Governing Congo Basin Forests in a Changing Climate

Actors, Discourses and Institutions for Adaptation and Mitigation

Olufunso A. Somorin

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Thesis

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Dedicated to the three women who give meaning to my life:

To my mother, Gbemisola – for the dreams of yesterday;

To my wife, Adedoyin – for the realities of today;

To my daughter, Diekololami – for the aspirations of tomorrow

Acknowledgement

It's been a long way down here! As a young boy growing up in the village, I used to idolize the idea of having one's name on the cover of a book as the author. For every book I came across in the late 80s and early 90s, I would first read their biographies to understand the paths the authors had travelled in life and their motives for writing such books. As I grew older, I became too certain that I would write at least a book in my lifetime. What I did not imagine then was the first book would be my doctoral thesis. This thesis, this book, is an evidence of the childhood dream of a young boy who fought his way through the hardships of life to get 'here'. That's why I am grateful to my Maker and the Pillar that holds my life who kept these dreams alive and gave me the grace and strength to achieve them.

A thesis itself speaks to the relationships behind the writing process. For me, this thesis also represents my apprenticeship under one of the best minds I have come across – my promoter, Prof. Bas Arts. From a 3-month internship in October 2006 working on determinants of success or failure of the national forest programs in selected countries, to my MSc thesis on global policy architecture on REDD+ in 2008, and now to this PhD thesis. It's been 8 years of learning for me. Thank you Bas for your guidance and patience with me. Sometimes I thought you were too tough on me but I realized you were just doing your job, I took your constructive criticisms in good faith. You taught me how to ask critical questions and the danger of conventional thinking.

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the Congo Basin" – to see things from the lenses of the people even if doesn't make sense to me as a researcher. Thank you Denis! I am extremely grateful for your leadership and wisdom, even during our difficult times in CIFOR.

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The stone that the builders rejected has become the chief cornerstone. To God alone be the Glory!

Now on to the next book!

Olufunso Somorin
Wageningen Netherlands
01 December, 2014

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Acronyms

AC	Adaptive Capacity
AD	Avoided Deforestation
ADB	African Development Bank.
AF	Adaptation Fund
AFMN	African Forest Model Network
A/R	Afforestation/Reforestation
CAR	Central African Republic
CARPE	Central African Regional Program for the Environment
CBFF	Congo Basin Forest Fund
CBFP	Congo Basin Forest Partnership
CBOs	Community-based organizations
CCPM	Consultation Circle of Partners of MINFOF/MINEP
CDM	Clean Development Mechanism
CED	Centre for Environment and Development
CEFDHAC	Conference on Humid and Dense Forest Ecosystems of Central African Rainforests.
CERs	Certified Emission Reductions
CI	Conservation International.
CIFOR	Center for International Forestry Research
CIRAD	French Institute for Agricultural Research and Development
CODELT	Environmental Defense Council for Legality and Traceability.
COMIFAC	Central Africa Forests Commission
COBAM	Congo Basin Forests and Climate Change Adaptation and Mitigation
COFCCA	Congo Basin Forests and Climate Change Adaptation
DFID	Department for International Development.
DPs	Development Partners
DRC	Democratic Republic of Congo
EU	European Union.
FAO	Food and Agriculture Organization of the United Nations.
FCPF	Forest Carbon Partnership Facility
FESP	Forest and Environment Sector Programme
FLEGT	Forest Law Enforcement, Governance and Trade
FMU	Forest Management Unit

GEF	Global Environment Facility
GDP	Gross Domestic Product
GIZ	German International Development Cooperation
GTZ	German Technical Cooperation.
ICRAF	World Agroforestry Centre.
IITA	International Institute of Tropical Agriculture.
INERA	National Institute for Agricultural Study and Research.
IRAD	Institute for Agricultural Research and Development.
IUCN	International Union for the Conservation of Nature and Natural Resources
KP	Kyoto Protocol
MINEP	Ministry of Environment and Nature Conservation
MINOF	Ministry of Forest and Wildlife
MRV	Monitoring, Verification and Reporting
NAPA	National Adaptation Plan of Actions
NAS	National Adaptation Strategy
NGO	Non-governmental organization
nPFD	non-Permanent Forest Domain
NRM	Natural Resources Management
NSA	Non-state actors
OCDN	Central African Organization for the Defense of Nature.
ONAAC	National Observatory for Climate Change
PES	Payment for Environmental Services
PFD	Permanent Forest Domain
R-PIN	Readiness Plan Idea Note
R-PP	Readiness Preparation Proposal
RED	Reducing Emissions from Deforestation
REDD	Reducing Emissions from Deforestation and Degradation
REDD+	Reducing Emissions from Deforestation and Forest Degradation
REPAR	Network of Parliamentarians for the Sustainable Management of Forest Ecosystems in Central Africa, National Assembly.
SBSTA	Subsidiary Body of Scientific and Technological Advice
SFM	Sustainable Forest Management
SNV	Netherlands Development Organization.

UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation.
UNDP	United Nations Development Programme.
UNEP	United Nations Environment Programme.
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development.
USD	United States Dollar
VPA	Voluntary Partnership Agreement
WCS	Wildlife Conservation Society.
WRI	World Resources Institute.
WWF	World Wide Fund for Nature.

Chapter 1

General Introduction and Research Setting

1.1 Climate Change Policy: Adaptation and Mitigation

Anthropogenic interference in the climate system is a real and growing threat to societies, economies and the environment (Chomitz et al., 2006; Palmer and Engel, 2007). There is now a nearly global consensus that human-induced climate change is indeed occurring, implying several consequences for humans, societies and the planet. Over the last two decades, all countries that are Party to the United Nations Framework Convention on Climate Change (UNFCCC) have recognized the need to provide policy responses and actions to combat climate change. It has been implied by many scholars that the global causes and effects of climate variability and change imply the need for international collective action for an efficient, effective and equitable policy response, from both developed and developing countries (Stern, 2006; Maartens et al., 2009; Parry, 2009). The latest IPCC reports (2014) emphasize that in most countries, climate change is now considered to be a constraint to achieving sustainable development. That is why climate policies are believed to be more effective when consistently embedded within broader strategies designed to make national development pathways more sustainable.

Within the climate convention[1], adaptation and mitigation are two necessary components of a strategy to tackle climate change (Figure 1-1). *Mitigation* comprises all human activities and interventions aimed at reducing emission sources or enhance the sinks of greenhouse gases (GHGs) (IPCC, 2007; Forsius et al., 2013). Mitigation actions are expected to delay and reduce damages caused by climate change, thus providing environmental and socio-economic benefits (Ravindranath, 2007). On the other hand, a*daptation* in the context of climate change refers to any adjustment in systems in response to climate change impacts, aimed at moderating harm or exploiting beneficial opportunities (Klein et al., 2005; IPCC, 2007). The IPCC (2007) reports that adaptation and mitigation can be complementary, substitutable or independent of each other. Both adaptation and mitigation depend on capital assets, including social capital, and both affect vulnerability and GHG emissions; and through this

1 The ultimate objective of the UNFCCC is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." It states that "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner." Article 2 of the Convention

mutual dependence, both are tied to sustainable development (IPCC, 2007; Parry, 2009).

It is well accepted that due to lag time in the global climate system, no mitigation effort, irrespective of how rigorous and relentless, is going to prevent climate change from happening in the next few decades (IPCC, 2007; Ravindranath, 2007; Klein et al., 2005), thus making adaptation to be extremely critical, especially for low income countries with low adaptive capacity. A plethora of definitions of adaptation exists, but what is central to all these definitions is the capacity of systems to deal with perturbations from external risks through social and/or ecological adjustments. In principle, it involves adjustment to reduce vulnerability of communities, regions or activities to climate variability and change, and enhance their resilience (Paavola and Adger, 2006; Kant and Wu, 2012). *Vulnerability* refers to the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extreme events. Vulnerability is often considered to be a function of the character, magnitude and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Adger, 2006; Fussel and Klein, 2006; Smit and Wandel, 2006; IPCC, 2007). Figure 1-1 presents adaptation and mitigation as climate responses, and vulnerability as a constituent element of adaptation.

As a policy response to climate change, planned adaptation implies the use of information about present and future climate change to review the suitability of current and planned practices, policies, and infrastructure (Fussel, 2007). Autonomous adaptation does not constitute a conscious response to climatic impacts but is triggered by ecological changes in natural systems or by market or welfare changes in human systems (IPCC, 2007). An important constituent of a planned adaptation is assessing the vulnerability of systems or sectors to the impacts of climate change. Assessment of vulnerabilities of society (individuals, livelihoods and populations) and places (ecosystems – land, water) to climate risks, within the contexts of institutions, characterizes the strategy for adaptation policy.

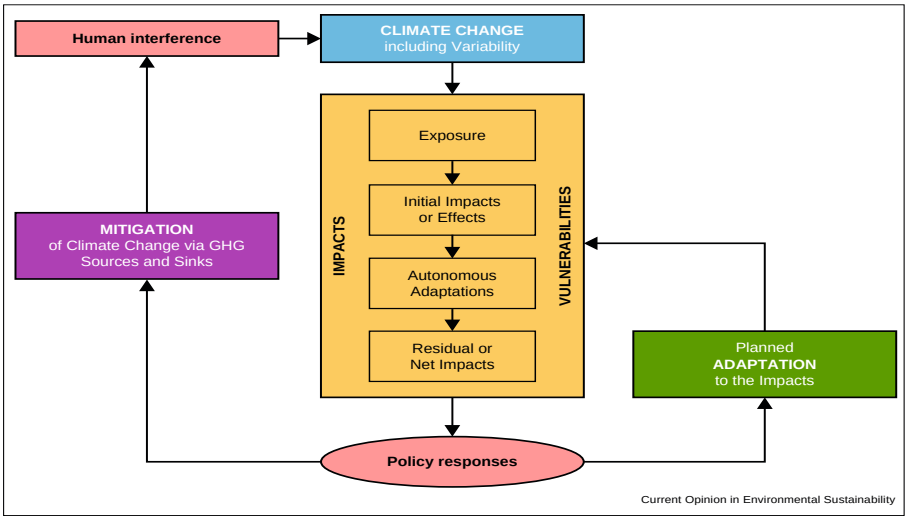

Figure 1-1: Adaptation and Mitigation as policy responses to climate change (Source: Forsius et al., 2013: p. 27)

Many authors have argued that despite adaptation and mitigation sharing a common objective of addressing climate change, differences exist in their approaches and strategies. Drawing from the work of different scholars, Table 1-1 provides a snapshot of these main differences. The differences, including spatial scale, relevant sectors, time scale, and urgency, have been considered as the reasons for the trade-offs between both climate responses (Tol, 2005; Locatelli et al., 2011). Even at the global policy-making level within the UNFCCC, they are both considered as separate issues (Swart and Raes, 2007). Under the principle of common but differentiated responsibility, mitigation is seen as the responsibility of developed countries while adaptation is considered as a challenge for the South, due to its low mitigative capacity and significant adaptation needs (Ayers and Huq, 2009). However, in recent years, the 'reality' of this principle is quite opposite. On the one hand, more developing countries are involved in mitigation activities through the Clean Development Mechanism (CDM) of the UNFCCC. On the other hand, planning adaptation needs and options pose policy challenge even for developed countries.

Table 1-1: Main differences between adaptation and mitigation

Attributes	Mitigation	Adaptation
Objectives	Addresses the causes of climate change (accumulation of atmospheric GHGs)	Addresses the impacts of climate change
Spatial scale	Primarily an international issue, as mitigation provides global benefits	Primarily a local issue, as adaptation mostly provides benefits at the local scale
Time scale	Long-term effect on climate change because of the inertia of the climatic system, usually decades to centuries.	Medium- to short-term effect on the reduction of vulnerability, usually in terms of years
Sectors of interest	Mitigation is a priority for all sectors, especially in the energy, transportation, industry and waste management sectors	Adaptation is a priority for selected sectors in the agriculture, water and health sectors.
Monitoring	Most mitigation interventions and outcomes are relatively easy to measure or monitor	Adaptation interventions and outcomes are more difficult to measure or monitor

Based on: Klein et al., 2005; Tol 2005; ; Fussel and Klein, 2006; Fussel, 2007; Locatelli et al., 2011

Notwithstanding the highlighted differences between adaptation and mitigation, there is a recognition that as policy responses to combatting climate change, both are intricately linked in certain sectors, especially the agriculture and forest sectors. The IPCC (2014) reports that despite the differences, opportunities are being explored to develop and promote synergies between the two policy responses. A call for enhancing synergetic relationships between adaptation and mitigation in both developed and developing countries is receiving increased political and scientific attention. Synergies in climate policy are assumed to be created when measures that control atmospheric greenhouse gas concentrations (i.e. mitigation) also reduce adverse effects of climate change (i.e. adaptation), or vice versa (Kane and Shogren, 2000; Klein et al., 2005). Most of classic examples of synergies between adaptation and mitigation cluster around forest protection, biodiversity conservation, natural resource management and land use systems. For instance, afforestation of abandoned agricultural lands can provide benefits for carbon sequestration (mitigation) and provision of forest products (adaptation). Arguably, it is in this respect that Stern (2006) and the IPCC (2007) posit that forests can make a very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation of forest ecosystems and forest-dependent populations to the impacts of climate change.

1.1.1 Tropical Forests and Climate Change: the Congo Basin Forests

Globally, forests cover approximately 30% of the earth's surface and these are either primary or modified natural forests (Houghton, 2005; Kirilenko and Sedjo, 2007; Bonan, 2008). When grouped according to their ecological types, tropical forests constitute the major forest type followed by the boreal, temperate and sub-tropical respectively (FAO, 2006). Forests play a major role in the regulation of the climate through physical, chemical and biological processes that have an effect on planetary energetics, the hydrological cycle, and atmospheric composition (Bonan, 2008). Although forests store carbon, they can also be a major source of carbon emissions to the atmosphere. This happens when forest areas are converted to other land uses and soils are cultivated (Bodegom van et al., 2009). Societies have always been involved in activities that modify natural landscapes (land-use change) which consequently led to changes in carbon storage densities in forests, savannahs and grasslands. The major types of land-use systems that affect carbon storage are: (i) the permanent clearance of forest for pastures and arable crops; (ii) shifting cultivation that may vary in extent and intensity as populations increase or decline; (iii) logging with subsequent forest regeneration or replanting; and (iv) abandonment of agriculture and replacement by regrowth or planting of secondary forest (i.e. deforestation, afforestation and reforestation) (Malhi et al., 2002).

Like any other ecosystem, forest ecosystems as well as the services they provide are going to be affected by climate change. The *exposure* and *sensitivity* of the forest determine the extent to which the forests will be affected by impacts of climate change. A combination of climate change, with associated disturbances (such as flooding, drought, wild fire, insects), and other global change drivers (such as land-use change, pollution, overexploitation of resources) are going to affect many ecosystems (IPCC, 2007). These effects could either be positive or negative. In addition, the *vulnerability* of a forest also depends on its internal capacity to adapt to unprecedented rates of climatic changes (*adaptive capacity*) (Locatelli et al., 2011). The adaptive capacity of an ecosystem is related to the diversity of functional groups within the ecosystem and the diversity of species within groups (Locatelli et al., 2008). In a nutshell, vulnerability and adaptive capacity, which are like two sides of a coin, are the building blocks of adaptation.

The Congo Basin forests represent a transboundary pool of natural resources across six countries (Cameroon, Central African Republic, Democratic Republic of Congo, Equatorial Guinea, Gabon and Republic of Congo) in the central region of Africa. With a forest area of about 242 million hectares (about 60% of the total land area of the region, see Figure 1.2) representing 18% of the world's tropical forests, the Congo Basin forests constitute the second largest area of dense tropical rainforest in the world after the Amazon (FAO, 2010).

Approximately 100 million people inhabit the region with an annual growth rate of about 2.5%, including more than 150 different indigenous groups (CBFP, 2010; WWF, 2007). Sixty-two percent of the total population live in rural areas in or around the forests (Ndoye and Tieguhong, 2004; Tieguhong, 2008). They directly depend on forest resources for food and nutrition, shelter and livelihoods, and during periods of crop failures due to climate variability or disease infestation, forests often act as a safety net for these rural people (MINEFI, 2006; Ndoye and Awono, 2005; Sassen and Jum, 2007). The majority of the Congo basin populations sustain their livelihoods by direct use of forest ecosystem goods and services for household consumption.

In terms of biological diversity, the Congo Basin contains about 60-70% of Africa's fauna and flora within the remaining contiguous tropical forest (Wilkie et al., 2001; CBFP, 2006), making it the ecologically richest natural ecosystem on the continent. Importantly, the forests contribute to national economies of the six countries through export of timber and valuable non-timber forest products for food and pharmaceutical industries (Ndoye and Tieguhong, 2004; Cerutti et al., 2008; Nkem et al., 2010). The activities in the region such as hunting, timber and non-timber forest products extraction are major sources of income in local economies. The governments receive millions of US dollars as logging fees (WWF, 2007) and timber exports (Sonwa et al., 2009). The timber sector, both formal and informal, contributes 10-15% of the regional GDP and is a major source of foreign exchange and employment (Cerutti et al., 2008; CBFP, 2010).

Beyond the tangible products supplied by the Congo Basin forests, they also offer important environmental services such as watershed management, soil and biodiversity conservation and carbon sequestration. For instance, the vegetation and the soils of the Congo basin contain vast amounts of

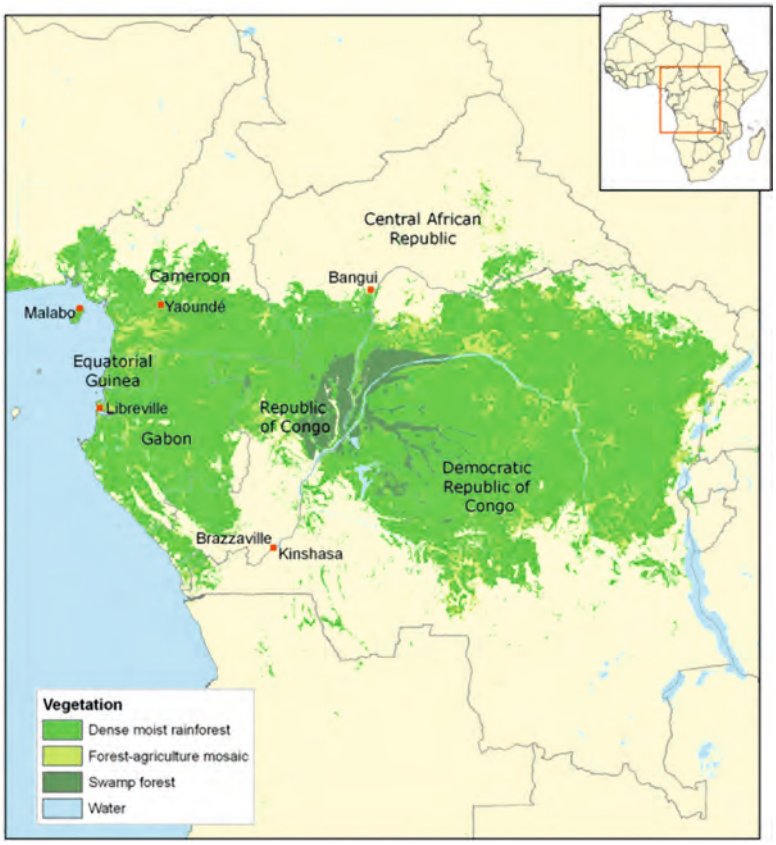

Figure 1-2: Map of the Congo Basin (Source: World Resources Institute, 2007)

carbon - between 25 and 30 billion tons of carbon in its vegetation alone (Hoare, 2007; Brown et al., 2011), with the forests of DRC storing more than half of this carbon. This carbon reserve is of global significance in regulating greenhouse gas emissions (Zhang and Justice, 2001). More recently, renewed global attention is gradually shifting from the importance of tropical forests beyond the provisioning functions in terms of tangible goods they provide, to the regulative functions through the intangible ecosystem services they supply, especially for carbon and biodiversity (Costanza et al., 1997; Ndoye and Tieguhong, 2002; World Bank, 2004; WRI, 2005).

