and saw-dust

from the processing of timber, etc. These residues and byproducts are usually burnt in several Francophone African countries – an undertaking that adds greenhouse gases into the atmosphere. This scheme offers the opportunity for recycling such byproducts into reusable products, such as the deployment of fiber as padding for different types of seats, mattresses and floor mats; wood shavings and saw-dust caked for use as floorings, charcoal etc. There is some ongoing biomass recycling initiatives in Francophone African countries. These, and new ones have to be encouraged by promoting the use of adapted technological innovation with the aim amongst others, of reducing the sources of greenhouse gases from the atmosphere.

Agro-silvicultural systems

This scheme is similar to "tree orchards" but oriented towards more professional forestry. It involves the cultivation of tree species to provide goods and services other than timber while sequestering and maintaining stocked carbon. Examples include plantations of the Annatto tree (*Bixa orellana*), who's flowers yield a renowned food dye; *Acacia arabica* also known as *A. nilotica*, whose pods serve in the tanning industry; the Rubber tree (*Hevea braziliensis*), who's latex serves in the manufacture of rubber products, etc.

Tree planting schemes

For description, see sub-section "Locally managed tree plantations", section "Assessment of status and challenges" of chapter 2.

Tree-based fallow systems

For description, see heading "Assessment of status and challenges", sub-section "Food production" of this chapter 4.

Bamboo forest schemes

For description, see heading "Assessment of status and challenges", sub-section "Fuel production" of this chapter 4.

Results of the assessment of the impact of applicable AFOLU mitigation activities on fiber production are presented in Figure 7.

Analysis and interpretation of results

- An analysis of the graphic display of results on Figure 7 reveals that with the exception of the "tree-based fallow systems" AFOLU mitigation activity, which is not impacted by the "supportive technical services" determinant, all the other remaining four AFOLU mitigation activities are impacted by all the determinants of their production of fiber. Notwithstanding, the "tree-based fallow systems" has the highest relative rating while the "agro-silvicultural systems" has the lowest relative rating among the major AFOLU

mitigation activities. The "maximization of biomass yield" determinant, has the highest overall impact on AFOLU mitigation activities, while the "supportive technical services" determinant has the lowest overall impact on AFOLU activities.

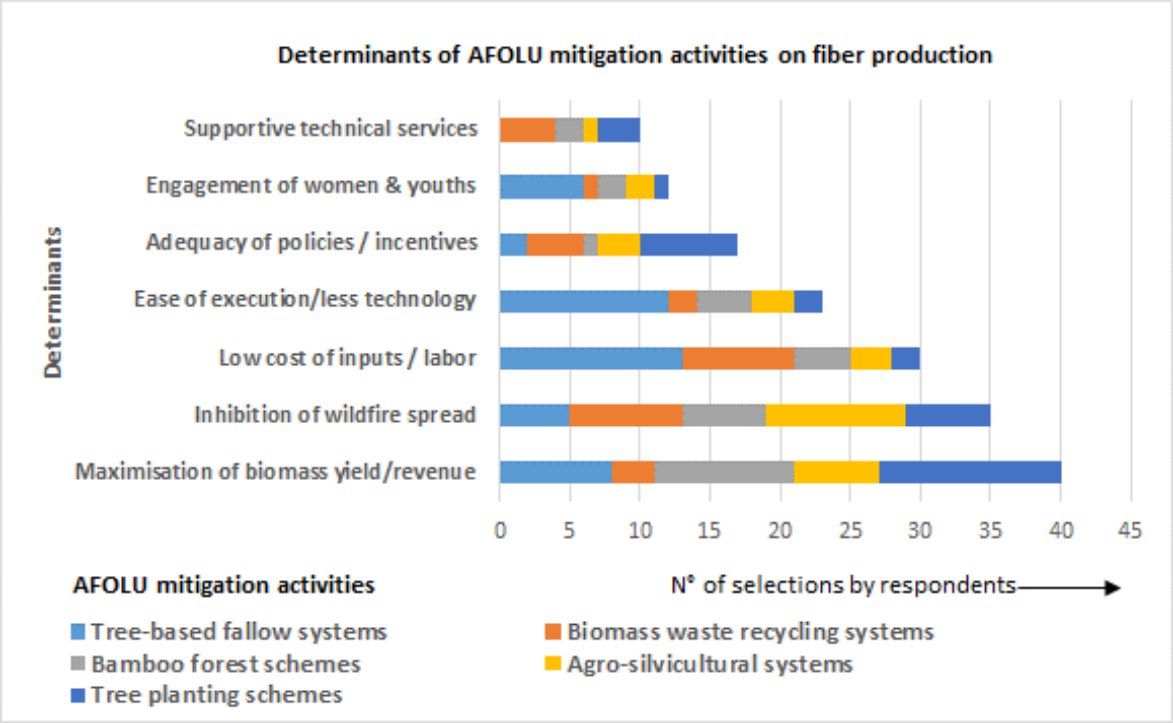

Figure 7. Determinants and relative impact of key AFOLU mitigation activities on fiber production, based on the experiences of respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

- The highest impacted AFOLU mitigation activity in relative terms by all determinants for fiber production is, "tree-based fallow systems". This is followed by: "tree planting schemes", then "biomass waste recycling systems", "bamboo forest schemes", and finally, "agro-silvicultural systems". This trend reveals the AFOLU activities' relative importance for fiber production.

- The most positively affected AFOLU activity for fiber production i.e. "tree-based fallow systems" is impacted most by the "low cost of inputs and labor" determinant; the second i.e. "tree planting schemes" is impacted most by the "maximization of biomass yield and revenue" determinant; the third, "biomass waste recycling systems" is impacted most by the 'inhibition of wildfire spread' determinant; the fourth, "bamboo forest schemes" is impacted most by the "maximization of biomass yield and revenue" determinant; and the fifth i.e. "agro-silvicultural systems" is impacted most by the "inhibition of wildfire spread" determinant. This trend reveals the areas of strength of the different AFOLU mitigation activities.

- There are two remarkable situations : (a) the extent to which the 'ease of execution and less technology' determinant, impacts "tree-based fallow systems" far and much more than it impacts any of the other four AFOLU mitigation activities, and (b) how the "engagement of women and youth" determinant impacts the "tree-based fallow systems" activity, far more than it impacts any of the other four AFOLU mitigation activities.
- Also noteworthy is the relatively low impact of the "supportive technical services" determinant on "agro-silvicultural systems", the low impact of the "engagement of women and youth" determinant on "tree planting schemes" and on "biomass waste recycling systems", and the low impact of the "adequacy of policies and incentives" determinant on the "bamboo forest schemes" activity.

IMPACT OF END-USE AFOLU MITIGATION ACTIVITIES ON FOOD, FUEL AND FIBER

Assessment of status and challenges

Land transport and passage-way infrastructure (railways, motorways, electric power and related transmission passage-ways)

While the construction of roads, railways, electric, telephone and related passageways are undertaken in Francophone African countries to promote development, they do not seem to consider arability of the land through which they transit as an issue, even as they increase exponentially over the years. For instance, in Côte d'Ivoire, the road network passed from 25,500 km in 1961 to 82,000 km in the year 2000 (République de Côte d'Ivoire, 2009), the latter covering a ground surface area of approximately 820 km² for an average road width of 10 meters. This surpasses the area of some African countries such as the Seychelles with a surface area of 455 km². In Cameroon, the Chad – Cameroon petroleum pipeline with a length of 1,070 km and a ground passageway width of 25 meters, renders approximately 27 km² of territory unusable for the production of food, fuel and fiber. In the DRC, the Inga–Shaba high tension electric power transmission line is hailed as the fourth longest in the world. With a length of 1,700 km and a ground passage-way width of approximately 10 meters, the Inga-Shaba renders 17 km² of land unusable for any other purposes. While the referred infrastructure all keep land out of use for producing food, fuel and fiber, they fulfill functions of transporting these products and their inputs; providing energy required to cure, transform and store the products and; inducing the social conditions favorable for the increased and sustainable production of food, fuel and fiber. One issue among others related to these infrastructures is that, climate proofing is usually not undertaken to guide decisions on whether to construct a road as opposed to a railway, and where it should pass to minimize negative impacts on food, fuel and fiber production.

Urbanization from industrial complexes, commercial spaces and human settlements

As in other African countries, urbanization, including the growth of industrial complexes, commercial spaces and human settlements in Francophone African countries is most visible in the major capital cities. An example of how urbanization takes up space that would otherwise serve for food, fiber and fuel production is narrated by the Burkina Faso government ministerial department responsible for housing and urbanization (MHU). MHU (2010), reports that the rate of growth of the population of Ouagadougou (capital city of Burkina Faso) evolved from 3,7 % in 1960 to 14,5 % in 1990 and to 20 % in 2007. This translates into an increased spatial occupation of land from 1,500 ha in 1950 to 20,000 ha in 2000 and to a projected coverage area that includes outlying villages of 34,000 ha in 2010 (SP-CONEDD, 2010). Also, an example of the impact of the chemical industry on the production of food, fuel and fiber in Côte d'Ivoire is narrated by AGRIFOR Consult (2006), which indicates that in the early 2000s, the market for Ivorian pesticides represented a volume of more than 4,500 tons, 93 % of which was used on cash crops such as cotton (50 % of the amount) and cocoa (10 % of the volume). The consumption of pesticides followed that of fertilizers. AGRIFOR Consult (2006) narrates that, currently, areas producing pineapple, banana, cotton and Cocoa without exception, present traces of several pesticides while the soil of cocoa farms is contaminated mainly by Lindane. In banana areas, there are still traces of old organochlorides (Aldrine, Dieldrine and Endrine) with higher concentrations in the deeper soil layers (AGRIFOR Consult, 2006). These substances have a negative effect on human life through the contamination of domestic water sources with a consequent negative effect on the quality of labor for the production of food, fuel and fiber.

Analysis of potential impacts of end-use AFOLU mitigation on Food, Fuel & Fiber

Land transport and passage-way infrastructure (railways, motorways, electric power and related transmission passage-ways)

- In addition to occupying space that would otherwise serve for the production of food, fuel and fiber, land transport and transmission passage-ways in Francophone African countries occasionally provoke landslides on sloppy-land due to inadequate climate proofing, leading to new road deviations, which destroy existing production units and occupy more arable land as exemplified on the road between Sangmelima and the REDD+ Ngoyla Mintom project in Southern Cameroon.
- Although this study found that road construction was always preferred in Francophone African countries without adequate studies on alternative transport mediums such as navigable inland waters, and the sea for coastal countries, roads were noted to provide

net benefits for the production of food, fuel and fiber. This is because optimization of production requires that transportation of inputs and outputs should be as near as possible to the production units and consumption centers respectively.

Urbanization from industrial complexes, commercial spaces and human settlements

While increasing population, commercial spaces and industries occupy arable land and generate wastes, residue and pollution capable of rendering land sterile for the production of food, fuel and fiber, they do provide inputs for production such as labor and manure, while specialized industries such as textiles (fiber), agro-industries (food), chemical and mining complexes (fertilizers), industrial wood-works (fiber, construction and fuel) actually contribute in improving the production, processing and storability of food, fuel and fiber.

OPPORTUNITIES AND PROSPECTS

There are still uncertainties related to the cost of mitigation even as the potential and contradictions between the impacts of the AFOLU sector activities on natural resources, human societies and wildlife needs to be sorted out (Smith et al, 2014). More specifically, some of such uncertainties include (a) the carbon price, (b) dominant biophysical, climatic and socioeconomic conditions especially when climate-proofing decisions must be made, (c) existing differences in management orientations including different baseline situations, (d) the degree and extent of leakage, i.e. an AFOLU mitigation activity must not lead to an equivalent carbon release elsewhere by displacing land-use practices from one location to another and (e) the timeframe for abatement activities and determination of the discount rate. Also noteworthy is the increasing uncertainty of the impact of AFOLU mitigation activities on food security especially those that promote new biofuel initiatives (Smith et al, 2014).

Pertaining to financial support for AFOLU mitigation measures and activities, the UNFCCC Decision 2 of COP 17 (FCCC/CP/2011/9/Addendum.1) specifically “Agrees that results-based finance provided to developing country Parties that is new, additional and predictable may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources” (Smith et al, 2014). In addition to the preceding specification, activities under this study area are eligible for funding sources narrated under section “Opportunities and prospects”, chapter 3 of this report of this report.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the analysis of research results and opportunities for AFOLU mitigation measures, this section formulates non-exhaustive suggestions in the form of institutional,

legal / regulatory and fiscal benchmarks to check negative impacts and capture positive effects of AFOLU mitigation measures on food, fuel and fiber production, as follows.

Institutional

(i). Create the appropriate environment for establishing and promoting AFOLU-oriented community-based young-peoples' wildfire-fighting brigades and related squads to prevent and combat uncontrolled fires, likely to devastate agricultural fields, pastures, fodder and forest lands.

(ii). Support the development of better and faster market information systems to inform on the geographical occurrence of AFOLU related food, fuel and fiber products and their prices, including the availability of jobs.

(iii). Create an enabling environment for pioneer public-private partnerships (PPPPs) that include communities, to facilitate the development and implementation of socially acceptable AFOLU related energy-saving schemes such as biogas, non-food based liquid biofuel, briquettes from waste-wood, high quality charcoal and others.