Over the past decades, tropical deforestation (conversion of forest to other land uses) has dramatically increased, even though global deforestation has reduced from 16 million hectares per year for 1990-2000 to about 13 million hectares per

year for 2000-2005 (FAO, 2010). However, unlike the case in other major tropical forest biomes, the Amazon and Borneo-Mekong, forest degradation (loss of forest quality) is more of a concern in Congo Basin countries than deforestation, as it is much lower than in other regions. This is in agreement with a report that suggests that emissions from forest degradation in sub-Saharan Africa might be three times higher than those for deforestation (Bombelli et al., 2009). The average deforestation rate in the Congo Basin forests is currently reported at about -0.36% per year, as shown in Table 1.2

A number of scholars continue to report that the causes of the continuing loss and degradation of tropical forests are diverse, complex, operate over different spatial and temporal scales, vary in importance among nations and regions, and have a socio-economic context (Kaimowitz and Angelsen, 1998; Geist and Lambin, 2001; Chomitz, et al., 2006). There are a number of causes of deforestation reported for most tropical forests, some are direct, e.g. agriculture, urbanization and mining; and others are indirect, e.g. socio-economic factors (population pressure, poverty, international market fluctuations, etc.) or political factors (political instability, etc.). However, the principal causes of deforestation in the Congo Basin region are mainly: slash and burn agriculture, shifting cultivation and unsustainable logging practices (Ndoye and Kaimowitz, 2000; CBFP, 2008; Mbatu, 2009; FAO, 2010; Nkem et al., 2010). The causes of forest degradation in the Congo region, though harder to quantify, are mainly fuelwood collection for charcoal and selective logging (WRI, 2007; CBFP, 2008; Robiglio, et al., 2010; Dkamela, 2011; Schure, 2014)

Table 1-2: Forest-cover distribution across the Congo Basin countries

Country	Total Land Area (000 ha)	Forest Area (000 ha)	Forest Area share in TLA (%)	Annual change rate (%)	
				1990-2000	2005-2010
Cameroon	47 271	19 916	42	-0.94	-1.07
CAR	62 300	22 605	36	-0.13	-0.13
DR Congo	226 705	154135	68	-0.20	-0.20
Congo Rep.	34 150	22 411	66	-0.08	-0.05
E. Guinea	2 805	1 626	58	-0.65	-0.71
Gabon	25 767	22 000	85	0.0	0.0
Congo Basin	**398 264**	**242 693**	**59**	**-0.33**	**-0.36**

Sources: CBFP 2008; FAO (Forest Resource Assessment) 2010

1.1.2. Adaptation and Mitigation strategies in the forest-climate nexus

The relationship between forests and climate change, or the forest-climate nexus, is intricate because it is biophysical, social and at the same time political (Bodegom et al., 2009; Mansourian et al., 2009). On the biophysical aspects, and as already alluded to, forests play a role in the regulation of climate through physical, chemical and biological processes; they store carbon and can also be a source of emissions to the atmosphere when converted to other land uses (Houghton, 2005; Bonan, 2008; van der Werf et al., 2009). The social dimension of the relationship between forests and climate change dwells on the 'cause and effect' of the climate problem. Humans are largely responsible for the cause of climate change – with the loss of forest quantity (deforestation) and quality (forest degradation) as one of the drivers of climate change (Miles and Kapos, 2008; Angelsen, 2009). At the same time, humans, including their livelihoods, economies and societies, are confronted with the impacts of climate change, to which they have to adapt. The political relationship between forests and climate change is complex, particularly as it regards issues of discourses, institutional arrangements and governance systems. One way of unpacking this complexity may be through the roles that forests play in climate adaptation and mitigation, and how these roles are allocated policy attention within a country's political system. This thesis sets to do that in the case of the Congo Basin forests.

Overall, the appreciation of the role that tropical forests play in climate change adaptation and mitigation is well grounded in literature (Dale et al., 2000; Innes and Hackey, 2006; IPCC, 2007; Nyong et al., 2007; Bele et al., 2010; Fisher et al., 2010; Somorin, 2010; Kalame, 2011; Locatelli et al., 2011; Pramova et al., 2012; Chia et al., 2014). Not surprising, the literature is polarised around forests' roles in: (i) reducing societal exposure and vulnerability to climate impacts by improving societal adaptive capacity (adaptation); and (ii) absorbing atmospheric carbon through its biochemical processes or in reducing destruction and degradation of forests as carbon sources (mitigation).

Of interest in this thesis is the set of forest-related activities that constitute adaptation and mitigation strategies. A number of literature reviews have explored forests' roles in climate adaptation (see Spittlehouse and Stewart, 2003; Spittlehouse, 2005; Guariguata et al., 2008; Seppala et al., 2009; Somorin, 2010;

Locatelli et al., 2008 & 2011; Pramova et al., 2012). While a few authors focused on meta-analysis of scientific publications, others have reviewed the National Adaptation Programme of Actions (NAPAs) submitted by low income countries (mostly countries in sub-Saharan Africa) to the UNFCCC. Examples of forest-related activities that constitute adaptation strategies include: sustainable forest management (SFM); natural resource management (NRM), conservation of forest genetic resources; conservation of biodiversity-rich primary forests; restoration of degraded forestlands through reforestation or afforestation; soil/water conservation; rangeland management; and improvement of plant and wildlife habitats. For instance, SFM and restoration of degraded forestlands can offer opportunities for providing forest goods for local communities to support improving their livelihoods and diversify their income sources (see MEA, 2005). Despite the recognition of these roles, literature holds that contestations still remain among policy actors in most developing countries on designing policies to promote these roles.

The role of forests in climate mitigation is rather straightforward, at least from the literature. Through the reducing emissions from deforestation and forest degradation[2] (REDD+) mechanism, tropical forest is now regarded as one of the solutions to mitigating climate change (Miles and Kapos, 2008; Angelsen et al., 2009; Grainger et al., 2009; Corbera and Schroeder, 2011; Gupta, 2013). REDD+ is intended to establish incentives for developing countries to protect and better manage their forests by creating and recognizing a financial value for the additional carbon stored in forest ecosystems (Agrawal et al., 2011; Corbera and Schroeder, 2011; Lederer, 2012). Nevertheless, a number of political contestations still exist around REDD+, and they include: global architectures, the financing mechanism (direct funding vs market-based), national design and implementation, natural forests vs. forest plantations, land tenure, carbon rights, safeguard issues, technical issues such as reference levels, leakage, monitoring, measurement, reporting and verification (MRV), and benefit sharing (Angelsen et al., 2009; Skutsch and McCall, 2010; Agrawal et al., 2011; Brown et al., 2011; Visseren-Hamakers et al., 2012; Awono et al., 2014, Buizer et al., 2014). In any case, many tropical countries have signalled their interest in REDD+, and are

2 Within the UNFCCC, the full meaning of REDD+ is "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries". This full definition provides insight into eligible activities under REDD+.

having policy debates within their countries on design and implementation. A number of REDD+ projects are being piloted on the ground through many bilateral and multilateral initiatives.

In making sense of the nexus between forests and climate, it is helpful to understand the convergence of their governance systems in terms of solving policy problems. Both forests and climate change pose many complex governance questions, and have often been labelled to show characteristics of 'wicked' problems (Roberts, 2000; Wang, 2002; Jordan et al., 2010) - a term which suggests that either the formulation of the problem is the problem or the problem is a symptom of another problem (Rittel and Webber, 1973; Roberts, 2000; Tameer et al., 2013). It has been argued that a profound understanding of climate change as a global environmental and social challenge is the central requirement of climate governance – that is why adaptation and mitigation can hardly be successful without an understanding of the structure of the problem (Meadowcroft, 2009; Ostrom, 2010; Frohlich and Knieling, 2013). Indeed, the governance of forests and climate change is complex. Several authors have argued that this is because of the diversity of stakeholders (actors) involved, the multiplicity of structural and regulatory bases for decision-making, the multi-layered political and social contexts and coordination processes, as well as the uncertainties associated with policy prescriptions (Betsill and Bulkeley, 2006; Lemos and Agrawal, 2006; Biermann, 2007; Agrawal et al., 2008; Adger et al., 2009; Arts and Visseren-Hamakers, 2012). In this thesis, the governance of the forest-climate nexus is linked to the participation of relevant policy actors and to the institutional structures for shaping adaptation and mitigation outcomes.

1.2 Defining the Research Problem

The starting point for this study is the recognition that at the international level, adaptation and mitigation policies are separated, for a myriad of reasons such as those presented in Table 1-2 (Klein et al., 2005; Ayers and Huq, 2007; Ravindranath, 2007; Jones et al., 2007; Guariguata et al., 2008; Locatelli et al., 2011), with each policy option canvassing for its own distinct national strategies and approaches for policy design and implementation.

In the Congo Basin, adaptation and mitigation policy developments in the forest sector are at large in their infancy, and varied in the dynamics of the policy debates. While official policies on adaptation and mitigation are yet to be developed either regionally or nationally, policy debates among a broad range of stakeholders on designing institutional arrangements, policy instruments and defining implementation strategies are growing and finding their roots in the much larger sustainable development thinking of the countries. Since 2005, when most of the countries started producing their National Communications to the UNFCCC, deliberations in each country (and regionally) among the governments (including various ministries and agencies), non-governmental organizations (NGOs), development partners, local communities and the private sector have created a 'policy space' to negotiate adaptation and mitigation strategies for the Congo Basin forests. The deliberations have explored different types of rules and norms along with scenarios for institutional and management structures on how existing issues of local livelihoods, sustainable forest management (SFM) and biodiversity conservation can be managed in tandem with using the forests for climate change adaptation and mitigation.

Despite the progress in deliberating the future of the Congo Basin forests under a changing climate, the policy actors still face the daunting challenge of policy design. Beyond climate change, the Congo Basin forest is already under pressure of balancing multiple imperatives: livelihoods, timber production and biodiversity conservation (Nkem et al., 2010). Designing policies to structure the management of the forests to respond to climate change adds an additional layer of complexity to the existing challenges confronting the sustainable management of the forests. Implicitly linked to the policy design challenge is also the question of how the existing forest governance initiatives and instruments such as forest decentralization, legality/sustainability standards and certification schemes, and conservation approaches, currently targeted at managing competing demands for forest goods and services, are capable of dealing with the additional climate burden.

More importantly, the Congo Basin region faces a policy challenge of how to contextualize many of the internationally defined decisions, agreement and strategies of adaptation and mitigation in the forest sector. Similar to other developing regions, the countries in the Basin are on the one hand fully aware

of the priority for adaptation given the high poverty, low human capacity and low infrastructure development (energy, ICT, etc), and ultimately vulnerability to the impacts of climate change. Using available natural resources, including the forests, in a sustainable manner to increase the adaptive capacities of the populations and ecosystems, in order to cope with or adapt to the uncertainties of climate change, becomes a priority. On the other hand, international discussions on forest-based mitigation in developing countries advocate that emission reductions from forest conservation should be financially compensated (Humphreys, 2008; Angelsen et al., 2009). This has led to the emergence of the reducing emissions from deforestation and forest degradation (REDD+) mechanism (Agrawal et al., 2011; Corbera and Schroeder, 2011; Lederer, 2012; Visseren-Hamakers et al., 2012). In its ambitious plan, REDD+ is seen as a mechanism to simultaneously address issues of climate change, biodiversity loss and poverty reduction (Kanowski et al., 2011). As of today, many countries in the Basin have expressed their interests in REDD+, largely due to its 'promise' of offering a new opportunity for benefits for poverty reduction and economic development (Brown et al., 2011; Dkamela, 2011; Chia et al., 2013). Simply put, the Congo Basin forest is caught in the web of 'playing' in the global arena of climate mitigation and at the same time having to contend with local realities of climate risks through adaptation.

As simple as it sounds in theory, matching the *opportunities* of contributing to the global mitigation effort through the REDD+ mechanism with the *priority* of adapting to climate change, presents not just a policy dilemma for a region characterized by weak governance (Brown et al., 2011; Karsenty and Ongolo, 2012), it also presents similar challenges for the scientific community. Given that the science of both REDD+ and adaptation are still developing, and particularly with many official policies yet to be made, it is thus understandable that the relationship between the opportunities of REDD+ and priorities of adaptation has not been sufficiently studied in the scientific community. Nevertheless, questions still remain especially on: (i) how such a 'matching' exercise would translate in practice in the form of projects and programs; (ii) the institutional framework(s) required to manage mitigation *opportunities* and adaptation *priorities* across regional, national and local levels; (iii) the type of coordination mechanisms, knowledge systems and cooperative partnerships necessary for maximizing adaptation and mitigation outcomes; (iv) the form of monitoring

or evaluative framework required to determine to what extent adaptation has interacted with mitigation, and vice versa. This thesis seeks to contribute to that knowledge generation and to offer recommendations for policymaking.

With the aforementioned, designing effective and coherent policies for adaptation and REDD+ in the Congo Basin, either separately or in synergy, is a governance challenge. There exists divergent and often conflicting perspectives on: uncertainties concerning the climatic system, societal response options and alternatives, and viable policy instruments and choices to address climate change. The cross-boundary, multi-level, multi-sectoral and multi-actor challenge characteristic of climate change (adaptation and mitigation) place a governance demand on policymaking. With respect to designing and implementing adaptation and REDD+ strategies, several authors have reported that different kinds of capacities, including political, institutional and administrative are required (Wilbanks et al., 2007; IPCC, 2014). The capacities are essential for the broadening and deepening of the deliberative and decision-making processes, and for dealing with issues of access to necessary resources, capacity and technology transfer for implementation (Pahl-Wostl , 2007; Ostrom, 2010; Frohlich and Knieling, 2013).

Given the nature of the sector involved, forests, which in the past have been characterized by a number of governance challenges which include: competing claims to the resources, multiple interests and stakes by different actors, unclarified tenure system and property rights, inefficiencies in the use systems, multi-layer management systems, multiple policy instruments, and resource decline (Ostrom, 1990; Bressers and Kuks, 2003; FAO, 2006; Lemos and Agrawal, 2006; Cronkleton et al., 2011; Acheampong et al., 2012). Obviously, implementing adaptation and REDD+ within the same forest sectors cannot escape contending with some of these highlighted governance challenges. Ultimately, the governance processes of adaptation and REDD+ in the Congo Basin will have to deal with 'double jeopardy' – dealing with the governance challenges specific to the forests on the one hand, and those specific to climate change on the other. This thesis considers the governance of the nexus between forest and climate policy – both as adaptation and mitigation – critical for the future of the Congo Basin forests.

The number of studies on REDD+ in the Congo Basin is growing, and several authors have investigated different aspects of the REDD+ policy debate in the Congo Basin forests: institutional arrangements (Dkamela, 2011; Ngendakumana et al., 2014); actor networks (Alemagi et al., 2014); safeguards and benefits (Fobissie et al., 2012); implementation capacity (Robiglio et al., 2012; Brown et al., 2011); governance concerns (Brown et al., 2011; Karsenty and Ongolo, 2012); and tenure and property rights (Sama and Tawah, 2009; Freudenthal et al., 2011; Awono et al., 2014). Unlike mitigation, studies on adaptation in the Congo Basin have been limited; a few of these studies looking at adaptation needs and options include: Sonwa et al. (2009); Brown et al. (2010 & 2013); Nkem et al. (2010); and Bele et al. (2011). However, interactions between adaptation and REDD+ have not received scientific attention. At the same time, compared to the Amazon and Borneo-Mekong regions, the Congo Basin has been less studied in literature. While the thesis seeks to contribute to the growing scholarship on adaptation and REDD+ in the Congo Basin, particularly on the actor networks, policy discourses and institutional arrangements, it takes a further step into investigating potential interactions towards synergy building.

1.2.1 Research Objectives and Questions

Following the aforementioned, it is evident that managing the use of the Congo Basin forests to respond to climate change presents a governance challenge for policy actors involved. The multiplicity of actors, institutions, interests, instruments and ideas involved in both policy spheres (forest and climate) makes an interesting and necessary governance study.

Specifically, the objective of this thesis is twofold. First, it seeks to gain better understanding of the governance processes of adaptation and mitigation in terms of the actors involved, the overarching discourses and the existing or emerging institutions. Second, it aims to contribute to scientific analysis of governance of a forest-climate nexus using the case of a region that is relatively less studied in literature. Based on the fact that responding to climate change (through adaptation and mitigation) poses a governance challenge for the policy actors, the thesis specifically investigates: (i) the frames and discourses shaping the policymaking processes of adaptation and mitigation strategies in the Congo Basin region; and (ii) the interactions between policy

actors (roles, diversities and capacity) and existing or new institutions (rules, values and norms) in achieving adaptation and mitigation outcomes. In order to operationalize the central objective of the thesis, the following research questions were formulated:

1. What are the dominant frames and discourses on adaptation and mitigation strategies in the Congo Basin, and what implications do these discourses have for policy design?

2. How are adaptation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape adaptation outcomes?

3. How are mitigation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors towards positive mitigation outcomes?

4. How do adaptation and mitigation strategies interact? What institutional arrangements or policy frameworks are policy actors developing towards maximizing the synergies?

Except for question 2, where two papers have been produced to look at adaptation strategies at the national level and another at the local level, each question is addressed individually by a separate chapter in this thesis. As peer-reviewed research papers, these chapters are further structured into sub-questions in order to further operationalize the main questions as well as make them more relevant to empirical realities.

1.3 Theoretical Background

1.3.1 The concepts of governance and new institutionalism

This thesis adopts a theoretical approach on *governance* to understand the policy processes of adaptation and mitigation strategies in the Congo Basin. Over the last three decades, the concept of governance has become a popular

framework in political sciences, especially in the study of policy fields in which political co-ordination problems arise (Böcher et al., 2008). Across the fields of political sciences, public administration, international relations and development studies, several authors have provided different perceptions and interpretations of governance (Kooiman, 1993; Rhodes, 1997; Pierre, 2000; Pierre and Peters, 2000; Rosenau, 2000; Kjaer, 2004; Kooiman et al., 2005). In much of the public and political debate, governance refers to sustaining coordination and coherence, and solving problems among a wide variety of actors with different purposes and objectives, such as political actors and organizations, corporate interests, civil society, and transnational organizations (Pierre, 2000). Some have argued that the emergence, and perhaps stability, of the concept of governance implies that societal and economic actors have become increasingly influential over policy (Peters and Pierre, 1998).

Even though the concept of governance has become extremely popular nowadays, no clear definition exists (Pierre and Peters, 2000). Rather, it functions more as a container concept to allow scholars and practitioners to discuss: (i) the increasingly important role of non-state actors in public policy making; (ii) the increasing complexity and changes in the composition of society as a whole; and (iii) the new norms and techniques with regard to how society should be governed (Offe 2009; Behagel, 2012). Despite the multiple meanings and interpretations of governance, authors have argued that three key elements are consistent with most definitions. These key elements include: (i) the increased involvement of non-state actors in public policy making; (ii) the decentralization of decision-making authority to lower administrative tiers, and (iii) the emergence of new modes of steering by central authorities (Rhodes, 1997; Arts, 1998; Glasbergen, 1998; Bulkeley and Mol, 2003; Behagel, 2012; Ayana, 2014).