Legal/Regulatory

(i). Develop and implement measures that limit the access of land-based industrial and commercial enterprises from fragile landscapes such as mangrove areas, river banks, sea shores, steep slopes and mountain-sides, where they could initiate ecological hazards.

(ii). Propose town-planning measures that advocate exploitation of aerial space for commercial buildings in certain parts of cities, in order to reduce ground areal occupation by commercial units in favor of urban green economy ventures.

(iii). Develop and implement climate proofing measures and techniques to guide decisions in the construction and operation of industries and road infrastructure.

Fiscal

(i). Make provisions in the form of incentives for the private sector, in collaboration with research agencies to develop sound and adapted environmental technologies (including documenting and propagating existing technologies) in the AFOLU related fields of biomass processing, recycling and use.

(ii). Earmark incentives for the establishment, equipment and motivation of AFOLU-oriented community-based young-peoples' wildfire-fighting brigades and related squads to prevent and combat wildfires.

CHAPTER 5 Applied polices in forest NAMAs

ASSESSMENT OF STATUS AND CHALLENGES

NAMAs (Nationally Appropriate Mitigation Actions), became an official process and scheme for supporting climate change efforts during the Cancún Agreements of 2010 (Morel et al, 2012). Signing countries agreed "*that developing country Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to 'business as usual' emissions in 2020*" (Cancún Agreements, 2010). The term 'nationally appropriate' in the Cancùn Agreements, gave developing countries considerable discretion in selecting projects for support. There were apparently little or no restrictions on size, sector and partnerships for NAMA interventions in so far as mitigation was targeted. They could be simple activities, national strategies and policies or large programs (Morel et al, 2012), although terminologies such as 'low carbon development strategies (LCDS) and low emission capacity building (LECB) are increasingly taking center stage in the NAMA discourse.

The diversity of approaches of NAMAs was noted during the collation of national priorities from intended nationally determined contributions - INDCs, (now nationally determined contribution - NDC) documents of Francophone African countries, visited during this study. A total of twenty-two NAMAs were collated from INDCs and other official documents of the five countries visited.

Under this study area, respondents in the countries visited, were requested to select five from among the twenty-two identified NAMAs, which they considered most amenable to promotion and implementation through forestry. The fifteen key respondents of this study and eight other knowledgeable respondents participated in the generation of information for this key result. The twenty-two NAMAs collated from country documents and other UNFCCC documents such as FCCC/SBI/2013/INF.12/Rev.3; were reduced to main representative words and coded. The coded categories were then regrouped around similar / collective themes. This generated a regrouping category of nine NAMAs. The process engaged is displayed in the matrix below.

Table 2. Core NAMAs project categories identified and involved processes

Forest NAMAs /INDC measures collated from NAMA documents – Francophone countries	Reduced NAMA code	Regrouping NAMA Code
1. Undertake actions to obtain savings from wood energy by promoting improved carbonization techniques & efficient wood energy-saving stoves	1. Wood energy savings	1. Energy production & wood energy saving schemes
2. Build and promote bio-digesters that employ timber residue and biomass wastes	2. Promote bio-digesters	
3. Promote the production and use of biofuels	3. Promote biodiesel production	
4. Develop the national REDD-plus policy and strategy	4. Develop REDD+ strategy	2. REDD+ implementation
5. Strengthen pilot projects that contribute to the implementation of the REDD+ national strategy	5. Implement REDD+	
6. Develop the legal and institutional framework for implementing REDD+	6. Develop REDD+ framework	
7. Improve the funding mechanism for implementing REDD+	7. Pursue REDD+ funding	
8. Build capacity of communities in income-generating activities linked to the sustainable management of forests	8. Alternative community incomes	3. Decentralized forest management & benefits
9. Develop & test scenarios for registration of community forests	9. Register community forests	
10. Develop and promote partnerships between community forests within and outside of the country	10. Community forest partnerships	
11. Strengthen capacity of communities and municipal councils in the establishment of Community / communal forests.	11. Promote Communal /community forests	
12. Sustainably reconstitute, arrange and manage the forests on rural lands	12. Arrange rural forests	4. Assess & plan national forests
13. Sustainably reconstitute, arrange and	13. Arrange state	

Forest NAMAs /INDC measures collated from NAMA documents – Francophone countries	Reduced NAMA code	Regrouping NAMA Code
manage the forests on the permanently held State-owned lands	forests	
14. Undertake large-scale reforestation programs	14. Pursue reforestation	5. Afforestation, reforestation & restoration
15. Pursue creation of new forests (afforestation)	15. Pursue afforestation	
16. Pursue restoration of degraded forests	16. Forest landscape restoration	
17. Pursue enrichment of existing forests	17. - Forest enrichment planting	
18. Promote reconstitution of the forest cover especially in sensitive areas such as head-waters and river banks	18. Restore sensitive landscapes	
19. Promote techniques for improving carbon sequestration by forests	19. Improve carbon sequestration	
20. Improve the management of protected areas using biodiversity management plans	20. PA management	6. Pursue forest conservation
21. Creation & management of conservation concessions	21. Conservation concessions	
22. Promote the large scale adoption of agro-forestry	22. Promote agro-forestry	7. Promote agro-silvo-pastoralism
23. Develop sustainable farming schemes	23. Promote sustainable farming schemes	
24. Multiply forage seeds and popularize them in grazing regions	24. Promote Silvo-pastoral schemes	
25. Reduce the extraction of forest timber	25. Reduce timber extraction	8. Reduce timber extraction
26. Improve the management of wild forest fires	26. Wildfire management	9. Wildfire management

Respondents providing answers to this study were also requested to select three best practices or enablers, likely to lead to the optimum performance of each of their previously identified forest NAMAs. The list of 16 best practices or enablers from which respondents made their choice is presented in the matrix below. To facilitate graphic presentation, each enabler was given a reduced code as indicated in the matrix.

Table 3. Forest NANA Enablers for up –scaled performance

Forest NAMA Enablers	Reduced enabler code
1. **Promote participation of women & youths in the development and implementation of forest NAMAs**	1. Include women/youth
2. **Ensure existence of adequate social infrastructure for implementation of NAMAs**	2. Improve social infrastructure
3. **Improve / update land-tenure system to empower stakeholders for implementation of NAMA-related schemes**	3. Improve land tenure
4. **Take account of traditional customary laws and local norms in NAMA development and implementation**	4. Consult customary institutions / instances
5. **Promote climate Change conscious forest land-use plans**	5. CC conscious LU plans
6. **Ensure good coordination among local NAMA actors**	6. Coordinate NAMA actors
7. **Ensure good coordination among government ministerial departments supervising implementation of NAMAs**	7. Coordinate ministerial departments
8. **Build capacity and equip supportive technical / extension services**	8. Supportive technical services
9. **Update and pursue adaptation of related Climate change and forestry policies, laws and related Decisions**	9. Update measures & decisions
10. **Facilitate access to financial resources including upfront funding**	10. Facilitate upfront funding
11. **Promote education, information & communication**	11. Education, information & communication

Forest NAMA Enablers	Reduced enabler code
12. Improve the NAMA governance process	12. Pursue good governance
13. Provide opportunities for income generation by NAMA implementers to reduce poverty	13. Promote income prospects
14. Promote the development and use of simple resource-use conventions among actors	14. Solve resource-use conflicts
15. Improve the knowledge and skills of NAMA implementers	15. Improve knowledge & skills
16. Identify adequate forms of incentives to encourage the participation of actors in NAMA schemes	16. Provide incentives

In order to reduce overlapping effects, the "facilitate upfront funding" enabler was merged with the "provide incentives" enabler thereby reducing the number of enablers from sixteen to fifteen. The interview results are captured in the graph of Figure 8. It displays information on the relative impact of good practices or enablers on priority forest NAMAs.

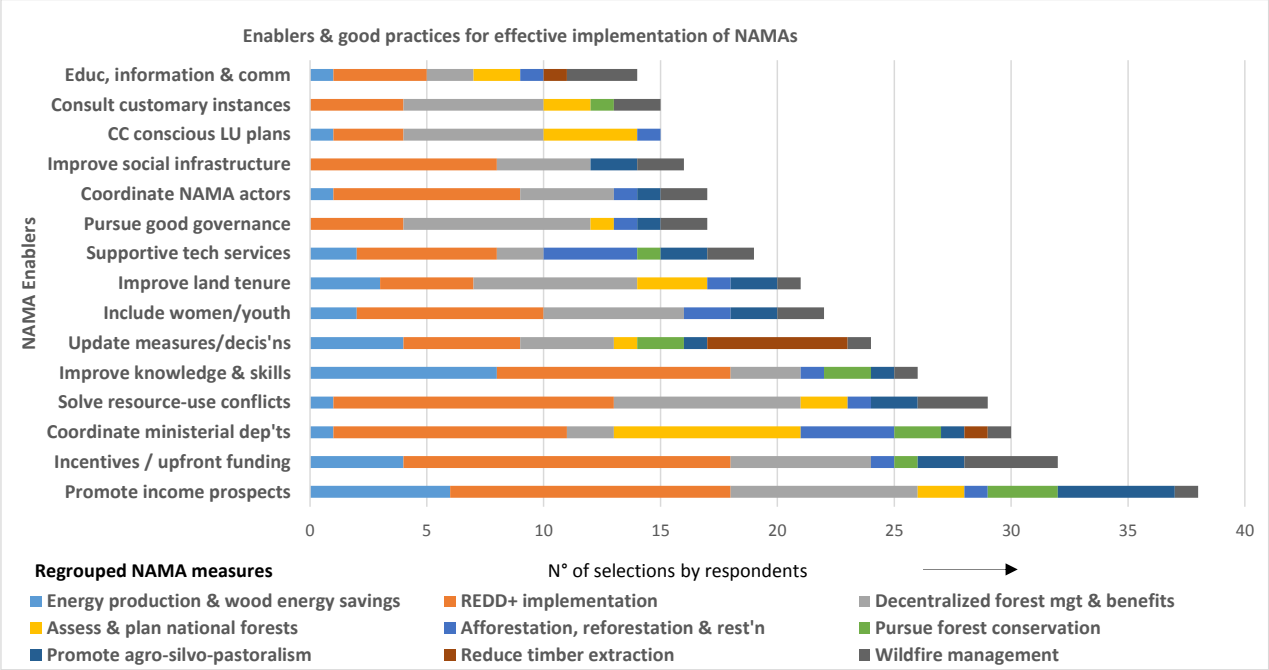

Figure 8. NAMA enablers and their relative impact on NAMA implementation measures based on proposals by respondents in Burkina Faso, Côte d'Ivoire, DRC, Madagascar and Cameroon.

ANALYSIS AND INTERPRETATION OF RESULTS

- An analysis of the graphic display of results on Figure 8 reveals that “coordinate ministerial departments” is the only NAMA implementation enabler to have an impact on all nine NAMA measures. Two other implementation enablers have an impact on eight out of the nine NAMA measures i.e. “promote income opportunities or prospects” and the “update measures and decisions” enablers. The NAMA implementation enabler with the least impact in terms of number of NAMA measures impacted is the ‘improve social infrastructure’ enabler, which impacts only four out of the nine NAMA measures.

- The NAMA measure with the highest impact from implementation enablers, in relative terms, is the “REDD+ implementation” measure. This is followed by: “decentralized forest management & benefits” measure, then “energy production and wood energy savings” measure, the “wildfire management” measure, the “assess and plan national forests” measure, etc. The least affected NAMA measure by enablers is the “pursue forest conservation” measure. This trend reveals how the nine NAMA measures compare against each other as portrayed by the NAMA implementation enablers.

- The most affected NAMA measure i.e. “REDD+ implementation” is impacted most by the “incentives and upfront funding” NAMA enabler. Its second highest impact is distributed equally from two enablers i.e. “solve resource-use conflicts” and “promote income opportunities or prospects”. The second most highly impacted NAMA measure i.e. “decentralized forest management and benefits”, is impacted equally at three NAMA enabler levels, i.e. “pursue good governance”, “solve resource use conflicts” and “promote income opportunities or prospects”. The third most impacted NAMA measure i.e. “energy production and wood energy savings” is impacted most by the “improve knowledge and skills” enabler. The forth most impacted NAMA measure i.e. “wildfire management” is impacted most by the “incentives and upfront funding” enabler; the fifth measure, i.e. “assess and plan national forests” is impacted most by the “coordinate ministerial departments” enabler; the sixth, i.e., “promote agro-forestry” is impacted most by “promote income opportunities or prospects” enabler. The “afforestation, reforestation and restoration” measure, is affected highest at two enabler levels, namely; “coordinate ministerial departments” and “supportive technical services”. The “pursue forest conservation” measure is impacted most by the “promote income opportunities or prospects”, and “reduce timber extraction” measure impacted most by “update measures and decisions” enabler. This trend appears to reveal enablers that are most required for success of the different NAMA measures.