To some extent, governance is still a loose set of theories ranging from global to local dimensions, and from analytical to normative perspectives rather than one clearly shaped body of theory (Schiller, 2008). Understandably, the plethora of definitions of governance has led to different theoretical approaches for analyzing and understanding governance. A few approaches are particularly *actor-based* – focusing on the contribution of state and non-state actors to solving societal problems (Scharpf, 1997; Arts, 1998; Betsill and Corell, 2001; Gupta 2003 & 2005; Andonova et al., 2009; Avant et al., 2010; Dellas et al., 2011; Schroeder and Lovell,

2012). Other approaches are particularly *rule-based*– focusing on the system of setting, applying and enforcing of rules to shape the actions of social actors towards achieving societal goals (Rosenau, 1992 & 1995; Kjaer, 2004; Mayntz, 2004; Pavoola, 2007). A few approaches are *process-based* - analyzing governance in terms of how coordination is achieved among actors and their networks (Kooimann, 2003; Hooper, 2006; Jordan and Schout, 2006; Schafer, 2006).

Within the rule-based approach of understanding governance, the neo-institutionalist theory is dominant. Mayntz (2004) argues that governance is the hallmark of an institutionalist approach dealing with regulatory structures combining public and private, hierarchical and network forms of action coordination. Several authors have approached understanding governance outcomes of different issues from the neo-institutionalist perspective: for the study of commons (McCay, 2002; Johnson, 2004; Armitage, 2007), for EU-related studies (Bulmer, 1993; Pollack, 1996), and public policy (Bogason, 2000; Barzelay and Gallego, 2006), amongst others. One advantage of using neo-insitutionalist theory is its strength to study governance systems at the national and regional levels, particularly as it concerns actors acting and interacting within larger institutional frameworks (Mayntz and Scharpf, 1995). This attribute makes it relevant for understanding the governance process of adaptation and mitigation within the Congo Basin countries.

The birth of 'new institutionalism' in political science emerged from the need for demonstrating the relationships between institutions and political outcomes, and also the roles that institutions play as determinants of human behaviour (Ostrom, 1990; Peters, 1999 & 2000). Broadly, the neo-institutionalist theory (NI) emphasizes the role that rule structures play in determining individual behaviour and the outcome of political processes (Hall and Taylor, 1996; Hay and Wincott, 1998; Hay, 2002; Arts and Buizer, 2009; Schmidt, 2008). Three main variants of neo-institutionalism (historical, rational choice and sociological) are traditionally studied in new institutionalism (Hall and Taylor, 1996; Marsh & Stoker, 2002). Historical institutionalism (HI) focuses on how institutions, understood as sets of regularized practices with rule-like qualities, structure action and outcomes (Schmidt, 2010). The main argument of HI is that structural choices made at the inception of institutions will have a persistent influence over its behaviour for the remainder of its existence (Steinmo et al., 1992; Hall

and Taylor, 1996; Greif and Laitin, 2004; Johnson, 2004). HI emphasizes not just the operation and development of institutions but also the path-dependencies and unintended consequences that result from such historical development (Pai and Sharma, 2005; Pierson, 2000). Rational-choice Institutionalism (RI) is assumed to be closer to neo-classical economics in its conception of institutions (North, 1990; Scharpf, 1997; O'Riordan and Jordan, 1999). RI assumes rational actors, who pursue their fixed preferences according to a 'logic of calculation' within purposefully designed institutional incentive structures (Hall and Taylor, 1996; Schmidt, 2010; Raitio, 2013). In contrast to HI and RI, sociological institutionalism (SI) relies on a broader definition of institutions. Within SI, institutions are defined as culturally constructed and as moral templates that provide the "frames and meaning" guiding human action (DiMaggio and Powel, 1991; Scott et al., 1994; Hall and Taylor, 1996; Schmidt, 2008). Individuals are thus viewed as socialized into particular roles and they internalize the norms associated with these. This is the way institutions affect behaviour. The rationality of an individual's behaviour is therefore socially determined (Agyenim, 2011).

More recently, an increasing interest in ideational, perceptual and discursive factors of institutional change (Schmidt, 2008 & 2010; Arts and Buizer, 2009) has given rise to the fourth new institutionalism called *discursive institutionalism*. The three traditionally recognized variants of 'new institutionalism' – RI, HI and SI – have been argued to all see institutions more or less as given, static and constraining (Arts, 2012; Ratio, 2013). Scholars in these three new-institutionalisms have traditionally explained change as a result of some type of exogenous shocks (Schmidt, 2010). Discursive institutionalism shares with the other neo-institutionalisms a core focus on the importance of institutions, but differs in its definition of institutions, in its objects and logics of explanation, and in the ways in which it deals with change (Schmidt, 2010). Table 1-3 presents the differences among the four new institutionalisms.

In order to analyze the roles that different ideas, frames and discourses play in shaping policy debates, institutional arrangements and governance processes on adaptation and mitigation in the Congo Basin, a theoretical approach that gives attention to the role of actors, discourses and institutions in policymaking process is useful. This is what discursive institutionalism promises (Schmidt, 2008 & 2010) as opposed to the other three institutionalisms.

Table 1-3: The four new institutionalisms (adapted from Schmidt, 2010; Raitio, 2013)

	RI	HI	SI	DI
Definition of institutions	Incentive structures	Macro-historical structures and regularities	Norms and culture of social agents	Meaning structures and constructs
Object of explanation	Behaviour and interests of rational actors	Historical rules and regularities	Cultural norms and frames	Ideas and discourse
Logic of explanation	Calculation	Path-dependency	Appropriateness	Communication
Approach to change	Static – continuity through fixed preferences and stable institutions	Static – continuity through path dependency	Static – continuity through cultural norms and rules	Dynamic – change (and continuity) through ideas and discursive interaction
Explanation of change	Exogenous shock	Exogenous shock by critical junctures	Exogenous shock	Endogenous processes through reframing, recasting of collective memories.

1.3.2 Discursive Institutionalism and Environmental Governance

As a relatively new branch of neo-institutionalism, discursive institutionalism (DI) is an umbrella concept for many different approaches that "see ideas as constituting the policy narratives, discourses and frame of reference which serve to (re)construct the actors' understanding of interests and redirect their actions within institutions" (Schmidt and Radaelli, 2004 p. 341). DI differs from other ideational and constructivist approaches (e.g. feminist) in that it is more concerned about elucidating the dynamics of change through discursive interactions in a (formal) institutional context, hence institutionalism (Schmidt, 2013; Crespy and Schmidt, 2014).

DI takes into account the institutional context in which discourses emerge and the way in which they are institutionalized in social practices (Schmidt, 2008; Arts and Buizer, 2009 Den Besten et al., 2014). According to Scot (2001), DI assumes: (a) the important role of discourses in influencing actors' preferences, interests and behaviour; and (b) the role of these discourses in assuring institutional stability, while simultaneously triggering and legitimizing institutional change. Additionally, DI scholars consider the discursive processes by which such ideas are deliberated in a 'communicative' political sphere and

operationalized in a 'coordinative' policy sphere (Schmidt, 2002). Importantly, as a theoretical approach, DI bridges the gap between institutional theory and discourse theory (Arts and Buizer, 2009). Whereas it brings in new dynamics and discursive understandings in institutional thinking, it helps discourse theory to go beyond mere ideas, concepts and communication and to refocus on their (selective) institutionalization and materialization (Buijs et al., 2014).

In this thesis, I adopt the analytical elements of discursive institutionalism: *discourses, institutions* and *actors* in terms of their consequences for governance process analysis. First, I consider the concept of environmental governance as a specific form or subcategory of a broader governance approach (Armitage and Plummer, 2010). The specific focus on environmental governance is useful for a myriad of reasons. The first and main reason is that this thesis focuses on two crucial topics in the environmental field: forests and climate change. Besides, the field offers an interesting case study since governance experiments are already taking place due to the nature of the topics. Second, policy fields concerning environmental questions can be seen as good examples of increasing challenges related to implementation and co-ordination (Böcher et al., 2008). Consequently, governance issues are currently discussed intensively in environmental policy (Jordan et al., 2003; Glück et al., 2005; Haas, 2006). Third, for decades, environmental issues also faced the dilemma on the definition of issues and formation of policies and measures to mitigate undesirable consequences, hence, giving rise to evolution of governance as a potential 'panacea' (Bulkeley and Mol, 2003). Fourth, the complex interrelationships between different environmental problems including biodiversity loss, climate change, pollution and ecological degradation, from global to local levels, require innovative governance systems that can solve these problems (Glasbergen, 1998; Lemos and Agrawal, 2006). Finally, the limitations of the traditional command and control, state-centric approaches to environmental problems are now well-recognized. This recognition has heralded a new consideration for governance systems forged to address recurring and emerging environmental problems (Belkes et al., 2003; Folke 2007; Armitage and Plummer, 2010).

In this thesis, two definitions of environmental governance are considered relevant for their emphasis on similarities and for their possible application to the study of policy processes of adaptation and mitigation strategies in the

Congo Basin forests. The first definition given by Lemos and Agrawal (2006. p 298) refers environmental governance as '*the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes*'. The second definition given by Biermann and others (2010. p 279) considers earth system governance (which can be considered a synonym for environmental governance) as 'interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change'. These definitions share two elements that are useful for understanding the policy process of adaptation and mitigation strategies in the Congo Basin forests. One, governance does not exist or operate in a political vacuum – it is a subject of political actors, agents or actor-networks who operate from local to global levels. How different agents conceive the idea of different governance instruments and approaches to 'steer' the societies towards a particular objective is a central analytical question of interest to many scholars of environmental governance. Two, governance is underpinned by a system of structures - a constellation of regulatory processes, formal and informal rules, norms and rule-making systems - called institutions. Similar to policy agents, institutions within the context of governance, also operate across scales: global to local.

Closely related to the study of environmental governance is the concept of regime. Regimes refer to 'implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area' (Krasner, 1982, p. 185). Most of the major issue areas within the environmental sector: climate change, biodiversity, desertification, and pollution, currently have international regimes formed in response to the need to coordinate behaviour among countries around these issue areas (Miles et al., 2001; Young, 2002). Many scholars in the field of regime theory have made important contribution to the research of regime effectiveness and regime interaction (Keohane, 1982; Haggard and Simmons, 1987; Rittberger, 1993; Haas et al., 1995; Raustalia, 1997). International environmental regimes have increasingly become an important empirical focus of regime literature (Visseren-Hamakers, 2009). Within the regime interaction or institutional interaction debate, scholars presume that (the effectiveness of) one regime or institution is affected by its

interactions with other regimes from the same issue area and/or with institutions governing other issues (Young 2002; Oberthür and Gehring, 2006; Stokke et al., 2006). In this thesis, with the focus on the climate change regime, I consider adaptation and mitigation as sub-regimes within the climate regime. This is because both adaptation and mitigation have their own defined goals, actor networks, institutional mechanisms, policy architectures and instruments.

The forest-climate nexus offers an interesting policy arena to understand the place of environmental governance in managing global commons. For years, policy-makers and scientists have been grappling with the concept of forest governance and its role in delivering positive outcomes for local livelihoods, economic and social development, and environmental sustainability. In parallel, though more recently, the idea of climate governance has evolved. Climate governance refers to all purposeful mechanisms and response measures (by actors) aimed at steering social systems towards preventing, mitigating or adapting to the risks posed by climate change (Jagers and Stripple, 2003).

I will now focus on the conceptual framework adopted for this thesis which is based on the analytical elements of discursive institutionalism: actors, discourses and institutions. The conceptual framework is useful for analysing the governance processes of adaptation and REDD+ in the Congo Basin in terms of the types of actors involved, the overarching discourses on the issues and the institutional contexts in which these discourses are embedded.

1.3.3 Actors and Agency in Environmental Governance

In the environmental change literature, human agency is often highlighted as a critical factor in determining how individuals, households, and communities can respond to different types of environmental stressors (Brown and Westway, 2011). The analytical problem of agency begins with the assumption that the credibility, stability, and inclusiveness of environmental governance is affected by a wide range of actors, including national governments and their bureaucracies as well as the growing network of non-state actors, such as environmental non-governmental organizations (NGOs), expert networks, and corporations (Biermann et al., 2009; Bulkeley and Newell 2010; Dellas et al., 2011).

Agency in this thesis refers to the capacity of individual and collective actors to change the course of events or the outcome of processes (Pattberg and Stripple, 2008). Within the context of environmental governance, agency requires identifying those actors involved in a decision-making process who actively shape ideas, norms and values related to a particular environmental issue, and/or identify environmental problems and possible solutions (Dellas et al., 2011). Central to the notion of agency is the capacity and competence of policy actors, from local, national to international levels, to respond to a policy challenge, and how this capacity may be changing within a given context. Many authors have highlighted a key attribute that distinguishes agents from actors: in addition to proposing solutions to environmental problems and implementing them, agents can shape broader ideas, norms and values relating to environmental governance (Hall and Biersteker, 2002; Betsill and Bulkeley, 2006; Dellas et al., 2011).

Another key issue that is emphasized throughout literature is that the ongoing reconfigurations of agency challenge discrete, dichotomous categories, such as "state" and "non-state" and "public" and "private" (Betsill and Bulkeley 2006; Pattberg and Stripple 2008). What is fairly consistent in most of the governance literature is the consensus that configurations of actor-networks are a critical element of environmental governance (Haas, 2007). The increasing number of partnerships between state and non-state, or public and private, actors are essential for the performance of environmental governance to deliver the expected outcomes (in this thesis: of adaptation and mitigation in Congo Basin forests). Arguably, these partnerships hinge on the realization that contemporary society and/or environmental problems are so complex that neither the state, nor the market or civil society can solve the problem alone (Ostrom, 1990; Kooiman, 1993; Lemos and Agrawal, 2006; Visseren-Hamakers, 2009; Schroeder, 2010). In a broad sense, as Tatenhove and Leroy (2003) argue, the shifting dynamics between state and non-state actors within the environmental policy arena are reflective of broader trends within the relationship between the state and society.

On defining the specific roles and responsibilities of policy actors in environmental governance, Schroeder (2010) argues that the activities of policy actors are not limited to participation in decision-making, rather that they actively shape

policy outcomes and/or set rules related to the interactions between humans and their natural environment. The state, through its agencies, remain the central actor in characterizing a policy response to the problem (Raustiala, 1997; Karkainen, 2004; Biermann and Dingwerth, 2004). Although the increased participation of non-state actors in environmental governance might question the centrality of the state (Cashore 2002; Pattberg, 2005), nevertheless, policy design and implementation in most countries, especially the developing ones, are still undertaken under the auspices of the centrality and leadership of the state. Non-state actors from market and civil society have been reported to shape governance outcomes through an exercise of their agency in the form of knowledge and expertise, especially at it regards defining the problem and proposing and implementing solutions as well.

With regards to the influence of actors to shape policy-making processes, scholars have argued that agents may contribute to the purposeful steering of constituents either indirectly (by influencing the decisions of other actors) or directly (by making steering decisions). Agents are thus a constituent part of the cumulative steering effort toward achieving environmental outcomes (Biermann et al., 2010; Schroeder, 2010). Additionally, Peters and Pierre (2001) suggest that, in effect, 'political power and institutional capability is less and less derived from formal constitutional powers accorded to the state but more from a capacity to wield and coordinate resources from public and private actors and interests' (p.131).

1.3.4 Discourses and Environmental Governance

In this thesis, Hajer's definition of discourse is used, which refers to discourse as "a specific ensemble of ideas, concepts, and categorizations that is produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (1995, p.44). Through discourses, agencies express their ideas, frames and ideals, their conception of societal issues and the way in which these could or should be dealt with in politics and policies. The former are labelled as 'substantial', the latter as 'governance' discourses (Liefferink, 2006). Frame here refers to "broadly shared beliefs, values and perspectives…..on which individuals draw in order to give meaning, sense, and normative direction to their thinking and action in policy

matters (Schön and Rein, 1994, p. xiii). Conceptually, frame and discourse differ in their ontological and epistemological assumptions (van der Brink and Metze, 2006), hence combining them is not popular. In this thesis, we combine the *agency-focus* framing with *structure-focus* discourses. Predominantly, ideas, frames and discourses often find their way into policy programs and, often implicitly, underpin concrete policy measures. Consequently, discourses eventually translate into budgets and responsibilities, and into competencies and rules and they can impact institutions and policy making (Wallace, 2000; Hajer, 2006).

Many studies on the development of environmental policy (global or national) have revealed how the 'naming and framing' of environmental problems and solution options are the result of discursive processes (Jasanoff, 1990; Hajer, 1995; Arts and Leroy, 2006; Humphreys, 2008; Den Besten, 2014). The appreciation of discourse analysis (DA) as an approach for understanding environmental governance is growing within the scientific community. This thesis considers a few justifications for promoting discursive approaches in environmental governance and policymaking. First, Hajer (1995) argues that discourse analysis investigates how a particular framing of issues by actors makes certain elements appear fixed or appropriate while other elements appear problematic. Along the same line of argument, Hajer and Versteeg (2005) report that discourse analysis allows one to see how actors actively make efforts to influence the definition of an issue's problem and solutions. Second, DA offers an analytical framework to understanding how environmental norms are articulated and contested, and how they shape practices (Behagel, 2012). How environmental norms and values are articulated across scales, and how these norms shape practices, also at various scales, could be argued to be constitutive of the institutional component of environmental governance. Third, Phillips et al. (2004) assert that through interactions, actors exchange discourses, merge into discursive coalitions or even split up into discursive oppositions, depending upon shared or conflicting definitions. It is instructive to see that DA recognizes the importance of actor coalitions in deliberative framing of issues. Environmental governance also recognizes the distinct roles of actors and their networks in promoting certain steering ideologies or instruments over others (Betsill and Bulkeley, 2006; Dellas et al., 2011).

More appropriately, for the thesis, the key question is how in *practice* do ideas, frames and discourses constitute conditions for their institutionalization into the policy process, in this case, on adaptation and mitigation strategies in the Congo Basin forests. Based on a number of publications: Howarth (2000), Philips et al. (2004), Böcher et al. (2008), Arts and Buizer (2009) Schmidt (2008 & 2011) and Buijs et al. (2014), the following circumstances are considered most relevant: (a) the new discourses cover 'existential' and 'timely' topics that resonate with a larger and concerned audience; (b) the emerging ideas, frames and discourses appear credible and coherent to the audience, at least to a reasonable level; (c) they are carried and strongly advocated for by authoritative policy actors, that is, discursive agents; and (d) the legitimacy of the current discourse and related institutional arrangements are under pressure. Buijs et al. (2014) further argue that under such conditions, the new discourse might become dominant over the preceding one, and force (some) institutional change. The 'new' emerging discourses in this thesis are the concepts of climate adaptation and mitigation as well as their envisioned policy strategies in the forest-climate nexus and the Congo basin context.