OPPORTUNITIES AND PROSPECTS

The NAMA Facility, established in 2012 by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), and the UK Department of Energy and Climate Change (DECC) are currently supporting NAMA projects (Morel et al, 2012). Also, the Danish Ministry of Energy, Utilities and Climate (EFKM) and the European Commission joined the program as new Donors in 2015. The NAMA Facility provides financial support to developing countries and emerging economies that manifest leadership in tackling climate change and that desire to implement transformational country-led NAMAs within the existing global mitigation architecture in the short term (Morel et al, 2012).

In addition to the NAMA Facility, activities under this study area are eligible for funding sources narrated under section "Opportunities and prospects", chapter 3 of this report.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the analysis of research results and opportunities for the promotion and implementation of NAMAs, this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks expected to set the stage and facilitate such implementation, as follows.

Institutional

(i). Set-up a framework for participatory development of tools and instruments among forest resource users and NAMA implementers such as local conventions, to help avoid and solve resource-use conflicts.

(ii). Devise and implement strategies to enhance the technical and management capacity of decentralized bodies in view of their effective management and supervision of forest NAMAs.

Legal/ Regulatory

(i). Develop mechanisms and identify instances for inter-ministerial coordination as well as measures to institute and strengthen new or updated NAMA-related conflict of interest regulations and laws.

(ii). Setup revenue and benefit sharing systems and mechanisms where a significant proportion of local taxes are reinvested in local NAMA-related programs, including NAMA-related capacity building initiatives.

Fiscal

(i). Earmark funds to promote field cultural processes related to the implementation of forest NAMAs acknowledged to be beneficial, socially acceptable and easy to implement and for the motivation of those engaged in NAMA schemes.

(ii). Make provisions for funds to support preliminary processes related to the organization of benefit sharing systems, including for NAMA-related capacity building programs.

CHAPTER 6 Policies Incorporating Adaptation and Mitigation

ASSESSMENT OF STATUS AND CHALLENGES

While climate change adaptation and mitigation contribute towards the same objective of buffering the adverse effects of climate change, they have so far been detached and treated as separate topics under the international climate change convention (Swart & Raes, 2007; Loh Chia et al, 2014). This is understandable at the level of the science where their methodological approaches are different. They also manifest differences at the temporal and space-based levels with mitigation targeting the alleviation of medium to long-term climate impacts and driven by global and national interests and stakeholders, while adaptation mainly targets the short term impacts of climate change, driven by local interests such as coping strategies at the community level (Somorin et al, 2011). In spite of this difference, the Bali Roadmap of the UNFCCC specifies that, actions that seek to safeguard food security and rural livelihoods under climate change in upcoming decades must focus on the synergy between adaptation and mitigation strategies in both the agriculture and forestry sectors. This is of utmost relevance if such actions are also expected to address climate, environmental, social and economic concerns expressed within both the UNFCCC and the Millennium Development Goals (Tubiello, 2011).

Under this study area, respondents in the countries visited, were requested, based on their knowledge of forest and climate change related strategies generally, and their countries' 'intended nationally determined contribution (INDCs)' specifically, to select five priority forest climate change related approaches based on a list of strategies collated from the INDCs of Burkina Faso, Côte d'Ivoire, RDC, Madagascar and Cameroon. The following ten policy areas and strategies, with improved precision, were selected at least twice by respondents, namely :

(i). carbonization for charcoal production using improved and innovative methods ;

(ii). large-scale / local level afforestation and reforestation through local community involvement ;

(iii). development of urban forestry schemes using socially acceptable tree species ;

(iv). restoration of degraded forest land using adapted tree species ;

(v). production of bioenergy / biodiesel in a socially and environmentally friendly manner ;

(vi). development of bio-digesters around high timber and agricultural residue centers ;

(vii). development of communal and community forests based on CC friendly land-use plans ;

(viii). promotion of agro-silvo-pastoral schemes based on local knowledge and research result ;

(ix). development of sustainable farming schemes based on local knowledge and research results ; and

(x). improvement of management of forest fires through the use of appropriate social infrastructure.

The preceding INDC (NDC) policy areas and strategies are described and assessed below, based on their level of compliance and fit as both adaptation and mitigation interventions.

Carbonization for charcoal production using improved and innovative methods

The making of charcoal involves the near anaerobic combustion of green or dry wood to produce coal, liable to last three times or more, longer than ordinary firewood for the production of cooking energy in households. More than half of the households in Sub-Saharan Africa, including Francophone countries, depend on biomass and especially wood for household cooking energy supplies (FAO – State of the World Forests, 2011). For example in Burkina Faso, biomass accounts for 85 % of the total energy consumption in the country, ahead of petroleum products – 14 %, and hydroelectricity – 1 % (SP-CONEDD, 2009). Cutting trees for the supply of domestic energy is therefore almost inevitable. Generally, in the moist forest Francophone countries, charcoal making is usually undertaken close to and associated with the opening of new farms or mature fallows. Instead of burning standing trees as farms are opened, carbonization for charcoal production in moist forest contexts has the advantage of reducing the quantity of carbon dioxide emitted from the agricultural scheme. In this regards, carbonization is a mitigation activity if the process is efficient in converting firewood to charcoal.

It should be mentioned that traditional carbonization kilns that consist of burning wood underneath mounds of thatch and soil (Figure 9), only accounts for an efficiency rate of about 18 % i.e. 5.5 kg of wood yielding 1 kg of charcoal (Sow, 1990). There are other forms of kilns with higher conversion rates, i.e. the Kenya Forest Research Institute's kiln has a conversion rate ranging between 28 % and 30 %. Brick kilns such as on Figure 10, are common in drier Francophone countries such as Burkina Faso and entertain a conversion rate of up to 50 %. Others, such as the Mekko kiln, made of a durable metal casing, though slightly more expensive, has the ability to conserve most wood byproducts during the combustion process with a wood to charcoal conversion rate upwards of 75 % (Kalenda et

al, no date). As forests and trees become scarce in the face of increasing population, exacerbating poverty, coupled with the negative effects of climate change, carbonation for charcoal in kilns constitutes a coping strategy and therefore a climate change adaptation strategy for the production of domestic cooking energy. Carbonization for charcoal production using improved kilns is consequently a mitigation and adaptation scheme. The scheme should however be accompanied by planned reforestation.

Figure 9. Charcoal making kiln in moist forest setting: south western Côte d'Ivoire. Source: Martin NGANJE.

Figure 10. Charcoal making kiln in semi-arid setting: western Burkina Faso. Source: Martin NGANJE.

Large-scale / local level afforestation and reforestation programs through community involvement

As mentioned in the introduction of this study, initial large-scale public afforestation and reforestation schemes in Francophone African countries were not participatory, leading to their mixed results. Afforestation and reforestation have been described under section 3.1 of this study. They constitute typical mitigation activities since they expand carbon sinks by accumulating and immobilizing carbon. Afforestation and reforestation however, together with minimum tree cutting strategies, have been employed in several Francophone African countries as coping strategies to buffer the negative effects of climate change. Examples include: (a) minimum cutting and adapted reforestation to reduce the drying-up of water sources due to drought, such as around several head-waters of the Niger River in the Fouta Djallon highlands of Guinea – the water tower of West Africa, which also affects Burkina Faso (b) adapted reforestation to reduce the incidence of landslides along slopes, such as practiced on sections of the Cameroon mountain range, where municipal / council forests protect the sloppy landscape against landslides including non-climate risks such as magma flow from occasional volcanic eruptions. Such activities imply both reactive and anticipatory adaptation. Local level afforestation and reforestation ventures can consequently be

classified as both mitigation and adaptation ventures. Moreover, it is also a mitigation venture when wood harvested from acknowledged afforestation and reforestation schemes is used as substitute for products that require extremely high energy for their production such as iron, steel, aluminum, plastics, and cement products such as armed concrete.

Development of urban forestry schemes using socially acceptable species

As described in section "Assessment of status and challenges" of chapter 3, urban forestry schemes are tree and related shrub planting ventures in public places, constituting one of the most stable tree-based systems, capable of lasting several decades. They serve the purposes of research and education, recreation and tourism, scenic beauty, shade, wind-breaks, cultural and spiritual purposes, and for the provision of non-timber forest products. Due to their stability, urban forestry schemes constitute a veritable mitigation option, sequestering and immobilizing carbon for several decades. However, they also serve as the 'lungs' of urban townships where their presence has the additional function of tempering the negative effects of climate change. This function is most evident in botanical gardens, urban floral sanctuaries and township parks. Urban forestry schemes can consequently be classified as a viable adaptation option.

Restoration of degraded forest land using adapted tree species

As described in section "Assessment of status and challenges" of chapter 2, the restoration of degraded forest landscapes is usually undertaken to alleviate the current and future negative impacts of climate and anthropogenic catastrophes. Examples include: the restoration of degraded coastal areas with mangroves and adapted species; degraded mining sites with indigenous tree species; landscapes degraded by refugees and displaced people with improved and adapted tree species; forest land degraded by erosive floods or extensive wild fires with locally adapted tree species; clear-felled forests with improved tree species etc. The landscape restoration scheme is evidently a mitigation venture by virtue of its ability to sequester and immobilize carbon. It is also an adaptation scheme when pursued in reaction to the negative impacts of climate forces such as eroded coastlines and landscapes decimated by wildfires, as well as in relation to anticipated climate and man-induced risks that lead to mudslides after mining operations.

Production of bioenergy / biodiesel in a socially and environmentally friendly manner

As narrated in section "Fuel production" of chapter 4, this scheme involves planting trees and shrubs whose products are used in the production of fuel i.e. biodiesel. Species already being used include; the Oil Palm (*Elaeis guineensis*) and Jatropha (*Jatropha curcas*). With increasing population on limited land resources, this scheme currently generates a lot of debate in relation to its impact on food security and food prices. Pertaining to characteristics; biodiesel is reportedly friendlier to the environment than fossil fuel and

consequently constitutes a mitigation venture. It is equally perceived as a coping strategy and thus an adaptation strategy.

Figure 11. Young Jatropha plantation mixed with onion, Burkina Faso
Source: Martin NGANJE

This is because it provides an opportunity for rural poor communities and land-locked countries such as those of the Sahel, to reduce their dependence on expensive fossil fuel, transported through thousands of kilometers away on risk-prone roads, to eventually produce their own fuel for the operation of equipment ranging from local mills to motor-cars. The NEPAD recommends that bankable bioenergy/biodiesel projects should preferably be PPP initiatives (NEPAD website).

Development of sustainable farming schemes based on local knowledge and research results

As narrated in section “Food production” of chapter 4, of this study, sustainable farming is advocated as responsive to the conservation of soils, forests and forest biodiversity. An exemplary case is; cocoa agro-forests, made of a mix of cocoa trees, occasional perennial shade trees and annual crops of cassava and bananas, as practiced in western Côte d’Ivoire and southern Cameroon. If the stocking rates from research results such as provided by the International Institute of Tropical Agriculture (IITA) are followed, this pattern has the potential to provide multiple revenue benefits and livelihood support to its

promoters, while entertaining the possibility of viable carbon sequestration through its cocoa stands and cocoa shade trees. The scheme is consequently a veritable mitigation option as well as a climate change adaptation venture.

Development of bio-digesters around high timber and agricultural residue centers

As explained in section “Fuel production” of chapter 4, of this report, bio-digesters anaerobically degrade biomass to produce gases, mainly methane, highly desired as a domestic fuel in cooking. This scheme uses the waste from timber processing units and the residue from industrial agricultural plants as well as from other sources to produce methane gas. Because bio-digesters essentially employ biomass wastes, habitually burnt as a way of their disposal, they consequently ensure a reduction in the use of fire-wood (released for carbon sequestration) and consequently reduce the quantity of carbon-dioxide released into the atmosphere. In this regards, the scheme is a mitigation venture. Bio-digesters can also be labeled as a coping and consequently an adaptation strategy as they promote the use of wastes in the face of dwindling and scarcer forest resources needed for the supply of domestic energy.

Development of communal & community forests based on climate change friendly land-use plans

Several Francophone African countries have enacted legislation for the decentralization and decongestion of forest management. While there are teething problems in most of these countries in terms of the effective devolution of powers for the management of forests, it is envisaged that this will become effective as the management capacity of decentralized authorities and communities is enhanced. Notwithstanding, several of such forests administered on the basis of simple management plans exist already. For example, the community managed “Forêts des Marais Tanoé-Ehy” in Côte d’Ivoire, visited during one of the field visits of this study, constitutes one of such forests, managed by officially recognized decentralized instances. The forest appeared to be very secure, due to the proximity control and oversight provided by virtually all village community residents. The security of such forests makes them a veritable carbon sink and consequently a viable mitigation venture. They also provide a pool of resources as safety-nets to community residents such as medicinal and aromatic products (MAPs) and a variety of non-timber forest products. In this regards, the scheme is also a viable climate change adaptation option.

Promotion of agro-silvo-pastoral schemes based on local knowledge and research results

As explained in section “Assessment of status and challenges” of chapter 3, of this report, fodder trees have the potential to modify the microclimate in drought-prone pasturelands into graze friendly rangelands. Research by the ICRISAT Sahelian Center in Niamey, Niger, found that *Faidherbia albida* is one among several remarkable fodder species for promotion on pastures as well as in agro-forestry schemes as a soil fertilizer during the cropping cycle.

The species among others, has been proven to be versatile in the face of drought and wild fires. Based on local knowledge from rangeland residents on the most resistant waterholes on the landscape, such tree species can be introduced around such waterholes from where they will spread outwards. Because of the drought and wildfire resistant ability of these parkland species and the local interest to protect them, this scheme provides an opportunity for carbon sequestration and consequently a viable mitigation option. The scheme also provides community residents with a multiplicity of goods and services, including NTFPs, fuelwood, fodder and others, to help withstand the negative effects of climate change, also making it an outstanding climate change adaptation option.

Improvement of management of forest fires through the use of appropriate social infrastructure

Fire is an important land management tool but when unplanned or unmonitored, it can lead to the decimation of millions of hectares of standing forests including their related functional ecological processes, and provided goods and services. Adequate fire management produces direct benefits to neighboring communities in comparison to the unmanaged condition. It has been revealed from forest fire projects that, wherever people have a direct interest in protecting their natural resources, unplanned wildfires will be reduced, i.e., communities will mobilize themselves to prevent wildfires when they acknowledge that by so doing, they will benefit in safeguarding their natural resources, and consequently their livelihood. With adequate mobilization through the setting-up formal or informal social groups such as community fire squads and brigades, this scheme can contribute in reducing the loss of tree-based carbon thereby constituting a veritable mitigation option. The setting-up of social infrastructure to fight forest fires in anticipation of the risks that are usually associated with such fires also constitutes a climate change adaptation option.

OPPORTUNITIES AND PROSPECTS

One or more of the preceding policy areas and strategies can be combined on the same landscape to fulfill the dual roles of mitigation and adaptation to climate change. Ongoing examples include newly secured funds from the Green Climate Fund to implement the “Climate Smart Landscapes” project in Madagascar, implemented by Conservation International, the National Agency for the Coordination of Climate Change in Madagascar and the European Investment Bank. The “Africa Great Green Wall for the Sahara and Sahel Initiative” consisting of a mosaic of forests, agro-forests, and agro-silvo-pastoral interventions from Djibouti to Dakar, around human settlements and involving community residents, also falls within this category of mixed schemes. Funds for such systems do not necessarily or only have to be procured through mechanisms of the climate change convention. Funding instruments such as the “Global Mechanism” of the United Nations

Convention to Combat Desertification (UNCCD) can equally be exploited as in the case of the 'Africa Great Green Wall for the Sahara and Sahel Initiative'.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the preceding assessment, and opportunities for incorporating climate change adaptation to mitigation, this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks expected to set the stage and facilitate such harmonization, as follows.

Institutional

Develop harmonized adaptation and mitigation terms of references and job descriptions for those working at the national planning level, and for those operating at the community level.

Legal/Regulatory

Create forums, platforms and networks, including steering committees that encourage joint planning, sharing of knowledge (project results) and other relevant information by those involved in mitigation and adaptation schemes.

Fiscal

(i). Earmark funds to support adaptive research on the most appropriate and socially acceptable mix of adaptation and mitigation schemes per agro ecological zone.

(ii). Make provisions in support of forums, platforms and networks, including steering committees that encourage joint planning, sharing of knowledge (project results) and other information by those involved in mitigation and adaptation schemes.

CHAPTER 7 Carbon policies and practices

ASSESSMENT OF STATUS AND CHALLENGES

An examination of the basic forestry, agriculture and climate change policy documents of Francophone African countries, including those of Rwanda (which is advanced in carbon planning), revealed that carbon as a commodity or a marketable ecosystem service is still to be targeted and treated as such by these basic instruments. Meanwhile, low carbon and green economy approaches are advocated at most regional instances on the African continent. This study noted that instead of attempting to improve basic policy instruments and laws to take account of carbon, countries were (a) aligning their new programs (agricultural investment programs, forestry investment programs etc.) with climate change concerns as advocated by the sub-regional commissions – ECOWAS, COMIFAC and others, (b) treating carbon within the framework of a separate program (coordinated at higher levels of government) into which different government departments insert projects that they fallow-through and implement within the time bound program. An example is Rwanda's "National strategy for climate change and low carbon development", which has contributions from more than ten government ministerial sectors, dubbed, "Rwanda Vision 2050". Discussions with senior government officials including those in regional commissions, revealed their reticence to modify basic policy documents and laws based on a commodity or service i.e. carbon about which they had little knowledge. For example, COMIFAC's Convergence Plan developed in 2014 and covering the period 2015 to 2025 has no narrative on carbon. The Plan refers to carbon twice i.e. "inventory of carbon stocks by 2025", mentioned as one of several expected results under "inventorying of forest resources" within its operational objective 2.1.2, and again as; "carbon markets are developed through the REDD+ process", mentioned as one of five results under the Plan's "innovative financial mechanisms" within its operational objective 6.1.3. Notwithstanding this political stance, COMIFAC is actively involved in the implementation of REDD+ projects with other partners such as CIFOR.

Pertaining specifically to policies and practices supporting or inhibiting carbon initiatives, this study noted that: (a) because basic policy documents are usually long-term instruments, their statements were mostly open ended, leaving some level of discretion for their interpretation – usually through their Decrees of Application, and their rolling short to medium term programs, and (b) the programs (these can easily be updated) assessed during this study, did not advocate suitable contexts for the development of carbon

initiatives. The carbon context-related weaknesses of the programs are narrated under opportunities below.

OPPORTUNITIES AND PROSPECTS

The forestry, agriculture and other rural sector investment programs were all noted to have short life-spans, ranging from one to five years, and up to ten years and beyond if they were multi-sector programs coordinated at a federating level of government i.e. the Prime Minister or the President's office. These programs can be targeted to take account of carbon planning and practices in under five years as they mature for updating. Areas that need updating to take account of carbon within forestry and agricultural investment programs have been assessed and are narrated below.

Forest Investment Programs (FIPs) and Carbon

The national forest investment programs under the regional economic commissions in Africa have more or less the same presentation structure across the board as guided by international support institutions such as the World Bank, the African Development Bank and regional commissions such as ECOWAS, COMIFAC and others. An examination of the FIPs revealed the following limitations on carbon.

Insufficient planning on learning about carbon

Considering that carbon is the central product for calculations on REDD+ benefits, there ought to be a strategy on how to inform and educate on this ecosystem output. This is grossly lacking in the FIP documents. For example, these documents do not explain the different ways in which carbon can be sequestered by vegetation including soils, nor mechanisms that can facilitate or inhibit its capture.

The following approaches could be planned or adopted to improve knowledge on carbon.

- Institute a carbon related extension service to sensitize on carbon. This activity can be captured and costed in the (next) FIP planning / program documents. It implies that forestry extension personnel would have to undergo special training in the management of carbon as a bankable resource or product within the context of climate change adaptation and mitigation, in order to be able to provide extension training on the resource.

- Plan and develop technical documentation on carbon. This activity should equally be planned and costed in the (next) FIP planning / program documents. It consists of producing pamphlets, bulletins and handouts on carbon, and as much as possible, planned to be written in the language that will best facilitate their exploitation.

Insufficient description and use of existing carbon related processes

An adage of good management advocates the use of existing structures, improve them if they are deficient, and create new ones only when existing ones are outdated. One of the most active and useful existing process in forest management created by government forestry administrations is the “forest concession management and exploitation process”. Forest concessionaires manage, harvest and commercialize timber and other forest products from large forest estates in conformity with the fiscal policies and forestry laws of the country. Several of them have forest land contracts covering several years i.e. twenty-five years renewable in the case of the DRC. Also, most of them are familiar and others have committed to good forest management principles developed through the “Forest law Enforcement, Governance and Trade (FLEGT)” mechanism with the European Union, where a significant proportion of the timber from Francophone African countries is exported.

It should however be mentioned that forest concessionaires have not been adequately involved, and in several instances apparently excluded in carbon policy development through REDD+, which is perceived as a supporting process, at least of the rural sector, towards a green economy. This is probably because of the pro-poor stance advocated and proliferated within REDD+. A look at the big picture, starting with carbon management and its role in green economy development, and based on successful collaboration conventions between local community groups (who may have traditional user rights on forest concession land) and forest concessionaires (who have clear property rights over the land) across the board, there should be a tendency towards inclusion rather than exclusion. In several instances, forest concessionaires have hired consultants to undertake studies on whether they can engage the REDD+ process and how this can be done (Nourtier, 2014). Engagement of the private forest sector should occupy a strategic line in the REDD+ policy development documentation. This line should inform on the different types and combination of types of activities that can embrace forest concessionaire involvement in the carbon and REDD+ processes.

The following types and combination of activities can be mentioned.

- Avoided planned deforestation. This involves preventing change from forest to non-forest by stopping agricultural expansion or extensive pastures in parts or in the whole forest concession. The prevented planned activities should be able to allow for the calculation of carbon that would have been emitted in the form of carbon-dioxide had the activities been allowed or not stopped.

- Avoided unplanned deforestation or unplanned degradation. This involves stopping perilous though unplanned activities in the forest concession such as the unsustainable removal of NTFPs, including illegal logging. The prevented unplanned activities should

be able to allow for calculation of carbon that would have been emitted had the activities been allowed or not stopped.

- Conservation concessions. These include forest concessions with authenticated management plans, whose promoters decide not to exploit for timber but rather leave part or all of the concession for conservation and consequently carbon sequestration.

- Reduced impact logging. This concerns concessions that are actively pursuing or already engaged in a certification scheme. Management elements would include reduced impact logging, capable of justifying calculations for sequestered carbon due to the enhanced management process.

- Enrichment planting. This includes planned plantings in the forest concession, capable of facilitating the calculation of added carbon as a result of the intervention. Similar activities in sections "Assessment of status and challenges" of chapters 2 and 3 of this report can be included in this section.

National Agricultural Investment Programs (PNIAs) and Carbon

The development approach of the PNIAs is similar to that of the FIPs, with more or less the same presentation structure across the board as guided by international support institutions such as the World Bank, the African Development Bank and by regional and continent-level commissions such as ECOWAS, CEEAC – ECCAS, NEPAD, AU and others. Development of PNIAs is consequently made to align with sub-regional and continental orientations such as the "Detailed Program for Agricultural Development in Africa (PDDAA)", the "Regional Program for Agricultural Investment (PRIA)", and the "Rural Sector Development Strategy (SDSR)" among others. PNIAs are also multi-sectorial programs with a handful of sub-programs amongst with a climate change related sub-program i.e. "Sustainable Management of Lands and Climate Change" in the case of Sahel PNIAs, and "Environmental Protection and Adaptation to Climate Change", in the case of moist forest country PNIAs. This sub-program is decomposed into a handful of major lines or axes, namely: management of river banks and water basins; management of irrigated areas, management of rain-fed agricultural landscapes; management of pastoral areas and rangelands; mitigation and adaptation to climate change; fight against desertification; fight against pollution, invasive species, nuisances and parasites; sustainable management of biodiversity amongst others. An examination of the "Sustainable Management of Lands and Climate Change" / "Environmental Protection and Adaptation to Climate Change" sub-program of PNIAs revealed the following limitations on carbon.

- Absence of carbon linkages. Activities planned in the climate change related sub-program of PNIAs have not been linked to carbon. For effective sensitization and to facilitate uptake of REDD+ and carbon marketing, such activities may necessarily be linked to carbon, as exemplified under food production, within the AFOLU subsection

"Food production" of chapter 4 of this report. This is because some activities and field cultural processes are likely to promote more carbon sequestration than others. Knowledge of the differences, which does not necessarily have to be based on detailed studies, is likely to influence the decision of promoters.

- Absence of fiscal policy or linkages to incentives for carbon production. There is a lack of policy that promotes carbon production with instructions on carbon transaction costs and taxation. Considering that the production of carbon within the framework of the climate change convention is a complex undertaking, with considerable risks such as the constant threat of wildfires, this important resource may need policy support for its production. As an example, a percentage of the subsidies associated with agricultural inputs may be directed towards providing some form of insurance for carbon production.

- Absence of a policy narrative on forest/AFOLU carbon value chain. The importance of a narrative on forest/AFOLU carbon value chain in the forestry and agricultural program documents is the knowledge that it provides in terms of guiding engagement by promoters and implementers. Those who desire to engage ought to be aware of the preconditions for commitment, pitfalls to avoid (leakage, additionality, and irreversibility), management / activity type to pursue, carbon packaging, verification and registration, distribution, and consumption through carbon credits. Such a narrative has the potential to guide investments especially from the private sector, encourage communities to request for capacity such as in the measurement and monitoring of carbon accumulation, among others. Without forest carbon chain related narratives, which have the added role of familiarizing implementers with the carbon process, the carbon business may continue to be perceived as a foreign imposition for several years to come.

- Absence of linkages with centers of excellence, and young people's programs. Forest and AFOLU carbon accounting and management in Francophone African countries is still significantly dependent on external capacity. The forestry and agriculture program documents should necessarily make linkages between carbon development and young people's programs, taking into account the importance of carbon as a strategic product for the future. Also, universities ought to be engaged or at least consulted during the development of carbon policy. This will guide their development of related programs and training curricula, expected to build capacity in carbon accounting and management in the continent generally and in Francophone African countries specifically.