1.3.5 Institutions and Environmental Governance

In its simplest form, institutions are the formal and informal rules that prescribe the "dos and don'ts" that people recognize in a given situation (Dietz et al., 2003). As systems of norms, rules, and decision-making procedures that give rise to social practices, institutions assign roles to actors within these practices that guide interactions among them (Young et al., 2008). A system of norms, rules and values defines goals, imposes constraints on social behaviour and empowers social action (Scott, 2001; Young, 2002). In creating solutions to environmental problems, Jentoft (2004) argues that it is the design of 'institutions', their dynamic nature and operations that are essential for shaping effective governance outcomes

Based on the earlier work of several authors such as North (1990), Bowles (1998), Williamson (2000), Acemoglu et al. (2001) and Beck et al. (2002), Jutting (2003) presents three different ways of classifying institutions – according to the degree of formality (informal and formal), different levels (social structure, rules of the game, play of the game, allocation mechanisms), and the arena where they are

situated (social, political, economic and cultural). More importantly, whichever way institutions exist, crucial for different forms of environmental governance are the political and economic relationships that institutions embody and how these relationships shape identities, actions, and outcomes (Jagers and Stripple, 2003; Agrawal, 2005; Lemos and Agrawal, 2006). Additionally, institutions constrain behavior as a result of processes associated with three institutional pillars: (i) the regulative, which guides action through coercion and threat of formal sanction; (ii) the normative, which guides action through norms of acceptability, morality and ethics; (iii) and the cognitive, which guides action through the very categories and frames by which actors know and interpret their world (Ostrom, 1990; Scott, 1995; Paavola, 2007). In its regulative form, Jepperson (1991 p.145) argues that institutions can be usefully viewed as performance scripts that provide "stable designs for chronically repeated activity sequences," deviations from which are counteracted by sanctions or are costly in some manner. In its normative form, institutions can be formally sanctioned rules of a society which provide expectations, stability and meaning essential to human existence and coordination (Vatn 2005).

In this thesis, I will be considering the different forms of institutions relevant for governing adaptation and mitigation in the Congo Basin. Specifically, I will be considering how institutional elements such as rules, norms, and values at global to local levels regulate and/or structure adaptation and mitigation strategies at different stages of the policy process (agenda setting, design, implementation) and how they shape their governance outcomes as responses to climate change. Analytically, the focus on institutions in the thesis is in three main forms. The first relates to the existing institutions in the forest and environmental sectors of the Congo Basin, which have potential to shape the governance processes of adaptation and mitigation in the region. I call this the *institutional setting*. Secondly, given that no specific formal institutional framework currently exists for both adaptation and mitigation in the Congo Basin, the thesis focuses on the rule-making process conducted by the actors involved as well. This is what I call *institutional arrangements*. Thus, the institutional dynamics of the governance process of adaptation and mitigation in the Congo Basin will be analysed based on this mix of institutional settings and arrangements. Thirdly, given the nature of adaptation and mitigation as sub-regimes of the climate debate, with each having its own institutional processes, the thesis considers an interplay of

institutions between the two (Young, 2002 & 2008). In order to analyse potential synergies, I use the conceptual framework developed by Gehring and Oberthur (2009) to analyse *institutional interactions* between adaptation and mitigation in the Congo Basin forest sector, and how these interactions can be managed by actors to produce the desired outcomes. The approach of the framework is to understand the manner in which institutions influence each other in most environmental regimes. The conceptual framework examines how institutions may exert causal influence on each other's development and effectiveness, by exploring causal mechanisms of interactions.

1.4 Research Methodology

This thesis has been undertaken within the framework of two projects of the Center for International Forestry Research (CIFOR) in the Central African Regional Office in Yaoundé, Cameroon. The two projects were: Congo Basin Forest and Climate Change Adaptation (COFCCA) and the Climate Change and Forests in the Congo Basin Forest: Synergies between Adaptation and Mitigation (COBAM). Both projects were aimed at providing policy actors with a set of analyses, tools and information they need to design and implement policies and projects on adaptation and REDD+ in the region. While COFCCA covered only three countries: Cameroon, CAR and DRC, COBAM covered all of the six countries of the Congo Basin. The author was affiliated with CIFOR (2008-2011) and actively contributed to these two projects. The research context in this thesis involves a nested approach from a regional discourse, national debates on design and implementation to local practices. At regional level, the focus was on three countries: Cameroon, CAR and DRC (for chapter 1). For the rest of the empirical chapters, the focus was on Cameroon with the objective of gaining deeper understanding of national and local dynamics of governance processes of adaptation and REDD+.

1.4.1 Data Collection and Analysis

This sub-section outlines a brief description of the methodological approaches used in this thesis. Complete details on the multiple data sources and data collection methods for each of the empirical chapters (Chapters 2-6) are

presented in the methodology section of the chapters. In a broad sense, the thesis uses a combination of different methods. Four data collection methods were prominent in this thesis, they include: (i) Qualitative in-depth interviews; (ii) Primary quantitative data; (iii) Participation in policy events; and (iv) Literature and policy document review. Studies by Bose (2012) and Ayana (2014) have suggested the usefulness of combining different methods both to validate the data and to collect comprehensive information about a complex process. Methods for data analysis will be discussed along with the different methods used for data collection below.

Qualitative in-depth interviews: Given the nature of the research subject which dwells on environmental governance and policy-making, in-depth interviews with a broad range of policy actors and stakeholders from government, civil society, development partners, the scientific community and the private sector, across national and levels, were conducted. According to Ritchie and Lewis (2003), the value of qualitative research lies in its ability to explore issues in depth and from the perspectives of different participants. Table1-4 presents a distribution of the categories of actors interviewed within each empirical chapter. Overall, 212 interviews[3] were conducted within the period of four years (2009-2012) of the research project. A few actors were interviewed more than once given the importance of their roles in the policy processes for adaptation and REDD+. Government and civil society organizations account for 30% and 26%, respectively. This is quite understandable given that both actor-groups are the most engaged, at all levels, in the policy debates on adaptation and REDD+ strategies in Congo Basin.

3 It is important to mention that the 212 interviews for the research does not mean 212 different people interviewed. The interview data for the chapters were collected at different times within the four year period. A few individuals were interviewed more than once. For example, Cameroon's focal person to the UNFCCC within the Ministry of Environment was interviewed for four of the chapters (except chapter 4).

Table 1-4: Distribution of qualitative in-depth interviews

Empirical Chapters	Types of Actors and Stakeholders						Total
	Government	*Development Partners*	*NGOs*	*Scientific community*	*Private sector*	*Others*	
Chapter 2	32	17	34	12	8	-	**103**
Chapter 3[4]	15	11	10	7	3	-	**46**
Chapter 4[5]	1	-	2	-	-	15	**18**
Chapter 5	8	4	6	4	1	-	**23**
Chapter 6	6	5	4	5	2	-	**22**
	62	**37**	**56**	**28**	**14**	**15**	**212**

One hundred and seventy-six of the total interviews, representing 83 percent, were conducted face-to-face using a more conversational approach, using semi-structured interview protocols in order to give room for deeper probing on the issues under discussion. Several authors have supported the primacy of semi-structured questions over close-ended option due to the former's limitation to obtain rich and detailed information (Weiss, 1994; Willner, 2011). A significant advantage of in-depth interviews in this thesis was the opportunity for, to a certain degree, exploration and deeper understanding of the responses provided by the interviewee to a few relevant and complex questions. Finally, each face-to-face interview took 30-90 minutes depending on the interviewee's interest and disposable time. In addition, about 128 of the in-depth interviews (representing 60 percent) were voice-recorded, provided that the interviewee accepted; all voice-recorded interviews were later transcribed for ease of analysis.

Primary quantitative data: Towards answering the research question on local adaptation practices as well as the impact of local institutions, primary quantitative data at the household level were collected in three different

4 These interviews were conducted within the context of a science-policy dialogue organized on regional and national adaptation strategies in Yaoundé, Cameroon. See section 3.3 for more details on the dialogue.

5 Given that this research was undertaken at the local level, the 18 in-depth interviews were conducted with the management board of local communitarian forestry institutions across three different project sites. Majority of these interviewees fall within the category outside the main ones in the table. See Section 4.3.3 for more details.

research sites (community forests). A total of 120 randomly-selected households were surveyed on their socio-economic characteristics and local adaptation practices. A local research assistant was hired to help with local language translation during the data collection. This method of data collection was only used for one of the five empirical chapters. Collected data were statistically analyzed using analysis of variance (ANOVA) to test for differences between the three community forests. Reference is made to the methodology section of Chapter 4 for more detailed information.

Participation in policy events: Towards designing official policies on adaptation and REDD+ in the Congo Basin, many of the countries and organizations organized a number of policy-oriented events, including: workshops, symposia, open and closed dialogues, and science-policy dialogues. I participated in more than 30 of these meetings over the research period in my capacity as CIFOR staff. In principle, this data collection method - participatory observation, had a unique value for understanding political and policy processes beyond formal rules and procedures. From the experience of this thesis, it offered enormous opportunities to understand of cognitive elements shaping the discourses on adaptation and REDD+ strategies. The method was also useful in revealing 'allies and axis' among different policy actors and how different ideas or perspectives on the type of institutions needed or 'what should be done' were more accentuated than others.

Literature and document review: As a method of data collection, a number of content analysis of published and unpublished documents produced by different actors within the region, was undertaken. A few output reports of some of the relevant policy events on adaptation and mitigation were particularly useful. On forests, national and regional policy documents, legal agreements and policy proposals were reviewed and analyzed. On climate, National Communications to the UNFCCC, National Adaptation Programme of Actions (NAPAs), Readiness Project Idea Notes (R-PINs) and Readiness Project Proposals (R-PPs) were also accessed and analyzed. Given that a number of demonstration projects on REDD+ and adaptation started during the research period, their project documents were also analyzed to get a grasp on balancing policy and practice.

1.5 Organization of the thesis

This thesis is organized into seven chapters with the introductory chapter followed by five empirical chapters, along with a final chapter with the discussion, conclusions and reflections. The five empirical chapters are published or submitted independent peer-reviewed journal articles; they are related to the four researched posed in Section 1.2.1. It is worth mentioning that the second research question on adaptation strategies is answered in two chapters: Chapters 3 and 4 as shown in Figure 1-3.

The first chapter presents an overview of the relationship between tropical forests and climate change as regards adaptation and mitigation. It presents the Congo Basin forests as the research area, and within the debates of its climate policy responses. The chapter also outlines the research problem, research objectives and the main research questions guiding this thesis. It further outlines the theoretical concepts and conceptual framework underpinning the research as well as the methodological accounts of the research empirics.

Chapter 2 analyses the policy discourses on adaptation and mitigation (with specific emphasis on the REDD+ mechanism) that are currently at the forefront within the Congo Basin region. It investigates how different actors hold divergent frames on adaptation and mitigation, and how these frames converge around dominant discourses with implications for policy making.

Both Chapters 3 and 4 seek to answer the research question on adaptation strategies in the Congo Basin forests, using the case of Cameroon. Chapter 3 explores the vulnerability of key forest-related sectors to climate risks. It further explores national-level understanding and planning of adaptation to increase adaptive capacities of the populations and economy against climate risks. On the other hand, Chapter 4 investigates household-level coping and adaptation practices of local forest-dependent communities, and how these practices and their outcomes are shaped by institutions governing forest access and management.

Chapter 5 presents an analysis of the mitigation (REDD+) strategy in the Cameroonian forest sector. The paper investigates the policy process of

designing a national REDD+ strategy on the one hand, and the challenges of designing a governance structure that integrates the diversity of actors and existing (new) institutions on the other hand.

Chapter 6 addresses the question of potential interactions between adaptation and REDD+ in the Congo Basin, using Cameroon as a case study. Following the findings in the preceding four chapters, the chapter examines the synergies between adaptation and mitigation and the policy frameworks for managing and coordinating the synergies to maximize positive outcomes.

Finally, Chapter 7 presents a detailed synthesis of discussions on major findings on the relationship between adaptation and mitigation within the forest-climate nexus. The chapter concludes on the process of governing policy making systems on adaptation and mitigation in Congo Basin. It also provides a reflection on the theoretical approaches and methodology. It presents a number of recommendations for research and policy.

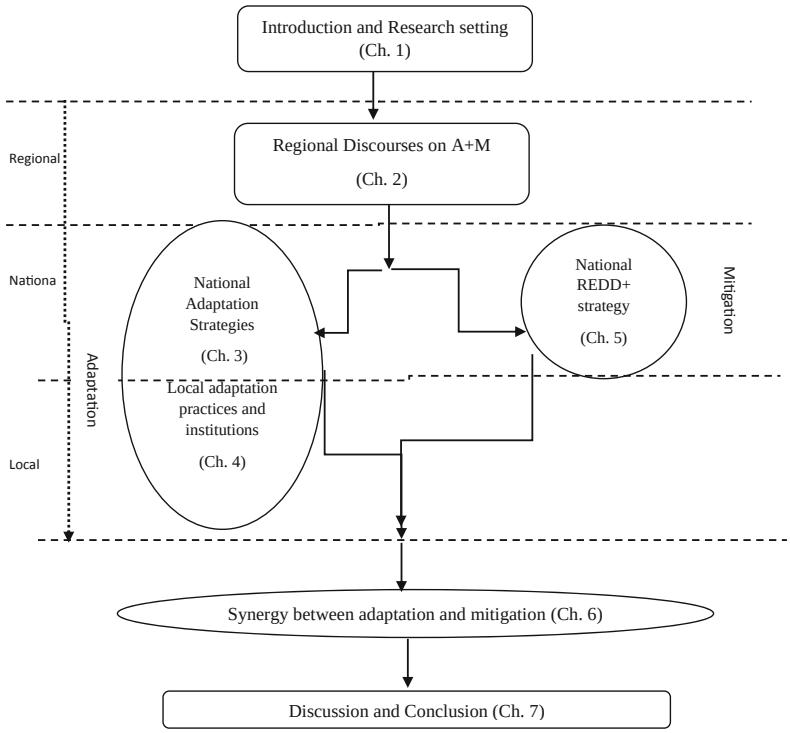

Figure 1-3: Overview of the thesis

Chapter 2

The Congo Basin forests in a changing climate: Policy discourses on adaptation and mitigation (REDD+)

This chapter has been published as:

Somorin OA, Brown HCP, Visseren-Hamakers IJ, Sonwa DJ, Arts B, Nkem JN. 2012. Congo Basin forests in a changing climate: policy discourses on adaptation and mitigation. ***Global Environmental Change*** 22 (1): 288-298

Abstract

This paper analyzes the discourses on climate change adaptation and mitigation that are currently at the forefront in the Congo Basin. On mitigation, the forests have enormous opportunities to contribute to the reducing emissions from deforestation and forest degradation (REDD+) mechanism. But the forest itself and its multiple dependent societies and sectors need to adapt to potential climate risks. Hence, actors are debating the design of climate change policy in the forest sector. Theoretically, we combine the *agency-focus* of frame analysis and discourse theory to analyze how different agents hold frames on climate change adaptation and mitigation policies in the region. This paper draws upon interviews with 103 different actors from government, international organizations, non-governmental organizations, research institutions and private sector in three countries: Cameroon, Central African Republic (CAR) and Democratic Republic of Congo (DRC). Three discourses were found on policy response to climate change in the forest sector: mitigation policy only, separated policy on adaptation and mitigation, and an integrated policy on adaptation and mitigation. The various frames articulated around each discourse by the coalitions include elements of: costs and benefits, scale of operation, effectiveness, financial resources and implementation mechanisms. Overall, the mitigation discourse, through its mix of actors, resources and interests seems to be stronger than the adaptation discourse. The paper finally outlines a number of implications of the discourses for policy design.

2.1 Introduction

Climate change is currently at the forefront of debates and discourses on global environmental change (Adger et al., 2001). The global nature of the causes and consequences of climate change imply the need for international collective action for an efficient, effective and equitable policy response (Palmer and Engel, 2009). The United Nations Framework Convention on Climate Change (UNFCCC) identifies two policy responses to address climate change: mitigation of climate change by reducing greenhouse gases (GHGs) in the atmosphere and enhancing carbon sinks, and adaptation to the impacts of climate change (Klein et al., 2005). Mitigation is defined as an anthropogenic intervention to reduce the sources or enhance the sinks of GHGs such as carbon dioxide, methane and nitrous oxide. Actions that reduce net GHGs reduce the projected magnitude and rate of climate change, hence, lessen the pressure of climate change on natural and human systems. Therefore, mitigation actions are expected to delay and reduce damages caused by the change, providing environmental and socio-economic benefits. Adaptation refers to any adjustment in natural or human systems in response to actual or expected climate change, aimed at moderating harm or exploiting beneficial opportunities (IPCC, 2001; Ravidranath, 2007).

Despite both adaptation and mitigation (A/M) sharing the same ultimate purpose of reducing the undesirable impacts of climate change (Fussel and Klein, 2006; Swart and Raes, 2007; Ayers and Huq, 2008), adaptation has received less policy attention at the global level (Jones et al., 2007). There are several explanations for this. First, a taboo has been placed on adaptation by those advocating for emissions reductions (Pielke et al., 2007). Another reason is a limited understanding of adaptation since its science is in its infancy (Kates, 1997; Klein et al., 2005). But there is a third reason worth mentioning, albeit, political in nature. There is a north-south burden divide in climate change responsibilities that cannot be ignored. Mitigation is largely within the domain of the commitment of developed countries, which hold the greatest responsibility for climate change, since they emit more GHGs per capita. Adaptation on the other hand, is a priority for many developing countries due to high vulnerability to climate impacts (Ayers and Huq, 2008; Somorin, 2010).

While mitigation has understandably dominated policy and research agendas in recent years there is an increasing recognition that actors and societies also need to be prepared for changes that are unavoidable. This has ultimately resulted in greater consideration of vulnerability and adaptation (Martens et al., 2009). In addition, the fact that extreme impacts of climate change are currently anticipated to fall disproportionately on people living in the poorest regions, people who are most vulnerable, means that adaptation is equally important and urgent (Adger et al., 2003; Thomas and Twyman, 2005). At the same time, society cannot adapt indefinitely to climate impacts, which makes urgent mitigation needed to avoid the worst effects of climate change (King, 2004). In a way, the climate change world is juggling with questions of how to combine both adaptation and mitigation as complementing responses and how the developed and developing worlds can contribute to these issues in an equitable manner. However, with the urgency involved in addressing climate change combined with the 'common but differentiated responsibilities' principle, mitigation can no longer be left alone for the developed world to tackle. Opportunities for emission reductions in developing countries through mechanisms such as the Clean Development Mechanism (CDM) in different sectors deepen the global collective effort to respond to climate change. One of such sectors that offer enormous opportunities for addressing climate change is forestry.

The forest of the Congo Basin represents a trans-boundary pool of natural resources across six countries (Cameroon, Central African Republic, Democratic Republic of Congo, Equatorial Guinea, Gabon and Republic of Congo) in the central region of Africa. With a forest area of around 227 million hectares (about 60% of the total land area of the region) representing about 18% of the world's tropical forests, the Congo Basin forest constitutes the second largest area of dense tropical rainforest in the world after the Amazon (FAO, 2006; CBFP, 2006). As a natural resource pool, the forest provides food and resources for humans, and raw materials for industries that are critical for economic development of the region. It represents a common heritage with livelihood portfolios shared by a great majority of people (Nkem et al., 2010). Like other tropical countries, millions of people have their livelihoods intricately dependent on forests, especially the rural poor (World Bank, 2004; Sunderlin et al., 2005; WRI, 2005). The forest also offers environmental services such as watershed management, soil and biodiversity conservation and carbon sequestration. The Congo Basin

forest has enormous carbon stocks given its diversity in forest types. It is estimated to contain between 25 and 30 billion tons of carbon in its vegetation (Hoare, 2007). This represents a carbon reserve of global significance for regulating greenhouse gas (GHG) emissions in the atmosphere. Hence, this opens up opportunities for international climate policy such as reducing emissions from deforestation and forest degradation, including the role of conservation, sustainable management of forest and enhancement of carbon stocks in developing countries (REDD+) as a potential climate mitigation option (Visseren-Hamakers and Glasbergen, 2007; Brown et al., 2010;Visseren-Hamakers et al., 2011; Brown et al., 2011). Although deforestation rates vary among the countries that share the basin, compared to the other tropical forest basins (Amazon and Borneo-Mekong), annual deforestation rates in the Congo Basin are historically lower, and currently at 0.36 percent (FAO, 2010). Having recognized the implication of the low deforestation but high forest degradation for REDD+ mechanism, the proposal of the Central African Forests Commission (COMIFAC) to the UNFCCC emphasizes the need to subsidize sustainable forest management (SFM) through REDD+ as a route to development, given its dominant land use status in the region (Okereke and Dooley, 2009).