Some Regional Forestry and Environmental Policies and Carbon: ECOWAS Forest Policy / NEPAD Action Plan for the Environment Initiative

The ECOWAS Forest Policy of 2007 does not mention carbon. However under strategies for implementing the policy, section 5.3.1.2, proposes the development of a code of "good

forest practice" by country members. As carbon attracts more attention by becoming commercially attractive, the problems currently plaguing the timber business will overflow to the forest carbon sector. Also, as regional forestry and environmental policy and program documents mature for updating, they may have to recommend a code for good forest carbon practice. The NEPAD Action Plan for the Environment, meanwhile, recommends carbon management for sustainable livelihoods under its program area on combating climate change in Africa. This encourages carbon practices and should translate into the development of social contracts on carbon with forest communities. These proposed updates can be pursued, based on Section 1b of Article 4 (Commitments) of the UNFCCC, which states that: "Parties should formulate, implement, publish and *regularly update national and, where appropriate, regional programs* containing measures to mitigate climate change by addressing anthropogenic emissions; by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and *measures to facilitate adequate adaptation to climate change*.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the foregoing assessment, this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks expected to set the stage and facilitate incorporation of carbon policies and related practices in national and regional planning, as follows.

Institutional

(i). Create a national carbon agency to regulate and supervise schemes that engage carbon development, accounting and marketing.

(ii). Create a carbon knowledgeable extension service to sensitize on carbon across the forestry, agriculture and energy divide.

(iii). Update mature (obsolete) national and regional environmental, forestry, agricultural, biodiversity, and energy policies and programs coming up for renewal, with cutting-edge knowledge and information on carbon.

Legal/Regulatory

Create conditions for the effective operation of a national carbon agency and a carbon knowledgeable extension service.

Fiscal

Advocate and make budgetary provisions for the operation of a national carbon agency and a carbon knowledgeable extension service.

CHAPTER 8 Institutions and forest climate governance

ASSESSMENT OF STATUS AND CHALLENGES

Good Governance in natural resources management including climate, necessarily passes through consultations and participatory platforms. In addition to this bottom-up approach, the demand by developing countries for committed conservation and climate change funds has been accompanied by requests for improved transparency, accountability and oversight regarding decisions and actions to allocate, distribute, spend and account for such 'new and additional' public financing (Madzwamuse, 2010). In order to harmonize the bottom-up and top-down approaches, climate governance can be described as follows.

It is the measure by which we ensure that the interests of those most affected by climate change are met, that the different parties to the international instruments that govern climate actions live up to their obligations and the relations between them; the manner in which decisions are made and decision makers are held accountable; the policies, plans and measures that the state and its citizens put in place to address climate change and their implementation in a just and effective manner. Climate governance also deals with how inclusive the decision making process is in the exercise of power and responsibilities, that is, whether all stakeholders, including civil society, private sector and governments, have a voice. In short, it is about ensuring :

(i). legitimacy through transparency, accountability, fairness and equity ;

(ii). effectiveness through the right mix of strategies and tools ; and

(iii). sustainability of the policies and actions (Makombe, 2014).

This study profiled several institutions engaged in climate change activities in countries visited, based on the preceding descriptions of governance and indices developed by bilateral agencies such as the USAID. The study noted that the performance of institutions was to some extent, influenced by the level of governance allowed by the governments of the accommodating countries. For example, an exploitation of the 2014 sustainability index developed by USAID for civil society organizations in sub-Saharan Africa revealed that among the five countries visited for this study, institutions of the Democratic Republic of Congo were most likely to be impeded from being sustainable. Their legal environment was prohibitive, their organizational capacity was impeded, their financial viability was hindered, and the infrastructure expected to serve civil society agencies was obstructive. This is

understandable from a sociopolitical background of civil unrest – a condition that imperils environmental and climate governance. This impeding climate can be confirmed by a letter sent by civil society organizations to the Minister responsible for the Environment in the DRC in 2012 deploring the lack of transparency in the REDD+ process (Forest People, 2012). USAID 2014, however reports that civil society organizations in the DRC are making progress in the areas of advocacy, provision of services to the needy, and maintenance of a good public image through good relations with the media i.e. their activities are increasingly becoming newsworthy.

Based on the governance criteria proposed by Madzwamuse, 2010; Makombe , 2014; and USAID, 2015, this study discovered that most governmental and intergovernmental agencies as well as regional commissions working on forests and climate, did not meet the expectation for good climate governance. This was found amongst others, to be due to their constitution, i.e. they had little or no direct contact with those most impacted by climate change, and secondly, though acknowledged as public institutions, they exhibited a tendency to conceal public information rather than make it openly available for exploitation by those most impacted by climate change. Some exceptions noted during this study include: the Permanent Secretariat of the National Council on Environment and Sustainable Development of Burkina Faso (SP-CONEDD), and to a less extent, the National Environmental Agency of Madagascar (ONE), ERND Institute in DRC and CED in Cameroon. Their governance narrative and framework are briefly described below.

SP-CONEDD Burkina Faso

CONEDD is a detached agency of the Ministry of Environment and Sustainable Development of Burkina Faso (recently transformed into the Ministry of Environment, Green Economy and Climate Change - MEGECC). CONEDD was created in 2002, replacing the Conference of the National Council for the Management of the Environment (CONAGESE) created in 1998. The peculiarity of CONEDD is in its constitution, made of three organs, namely: the “Conference”, the “Permanent Secretariat” and “Specialized Commissions”. The supreme organ i.e., the “Conference” is the structure that infuses legitimate representation of those impacted by climate change. It also instills accountability, transparency, equity, and rule of law into CONEDD. The Conference is composed of representatives of various government ministerial departments, local elected officials, technical and financial partners, private sector representatives, religious and traditional authorities, representatives of civil society organizations, NGOs, professional associations of producers at the rural level, and community organizations. The Conference meets in ordinary session once every two years, convened and chaired by the Prime Minister. It gives advice, makes proposals and recommendations an action plan to Government, to be implemented by the CONEDD Secretariat. The CONEDD Special Commissions, meanwhile, are advisory and constituted according to the need.

ONE – Madagascar

The National Environmental Agency of Madagascar (ONE) is a regular parastatal government agency with financial autonomy represented by one central administration office in the country's capital and two decongested units in the country's regions. It was created in 1990 and technically placed under Madagascar's Ministry responsible for the Environment, and financially under the country's ministry responsible for Finances. ONE is the executing agency for environmental management policy in Madagascar. It is administered by a general manager and coordinated by a board of directors made of nine representatives, seven of whom are delegates of government ministerial departments. The other two are representatives of the college of enterprises of Madagascar, and the federation of miners of Madagascar. It is the participatory nature and transparency with which ONE undertakes impact assessments, making sure that; those likely to be affected by project impacts including as they may be associated to climate change, are heard and their views taken into account in the final decision, that makes ONE outstanding. ONE follows through with monthly bulletins carrying information on the results of impact assessments and other interventions of the agency.

ERND Institute, DRC

ERND was created in 2003. It is headed by an expert in development economics and project management, surrounded by a team of lawyers and experts in natural resources management. ERND entertains a regularly updated website, and was one of fifteen civil society organizations that signed a petition addressed to the Minister of the Environment, Conservation of Nature and Tourism of the DRC in 2012, denouncing the lack of transparency by government, and requesting good governance in the administration of the REDD+ process in the country (Forest People, 2012). A peculiarity of ERND is its intimate activities with local communities suffering from poverty and the negative impacts of climate change. As an example, ERND has advocated around national and local authorities in the DRC for recognition of customary and traditional rights of indigenous people to land and natural resources; trained more than 100 community paralegals among indigenous people in the pursuit of justice following their eviction from National Parks; rehabilitated several types of community infrastructure; secured indigenous lands with more than 40 cases supported and won; promoted the schooling of aboriginal children in the country; distributed hundreds of small livestock and poultry starter-stock to climate change vulnerable women and widows with support from the UNDP, among several other ongoing interventions.

CED – Cameroon

The Centre for Environment and Development (CED) was founded in 1994 in response to a crisis in the management of forests in Cameroon, beginning in the 1990s with the expansion of illegal logging, increased poaching, and environmental, social and economic problems of

forest communities. CED is headed by a lawyer and staffed with natural resource management experts. Its scope has expanded over the years to embrace extractive industries (oil and other minerals), and onwards to advocacy, gender policy, indigenous people and Bantu, climate change adaptation and mitigation. It provides support to local NGOs and associations in the forest zones of Cameroon and in other countries of the Congo Basin (CAR, Gabon, Republic of Congo, DRC), on issues related to monitoring illegal logging and other extractive ventures. The peculiarity of CED resides in the confidence that it has garnered from the government of Cameroon and international partners, resulting in its always nearly getting involved in the development of natural resource knowledge instruments, into which CED always attempts to inculcate aspirations of the forest poor and those most impacted by climate change. CED has a vibrant web site on which it displays the knowledge products in whose production it has participated.

The following matrix (Table 4)summarizes how the preceding institutions fare against governance criteria collated from several sources, including from Madzwamuse, 2010. Three crosses in a cell imply high standing on the referred criteria and a single cross implies minimum performance. The scoring is based on the expert judgment and investigation of the researcher of this study guided by discussions with stakeholders in the countries visited. The matrix is an individual performance standing of each organization only, and not a comparative assessment among organizations, since they operate at different scales and in different countries with different governance arrangements.

Table 4. Exemplary standing on key governance factors for sample organizations working on forests & climate change in Francophone African countries

Organisation	CC Gouvernance Principes									
	(a) Readiness to legitimately represent the intentions of the voiceless suffering from CC impacts. (b) Ability to use broad consensus to arrive at decisions for CC actors.		(a) Tendency of the hierarchy to portray a long-term view through plans for the popular survival (b) Development of people and societies encountering CC related difficulties		(a) Responsiveness by endeavoring to be helpful in solving the problems of CC related actors. (b) Effectiveness & efficiency in terms of cost and timeliness of results.		(a) Accountability to the public in use of resources and to CC stakeholders. (b) Transparency with information, presented in a way that facilitates its optimum exploitation.		(a) Pursuit of equity through the promotion of equal opportunities to all CC related stakeholders. (b) Proof of pursuit of the rule of law at all times in CC transactions	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Government Agencies										
SP-CONEDD Burkina Faso	++	+++	+	++	+	++	+++	+++	+	++
ONE - Madagascar	+	+	+	+	+	+++	++	++	+	+
Civil Society (NGOs)										
ERND Institute, RDC	+++	+	+++	+++	+++	+	++	++	+++	++
CED - Cameroon	++	+	++	++	++	++	++	++	+++	+++

Legend:
+++ = High performance or standing on indicated governance factor
++ = Average performance on indicated governance factor
+ = Low performance on indicated governance factor

CHAPTER 9 Impact pathways for governance of climate change in forestry

ASSESSMENT OF STATUS AND CONSTRAINTS

The content of the letter written by civil society organizations of the DRC to the country's Minister of Environment, Conservation of Nature and Tourism in 2012 (Forest People, 2012), is proof that a country may have a comparatively large national forest estate, which may not be appropriate for use in climate change adaptation and mitigation. The ability to attract climate change forest-related adaptation and mitigation investments depends in large part, on the quality of forest governance (FAO & ITTO, 2009). The civil society letter referred above revealed: failings in policy and legal frameworks manifested by weak enforcement, inadequate information and corruption; poor coordination; inconsistencies and contradictions to established plans and agreements; absence of participation and support from local level stakeholders; and deficiency in lessons learned from ongoing initiatives to inform upcoming processes. Some simple processes that can address these insufficiencies include: (a) regular updates through press conferences organized by the concerned stakeholders or government ministerial departments, (b) open public consultation forums, (c) interactive websites entertained by stakeholders with stewardship over climate change and forest resources, (d) timely emission and effective dissemination of informative bulletins and newsletters, (e) set-up of comprehensive steering committees with competent membership (f) institution of in-country donor coordination meetings, (g) open communication lines between stakeholders and donors etc.

This study examined the following high impact pathways for governance of climate change in forestry, namely :

(i). mechanisms for effective stakeholder participation ;

(ii). mechanisms for resolving conflicts and grievances ;

(iii). mechanisms for coordinating cross-sectoral issues ;

(iv). mechanisms for protecting informants and whistle-blowers ;

(v). mechanisms for the development / monitoring of cross-sectoral policies and programs ;

(vi). legal mechanisms for promoting transparent climate change and forest resources stewardship ;

(vii). mechanisms for the oversight of government agencies ;

(viii).pro-poor legal / legislative safeguards for forest communities ; et

(ix). mechanisms for circumventing inappropriate high-level political decisions.

Two processes that captured several of the preceding high impact pathways observed during this study include the FLEGT/REDD+ civil society platform in Côte d'Ivoire, and the framework for obtaining free, prior and informed consent for REDD+ initiatives in Cameroon. These two initiatives are summarily described below.

National FLEGT/REDD+ civil society platform

The national civil society FLEGT/REDD+ platform, also known as the "Ivorian observatory for the sustainable management of natural resources (OIREN)" become operational in Côte d'Ivoire as an inclusive, legitimate, neutral, independent and autonomous body in 2015. It is made of local and national civil society and community-based organizations, cooperatives, women and youth organizations and others operating on the environment, conservation, rural and sustainable development, human rights, land tenure and on the specific themes covered by the FLEGT and REDD+ mechanisms. OIREN brings together the FLEGT mechanism, implemented by the Ivorian Ministry responsible for Water and Forests (MINEF), and the REDD+ mechanism, implemented by the Ivorian Ministry responsible for Environment, Urban Health and Sustainable Development (MINESUDD) with both ministerial departments represented in OIREN at the regional levels. The platform meets once very quarter and acts as a framework for collaboration between these two highly competitive ministerial departments and their different partners. More specifically, OIREN ensures transparent management of natural resources in the country through the following missions: (i) sensitize populations in rural areas on the FLEGT and REDD+ mechanisms (ii) collate the concerns and proposals of the most vulnerable populations to enrich the REDD+ strategy and FLEGT negotiations, (iii) strengthen the organizational capacities of civil society organizations and local associations in their areas of intervention (iv) contribute to the definition of the legality of timber in the FLEGT process and social and environmental safeguards in the REDD+ process; (v) identify legal reforms needed for better forest governance; (vi) pursue the sharing of benefits in sustainable forest management as anticipated in the new draft forest code; (vii) independently observe the FLEGT and REDD+ processes. Additionally, the operation of OIREN enables civil society to use best practices from both the FLEGT and REDD+ processes to strengthen their participation in forest management in relation to climate change and land use in Côte d'Ivoire [Collated from UN-REDD, and R-PP Côte d'Ivoire].

Framework for obtaining free, prior and informed consent for REDD+ initiatives in Cameroon

The proliferation of REDD+ activities in Cameroon by the private sector, civil society organizations, development partners, conservation organizations, research centers, government institutions, and others made it imperative to pursue social safeguards through a common free, prior and informed consent (FPIC) standard. The framework developed for Cameroon and adopted in 2013 is regulatory in nature and include principles, criteria, indicators, as well as narrative guidance. The framework is made of three phases and ten benchmarks as summarized in the following Box.

Box. Summary operational framework for obtaining Free, Prior & Informed Consent (FPIC) for REDD+ initiatives in Cameroon

Phase 1. Field Preparations

Benchmark 1. Establishment of a technical team for FPIC implementation

REDD+ promoters recruit and train a multidisciplinary team of local and non-local facilitators, who understand & respect national laws, and related international treaties and agreements ratified by Cameroon.

Benchmark 2. Analysis of the physical, socio-economic and legal context

The REDD+ promoter's team map the actors and undertake a survey to identify; the different land-uses, indigenous and/or local communities present, and right holders and their rights. Analysis of the physical, socio-economic, cultural and legal contexts will be used to assess opportunities and constraints that the site poses and the economic and cultural aspects which right holders stand to gain or lose from project implementation.

Benchmark 3. Development of an information and communication strategy

An information and communication strategy takes into account; both internal communication, within the technical operational team, and external communication with indigenous and local communities as well as the other stakeholders. The REDD+ steering committee's accord must be obtained before the FPIC process begins.

Référence 3. Développement d'une stratégie d'information et de communication

Une stratégie d'information et de communication prend en compte; la communication interne, au sein de l'équipe technique opérationnelle, et la communication externe avec les communautés autochtones et locales ainsi qu'avec les autres parties prenantes. L'accord du comité de pilotage REDD+ doit être obtenu avant le début du processus de CPLCC.

Phase 2. Field implementation

Benchmark 4. Taking appointments

This involves the REDD+ facilitator going to the project area to meet with communities in order to inquire about their availability to participate in discussions.

Benchmark 5. Information and sensitization meetings

At this stage of FPIC, the REDD+ initiative promoter builds capacity on issues where gaps have been identified or for which there is a demand from communities. It is only after the capacity building measures have been taken that the developer may proceed with the information and

sensitization meetings.

Benchmark 6. Negotiating with stakeholders

Once the community has analyzed the information received, a date for negotiations is fixed. Consensus is negotiated in relation to the details of the initiative, point by point, after which the community may give its consent for the global initiative. Initiative promoters will have to negotiate with communities on a mechanism that guarantees a fair, transparent and non-discriminatory sharing of benefits emanating from the project.

Benchmark 7. Formalizing agreements between parties

The formalization of agreements is only possible if the community gives their consent to the project. If consent is granted, the agreement will be documented, ratified and published in the national register for REDD+ initiatives and, if accepted by both parties, the agreement will be confirmed by a public notary.

Benchmark 8. Developing a roadmap

After an agreement has been established, a road map must be developed by mutual agreement. This action plan will clearly explain the activities to be implemented in the allotted time and space, with the roles and responsibilities of everyone clearly defined.

Phase 3. Monitoring and evaluation of the FPIC process

Benchmark 9. Monitoring

This stage of the FPIC process ensures that each party carries out their functions based on the agreement and the roadmap that was established.

Benchmark 10. Verification and evaluation

A few years after implementation, a neutral, independent third party organization specialized in forest-community interactions is contacted for verification of the FPIC process. The project developer & communities will agree on the verification standards, terms of the accord after evaluation, and if the terms of the agreement are not respected, readjustments to be made and a restructuring plan to be developed and put in place.

Source. Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED), 2013.

OPPORTUNITIES AND PROSPECTS

Francophone countries in Africa have all ratified the climate change convention and its related Protocols. Most have promulgated and enacted instruments for decentralization in the management of natural resources, although real devolution of powers to the appropriate instances can be described as timid. The level of literacy in these countries is increasing along with a world caught in the bandwagon of globalization. With the Internet and mobile telephony, it is now possible for social networks to capture and share information long before official media have the opportunity to censure it. These all constitute opportunities

that facilitate high impact pathways for good governance of climate change in forestry. Moreover, specialized institutions such as “Global Forest Watch”, “Global Witness”, “Transparency International” and others, which monitor governance in the management of natural resources, including climate change in forestry, have been decongested with local branch offices now available in most Francophone African countries. This has challenged and encouraged some Francophone countries to create parallel oversight institutions, such as Cameroon, to monitor good governance in the administration of State business including the management of natural resources.

POLICY PROPOSALS IN OPEN-ENDED BENCHMARKS

Based on the foregoing assessment, which includes the case studies of Côte d’Ivoire and Cameroon, this section formulates non-exhaustive suggestions in the form of institutional, legal / regulatory and fiscal benchmarks expected to set the stage and facilitate institution of impact pathways for governance of climate change in forestry, as follows.

Institutional

(i). Develop a code of conduct for public officials and arrange swearing-in occasions for those who accede to strategic posts, to commit to transparent stewardship and good governance over forest and climate resources of the State.

(ii). Create and promote multi-sectoral and multi-stakeholder platforms upstream, and forums downstream at national level, as high impact governance pathways, facilitated by federating government bodies, for transparent planning, reporting on outcomes, sharing of experiences and harmonization of programs related to forests and climate.

(iii). Setup communication mechanisms among government departments on the one hand, and between government departments and other stakeholders on the other hand, in relation to the governance of forest and climate resources.

(iv). Promote the establishment of broad-based membership of steering committees, board of directors, and board of governors’ mechanisms at forest and climate program, agency and project levels, to include representatives from the base.

Legal/Regulatory

(i). Protect feedback mechanisms and instituted processes linking communities to public enforcement agencies in relation to the governance and administration of State forest and climate resources.

(ii). Develop and enforce anti-corruption and antitrust / conflict of interest legislation, related to the governance of forest and climate resources of the State.

Fiscal

Make provisions in support of communication mechanisms among government departments on the one hand, and between government departments and other stakeholders on the other hand, in relation to the governance of forest and climate resources.

CHAPTER 10 Discussion and proposals for policy design and uptake

This section is a discursive overview of the results of the eight study areas in this report along the lines of the different policy related strategies proposed, the accompanying institutional, legislative and fiscal aspects raised, and the potential research and capacity building orientations implied. The principal limitation is the complex and multidimensional challenge that policy making related to climate change imposes, even when only based on biomass. In addition to the habitual biomass sectors of forestry, agriculture, livestock husbandry and pastures, water resources and biomass energy; the inter-linkages and functional ecological processes within biomass and its habitat, affecting biodiversity brings in sectors such as health; its interactions and thought-provoking existence brings in sectors such as education and scientific research, even as the refining of its byproducts brings in tertiary sectors such as transportation, industry and urbanization. This calls for robust policy making, which is necessary though not pursued in the studies of this report, as African countries grapple with the vision of a green economy. The policy implications of the results of the eight studies narrated in this report are each discussed in the following paragraphs.

The study on "promising practices on forest-based adaptation", proposed strategies around "locally managed natural forests", "locally managed tree plantations", and others. Based on the desired objective, the social infrastructure in place, the type of forest landscape and other considerations; each of these strategies can be implemented on a single community or municipal locality, on large swaths of local landscape, regional landscape or even adopted nationally. An adopted strategy may have to be considered as a project or program and broken down into activities or projects respectively. For example, if "locally managed natural forests", were adopted as a project, it could enshrine activities, such as: (a) set-up a management committee around the implementing body, (b) undertake a study of the landscape that includes products from the forest-based adaptation scheme, (c) develop a simple management plan, including fire-fighting activities, (d) identify key species to promote on the landscape by virtue of their contribution to the objective of the scheme, (e) make provisions for inputs to the scheme, (f) schedule training of implementers, (g) promote family-based or enterprise-based networks and organizations to support development of outputs of the scheme, etc. Depending on the level of implementation, i.e. municipal, regional or national, provisions would be necessary along the lines of the non-exhaustive "policy indications as open-ended benchmarks" proposed under this adaptation study. In this case they include :

(a) *for institutional provisions*; (i) enhance the capacity of forestry extension personnel in forest-related climate change adaptation measures through the "training of trainers"

approach, in order for them to build the capacity of adopters of climate change adaptation measures; establish linkages between research institutions and local organizations such as cooperatives so as to reduce the cost of research while improving effectiveness of the research output ;

(b) *for legal and regulatory provisions*; provide legal status for promoted local institutions such as cooperatives and self-governing user groups, and; reduce the regulatory obstacles that those striving to adapt to climate change face, when attempting to sell their sustainably sourced products ; and

(c) *for fiscal provisions*; earmark funds for community organization and start-up support, with the aim of creating a conducive environment for collaboration between different groups impacted by climate change, including women and youth …; and funds for the promotion of adaptation technologies that would be beneficial.

Results of the study implied that adaptation, based on the manipulation of trees and forests in response to or anticipation of the negative consequences of climate change to fulfill subsistence, economic, protective, cultural or spiritual objectives, also sequesters carbon, though unplanned, and ends up constituting veritable carbon sinks, reserved for mitigation ventures. This should make forest-based adaptation schemes bankable for mitigation funding.

The study on "forest-related mitigation approaches in AFOLU" also proposed strategies around schemes such as, "forest concession management", "municipal / community forests", and others. Their adoption should transit a similar process described for adaptation schemes above. Policy related provisions captured under this study included :

(a) *for institutional provisions*; develop projects and institute schemes whereby those who benefit from forest-related mitigation ventures compensate those who implement such schemes; Institute coordination platforms to check conflicting policies and programs and challenges related to poor governance for the adoption of climate change related mitigation approaches ;

(b) *for legal / regulatory provisions*; institute penalties for those who flout governance procedures and violate the rights and privileges of those engaged in forest-related climate change mitigation ventures ; and

(c) *for fiscal earmarks*; encourage involvement and investment by the private forest sector (concessionaires) through collaboration agreements with communities in which communities will benefit financially and; earmark funds for community organization at the local level, with the aim of creating the conducive environment for collaboration between different groups, including women and youth.

Schemes in this study encompass REDD+ operations, characterized by 'ready to go' cash-laden promoters who may not be aware of national policy priorities nor the bureaucracy of government leading to frustrations. An analysis of the related national policies, programs and laws as well as the organizational strengths and weaknesses at the implementation level should constitute a priority for those promoting REDD+ and related initiatives. Ignoring this simple procedure may lead to impasses resulting from i.e., engaging wrong partnerships leading to a revision of planned approaches and longer than expected timeframe for activities. This study also argued in favor of involving forest concessionaires in REDD+ pilot initiatives based on their experience in handling forest products, their networks, and capacity to fulfill contractual obligations.