Just like many other sub-Sahara African countries, the interest in responding to climate change in Congo Basin countries is confronted with many challenges. First, governance is central to the success of any forest-related policy (Rayner et al., 2010). Many past forest policies and programmes in tropical Africa including the Congo Basin, for example, the Tropical Forest Action Plan (TFAP) and National Forest Programmes (NFP), have not been successful due to weak political and governance systems and low human and technical capacity, amongst other factors (Mayers and Bass, 1998). Now under the climate regime, with new policies such as REDD+ requiring adequate monitoring and governance systems for implementation in order to take advantages of opportunities in carbon trading, it remains uncertain whether the region has the institutional capacity to implement REDD+ policy. Second, concerns are growing globally about the impact of REDD+ policies on indigenous and forest-dependent communities (Cotula and Mayers, 2009), whose immediate need is how to respond to stresses (both climate and non-climate driven) facing their everyday life. The new frontier of policy deliberation and negotiation in the forest sector is fast emerging among the stakeholders and it is centered on

what is currently most important for the Congo Basin forest: adaptation or mitigation, or both.

This paper seeks to analyze the policy discourses on climate change adaptation and mitigation in the Congo Basin forest sector. Of particular interests are how actors and stakeholders (re)frame adaptation and mitigation policies and strategies, and how these frames shape the discourses. The paper is organized as follows. In Section 2, we present the theoretical framework guiding this paper: discourse and discourse coalitions. Our methodological account is presented in Section 3. The emerging policy discourses on adaptation and mitigation which form the result of our research are presented in Section 4, and the section concludes by comparing and contrasting the discourses. In Section 5, we present the implications of our result (the three discourses) for policy design in the Congo Basin region, and the conclusion in Section 6.

2.2 Theoretical framework – Frame Analysis and Discourse Theory

The application of discourse analysis to political science has been appreciated by a number of scholars (Hajer, 1995; Howarth, 2000; Dryzek, 2005). The growing prominence of discourse analysis within social science has resulted from increasing awareness of the importance of language and meaning, readership and interpretation for social and policy analysis, also referred to as 'the argumentative turn' (Fisher & Forrester, 1993; Fisher, 2003; Mottier, 2002). Since 1970s, a number of schools of thought or perspectives on discourse have emerged; notable among them are: linguistics, hermeneutics (e.g. Critical Discourse Analysis), frame analysis and post-structuralists (Howarth, 2000). For our research, similar to van den Brink's work (2009), we have developed a theoretical framework that builds on post-structuralism on the one hand and frame analysis on the other. The former is strong on 'structure' (language as a structured system that shapes the thoughts, speech acts, behaviour and practices of people), the latter is strong on 'agency' (human beings who name and frame the world around them in a particular way). We believe that we need them both. Below, we will first explain each of them individually, after which we integrate them.

We define a discourse as "*a specific ensemble of ideas, concepts, and categorizations that is produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities*" (Hajer, 1995, p.44). Discourses produce social identities, subject positions and social relations between agents as well as mediate social practices (Arts and Buizer, 2009; Rogers-Hayden et al., 2010). Empirically within the forest sector, discourse analysis have been used by Lindahl (2008) to explore the politics of natural resource management in Northern Sweden; Buizer and Herzele (2012) investigated the participative completeness of centrally formulated plans in green structure planning in the Netherlands and Flanders. Within climate change, Doulton and Brown (2009) explored a decade of media construction of climate change and development in UK major newspapers.

Schon and Rein (1994) define a frame as follows: "*the broadly shared beliefs, values and perspectives familiar to the members of a societal culture and likely to endure in that culture over long periods of time, on which individuals and institutions draw in order to give meaning, sense, and normative direction to their thinking and action in policy matters*" (p.xiii). Frame theory has been used and developed by different disciplines in relative isolation from one another. Possibly the greatest dividing line exists between those who view frames as cognitive structures of actors' memory, and those who view frames as social constructions (Raitio, 2008). According to Perri (2005), frames perform two main functions: they organize experience (i.e. they enable people to recognize what is going on, they provide boundaries, define what counts as an event or a feature) and they produce a bias for action (i.e. they represent people's worlds in ways that already call for particular styles of decision or of behavioural response). Because recognizing policy responses (such as to climate change in the Congo Basin forest) would require both functions, frame analysis provides a good case for appraising these varying accounts. In addition, due to its focus on agency, the framing perspective is interesting for our analysis of how policy actors and stakeholders construct policy responses. However, such framing processes do not take place in a societal vacuum. They are influenced by and nested in wider overarching discourses, including global ones. Therefore we need the first perspective too, in order to have a full 'discursive picture' of policy responses.

For many scholars, frames and discourses represent approaches from different schools of thought; they are considered distant-apart based on their ontological and epistemological assumptions (van den Brink and Metze, 2006), hence combining them is largely uncommon. Nevertheless, both conceptual tools continue to be used to capture how policy actors deal with ambiguity and allocate particular significance to special social events (Hajer and Laws, 2006; van den Brink, 2009). We build our argument for framing in discourse analysis from Hajer's position: "Discourse analysis investigates…how a particular framing of an issue makes certain elements appear fixed or appropriate while other elements appear problematic" (1995: 54).

Furthermore, we use the concept of 'frame articulation' by Benford and Snow (2000), to aggregate similar frames within a particular discourse. *Frame articulation* refers to the decision that subjects make to identify with particular discourses and involves the connection and alignment of events and experiences so that they hang together in a unified and compelling fashion. Benford and Snow (2000) posit that frame articulation forms the discursive process of generating collective action frames. They further assert that besides being discursive, framing processes are strategic, deliberative, utilitarian and goal-directed. This means that actors can develop and deploy frames to achieve specific purposes and interests. Of interest, Schon and Rein (1994) present the reciprocal relationship between the interests of the agents involved in a discourse and the way that they frame a problem. On one hand, their understanding of their interest may motivate them to frame a policy issue in a particular way. On the other hand, their framing of the situation affects their perception of their interests.

The actors adhering to the discourse participate in various degrees in its production, reproduction and transformation through written and oral statements (Adger et al., 2001). These actors or group of actors are often referred to as discourse coalitions, i.e. a group of actors who share a social construct (Hajer, 1995). The study of discourse also allows one to see how a diversity of actors actively tries to influence the definition of the problem (Hajer and Versteeg, 2005) and perhaps its solution. Various studies have shown how distinct actors exercise power through trying to impose a particular frame or discourse into a discussion. So discourse analysis should not be understood as a

type of analysis in which actors do not play an important role. Quite the contrary, they are actively 'positioning' themselves and others drawing on discursive categories (Hajer and Versteeg, 2005). In other contexts, these coalitions are also referred to as discursive change agents who possess the ability to frame or reframe certain discourses (Benford and Snow, 2000; Schmidt, 2008). Arts et al. (2011) posit that influential actors may re-frame discourses, for example when their frames resonate in the media, in science and politics. Taken together, the relationship between discourses and agents is dialectical: discourses shape the perspectives of agents, and agents often in turn reshape discourses.

To guide the research, we follow the following steps. First, from the overarching discourses on the Congo Basin forest and climate change, we analyze the different discourses attached to by different actors and stakeholders on adaptation and mitigation. Second, we identify the discursive frames they use. Within these frames, we distinguish various devices: patterns of shared meanings, ideas and interpretations. We then aggregate similar frames within each discourse through frame articulation. The resulting frames reflect the construction of discursive realities of adaptation and mitigation. Finally, we discuss the different discourse coalitions that we have found on adaptation and mitigation in the Congo Basin.

2.3 Methodological Account

For our research, we used a qualitative approach in data collection through in-depth interviews with different categories of actors: governments, international organizations, private sector, non-governmental organizations, and research institutes. The research was carried out in three of the six Congo Basin countries namely: Cameroon, Central African Republic and Democratic Republic of Congo in 2009. These three countries potentially represent about 80 percent of the Congo Basin forest cover as well as about 85 percent of the region's total human population.

In total, 103 in-depth interviews were conducted across different categories of actors in the three countries as shown in Table 2.1. Respondents were found to have significant knowledge of forest and climate change at both scientific

and policy-making levels. Emphasis was placed on interviewing one person from each organization or institution considered relevant for the research, and usually either the head of such organization or someone highly involved in the mission of such an organization. There were a number of people interviewed who were not based in the Congo Basin region but whose influence of work and operations cover many geographical regions including the Congo Basin region, for example, the officials of Forest Carbon Partnership Facility (FCPF) of the World Bank and the Congo Basin Forest Fund of the African Development Bank.

Table 2-1: Categories of respondents interviewed

Actors	No. Interviewed	Examples
Government	32	-National Ministries: Environment, Forestry, Agriculture, Energy, Water, Research, Tourism -Regional Government: COMIFAC, CEFDHAC, REPAR -Others: Heads of Departments, Commissions and Agencies, Parliamentarians
International Organizations	17	-Specialized agencies: UNDP, UNEP, FAO, UN-REDD, World Bank, ADB -Development co-operation/ Donor groups: GTZ, SNV, DFID, EU, USAID
NGOs	34	-International: WWF, CI,WCS, Greenpeace, Living Earth -National: OCDN, CODELT, CED
Research Organizations	12	-National: INERA, IRAD, Universities of Yaoundé, Bangui - International: ICRAF, WRI, IITA
Private sector	8	Logging companies, timber processing companies
Total	**103**	

Interviews were conducted in French or English, depending on the preference of the person being interviewed and were digitally recorded for later transcription. Interviews lasted between 30 and 90 minutes and were conducted in person. Interviews focused on the respondent's idea or understanding of adaptation and mitigation in Congo Basin forests, and their perceptions on policy approaches for A/M. Additionally, national and regional policy documents, strategies, press releases and government statements were reviewed and analyzed. Data collection was extended to a number of international and national meetings, workshops and dialogues on forest and climate change that were organized in the region during the research period.

To analyze the discourse coalitions, we developed a novel method of mapping the discourses of the respondents in a triangle in which each vertex represents a discourse. Each respondent was associated to a point in this triangle (a vertex if the respondent was following fully one of the three discourses or a point inside the triangle if the respondent was using a combination of the three discourses). In doing this, we assigned a value (1) for every respondent's frame under each discourse. Frames that cut across two or more discourses were also assigned a value each under each discourse. Similar frames were then aggregated under each discourse along the actor-category (e.g. government, NGOs). Following this approach, an actor-category could be in two or more discourses (e.g. 80% in Discourse 1 and 20% in Discourse 2). For each group of respondents (actor-category), we calculated the 90% confidence intervals of the point coordinates and used these intervals for drawing eclipses representing the position of the group in the discourse triangle (see Figure 2-1).

2.4 The Policy discourses

There is a deepening recognition that the current climate change discourse in the Congo Basin has grown beyond dealing with a purely environmental problem to a more developmental challenge (Bele et al., 2010; Brown et al., 2010). In our research, we found three emerging policy discourses on climate change and forests: mitigation only, separated adaptation and mitigation, and integrated adaptation and mitigation (Table 2-2), which we present below. For each discourse, we identify main characteristics in terms of shared meaning, ideas, interests, perception and framing. Where necessary, some illustrative quotes are added to support ideas and arguments central to each discourse. Each discourse has its own mix of actors that form its coalitions and the central ideas and frames shared by at least two categories of actors were considered to underpin the homogeneity in meaning.

2.4.1 Mitigation only

The main tenet of the mitigation only discourse is the belief that adaptation is a highly contested issue especially in the face of the uncertainty that pervades the magnitude and frequency of climate impacts. Specifically in the case of

the Congo Basin forests, changes in ecosystem species composition might go unnoticed, and no records exist of abrupt changes in the forest biome that is traceable to climate change. Even where a degree of climate impact on forests is acceptable within this discourse, there is still the assumption that the climate will not vary or change to the extent that long term existence, functioning and productivity of the forests may be affected. This discourse does not challenge whether climate change is real or not, either globally or locally, but its approach of mitigation policy only is based on the fact that the Congo Basin forest is not being threatened to a scale that calls for an adaptation policy. With this perspective, to present adaptation as a priority does not resonate with certain actors or categories of actors who believe that mitigation policy such as REDD+ offers an incentive to reduce deforestation and forest degradation, not only for climate change but for other interests such as sustaining biodiversity and human livelihoods.

> *Anytime I hear about the impacts of climate change on Congo Basin forests whenever I attend meetings and meetings, I keep asking them one question "Where is the evidence of the impact of this change?" If you ask me, I will tell you we can only talk of adaptation to climate change when we see unmistakable impacts in the forests. Please, don't get me wrong, I am not saying climate change does not exist….. If there are problems at all with our forest, it is how we use the forest and the value we place on it, and that's why we have opportunity to reduce deforestation through REDD* (A respondent from a government ministry)

> *Let's deal with what we know for now. We know deforestation is happening and there is opportunity to reduce it through REDD* (A respondent from a government ministry).

The discourse for mitigation policy emphasizes that the human systems have always historically coped with and/or adapted to changes in their environments, and there might be nothing new to do for adaptation. The premise of this position is that adaptation takes place not necessarily at the frontiers of climate change but rather as a way of life. But mitigation under the climate regime is perceived relatively new, which calls for a new measure or approach for managing the forests. This particular framing presents a number of important

insights. First, it presents adaptation to be existent before the emergence of the climate discourse, that is, local populations and economies have historically always coped with external risks. To these actors, giving adaptation policy attention under the climate regime is not a priority. Second, climate mitigation (REDD+ in particular) is perceived as a novel initiate to reduce deforestation and GHG emissions towards achieving sustainable national development, and as such should be given the required policy attention. The focus therefore is a strong mitigation policy that is implementable and measurable in achieving set targets.

It is not surprising that the private (forestry) sector is *championing* the discourse to keep it on mitigation only – to them, mitigation is a burden already; adding an adaptation burden on them is perceived unrealistic despite the effects of climate impacts on their timber harvesting operations (Brown et al., 2010). Even where the changing patterns of rainfall in the Congo Basin forests presents an economic implication for many of the logging companies in the region (logging activities are affected by heavy rainfalls) (Brown et al., 2010), the burden of adaptation is still considered to be the onus of the government, and not necessarily theirs. It is thus worth mentioning that an actor's acceptance or rejection of a particular idea or concept in a discourse may be shaped by the perceived implication of a policy that might be designed through the influence of such discursive idea or concept. This is particularly so if the new policy could (re)define or (re)distribute roles, resources, interactions and power relations among the actors.

Another point central to this discourse are the perceived costs and benefits of both adaptation and mitigation policies. For some actors, it is important to have knowledge of what adaptation or mitigation costs, and what would be the associated benefits if they supported such policy, both in terms of monetary value. The impression 'out there' to certain actors is that adaptation is costly with no monetary value to incentivize their participation in such policy. On the other hand, mitigation through REDD+ offers financial compensation if they practice any mitigation activity such as sustainable forest management (SFM), improved forest management (IFM) or reduced impact logging (RIL). Since these forest management systems are already on-going through provisions within the national/regional forest laws and policies and international

certification systems, participating in REDD+ should not be challenging for the private sector.

> *Whichever way you look at it, adaptation has a cost and the question is "who is going to pay?" REDD already has people who are ready to pay* (A respondent from the private sector)

In another context, REDD+ is not seen as an environmental project but a national development strategy or road map. From this standpoint, although the need for policies and programmes that can enhance adaptive capacity of local populations to respond to impacts of climate variability and change are recognized, the overarching developmental ambition of REDD+ would automatically cater for the adaptation policy. Similar to this position is the assertion that adaptation similar to biodiversity conservation and poverty reduction will be co-benefits of mitigation. This idea emphasizes a "one size fits all model" power of mitigation policy; a standpoint that REDD+, afforestation and reforestation combined in any forested country is sufficiently robust to cater to achieving economic development, poverty alleviation and biodiversity conservation. For this particular frame, issues such as potential trade-offs between forest-based mitigation and development, particularly regarding forest access rights and potential negative impacts on the forest poor, are not concerns for the actors. Rather for them, investing capacities into achieving successful implementation of REDD+ is fundamental.

> *Depending on the way we look at it, adaptation will automatically be part of the many benefits of REDD* (A respondent from a government ministry)

2.4.2 Separated policies of adaptation and mitigation

Central idea to the discourse for separated policies is that adaptation and mitigation, along with their associated policies, differ in terms of the required capacity, spatial and temporal scale, people's perception, distribution effects, and related stakeholders. Supporters observe an obvious mismatch in terms of scale, both spatially and temporally. Mitigation efforts are typically driven by national initiatives operating within the context of international obligations,

whereas adaptation to climate variability and change tends to be much more local in nature, often in the realm of local economies and livelihoods by local populations (Martens et al., 2009). The spatial and temporal difference in scale as framed by the mix of actors in this discourse seems to be centered on the calibration of actor networks and capacities. Mitigation is presented as the goal of national and international stakeholders to reduce emissions from deforestation and other land uses at the national level; carbon credits generated from such reductions are traded in global carbon market. Adaptation on the other hand is about the coping strategies of individuals, households and communities which are influenced by many factors that are not necessarily forest-related. Another framing of scale is in terms of benefits – mitigation tends to be driven by global benefits while adaptation's benefits are local. Thus, different and varying interpretations of what adaptation and mitigation constitute or not have elucidated the need for some actors to keep them at arm's length.

But the need to keep them separate transcends the issue of mismatch in scale. Many pro-poor adaptation advocates in the region, especially those working with the local population are of the opinion that given the current political, scientific and media attention for REDD+ in the region, it is obvious that adaptation does not stand a chance. It is against this backdrop that these actors postulate that if the 60 million vulnerable natural resource dependents whose livelihoods are intricately linked with the forests are going to adapt to climate variability and change, then adaptation must have its own policy space. On the other hand, mitigation experts and advocates are canvassing a REDD+ policy design that is not overburdened with adaptation needs of the people. They maintain that for implementation success, it is important to keep the design as simple as possible.

> *Adaptation will suffer if you keep it with mitigation. The news all over on the Congo Basin forests now is just about REDD!….. Adaptation has its own place, especially for local populations and we must keep and develop that space* (A respondent from a development NGO)

> *We must keep REDD very simple! Remember how CDM stringent rules could not support forestry in Africa, we can't afford the same with REDD…..*

> *We should also be careful not to overload REDD with too many issues: biodiversity conservation, poverty reduction and economic development. REDD cannot fix all the problems of our country* (A respondent from a government ministry).

Effectiveness and efficiency are key to any environmental policy, not just related to the policy outcome, in the case of climate change – stabilizing GHGs in the atmosphere, but also to the implementation approaches and mechanisms set for achieving such outcomes. The need to achieve effectiveness and efficiency in the coordination of the implementation mechanisms of adaptation and mitigation has found itself as another strong argument for separating both policies at national and local levels. In the case of mitigation, currently two of the three countries (CAR and DRC) have established a National REDD+ Coordination Office or Unit to oversee the implementation of national REDD+ strategies. DRC is already under the UN-REDD process as well as the World Bank's Forest Carbon Partnership Facility (FCPF). CAR is now a partner with the UN-REDD process and has its Readiness Preparation Proposal (R-PP) about to be evaluated by FCPF.