The study on impacts of AFOLU on food, fuel and fiber production, generated policy related strategies around "sustainable agriculture", "biomass waste digester systems", "biomass waste recycling schemes" and others. The adoption of such schemes can be explored along the lines of the adaptation strategies presented further above. Policy related provisions captured under this study included :

(a) *for institutional provisions* ; create the appropriate environment for establishing and promoting AFOLU-oriented community-based young-peoples' wildfire-fighting brigades and related squads to prevent and combat uncontrolled fires, likely to devastate agricultural fields, pastures, fodder and forest lands; support the development of better and faster market information systems to inform on the geographical occurrence of AFOLU related food, fuel and fiber products and their prices, including the availability of jobs; create an enabling environment for pioneer public-private partnerships (PPPPs) that include communities, to facilitate the development and implementation of socially acceptable AFOLU related energy-saving schemes such as biogas, non-food based liquid biofuel, briquettes from waste-wood, high quality charcoal and others ;

(b) f*or legal / regulatory provisions*; develop and implement measures that limit the access of land-based industrial and commercial enterprises from fragile landscapes such as mangrove areas, river banks, sea shores, steep slopes and mountain-sides where they could initiate ecological hazards; propose town-planning measures that advocate exploitation of aerial space for commercial buildings in certain parts of cities, in order to reduce ground areal occupation by commercial units for urban green economy purposes; develop and implement climate proofing measures and techniques to guide decisions on the construction and operation of industries and road infrastructure in order to reduce negative impacts on the production of food, fuel and fiber; and create and support an enabling environment for pioneer public-private partnerships (PPPPs) that include communities, to facilitate development and implementation of socially acceptable biofuel/biodiesel schemes ; and

(c) *for fiscal earmarks* ; make provisions in the form of incentives for the private sector in collaboration with research agencies to develop sound and adapted environmental technologies in the AFOLU related fields of biomass processing, recycling and use; and earmark incentives and create the appropriate environment (legal) for the establishment, promotion and motivation of fire-fighting brigades to combat wild forest fires.

Some pertinent inhibitors to the wider uptake of CDM initiatives under the Kyoto Protocol are apparently being ignored in REDD+ such as 'leakage', and especially 'perverse' incentives likely to enrich project beneficiaries only for some to purchase mobile saws and guns for illegal logging and poaching, or to receive free training on behalf of communities only to turnover to greener pastures. This may require the generalized development and monitoring of checks and balances together with sanctions and rewards along the implementation lines of AFOLU REDD+ schemes.

The study on applied policies in forest NAMAs produced strategic measures such as "pursuit of decentralized forest management", "promotion of agro-silvo-pastoralism", and others. In line with the preceding approach, these strategic measures have to be analyzed into activities or projects and scheduled in short to medium term planning documents or in operational plans for implementation at the desired levels. The planning provisions captured under the strategic measures of this study included :

(a) *for institutional provisions*; support the participatory development of tools and instruments among forest resource users and NAMA implementers such as local conventions that help solve resource-use conflicts; and to devise and implement strategies that enhance the technical and management capacity of decentralized instances in view of their effective management and supervision of NAMAs ;

(b) f*or legal and regulatory provisions*; setup revenue and benefit sharing systems and mechanisms where a significant proportion of local taxes are reinvested in local programs, including in capacity building and; develop mechanisms and identify instances for inter-ministerial coordination as well as measures to institute and strengthen new or updated conflict of interest regulations and laws ; and

(c) *for fiscal earmarks* ; earmark funds to promote field cultural processes related to the implementation of forest NAMAs acknowledged to be beneficial, socially acceptable and easy to implement and for the motivation of those engaged in NAMA schemes; make provisions for funds to support preliminary processes related to the organization of benefit sharing systems, including for NAMA-related capacity building programs.

The lack of adequate coordination among government ministerial departments featured prominently in this study. The study underscores the development of terms of references at all levels, and job descriptions and task specifications at the necessary levels.

The study on policies and activities incorporating adaptation and mitigation, generated dual schemes such as, “urban forestry”, and “tree-based biofuel schemes”, among others. These can be developed into activities or projects and scheduled in short to medium term plans or in operational plans for implementation at the preferred levels. The planning provisions captured in this study included :

(a) *for institutional provisions* ; develop harmonized adaptation and mitigation terms of references and job descriptions for those at the national planning and operating community levels ;

(b) *for legal / regulatory provisions*; create and support forums, platforms and networks, including steering committees that encourage joint planning, sharing of knowledge and other information by those involved in mitigation and adaptation schemes; and

(c) *for fiscal earmarks*; set-aside funds to support adaptive research on the most appropriate and socially acceptable mix of adaptation and mitigation schemes per agro-ecological zone.

It will be necessary for African countries to create operational synergy between adaptation and mitigation initiatives in order to develop a vision for low carbon or green economy approaches. Such harmony will reduce duplication of effort and costs. For example, a harmonized point of entry for a low carbon economy could involve investment in the use of wastes along the forestry and / or agricultural processing lines: in the case of forestry; (a) collecting and processing primary wastes i.e. leftovers after logging operations; (b) processing secondary wastes such as released during industrial processing of timber and (c) recycling and or refining tertiary wastes i.e. remains of the primary product fifteen to twenty-five years at the end of its lifespan. Such a joint planning vision spanning the near to the long-term can track the evolution of adaptation results, perceived as a near term intervention to mitigation results perceived as the long-term intervention.

The study on carbon policies investigated forestry, environment, agriculture, and climate change policy and program documents and discovered that there was: insufficient planning and learning about carbon; insufficient use of existing carbon related processes; lack of legally scheduled incentives for carbon production; absence of carbon linkages with centers of excellence, and more. The planning requirements were mainly comprehensive, cutting across institutional, legal and regulatory, and fiscal provisions. They include:

(a) c*reate a national carbon agency* to regulate and supervise schemes that engage carbon development, accounting and marketing ;

(b) u*pdate mature national and regional environment, forestry, agriculture, biodiversity, and energy programs* coming up for renewal, with succinct but cutting-edge knowledge and information on carbon ; and

(c) *create and support a carbon knowledgeable extension service* to sensitize on carbon across the forestry, agriculture and energy divide.

While not moving away from the pro-poor stance advocated by REDD+, it is worthwhile involving forest concessionaires in the forest carbon business sooner rather than later. In addition to reasons earlier raised related to their experience and networks, concessionaires have the possibility to obtain carbon credits for forest areas in their management units that are unfit for logging. Revenue generated from such engagements could benefit governments by way of taxes and local communities through cash incentives guided by local collaboration agreements.

The study on "institutions and forest-climate governance", and "high impact pathways that address governance of climate change in forestry", revealed the necessity for collaboration between existing governance instances such as FLEGT and schemes such as the Forest Stewardship Council (FSC) with the increasingly relevant REDD+ process. Policy related guidelines captured under this section included :

(a) *for institutional requirements*; develop a code of conduct for public officials and arrange swearing-in occasions for those who accede to strategic posts to commit to transparent stewardship and good governance over forest and climate resources of the State; create and promote multi-sectoral and multi-stakeholder platforms upstream, and forums downstream at national level, as high impact governance pathways, facilitated by federating government bodies for transparent planning, reporting on outcomes, sharing of experiences and harmonization of programs ;

(b) f*or legal and regulatory provisions*; protect feedback mechanisms of communities to public enforcement agencies in relation to the governance and administration of State forest and climate resources; develop and enforce anti-corruption and conflict of interest legislation, related to the governance of forest and climate resources of the State; and an institutional / legal and regulatory provision i.e., promote the establishment of broad-based membership of steering committees, board of directors, and board of governors' mechanisms at program, agency and project levels to include representatives from the base; and

(c) f*or a comprehensive (across the board) provision comprising fiscal, institutional and legal aspects*; setup, promote and support communication mechanisms among government ministerial departments on the one hand, and between government departments and other stakeholders on the other hand, in relation to the governance of forest and climate resources.

As narrated in the introduction of this report, it was only by working directly with impacted communities through adaptive research that ICRAF was able to make a difference in the West African Sahel. In the same vein, an effort should be made to improve governance by adopting broad-based memberships in Board of Directors and Board of Governors mechanisms, to include representatives from those impacted or engaged in forest and climate change ventures.

CHAPTER 11 Conclusion, key messages and related recommendations

The eight sub-studies whose results are narrated in this report have generated information that should be placed in perspective before adoption due to the differences in agro-ecological zones, forest type, cultural practices and degree of impact by climate change in Francophone African countries. While the forestry-based climate change interventions may be modified according to the preceding differences, their enablers or inhibitors appear to be the same across the board. The most pertinent and recurrent ones have been on governance, incentives, and coordination among government ministerial departments. The proposals made in this report to confront these issues are not entirely new. As reported in the text, innovative governance measures, coordination among government departments and various incentives have been tested in several REDD+ project countries including Cameroon, Burkina Faso, and others. Planning and scheduling of relevant proposals in this report by the relevant instances is therefore suggested even if the concurring results of other studies may be helpful. This study revealed that implementing REDD+ initiatives on forest landscapes is a complex undertaking, usually requiring the supervisory commitments of different government ministerial departments i.e. agricultural extension services, forestry extension services, livestock husbandry extension services, wildlife and nature conservation services, climate change support services etc. On some landscapes, it is the same beneficiaries belonging to different user-groups who receive the different sector-based extension services, and on others, the user-groups are highly professionalized and different from one another, with tight or loose allegiance to specific government ministerial departments /services. This study noted the high probability of conflicting extension messages with different field level government services promoting their sector activities as a priority. The necessity to coordinate the policy, measures and extension activities of government departments/services was underscored during this study and should be pursued as a priority enabling activity for REDD+ interventions on the forest landscape. Part of the solution is an informed integration of climate change strategy into multi-sectoral policy.

This study also noted that Francophone African countries have engaged decentralization in the management of their natural resources, including of forest landscapes on which REDD+ initiatives are / will be implemented. Municipal authorities meanwhile have very limited capacity, such that they occasionally engage in land related contracts favorable for the survival of the municipal unit though detrimental for the survival of natural resources and dependent communities. A case in point is the promotion of biofuel initiatives by joint foreign / local agents. This has been partly because municipal authorities do not receive salaries

(the Cameroon government proposed salaries for its municipal authorities in 2016). This study recommends enhancement of the technical and management capacity of decentralized bodies for the effective management and supervision of forest NAMAs and related schemes. Proposing salaries for municipal authorities should be perceived as a capacity enhancement measure, also expected to contribute in good natural and forest resource governance.

An analysis of national policies, programs and laws as well as the organizational strengths, weaknesses and level of preparedness of forest landscape communities should constitute a priority for those promoting REDD+ and related initiatives. This study noted that REDD+ promoters who ignored this procedure ended up engaging the wrong landscape partners, paying allegiance to the wrong government ministerial department, using frameworks that were neither recognized nor authenticated by government etc. This often led to a revision of planned approaches, resulting in more expensive initiatives that took longer to implement. Developing and adopting a free, prior and informed consent (FPIC) framework for REDD+ initiatives in Francophone African countries should constitute a priority.

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Appendix Data gathering tool

Strengthening climate change adaptation policies and mitigation interventions based on agriculture, forestry and other land uses (AFOLU) relevant to forestry and African people

Questionnaire

Name of respondent.……..……..……..……..……

Institution..……..……..……..……..…….

Country..……. ……..……..……..……..……..…….

Address..……..……..……..……..……..……..

Date..……..……..……..……..……..……

The objective of this questionnaire is to collect information on forest and climate change policies and programs from government ministries and affiliated organizations, development partners, civil society actors, beneficiaries and the private sector in the country. The information collected will provide primary and secondary data which, after analysis, will contribute to strengthening AFOLU-based climate change adaptation and mitigation policies relevant to forestry and African people.

The questions are organised around key results (KR).

KR1. Assessing perspectives for promising forest-based climate change adaptation practices and the conditions and drivers of their wider adoption

1. Starting with the most important practice that you will associate with the number '1', at least significant, number '5' and referring to the information below, indicate in your opinion, the 5 most favorable practices to CC adaptation in the country! [Tick the 5 appropriate cells]

Forest-based practice conducive to CC adaptation in the country	1	2	3	4	5
a. Controlled clearing in the under growth					
b. Controlled growth in forests					
c. Forest restauration / Afforestation					
d. Assisted Natural Regeneration / Reforestation					
e. Windbreak based on the trees					
f. Firewalls based on the tree					
g. Stabilization of dunes based on trees / shrubs					
h. Fight against erosion based on trees/shrubs					
i. The establishement of arboretums					
j. Establishement of botanical garden (medicinal, aromatic trees, ...)					
k. Attachment of tree based-shores					
l. Other					

2. What are the top 3 barriers that may hinder each of your 5 practices identified in question 1 above from being widely adopted? [Tick appropriate cells]

Obstacles for wider adoption of conducive practices for CC adaptation	Conducive pratices to CC adaptation											
	a	b	c	d	e	f	g	h	i	j	k	l
Political conflicts												
Inadequate extension services												
Insufficient social infrastructure for collaboration												
Poverty / high cost												
Lack of upfront funding												
Inadequate incentives												
High labor demand												
Poor governance												

Obstacles for wider adoption of conducive practices for CC adaptation	Conducive pratices to CC adaptation											
	a	b	c	d	e	f	g	h	i	j	k	l
Insufficient forest land / water												
High technological need												
Encourage conflict between resource users												
Excludes certain social classes such as women / youth												
High frequency of maintenance												
Poor knowledge and skills												
Other												

3. What are the three (03) main factors that contribute or are expected to contribute to the large adoption of each of your 5 practices identified in question 1 above? [Tick appropriate cells]

Factors that contribute to the wider adoption of each of the 5 CC adaptation practices	Conducive practices to CC adaptation											
	a	b	c	d	e	f	g	h	i	j	k	l
Decentralization of forest management												
Local mangement plans that incorporate adaptation to CC												
Good system of access to financial resources												
Ease and simplicity of application / implementation												
Availability and good competence of technical support services												
Good framework for collaboration among stakeholders												
Recognition and involvement of customary law												