Cameroon is currently preparing for the consultation process leading to the submission of the R-
PP after its Readiness-Plan Idea Note (R-PIN) was reviewed also by FCPF. On the adaptation front, as members of the Least Developed Countries (LDCs) under UNFCCC, CAR and DRC produced their National Adaptation Programme of Actions (NAPAs), through their access to a number of financial resources such as the Kyoto Protocol Adaptation Fund (AF), LDC Fund, Special Climate Change Fund (SCCF), and Global Environmental Facility (GEF), to finance adaptation projects at local levels. Invariably, these streams of global facilities and financial instruments have been focused around each policy response to climate change, and they have further strengthened the discourse on separating adaptation and mitigation at the implementation level.

> *If you received money from a donor for a particular programme, you have to spend it on that programme. Let's say the World Bank or the EU gave you money for REDD, you can't spend it on adaptation projects, the same way you can't spend money from the Adaptation Fund for a REDD project* (a government respondent/ focal point to the UNFCCC)

Although less obvious, we also found the overarching political system of administration and the historical trend of fragmenting sectors, policies and programmes in the Congo Basin countries as a relevant idea in this discourse. State actors within this discourse regard their 'experience' from their tradition of fragmented policy and sectors as critical to their current and future response to climate change. Putting this in perspective, Cameroon has 32 government ministries and over 60 ministers and deputies while DRC has 38 government ministries. For forest and climate change, about five ministries are currently known to be in the frontline: Forestry and Wildlife, Environment and Nature Protection, Energy and Water Resources, Scientific Research and Innovation, Agriculture and Rural Development. Future policies related to forests and climate change in the Congo Basin are unlikely to escape this traditional system of fragmented policies and sectors.

> *For us, it is important to break down complex issues in order to solve it with available resources. You see how we organize the ministries and agencies. It is very common in CEMAC (Economic Community of Central African States) countries* (A respondent from the government ministry)

Also, the global architecture of regimes and treaties to respond to the myriad of complex environmental problems confronting humanity has been at individual problem level rather than at collective level. Cowie and others (2007) assert that despite desertification, biodiversity loss and climate change being closely related and interacting, they are dealt with as separate issues under international conventions. Similarly under the climate regime, adaptation and mitigation remain separated for political and scientific reasons (Tol, 2005; Ravindranath, 2007). In our analysis, we found virtually all the respondents in this discourse considering the separation at the global level important for separation at regional or national level. This perhaps follows the idea of linking global to local and vice-versa. Even where there were no reasons to strengthen such argument, the fact that they remain separated at global level seems sufficient and legitimate. This shows the extent to which local actors draw discursive frames from international regime architecture. One can argue that the political economy of national institutions and policies are (in) directly impacted by these international regime structures, norms, rules and organization.

> *They are separated under UNFCCC, so we should keep them separated too…..When you attend all these COP (Conference of the Parties) meetings, you see Adaptation meetings different from Mitigation meetings irrespective of the sector* (A respondent from a government ministry)

2.4.3 Integrated policy of adaptation and mitigation

The most emphasized idea in the integrated policy discourse is the opportunity for shared policy outcome that both adaptation and mitigation possess. At the micro-level, they both offer elements of poverty reduction and increased resilience of the natural ecosystems in their strategies. At a general or macro level, they are both targeted at addressing anthropogenic climate change. With these shared policy outcomes in sight, actors in this discourse believe that an integrated policy of adaptation and mitigation can advance a sustainable development agenda of the Congo Basin countries, especially the least developed ones like CAR and DRC.

> *I don't think we need a system where you have* afforestation and reforestation (*A/R) under adaptation – at least from many of the NAPAs submitted to UNFCCC, on one hand and also A/R under mitigation on another hand. We should have them integrated! It goes also for poverty reduction, if REDD is going to achieve poverty reduction as it claims and adaptation policy is about reducing people's vulnerability by reducing poverty, I don't think we have two different poverties to reduce. We must have a harmonized system for adaptation and mitigation, especially in the forest sector* (A respondent from a Civil Society organization).

Forest management practices such as afforestation and reforestation (A/R) could be accounted for as mitigation under the REDD+ strategy since they involve the sequestration of carbon through the planting of trees. Likewise within adaptation, many sub-Sahara African countries have emphasized the need to support plantation forestry to meet the growing energy demands of the people, hence, A/R have become one of the most important adaptation strategies. The prominence of A/R as adaptation strategy extends beyond meeting energy needs of the growing population to reducing overdependence on natural forests, protection against natural disasters, rehabilitation of

degraded ecosystems and regulation of environmental services (e.g. water regulation) as shown in the NAPAs submitted to the UNFCCC and many other forest policy documents. This perceived dual role of A/R for both adaptation and mitigation as framed by the agents in this discourse underpins an integrated approach in policy design.

Interestingly, the issue of cost and effectiveness is also assumed by certain actors, especially international research institutes and NGOs, to support an integrated approach. In their claim, reducing the transaction costs attached to mechanizing the implementation of adaptation and mitigation strategies and policies is critical to the overall effectiveness and efficiency of both policies. In the context of forestry, where certain management systems such as afforestation, reforestation, and rehabilitation of degraded landscapes can provide both adaptation and mitigation functions, an integrated framework would inevitably avoid duplication of efforts, and achieve maximum benefits at low costs, amongst others. Another point of departure within this discourse is the need to develop frameworks that develop solutions to problems even outside the climate arena such as biodiversity loss, desertification, and air pollution since these environmental problems are related. To the agents in this discourse, adaptation and mitigation should not be only about climate change but also about other environmental issues of global and local interests.

> *There is an opportunity to reduce transaction costs during implementation, particularly in areas where both adaptation and mitigation are trying to achieve the same thing* (A respondent from a non-governmental organization)

> *Too risky to separate adaptation and mitigation, there is a level of interception especially in terms of poverty reduction outcomes, which must be given much policy attention (A* respondent from an international donor organization)

In this discourse, climate change adaptation activities can promote conservation and sustainable use of biodiversity, which can in the long run, conserve or enhance the carbon stocks in the forest ecosystems, which is what mitigation is all about (Ravindranath, 2007). This justifies their integration. The argument is

further strengthened by the emphasis on the negative effect that one strategy might have on the other. For example, if care is not taken, mitigation activity might increase the vulnerability of the forest ecosystems, plantation forestry, or food production, consequently increasing the vulnerability of the local communities and economies that depend on them. In the same manner, certain adaptation actions or options can involve loss or degradation of natural ecosystems, for instance, draining of wetlands, which can result in greenhouse gas emissions, and may thus be *maladaptation* in the long term (Campbell et al., 2009).

2.4.4 Frame articulation in the three discourses

The different frames held by the actors largely revolve around the way meanings were given to the policy issues within the overarching climate discourses. In Table 2.2, we draw out certain parallels in the three discourses, specifically on the mix of actors and the multiple frames they hold. The table provides an overview of the main frames.

Table 2-2: Frame articulation in the three discourses

Discourses	Main actors	Frames
Mitigation policy only	- Government ministries and agencies (trade, forestry, agriculture) - Private sectors (especially timber-producing companies)	1. The 'invisible' hand of mitigation will cater for adaptation 2. Adaptation, just like biodiversity conservation and poverty reduction should be a co-benefit 3. Uncertainty of climate impacts (in terms of magnitude and frequency) makes adaptation highly contested
Separated Policies of Mitigation and Adaptation	-Government ministries across different sectors (forestry, environment, water, energy, agriculture) -International donors -Pro-poor development agencies and organizations	1. Both policies are separated at the global level, and so should be separated at regional or national level 2. Effectiveness of coordinating and implementation mechanisms 3. Regional tradition of fragmented policies and programmes 4. Different streams of global facility and financial instruments 5. Different scales of operation (both spatial and temporal)
Integrated Policy of adaptation and mitigation	-Intergovernmental Organizations - Advocacy groups -Civil society groups -Regional Governments -Research Institutes	1. Many windows of opportunity for synergy 2. Possibility of designing each to integrate the other 3. Seemingly similar institutional and legal framework for design and implementation 4. Shared policy outcome of poverty reduction, biodiversity conservation and development

2.4.5 Discourse Coalitions

In our analysis, we found that the discourse coalitions have been largely created due to variations in: shared meanings of the policy concepts, salient interpretations and specifications of the policy concepts, and selected interests and values by the different actors. The coalitions were not traditional alliances and networks created to deliberate and negotiate a position on the policy issue. Rather, these coalitions have been formed due to the common frames they hold around adaptation and mitigation. For example, although the actors from the private sector and government categories largely dominate the discourse on mitigation only, there was no interaction in the form of any alliance between the two actor-categories. We found that each discourse incorporates different layers of coalitions which tend to be structured along their frames. For example, actor A and B might share a particular frame, hence forming coalition 1 but it is also possible that actor B can share another frame with actor C forming coalition 2. As such within a particular discourse, there exists a discourse-coalition which is an aggregate of many sub-coalitions. However, though less obvious, there were actors who share frames that cut across different discourses. A respondent asserted:

> *It's difficult to separate adaptation and mitigation but it is also not easy to keep them together. The best thing might be to start them separately and during implementation, you can begin to integrate them where possible. When we do REDD, we do it with adaptation in mind and when we do adaptation, we do it with REDD in mind* (A respondent from a research organization).

We found more diverse coalitions around the integrated discourse than around other discourses. But more importantly, there tend to be more categories of actors on whether adaptation and mitigation should be separated or integrated (Figure 1.1). The primacy of the private actors' interest in mitigation only policy is undoubtedly evident in the discourse. On some fronts, few government actors share their frames as discussed earlier. Actors from IGOs tend to be divided between 'separated' and 'integrated' but a slight majority still tends towards an integrated approach. Compared to NGOs and IGOs, research organizations exhibit stronger interest for an integrated approach. This might be due to their

consensus on the scientific possibility of an integrated approach as well as the scientific implications of a separated approach or mitigation only policy. The governments on the other hand tend to be more polarized towards a mitigation policy agenda for the Congo Basin, either alone or completely separated from adaptation. This is probably because the government sees REDD+ as a source of revenue for the state, especially since it would likely be designed to use a national implementation system.

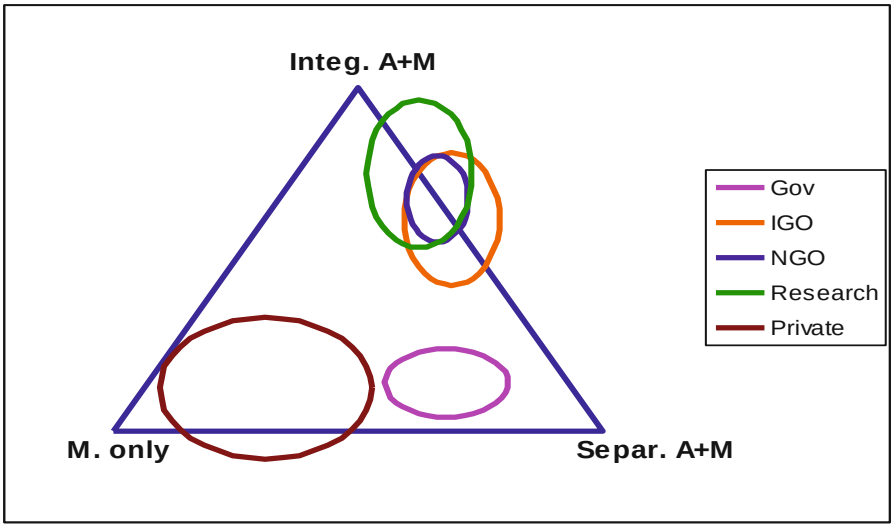

Figure 2-1: A map of the categories of actors in relation to the three discourses

2.5 Discussion: Implication of the Discourses for Policy Design

Drawing from the position that policies are not necessarily neutral tools but rather products of discursive struggles (Bäckstrand and Lövbrand, 2006), it might be safe to assume that future policies on adaptation and mitigation in the Congo Basin might require understanding of the implications of each discourse for policy design. The frequency of policy deliberation and negotiation by the actors involved in the climate debate within the region confirms the claim that there is a conscious urgency to carve a direction for the forests under the climate regime. The emerging discourses produced in some cases showed diverging interpretations of how adaptation and mitigation would function in reality

and how they can be framed in policy, especially in the Congo Basin. It is thus important to realize that the interests of the actors and coalitions underline the shared meanings, ideas and framing of adaptation and mitigation policies in the Congo Basin forest sector. The discourses as presented in this article are not neutral of such 'struggle of frames'. In this section, we therefore seek to discuss potential implications of the discourses for policy design on climate change in the region.

First, there is an undeniable recognition of the dominant power of mitigation (REDD+) in the region, which is evident in the fact that our research found no discourse on adaptation policy only. Despite the overwhelming evidence of high degree of vulnerability and poverty in climate change literature attributed to the region, adaptation seems to play a secondary role to mitigation. In a sense, the political attention for REDD+ in many developing countries, including the Congo Basin's is changing the boundary between the North-South divide in the global response to climate change. The global climate principle of "common but differentiated responsibilities" in the past put the mitigation burden on developed countries, based on the notion of fairness and justice (in terms of the cause and effect of climate change). But from the discursive formations in a typical developing region, one is made to think that the development drive of these countries is tending to override their demand for fairness and justice. Another line of thinking would be that due to the urgency required in mitigating climate change, any opportunity to achieve mitigation cheaply would likely receive global attention; and REDD+ has managed to capture this attention.

Also, the demand for clear evidence of climate impacts before adaptation is given a policy consideration under the first discourse (mitigation policy only) shows that adaptation policy is expected or framed to be reactive instead of proactive. Even where climate impacts seem less obvious in the forest sector, immediate and direct impacts of climate variability and change on other related sectors, such as agriculture, energy, and water, means that forests become the safety nets that local populations fall back on (Nkem et al., 2010). This inevitably leads to the vulnerability of the forest ecosystem and the dependent societies, livelihoods and economies.

Additionally, under the 'precautionary principle' – even where a degree of uncertainty still exists about the cause and effect of a particular environmental problem, discretionary actions are expected to be taken. In a scenario where the mitigation only discourse institutionalizes into a policy design, adaptation policy might become either non-existent or a co-benefit of mitigation policy. In addition, where a mitigation strategy could potentially offer adaptation as a co-benefit, like biodiversity conservation and poverty reduction, it is still uncertain whether the 'currency' of any mitigation project, which is carbon, can completely capture the adaptation needs of the multiple rural livelihoods of the Congo Basin countries. The role of the government in this discourse also merits further discussion. First, there are differences in the frames articulated across the Ministries in different countries, which could be a result of their level of knowledge and involvement in the issue. Second, the government's focus on this discourse does not infer an outright rejection of adaptation policy but tends to focus on the more developed of the two, and perhaps, the more lucrative one. In this case, REDD+ is considered the more developed and lucrative policy due to the magnitude of investment flows available for the governments. Third, the government is probably aware of its limited capacity in designing adaptation policies for changes that will occur in the middle to long term at the expense of short term challenges of development.

For the separatist discourse on adaptation and mitigation, the mismatch in scale which is considered as critical to separating adaptation and mitigation policies offers some insights for policy design. Some authors have argued that adaptation is very much local in nature, and that, national governments and international organizations have little to do with adaptation (Tol, 2005). If this would apply for the Congo Basin forests, it would mean that adaptation should be left for individuals and households alone to respond to climate stress, and that adaptation in any form would not need any political or institutional framework to support the collective adaptive capacity of the populace to climate impacts. In the same vein, to present mitigation as a national 'project' requiring only national and global actors would mean that households and communities have seemingly little or nothing to contribute to mitigation. In our opinion, this negates the fact that (members of) local communities are more likely to be the ones to make land use decisions for REDD+ implementation. For instance, REDD+ strategies will likely target the drivers of deforestation and degradation

in its design and implementation – one such driver in the case of the Congo Basin is shifting cultivations practiced by many rural communities. It is thus difficult to imagine a REDD+ strategy that does not involve the participation of local communities or an adaptation strategy that needs no government role. Moreover, REDD+ policy as it is currently being developed already includes interventions that explicitly target local communities. Therefore, the framing of mismatch in scale used in the separatist discourse, in reality offers no advantage to either adaptation or mitigation.

The three emerging discourses have shown that adaptation and mitigation in the Congo Basin forests are facing two competing realities: trade-off or synergy. These competing realities are identified through many of the frames that have been presented in the earlier sections, which include: cost, benefits, processes, actors, capacity, scale of implementation and target outcomes. Scholars and policy makers are also polarized between a possible win-win synergetic relationship between adaptation and mitigation, and a winner-loser relationship leading to trade-offs. The challenge for policy design however is how to maximize the potential benefits of the synergetic relationship as well to negotiate the trade-offs that are necessary in certain cases. The trade-off vs. synergy competing reality could in a way legitimize the separated and integrated discourses on adaptation and mitigation. That is, where synergies are possible, adaptation and mitigation strategies could be integrated, and where trade-offs are inevitable, they could be separated.

Especially the question of costs, effectiveness and their associated interpretations by the coalitions merits further discussion. The agents of both separatist and integrated discourses used different arguments to support their positions in designing adaptation and mitigation policies in the Congo Basin. Reducing transaction costs involved in executing adaptation and mitigation actions is on the one hand labeled as cost-effectiveness. On the other hand, in order to achieve effectiveness, there is need to have different coordinating mechanisms, define priorities differently and take advantage of the different financial instruments available for each policy.

The varying definitions and interpretations of effectiveness are in part understandable in climate policy because of the challenge involved in

assessing causality (Levin et al., 2008). More broadly, while the idea of cost-effectiveness is valid for a policy system, it is important how 'cost' is defined. Hallegatte (2009) reiterates that although adaptation has an attached cost, it differs from sector to sector and region to region and changes over time. For us, where a cost exists for adaptation, it might be that such cost is expected to be borne by mitigation in a typical integrated system, and a combination of both produces the desired effectiveness. For instance, potential income from REDD+ might be used to finance adaptation, depending on how REDD+ policy is designed. What remains somehow uncertain is whether effectiveness would in real life mean the same for both adaptation and mitigation. For REDD+, it is likely about reducing emissions from forestland conversions, and possibly poverty reduction and biodiversity conservation. For adaptation, it might be about how local adaptive capacity is enhanced. But given that adaptation is a process and dynamic, effectiveness of a policy response to climate variability in the short run might not necessarily be compatible with response to new climatic regimes in the long run. That is, effectiveness of present coping strategies might not be adequate to meet future risks. In any case, any future policy on forests and climate change in the Congo Basin must be clear about what effectiveness entails.

There is increasing recognition that as policy evolves, new windows of opportunity may also emerge which allow for designing integrated options for long-term policy on climate change mitigation and adaptation (Martens et al., 2009). It is necessary to explore if synergy is possible in planning and implementation of adaptation and mitigation projects to derive maximum benefits to the global environment as well as local communities or economies. Thus, the focus is whether adaptation strategies can be incorporated in mitigation projects in the forest sector and vice versa (Ravindranath, 2007). Emission reduction payments for REDD+ can for example potentially help to diversify livelihoods – an adaptation strategy in the face of extreme climatic events. Also, the protection of forests through REDD+ may provide a natural insurance in that forests have been shown to be crucial safety nets, with households turning to forests for sustenance and income in the face of shocks (Campbell, 2009).

Mitigation, being an action targeted at the longer term, attaches value to the interests of future generations and to some extent can be considered an altruistic response by society. Conversely, the impacts of climate change are felt more immediately by society, and as such adaptation is typically viewed as everyday 'self-interest' (McEnvoy et al., 2006; Martens et al., 2009). Schelling (1995) and Tol (2005) have argued that the current GHG emission abatement would primarily benefit the grand-children and great grandchildren of the people living in currently less developed countries. For people in such countries, one would imagine that the concerns of the present generation are as important, if not more important than those of the future generations.

Somehow, though less obvious, the discourses on adaptation and mitigation in the Congo Basin are heralding a new frontier of balancing two generational equities. For some actors, it is a question of which generation's need is more pressing; for others it is about how both needs should be addressed in the present term. In our opinion, the adaptation-mitigation debate is arguably a sustainable development debate and, as such, it also faces the dilemma of defining, prioritizing, and operationalizing the essentials.

By critically examining these frames and discourses on the lens of a future climate policy in the Congo Basin forest sector, it is obvious that the key challenge is how to combine the *priority* for adaptation with the *opportunity* from mitigation. For some, the dilemma is which comes first or more important: priority (adaptation) or opportunity (mitigation). In addition, the challenge seems to be around how to navigate between two compelling realities: institutional coordination mechanisms that might place a demand on the policy/decision makers to keep adaptation and mitigation policies separated, and the potential benefits-maximization incentives in an integrated framework. In our opinion, dealing with this might involve Congo Basin countries to consider designing an overarching environmental road-map or policy strategy from which policy approaches for implementation of REDD+, adaptation, biodiversity conservation, poverty reduction strategies are drawn.

2.6 Conclusion

The analysis of discourses on Congo Basin forest and climate change shows how different actors and coalitions use competing frames and their devices (patterns of shared meanings, ideas and interpretations) to present adaptation and mitigation. On the whole, the mitigation agenda is found to be stronger than adaptation, largely due to the ideas and interests of the government and other actors. Mitigation, especially REDD+ has been labeled to possess a development agenda that could potentially deliver benefits such as poverty alleviation, economic development, biodiversity conservation and even adaptation to climate change. This interest in REDD+ stems from the potential finances the mechanism could generate for development agenda. The mitigation only discourse focuses on the potential of REDD+ to deliver adaptation needs of the region, with the emphasis that adaptation needs no policy intervention. The separated discourse suggests that it is in the interest of both adaptation and mitigation to be separated for implementation success, effectiveness and scale of operation. The integrated discourse presents an opportunity to maximize the benefits of adaptation and mitigation in the forest sector if both are integrated in a policy framework. From the diversity of actors around each discourse, the highlights of the research results in Figure 1.1 show that the debate is between whether adaptation and mitigation should be integrated or separated.

In the struggle of dominance, it is obvious that the different frames articulated by the actors are not devoid of their interests and positions. Saliently, elements of finances, power and control, knowledge, influence and justice underline these interests and positions. Thus, there is need to balance the multiple interests of the actors both in the short and long term, especially where policies are made following a deliberative process. For the rural poor, adaptation to external stress, whether climate driven or not, is an utmost priority; for the global community, the demand for adaptation should not slow down mitigation efforts. The Congo Basin policy community has the task to combine adaptation and mitigation in a manner in which the multiple interests of the actors and stakeholders are represented. Sequel to this, we believe that, whether separated from or combined with mitigation, adaptation policy in the forest sector should be anticipatory to potential future impacts and reactive to

current impacts of climate variability. In the same vein, mitigation policy should seek to address other issues and concerns that might impede its successful implementation to achieve set objectives. It is in this light that actors in the region might have to define priorities for mitigation in terms of solely reducing GHG emissions or also achieving multiple benefits such as poverty alleviation, biodiversity conservation and economic development.

Chapter 3

Vulnerability, Forest-related Sectors and Climate Change Adaptation: the case of Cameroon

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Abstract

In Cameroon and elsewhere in the Congo Basin, the majority of rural households and a large proportion of urban households depend on plant and animal products from the forests to meet their nutritional, energy, cultural and medicinal needs. This paper explores the likely impacts of climate-induced changes on the provisioning of forest ecosystem goods and services and its effect on the economic and social well-being of the society, including the national economy and the livelihoods of forest-dependent people. The analysis focuses on four identified vulnerable sectors – food (NTFPs), energy (fuelwood), health (medicinal plants) and water (freshwater) through a multi-stakeholder dialogue at national and regional levels. We use a vulnerability assessment framework by combining the elements of exposure, sensitivity and adaptive capacity to conceptualize vulnerability in these sectors. The identified sectors in relation to the forest ecosystem are discussed in view of providing an understanding of the sector's potential adaptive capacities for policy intervention. Our analysis presents the possible implications of the vulnerability of these sectors for planning local and national adaptation strategies. Local and national adaptive capacities to respond to climate impacts in the forest sectors includes: reducing poverty, enhancing food security, water availability, combating land degradation and reducing loss of biological diversity.

3.1 Introduction

The Congo Basin forest, which covers more than 200 million hectares, is the second largest most intact tropical forest region of the world after the Amazon (Mayaux et al. 2004; FAO 2005; Hoare 2007). The Congo Basin forest accounts for 60% of the total land area in 6 Central African countries; Cameroon, Central African Republic (CAR), Gabon, Equatorial Guinea, the Republic of Congo (Congo-Brazzaville) and the Democratic Republic of Congo (DRC) (Ndoye and Awono, 2005). Forests are important to indigenous communities in this basin whose livelihoods directly depend on forest resources: food, fuel, water, medicine and household incomes (Ndoye et al., 1998; Sassen and Jum, 2007). Forest foods contribute significantly to the diet of many rural and urban households (FAO 1998; Ndoye and Awono, 2005).

In Cameroon, like many other African countries, forest ecosystem services provide security portfolios for over 80% of the predominantly rural communities, and thus, highly crucial for poverty reduction and national development (FAO, 2007). The major occupations of rural populations are overwhelmingly farming, hunting, gathering of non-timber forest products (NTFPs) and animal husbandry (MINEFI, 2002). The contribution of the forestry sector to gross domestic product (GDP) is about 6-10% (CBFP, 2006) and the value of forest products (logs, sawnwood, plywood, veneers, parquets) run into millions of dollars annually. The Cameroonian forestry sector alone employs up to 13,000 people (MINEFI, 2006) and many more within the informal sector involved in domestic timber trade, charcoal, and even NTFPs.

Agriculture practiced in the humid forest zones of Cameroon contributes largely to the mainstay of a higher percentage of the population. During periods of crop failures especially in agricultural communities, forest foods are most extensively used to help meet dietary shortfalls (Shackleton et al 2007; Nkem et al., 2010). Firewood and charcoal provide fuel for the vast majority of people in the countries of the Congo Basin, and also provide an important source of income. For centuries, fuelwood has remained an affordable and reliable source of domestic energy for rural populations of the developing countries. Demand for fuelwood is heaviest in the small towns and rural areas, where there is less potential for fuelwood substitution (FAO 1998).

The forest provides medicines for the most majority of urban and rural people and these medicines are one of the most-valued forest products by local people. Women usually play an important role in this regard as it is usually them who administer first aid to their children. Pharmaceutical uses of NTFPs generate the most significant revenues. Extracts from the bark of the *Pausinystalia yohimbe* (popularly known in Cameroon as the African viagra), are consumed locally as a cure for many ailments and is sold in North America and Europe as an aphrodisiac and a stimulant in soft drinks. Similarly, the bark of *Prunus africana*, which grows widely in the same region and all the way down to East and Southern Africa, is used to extract a chemical cocktail used for the treatment of benign prostate hyperplasia in Europe and North America (Sunderland et al., 2002).

However, similar to other tropical forests the forest of Cameroon also faces threats from the multiple impacts of climate variability and change, which exacerbate the vulnerability of the functioning of the forest ecosystems. Despite the relative importance of the provisioning services of the forest, there are serious and dynamic problems being experienced in Cameroonian forest sector. Persistent problems include environmental degradation, inequity and poverty. But recent problems include: deforestation, unequal social access to resources and benefits, the degradation of environmental services, low productivity of land and labor and a weak policy and institutional framework for managing the forest (Ndoye and Awono, 2005).

Climate change presents a risk to the composition, health, and vitality of forest ecosystems (Locatelli et al., 2008). The vulnerability of the forest ecosystems is not just related to the direct and indirect impacts of climate variability and change. Given the complex interrelations that exist between natural and human systems, impacts on one system will affect the other systems, in the same light; the vulnerability of one system could potentially lead to vulnerability of other systems (Osman-Elasha, 2009). For instance, contextual weakness of rural livelihoods and factors of susceptibility that underpins people's daily lives, independent of climatic stress, which are often understood as components of social vulnerability (Tschakert, 2007) can lead to unsustainable local practices and systems of forest use and management, leading to the vulnerability of the forest ecosystems (natural systems). Like other ecosystems, the value of

the forests is often in its social capital and assets through the contribution of the forests to local livelihoods and development. The CoFCCA project within which this study was done is one of the first initiatives on adaptation that take into consideration sustainable forest management (Sonwa et al, 2009, 2011, 2012; Bele et al., 2011). While a certain degree of uncertainty still pervades the magnitude and frequency of climate impacts, we focus on vulnerability of the forest itself and its associated related sectors. Identifying vulnerable forest-related sectors (i.e. those with least capacity to cope with climate impacts) can act as an entry point for both understanding and addressing the processes that cause and exacerbate vulnerability (Brooks et al., 2005), hence, relevant adaptation strategies can be developed.

This paper on Cameroon is rooted on previous initiative during which forest related sector was prioritized for the entire Congo basin. The paper explores the likely impacts of climate-induced changes on the provisioning services of forest ecosystem goods and services; food (NTFPs), health (medicinal plants), energy (fuelwood) and water (freshwater), and the effects on the economic and social well-being of the society, including the national economy and the livelihoods of forest-dependent people as well as climate adaptation strategies. The activities of these sectors in relation to the vulnerability of forest ecosystem of Cameroon are discussed in view of providing an understanding of the sector's potential adaptive capacities for policy intervention. Understanding and assessing vulnerabilities to climate variability and change is necessary to inform policy makers and develop policies for reducing risks associated with climate change (Locatelli et al., 2008). It is believed that vulnerability assessments contribute to increasing the body of scientific knowledge about climate-sensitive socio-economic or ecological systems (for example, tropical forests), targeting policy to the most vulnerable places or sectors, and defining adaptation options (Fussel and Klein, 2006; Locatelli et al., 2008). The next section of this paper sets the theoretical framework guiding the research by presenting the centrality of vulnerability and its constituent elements of exposure, sensitivity and adaptive capacity. The study approach and the methodological account are presented in section 3 while section 4 investigates the current national legislations and policies surrounding the identified forest-prioritized sectors. A sectoral- and inter-sectoral analysis of the forest-based sectors is presented in section 5 and section 6 concludes.

3.2 Theoretical framework for the study

3.2.1 Vulnerability Analysis framework

The vulnerability of coupled human-environment system is one of the central elements of sustainability research and global environmental change science (Kasperson and Kasperson, 2001). The IPCC (2001) defines 'vulnerability' as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Fussel and Klein, 2006; Williamson et al., 2012) (see Figure 3-1).

Thus V = f (E, S, AC)[4]..... (1)

Where the potential impacts of climate change on tropical forests are a function of exposure and sensitivity (Johnston and Williamson, 2007), vulnerability becomes a function of potential impacts and adaptive capacity, thus making equation 1 to be rewritten as:

V = *f* (PI, AC)[5]..... (2)

In the context of tropical forests, Table 3-1 presents examples of exposure and sensitivity, which aggregately result into the potential impacts that the forest is vulnerable to. In general, the aggregate of these impacts depends on ecosystem-specific factors and their interactions. Conceptually, changes in one or more dimensions of climate (e.g. temperature and precipitation regimes) affect ecosystem processes (e.g. photosynthesis, disturbance). Alteration of ecosystem processes can lead to impacts on biodiversity and ecosystem services (Ayres, et al., 2009).

4 Where: V = Vulnerability (as already defined); E = The nature and degree to which a system is exposed to significant climatic variations; S = Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate-related *stimuli;* AC = The ability of a system to adjust to *climate change* (including *climate variability* and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

5 Where: PI = Potential Impacts

In analyzing vulnerability the primary aim is to identify people and places that are most susceptible to harm and this is expected to lead to the identification of vulnerability reducing actions vis-à-vis adaptation strategies (Luers, 2005). Vulnerability can be conceptualized in terms of its constituent components which include; sensitivity to or exposure of a system (people or place) to shocks, stresses or disturbances, the state of the system relative to a threshold of damage, and the system's ability to adapt to changing conditions (Kelly and Adger, 2000; Luers 2005; Adger, 2006), as Figure 3.1 depicts the exposure, sensitivity and adaptive capacity components of the vulnerability assessment framework provide a guide to achieving the aims of vulnerability assessment.

Table 3-1: Components of the exposure and sensitivity of most forest ecosystems

Exposure	Sensitivity
Climate change and variability	Changes in disturbance regimes
Increase in temperature	e.g. fires, pests and diseases
Changes in precipitation	Changes in tree level processes
Changes in seasonal pattern	e.g. productivity
Hurricanes and Storms	Changes in species distribution
Increase in CO2 levels	Changes in site conditions
Sea level rise	e.g. soil condition
Land use change	Changes in stand structure
Landscape fragmentation	e.g. density, height
Resource exploitation	
Other drivers	

Source: Locatelli et al., 2008

In some scholarships, vulnerability is often seen as a starting point (Kelly and Adger, 2000; Burton et al., 2002, Adger, 2006); which then calls for analysis or assessments of the vulnerability of a given socio-ecological system before appropriate adaptation strategies, plans or programmes are prescribed. Given that addressing climate change could mean enhancing the ability to cope with present day climate variability and long-term climate uncertainty, there is need to first understand the drivers that first underlie vulnerability (O'Brien et al., 2004). Conversely, vulnerability is also often described by the internal state of the system, and not necessarily by the characteristics of the threats (Brooks et al., 2005). It is mostly from this perspective that adaptive capacity presents itself as an essential aspect of climate change adaptation.

The IPCC (2001) defines adaptive capacity as "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate

potential damages, to take advantage of opportunities, or to cope with the consequences." In this light adaptive capacity can be seen as a key element of resilience. Gunderson and Holling (2002) defined resilience as the capacity of a system to absorb sudden changes and disturbances while maintaining its function and control. Adaptive capacity varies significantly from system to system, *sector* to *sector*, and region to region (IPCC, 2007). Therefore the determinants of adaptive capacity include the existence of sufficient economic resources, technology, information and skills (including human capital), infrastructure, equity and developed institutions such as government bodies (Hill et al., 2010).

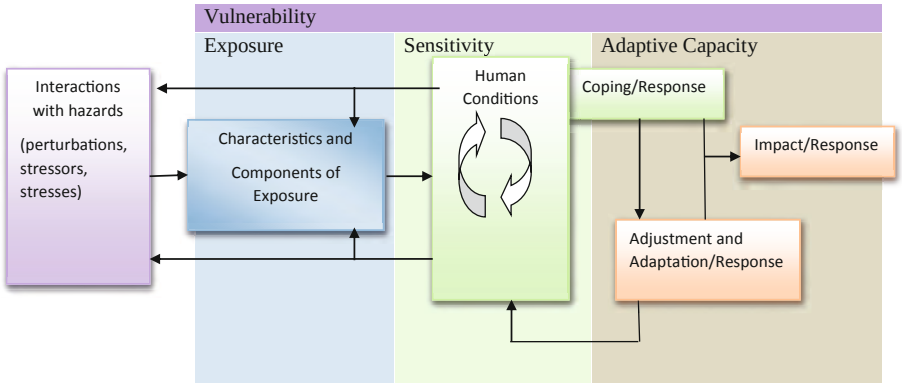

Figure 3-1: Vulnerability framework for a socio-ecological system (adapted from Turner et al., 2003)

While adaptation to change and vulnerability over short time periods falls within a 'coping range', there are limits to resilience even for the most robust of systems (Yohe and Tol, 2002). In that case, judging adaptive capacity depends on being able to define the coping range and understanding how a 'coping strategy may be expanded by adopting new or modified adaptations' (Yohe and Tol, 2002, p.27). And because adaptation does not occur instantaneously, the relationship between adaptive capacity and vulnerability depends crucially on the timescales and hazards with which we are concerned. The vulnerability, or potential vulnerability, of a system to climate change that is associated with anticipated hazards in the medium-to-long-term will depend on that system's ability to adapt appropriately in anticipation of those hazards (Brooks et al., 2005).

Sensitivity is a characteristic of a system and represents the 'dose-response' relationships between the exposure and the impacts (Locatelli et al., 2008). Meanwhile, exposure has been conceptualized as the contact between a system, or system component, and a perturbation or stress. It is a function of both the magnitude and scope of the perturbation, and of the system with which it comes into contact (Kasperson and Kasperson 2001). These are important vulnerability elements that define the resilience and adaptive capacity of a forest ecosystem.

There exist a number of conceptual frameworks that have been used to incorporate these various components of vulnerability to juxtapose the different processes that brings about vulnerability. The pressure-and-release framework (PAR) looks at vulnerability as a system's sensitivity, ability to recover from stresses and its adaptive capacity (Blaikie et al, 1994). Social space of vulnerability is a conceptual framework that highlights the processes of human ecology, entitlements and political economy as those that govern the risk exposure, coping capacity and recovery potential of a system (Bohle et al, 1994). To accommodate the feedbacks within the human-environmental system that defines sensitivity, exposure and resilience of a vulnerable system, the SUST framework was developed as a guide (Turner et al, 2003). The PAR and social space frameworks are useful in characterizing human vulnerability but provide simplistic indices that address single stresses and perturbations on an exposed human-environmental system. Putting in perspective in the context of this research, we follow the position of Smit and Wandel (2006) that vulnerability, its elements of exposure, sensitivity and adaptive capacity, and their determinants are dynamic (they vary over time), they vary by type, they vary from stimulus to stimulus, and they are place- and system-specific.

The vulnerability framework presented serves as a template suitable for an inclusive, reduced-form of analysis but also accommodates the larger systemic character of the stresses and perturbations. The four cardinal points taken into consideration in this study to analyze vulnerability of forest-related sectors of the forest of Cameroon are (Fussel, 2007); i) System of analysis vis-à-vis the coupled human–environment, ii) Attribute of concern which explains the valued attribute(s) of the vulnerable system that is/are threatened by its exposure to a climate change and climate variability, iii) Hazard, which in this

study is climate change and climate variability and, iv) Temporal reference, this is a point in time or time period of interest. From the IPCC (2007), a number of forest-related sectors are considered vulnerable to multiple impacts of climate variability and change (e.g. food, energy, ecosystems, freshwater resources, health, etc). However, the vulnerability of these sectors largely depends on the vulnerability of the ecosystems they rely on. Recognizing that most vulnerability assessments use a sectoral approach, which often overlooks the links between sectors and with ecosystems, we follow the assertion of Locatelli et al. (2008) that, if ecosystem services are relevant for a given sector, the vulnerability assessment should deal with the vulnerabilities of both natural and human systems at the same time and consider the links between them.

3.2.2 Conceptualizing vulnerability framework for Cameroon's forests to climate impacts

Agriculture and forestry sectors provide employment for a large percentage of Cameroonians, with about 80% of the population living in rural areas, employed in these sectors (Molua and Lambi, 2006). Previous studies revealed that climatic impacts in Cameroon will be more severe and beyond the Central African sub-region. Cases of low rainfall was recorded in 1997 around northern Cameroon, which affected crop yields, livestock death, hunger and eventual intervention of the World Food Programme in 1998 (Molua and Lambi, 2006). In this study, analysis of vulnerability is done by identifying and discussing which characteristics of the forests of Cameroon are vulnerable to stresses and perturbations of climate change and climate variability. Exposure of the forest to climatic changes and variations will bring many and complex effects for forest. Rising atmospheric CO_2 concentration, higher temperatures, changes in precipitation, flooding, and drought duration and frequency will have significant effects on tree growth. High amount of precipitation; 5000mm exceeding the expected maximum of 2,700mm in extreme seasonal variability of rainfall has been recorded in Southwestern Cameroon (Molua and Lambi, 2006). These climatic changes will also have associated consequences for biotic (frequency and consequences of pests and diseases outbreaks) and abiotic (changes in fire occurrence, changes in wind storm frequency and intensity) disturbances with strong implication for forest ecosystems. The impact however, will remain uncertain, because of the uncertainties in the climate change projections and

also because of incomplete understanding of tree responses to the changing climatic variables.