Factors that contribute to the wider adoption of each of the 5 CC adaptation practices	Conducive practices to CC adaptation											
	a	b	c	d	e	f	g	h	i	j	k	l
The use of both customary and statutory rights												
Good land tenure policy												
Produces good results												
Good community profiling system												
Greater participation of women and youth												
Adapted forest and CC policies												
Good coordination of the implementation of policies between the different ministerial departments												
Education, Information and Communication												
Other												

KR2. Analyze relevant forest-related mitigation approaches in AFOLU including conditions and determinants of adoption as applied in the African context

1. What are the 5 most favorable forest-related practices implemented in the country in relation to mitigating the effects of CC in the context of AFOLU? [Tick the 5 appropriate cells]

Forest-related practice conducive to CC mitigation in the AFAT context	1	2	3	4	5
i. Well-managed forest protected areas					
ii. Well organized forest fire management					
iii. Organized forest risk management against illegal logging / abusive logging / shifting cultivation etc.					
iv. Reforestation and forest restoration					
v. Pasture ordered in the undergrowth					
vi. Local development plans that integrate sustainable					

Forest-related practice conducive to CC mitigation in the AFAT context	1	2	3	4	5
forest management and CC					
vii. Leguminous / shrubby trees used in alley cropping systems					
viii. Planting trees in cities, along roads and public places / botanical gardens					
ix. Agroforestry practices widely adopted					
x. Tree planting on pastoral lands widely adopted					
xi. Sustainable harvesting of NTFPs including tree parts for forage					
xii. Ecotourism					
xiii. Sustainable forest management / forest concessions					
xiv. Efficient use of biomass energy / Improved stoves					
vx. Other (please suggest according to importance)					

2. What are the 3 main obstacles that hinder each of the 5 practices identified in question 1 above from being widely adopted? [Tick appropriate cells]

Obstacles for wider adoption of CC mitigation practices: AFOL context	Conducive practices for CC mitigation in the context of AFOLU													
	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
Political conflicts														
Inadequate extension services														
Insufficient social infrastructure for collaboration														
Poverty / high cost														
Lack of upfront funding														
Inadequate incentives														
High labor demand														
Poor governance														

Obstacles for wider adoption of CC mitigation practices: AFOL context	Conducive practices for CC mitigation in the context of AFOLU													
	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
Insufficient forest land / water														
High technological need														
Encourage conflict between resource users														
Excludes certain social classes such as women / youth														
High frequency of maintenance														
Poor knowledge and skills														
Other														

3. What are the top 3 factors that currently contribute or are expected to contribute to the wider adoption of each of the 5 practices identified above? [Tick appropriate cells]

Barriers for wider adoption of CC mitigation practices: AFOLU context	Conducive practices for CC mitigation in the context of AFOLU													
	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
Decentralization of forest management														
Local mangement plans that incorporate CC adaptation														
Good system of access to financial resources														
Ease and simplicity of implementation														
Encourages good yied														

Barriers for wider adoption of CC mitigation practices: AFOLU context	Conducive practices for CC mitigation in the context of AFOLU													
	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv
Availability and good competence of technical support services														
Good framework for collaboration among stakeholders														
Recognition and involvement of customary law														
Acceptance and use of both customary and statutory rights														
Good land tenure policy														
Good community profiling system / Greater participation of women and youth														
Adapted forest and CC policies														
Good coordination of the implementation of policies between the different ministerial departments														
Education, Information and Communication														
Other														

KR3. Evaluate and document the impact of AFOLU mitigation activities on (a) food, (b) energy, and (c) fiber / woody production

1. What are the 5 most popular forestry interventions in multifunctional forest landscapes in relation to the mitigation of climate effects in the framework of AFOLU, which can positively or negatively influence food, energy and fiber (woody) production? [Tick appropriate cells]

Interventions in multifunctional forest landscapes in the context of AFOLU	Food production		Energy production		Woody production	
	Positive	Negative	Positive	Negative	Positive	Negative
a. Forest fallows on agricultural land						
b. Effective recycling of forest biomass waste, including prevention of processed wood						
c. Bamboo fallows / bamboo forests						
d. Fruit orchards						
e. Tree-based foragers / forage stocks						
f. Tree-based biofuel initiatives						
g. Windbreak based on the tree in agroecosystems						
h. Taungya / agroforestry (based on trees)						
i. Tree plantations for wood / poles						
j. Multipurpose trees in agroecosystems						
k. Tree-based soil improvement / protection systems						
l.						

2. What are the 5 relevant reasons for the negative impacts on food production associated with the interventions (a - m) identified above? [Tick appropriate cells]

Reasons for negative impacts (-) on food production	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	m
Strong competition for the land													
Predispose / facilitate the starting of fires													
Predispose insects and other pests													
Delay crop yield													
Higher labor costs													
Incompatible authorities / supervisors													
Conflicts of objectives													
Incompatibility on the same space													
Destroy the soil structure													
Does not engage enough social groups such as women													
High labor demand													
High technological need													
Other													

Reasons for positive (+) impacts on food production [Tick appropriate cells]	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	m
Low labor costs													
Involve participation of women													
Prevent wildfire spread													
Improve soil fertility & crop yield													
Cost reduction													
Improve collaboration between supervisory authorities / agencies													
Compatible goals and symbiotic relationships													
Improve the structure and texture of the soil													
Easy to implement													
Other													

3. What are the 5 relevant reasons for the negative impacts on energy production (charcoal or firewood) associated with the interventions (a - m) that you identified above? [Tick the appropriate cells]

Reasons for negative impacts (-) on energy production	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	m
Strong competition for the land													
Predispose / facilitate the starting of fires													
Delay biomass production													
Low biomass rate / amount at the end of the cycle													
Higher labor costs													
Incompatible authorities / supervisors													
Conflicts of objectives													
Incompatibility on the same space													
Destroy the soil structure													
Does not engage enough social groups such as women													
High labor demand													
High technological need													
Other													

Reasons for positive (+) impacts on food production [Tick appropriate cells]	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	m
Low labor costs													
Involve participation of women													
Prevent the starting and spreading of wildfire													
Low imputs costs													
Improve collaboration between supervisory authorities / agencies													
Compatible objectives and symbiotic relationships													
Good biomass yield													
Easy to implement													
Involve participation of youth													
Other													

4. What are the 5 relevant reasons for the negative impacts on fiber / woody production namely on timber, poles, artisanal wood industry, … associated with the interventions (a - m) that you have identified above? [Tick appropriate cells]

Reasons for negative (-) impacts on fiber / woody material production	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	M
Strong competition for the land													
Predispose / facilitate the starting of fires													
Delay biomass production													
Low biomass yield at the end of the cycle													
Higher labor costs													
Incompatible authorities / supervisors													
Conflicts of objectives													
Incompatibility on the same space													
Does not engage enough social groups such as women													
High labor demand													
High technological need													
Other													

Reasons for positive impacts (+) on fiber / woody material production [Tick appropriate cells]	Multifunctional forest landscapes interventions: AFOLU context												
	a	b	c	d	e	f	g	h	i	j	k	l	M
Low labor costs													
Involve participation of women													
Prevent the starting and spreading of wildfire													
Low imputs costs													
Improve collaboration between supervisory authorities / agencies													
Compatible objectives and symbiotic relationships													
Good biomass yield													
Easy to implement													
Involve participation of youth													
Other													

KR4. Assess policies implemented in forest NAMAs (INDCs) and identify best practices for their implementation

1. Identify the 5 major national action areas that advocate the use of forests in NAMAs (INDCs or CPDN) and rank them starting with "1" for the most practiced area at '5' for the least applied. [Tick the 5 appropriate cells]

Main action areas of forest NAMAs (stated in INDCs / INDCs documents)	1	2	3	4	5
a. Undertake actions to obtain energy wood savings by promoting improved carbonization techniques					
b. Undertake large-scale reforestation programs					
c. Improving protected area management through biodiversity management plans					
d. Creation and management of conservation concessions					
e. Develop national REDD+ policy and strategy					
f. Strengthen pilot projects that contribute to the implementation of the REDD+ strategy					
g. Develop the legal and institutional framework for REDD+ implementation					
h. Improve the financing mechanism for REDD+ implementation					
i. Pursue the creation of new forests (afforestation)					
j. Pursue the restoration of degraded forests					
k. Pursue the enrichment of existing forests					
l. Strengthen community capacity in livelihood activities related to sustainable forest management					
m. Continue the registration of community forests / communal forests					
n. Promote techniques for improving carbon sequestration by forests					

Main action areas of forest NAMAs (stated in INDCs / INDCs documents)	1	2	3	4	5
o. Develop and promote partnerships between community / communal forests inside and outside the country					
p. Strengthen the capacities of communities and municipal councils in the establishment of communal and community forests					
q. Promote bio-digesters that use wood residues and biomass waste					
r. Promote the production and use of biofuels					
s. Reconstitute, organize and ensure the sustainable management of rural forests					
t. Reconstitute, organize and ensure the sustainable management of State Crown Forests					
u. Promote the restoration of forest cover especially in sensitive areas such as springheads and riverbanks					
v. Promote the widespread adoption of agroforestry					
w. Develop sustainable farming systems					
x. Multiply forage tree seeds and popularize them in grazing areas					
y. Reduce extraction of logs / wood from the forest					
z. Improve forest fire management					

2. What are the 3 best practices associated with the implementation / success of each of the 5 “forest areas in NAMAs” that you identified in question 1 above? [Check the appropriate cells]

Best practices associated with the success of major area - forests in NAMAs / INDCs	Major action areas - Forests in NAMAs / INDCs															
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	P
Promote participation of women & youths in the development and implementation of forest NAMAs																
Ensure existence of adequate social infrastructure for implementation of NAMAs																
Improve / update land-tenure system to empower stakeholders for implementation of NAMA-related schemes																
Take account of traditional customary laws and local norms in NAMA development and implementation																
Promote climate Change conscious forest land-use plans																
Ensure good coordination among local NAMA actors																
Ensure good coordination among government ministerial departments supervising implementation of																

Best practices associated with the success of major area - forests in NAMAs / INDCs	Major action areas - Forests in NAMAs / INDCs															
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	P
NAMAs																
Build capacity and equip supportive technical / extension services																
Update adaptation of related climate change policies, laws and related Decisions																
Facilitate access to financial resources including upfront funding																
Promote education, information & communication																
Improve the NAMA governance process																
Provide opportunities for income generation by NAMA implementers to reduce poverty																
Promote the development and use of simple resource-use conventions among actors																
Improve the knowledge and skills of NAMA implementers																
Identify adequate forms of incentives to encourage the participation of actors in NAMA schemes																

KR6: Assess carbon policies and practices at national and sub-regional levels and identify those that promote / constrain the development of carbon initiatives

1. What are the main political statements that promote the development of carbon initiatives (market and trade, benefit sharing, carbon taxation) within the country's natural resource management policies?

National policy	Statements in favor of carbon initiatives
Forest policy / Forestry code	
Environmental policy / Environmental code	
Land tenure policy	
Rural development policy	
Agricultural development policy	
Land use policy	
National biodiversity strategy	
National protected areas strategy	
National carbon strategy	
R-PP / PDD / PIN Programs	
INDC / CPDN	

2. What are the main political statements that promote the development of carbon initiatives (market and trade, benefit sharing, carbon taxation) within the natural resources management policies of the sub-region.

Sub-regional policy	Statements in favor of carbon initiatives
ECOWAS Forest policy	
ECOWAS Environmental policy	
WAEMU (UEMOA) Environmental policy	
NEPAD Environmental program	
COMIFAC Convergence plan	
SADC Forest policy	
SADC Agricultural policy	

3. What are the key policy statements that may hinder the success of carbon initiatives (market and trade, benefit sharing, carbon taxation) within the country's natural resource management policies?

National policy	Statements in favor of carbon initiatives
Forest policy / Forestry code	
Environmental policy / Environmental code	
Land tenure policy	
Rural development policy	
Agricultural development policy	
Land use policy	
National biodiversity strategy	
National protected areas strategy	
National carbon strategy	
R-PP / PDD / PIN Programs	
INDC / CPDN	

4. What are the main policy statements that may hinder the success of carbon initiatives (market and trade, benefit sharing, carbon taxation) within the natural resources management policies of the subregion?

Sub-regional policy	Statements in favor of carbon initiatives
ECOWAS Forest policy	
ECOWAS Environmental policy	
WAEMU (UEMOA) Environmental policy	
NEPAD Environmental program	
COMIFAC Convergence plan	
SADC Forest policy	
ECOWAS Agricultural policy	
ECCAS Agricultural Policy	
SADC Agricultural policy	

KR7: Evaluate selected key African institutions with the potential to effectively address climate change governance in the forest sector

1. In your opinion, which institutions at the national level have demonstrated the capacity and potential to ensure good CC governance in the forestry sector? How?

2. In your opinion, which institutions at the sub-regional level have demonstrated the capacity and the potential to ensure good governance of the CC in the forestry sector? How?

KR8: Assess the potential of high impact pathways and mechanisms to address climate change governance in the forestry sector

1. How would you rank (1 to 5) the governance of forest-related climate change processes in your region or country? Why?

2. What can be done to improve CC governance in the forest sector in your region or country?

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