The impact of climate change on the forest ecosystems of Cameroon is significant. The function and structure of these ecosystems is partly determined by the surrounding climatic conditions. Rainfall patterns and mean temperature are responsible for tropical forest ecosystems distribution (Mahli and Wright 2004). Cameroon as one of the Congo Basin countries is dependent on the forest for a large part of its economy from industrial timber harvesting. Furthermore, the dependence of the local communities on the forest for subsistence and commercial agriculture as well as the harvesting of non-timber forest products (NTFPs) makes developing adaptation strategies to climatic change important. The future of the Cameroonian forests is at risk in a warmer, more populous 21st-century world. Tropical forests are vulnerable to a warmer, drier climate, which may exacerbate global warming through a positive feedback that decreases evaporative cooling, releases CO_2, and initiates forest dieback (Dale et al., 2000). Changes in climate are likely to affect tropical forest ecosystems with predicted impacts including variations in the availability of wood, reduction of water availability, increased pressure on agricultural land, biodiversity loss and socioeconomic stresses. The forests also influence climate change through their destruction. Forests can be serious sources of greenhouse gases but through sustainable management they can be important sinks of the same gases. They act as important buffers that cushion the impact of ongoing climate change (Locatelli et al., 2008).

The impacts of climate change are likely to affect all forest landscapes in Cameroon (Brown et al., 2010). Indeed, the predicted change in climate variables will place severe pressure on forests ability to adapt to these and to survive. With rising temperatures, changes in water availability and expected double levels of carbon dioxide, it is expected that forests will change at two levels: physiology and metabolism; and ecosystem functioning (Clark, 2007). The implications of these potential climate change impacts on the forests of Cameroon will affect the provision and quality of goods and services essential for livelihood and also for national development. It is anticipated that climate change will also increase the temperature of freshwater bodies, which could speed up eutrophication (oxygen deficiency) processes (IPCC, 2007b). The

impact on aquatic habitats would be substantial, leading to reduction in fish stocks and possibly driving some species to extinction. This will be compounded by increased river sediments fluxes due to higher levels of soil erosion as a consequence of deforestation and intense rainfall. According to IPCC Fourth Assessment Report (2007a), some of the projected potential climate change impacts on the carbon sink in mature forests may be substantially threatened by enhancing or changing the regime of disturbances in forests such as fire, pests, drought, and heat waves, affecting forestry productivity.

3.3 Study Approach

In 2008 the Center for International Forestry Research (CIFOR) initiated a research project on "Congo Basin Forest and Climate Change Adaptation" (CoFCCA). The project was piloted in three countries: Cameroon, Central Africa Republic and the Democratic Republic of Congo. The key objective of the CoFCCA project is to increase both public and policy-maker awareness of the contribution of forests to the development of livelihood adaptation strategies and to use forests goods and services in a way that does not jeopardize the resilience of the forests to future climate impacts. This would ensure the continuous provision of these goods and services, which contribute to adaptation, improving food security and reducing poverty. The project approach is based on a science–policy dialogue process, which follows the identification and engagement of multiple stakeholders in participatory actions at the onset, for setting adaptation priorities, assessing vulnerabilities, identifying adaptation options, and implementing adaptation (Nkem 2009). Stakeholders included representatives of international and sub-regional organizations (IGOs), national partners and organizations involved in environmental issues, government departments, United Nations Framework Convention on Climate Change (UNFCCC) national focal points, national research institutions, non-governmental organizations (NGOs), universities, community groups, independent experts, and resource persons from the respective countries of Cameroon, Central African Republic, and Democratic Republic of Congo. The stakeholder workshop identified priority research sectors which included at the regional level: food security, water, energy and health (Sonwa et al. 2012).

The study is based on the priority sectors identified in the regional workshop (Sonwa et al., 2012) and uses mainly information from secondary data; reports, reviews and articles on project findings. The data is analyzed qualitatively within the constituent components of the framework for vulnerability assessment of forest-related sectors (food, energy, health and water) to climate change and variability, identified by the project as priority for Cameroon. The choice of Cameroon in this study stern from the fact that, there exists a wide range of agro-ecological conditions in the country and the country also falls between two distinct climatic conditions in the north and south. Climatic variability implies high risks in agriculture and forestry, possible deterioration of sectoral growth and hindrance to overall economic progress in Cameroon. A large of the population are rural and they depend on agriculture and NTFPs, which raises the question of what the consequences will be for the local communities under changing global climate and what adaptation strategies can be explored? This approach is mainly to provide a better understanding of the sectors' vulnerabilities as well as their potential adaptive capacities for policy intervention. A strong point of using secondary data is the availability of pool of information to compare across other research works done in the forests of Congo Basin and Cameroon with a clear understanding of the problem. A limitation of this study is that, the use of secondary data might not reflect the exact dynamics of stresses and perturbations from climate change and variability that happens on a wide scale in the entire Congo Basin, livelihood opportunities and vulnerability of the different forest-related sectors as assumed in this study. Political and economic factors contributing to climate change vulnerability are not.

3.4 National Legislations and Policies surrounding the Forest Sector in Cameroon

Cameroon overhauled its legislative framework as a means of increasing the efficiency of industry, ensuring sustainable natural resource management and promoting community participation in forest management (Essama-Nsah and Gockowski. 2000). The State remains the main body in charge of forest management in Cameroon as it defines the general policy of the forestry sector and laws, and granting logging rights (Cerruti et al., 2008). The policy

and regulations affecting the exploitation of forest resources (especially NTFPs) in Cameroon are primarily influenced by the National Forestry Law. Law No. 94/01 of 20 January 1994 specifies forestry, wildlife and fisheries regulations. In addition, the National Forestry Action Plan developed in 1996 and the Emergency Action Plan put in place in 1999 as an implementation mechanism of the Central African heads of state summit, all have provisions for the sustainable management of the forest resources, as well recognize their roles in local livelihoods and national development (Ndibi and Kay, 1997). These laws, combined with series of implementing measures developed since 1996, define access to forest resources, including customary rights for traditional and aboriginal users, forest areas, the system of title allocation, sustainable logging practices, protection and management of flora and wildlife, etc. Cerruti and others (2008) further emphasized that the purpose of restructuring the legal framework was to convert the forest sector into a crucial sector for poverty reduction and development of Cameroonian economy.

However, enforcing the established policies and legislations continue to face daunting challenges due to a myriad of factors. One notable challenge facing the forest sector is how to account for or control activities within the informal sector. For instance, people who harvest and trade in NTFPs are generally from the "informal sector" that is, they are essentially self-employed, not recognized in official statistics, have little access to capital, and earn money from labor-intensive enterprises. The domestic trade in NTFPs starting from the harvest to the final consumption is thus part of the "hidden" economy. Consequently, "informal" taxation practices abound, by both forestry officials and customs officers, particularly given the extent of the cross-border trade (Sunderland et al., 2002). The informal sector in Cameroon also exist within the timber production system (i.e. production without logging title or with unrecorded logging titles in official statistics by national artisanal loggers, amount to about one million cubic metres).

Unfortunately, despite the importance in terms of volume produced and the impact of this sector on employment and local standards of living, the domestic timber market is not yet formally regulated (Cerruti et al., 2008). A possible way of dealing with this challenge of "hidden economy" is consider the formalization and development of the sector which could potentially lead

to greater conservation of the forests, as people utilize various programs and legislation to secure rights to the forests and their resources, and then to exploit the forest resource more rationally.

It is evident that the NTFPs sector is a significant income generating activity for communities in Cameroon and elsewhere in the Congo Basin. According to Sunderland et al (2002), capturing the benefits of this trade on a more formal basis would significantly change the manner in which these resources are perceived and managed; making sure that NTFPs harvest and trade contributes to household incomes, as well as to forest conservation, is of particular attention to the sector. Also, Sunderland et al (2002) are of the opinion that, a fundamental institutional change is needed in Cameroon, to ensure that NTFPs can enter the formal trading, revenue, and taxation systems that apply to the timber resource. Such change must occur at both the community level, where communities receive a fair price for access to the resource, and the level of the Ministry of Forestry and Wildlife (MINFOF).

A major setback to the realization of formal revenues from the trade and sale of major NTFPs resources is inadequate provision for NTFPs in existing forestry legislation. Apart from permits issued by MINFOF for the transport and evacuation of *eru* (*Gnetum spp*), most products, despite their market value, are not included in the current permit system, which focuses primarily on medicinal plants. Recently, a directorate for NTFPs has been created within MINFOF which will be responsible for formalizing revenue collection for the NTFPs sector. To date, no policy changes have been proposed.

3.5 Sectoral and Inter-sectoral Analysis

3.5.1 Vulnerability Analysis of the Prioritized Forest-based Sectors

The ecological systems provide large pool of goods and services including food materials, fuel/energy sources and freshwater which form the livelihoods of the rural population that directly and indirectly depend on them for food security and income generation, on one hand. On the other hand, these goods and services can act as safety nets, especially their capacity to supplement food

supplies during periods of failed agricultural yields, conflict or scarce resources. This means like in most of other tropical environments, the forest- related social systems of Cameroon is strongly tied with the perpetual provisioning and functioning of the region's ecological system. Conversely, where the ecological system is exposed and sensitive to climate impacts at different scales, resulting in its vulnerability, the vulnerability of the social system becomes imminent. Thus, establishing that the vulnerability of one system is linked to the vulnerability of the other system coupled within a given resource domain. Of great importance is the need to identify the vulnerability of prioritized forest-based sectors for adaptation to climate change, this provides synergy between national development goals and national adaptation needs (Sonwa et al., 2012). In Cameroon, the outcome of the prioritized sectors, which are food, energy and water arguably, emphasizes the livelihood challenges and the recognized vulnerability of livelihood system in the region (Nkem et al., 2010).

Food and Health Sector

The implication of changing patterns of rainfall and temperature (the two most important climate variables) on the forest sector in Cameroon is twofold: Firstly, resultant significant reduction in agricultural yields that contribute to the food security of the rural populations means that forest resources that can offer similar food security would be in high demand. Exposure to food insecurity and loss of livelihoods are imminent resultant effects of climate variability. Sonwa et al. (2009) establishes the fact that, predicted alterations in forest landscape and biodiversity due to climate change poses a possibility of reducing access to forest products, consumed as foods. The sensitivity and resilience of the Cameroonian forest in providing food products is nested in the domains of climate variability impacts and socio-cultural interactions of the people. The growing demands for timber products, persistence of detrimental forest logging practices, result in liquidation of timber stocks and degradation of forests (Ndoye, and Tieguhong, 2004). This wanes the resilience of the forest ecosystem towards climate variability factors, with a direct impact on food security of the local population. Ultimately it places an extractive burden on the forest ecosystems for their goods and services. Additionally, many of the forest and land use systems in the country are considered unsustainable, for example, slash and burn system, shifting cultivations, etc. Due to increasing

demands for food and food products predicated on the migration of people from northern to southern Cameroon (Molua and Lambi, 2006), anthropogenic interaction with the forest is on the increase. Poverty, economic crises and the changing value of CFA franc, constrain the people further to seek alternatives to food products from the forest, originally available as non-forest products. When the prices of beer and whisky soared in Cameroon, consumers sought palm wine and local whisky made from juice tapped from palm trees and fermented with other forest products (Ndoye and Tieguhong, 2002).

In an attempt to seek alternatives to food products from the forests coupled with increasing pressure on the forest for conversion to agricultural lands, its adaptive capacity to climate variability is influenced negatively. The ability of the forest ecosystem to accommodate climate variability diminishes, which makes the forest to be unable to cope with climate variations of small magnitude. These land use systems, increasing logging activities are largely responsible for loss of forest cover (deforestation) and quality (degradation) which aggregately makes the forest ecosystem more vulnerable to climate impacts. A combination of climate variability factors and socio-cultural interactions with the forest ecosystem of Cameroon, will likely distort its ability to provide food and food products for the poor rural population, thereby threatening their food security.

For many indigenous people, especially the Bantu and Pygmy groups in Cameroon, the common medicines they regularly use as first aid are found in the village periphery or in bush fallow rather than in the forest. For some particular ailment, or at the request of some healers, people may travel great distances into the forest to find specific medicinal plants. In Cameroon, there is also a strong urban market for some forest medicines as rural people migrating to urban centers want the traditional treatments they are accustomed to. A study around Cameroon's Mbalmayo forest reserve found that over 70% of the population depended on herbal medicines, and that these were 50-90% cheaper than pharmaceutical equivalents (Ndoye & Tieghuhong 2004, cited Ndoye et al 1999). On the other hand IPCC (2007) also projects increased malaria outbreaks and other diseases due to climate change in sub-Saharan Africa. Inevitably, medicinal plants which are collected locally to cure diseases by the local communities in the forests would inevitably be on the high demand.

The long term effect of this high demand on the forest could be unsustainable and overharvesting of the valued resources, and could undo many past conservation and sustainable management efforts. It is also worth imagining that different forest laws that people have always respected would be threatened. For example, in their bid to get cure to prevailing diseases and epidemics, local people can be expected to harvest medicinal plants in protected areas, irrespective of the law forbidding them to do so. This will be exacerbated by increased migration from the northern to southern part of the country, where the desert is encroaching and impacts of climate change already manifesting on a large scale (Brown et al. 2010). Thus, the vulnerability of the rural population to extreme events particularly those caused by climate change will perpetually produce a new relationship between the local communities and the Cameroonian forest ecosystems.

Energy Sector

Nutrition of forest-dependent rural populations often goes beyond the production, commercialization and access to food materials at a given time but also the energy sources required for processing such raw food materials for consumption. In Cameroon, fuelwood is the source of energy use of many rural areas for cooking and heating. Deadwoods from the forest are collected on constant basis by households as fuelwood. With the current population at about 20 million in Cameroon, with annual growth rate and a rural population of 52 percent (UN, 2011), demand for energy sources is on the increase. Of similar concern was the significant increased demand for fuelwood as incomes plunged with the economic crisis and following the doubling in price of traded fuels after the 1994 devaluation. A survey of fuelwood consumption among urban households in the Centre and South Provinces of Cameroon found 48 percent and 71 percent of households, respectively, citing it as their principal cooking fuel, compared to 30 percent and 55 percent in 1987 (Essama-Nsah and Gockowski, 2000). A report by the Cameroon's Ministry of Environment and Forestry (MINEF) in 1996 estimated that 80 percent of Cameroon's populations rely on fuel wood, using about 12million m^3 annually (Nkamleu et al 2002). The provision of fuel wood is also a valuable source of income for many. For instance, one study of a village near Yaoundé found that 80% of the community's income came from the sale of firewood, (Tchatat et al 2003).

One possible consequence could be that where there is little or no more deadwoods to collect from the forests, samplings, young and matured trees could be harvested and dried for fuelwood. With wood harvesting or extraction rate being faster than regeneration and growth rates, the ecological functioning of the forest would be distorted on one hand, and deforestation and degradation would increase on the other. Contextualizing the exposure of this sector to climate change, temperature rise exposes the fuel wood to possibilities of forest fires. Commercialization of this sector to meet the increasing demands for fuel wood drives deforestation (Sonwa et al., 2009). According to Kalame, (2011), charcoal understandably represents the largest removal of carbon from the forest system. Its production season lasts for almost the entire year. This is closely followed by palm wine. Charcoal and palm wine, with their higher total income returns, involve destructive collection methods that adversely affect forest structure and integrity. The collection of *Gnetum spp*. represents defoliation, which, if done sustainably, will allow for regeneration. Unarguably, this contributes to dousing the buffer capacity of the forest ecosystem, raising its sensitivity level and decreasing its resilience to climate variability. With large forest-dependent populations, expected decrease in rainfall, and increased severity and frequency of drought in the Cameroonian forest, current exploitation pressures on forest and expansion of agricultural into forest lands will be exacerbated. Vulnerability of the forest will manifest in form of more stresses that will be imposed on the forest and its ability to provide fuel wood for domestic energy use. The vulnerability of forest resources will also increase with the vulnerability of hydropower energy, which is one of the modern energy sources in Cameroon. This hydropower dam depends mainly on rainfall and was a common urban household energy source. However, a drop in rainfall has affected the capacity of the dam.

Water Sector

Naturally, the forest of Cameroon has rich and abundant surface water resources which are being depleted by upstream diversions, droughts and seasonal variation in river flows, due to climate change, (Sonwa et al., 2009). A study by Sighomnou (2004) comparing 1971- 2000 period with 1941-1970 reveals a generalized decrease in rainfall (10-20%) and flow rates (15-35%); a decrease of runoff volume of 24% in the forest zone and more than double for the river in

the northern part of the country. The Cameroonian humid forest is rootd in the Congo River (Brummett et al., 2009) and in Cameroon its main tributary in the Sanha river. Study in the hmid forest watershed in Cameroon reveals a decrease in rainfall from 1700mm around 1975 to 1400mm around 2001 and even the rain is becoming more acid (Mfopou Mewouo et al., 2012). Changing rainfall patterns, creating hotter, longer and more arid dry seasons coupled with intense down pours during raining season creates a big exposure problem for availability of water resources both in terms of quantity and quality. Climate variability brings about alterations in the physico-chemical characteristics of the freshwater ecosystem, raising its sensitivity level and decreasing ability to support viable aquatic lives. Increased river sediments fluxes due to higher levels of soil erosion as a consequence of deforestation and intense rainfall are expected (Sonwa et al., 2009). At the watershed level, vegetation structure always impacts on the quality and quantity of water availability (FAO 2006).

Deforestation largely impairs the adaptive capacity of the forest ecosystem to climate variability, towards maintaining good water regimes. Forest structure plays a key role in the erosion process that affects dams and also influences locally rainfall at the watershed level, (Sonwa et al., 2011). Vulnerability of the water sector hinges on uncontrolled anthropogenic interactions with the forest of Cameroon, which opens the avenues for climate variability factors to impact on the forest ecosystem and its services.

Research

Development and support of research activities related to climate change and adaptation is of absolute importance in Cameroon. The main barrier to research activities is the issue of funding; therefore exploration of additional funding opportunities for adaptation is necessary. Recognition of traditional knowledge, customs, practices and skills of indigenous/local people in forest resource management for better conservation is of importance. There is need for the evaluation of the dynamics of forest ecosystem fragmentation by studying the impacts of invading exotic species such as *Chromolaena odorata* and other bio-indicators of climate change. The collection, treatment and delivery of data and other meteorological, hydrologic and climatic information needs to be reinforced and early warning systems need to be set up.

Research was already facing some difficulties in Cameroon and with the climate change; there is a need to rethink a way to approach problems. On the four sectors that were found as priority sectors, food (mainly agriculture) had in the past received more attention and investment in research compared to others. Cameroon has a research center, IRAD (Institute of Agricultural Research for Development) which conducts research across all the agro-ecological areas of the country. Other research activities related to food production and security have been conducted in universities. Hydrological research is carried by the "Geological and Mining Research-Hydrological Research Centre" which also covers the entire national territory. The same institution is also responsible for research on energy. The health research is mainly undertaken within university, mainly the University of Yaoundé 1. The researches on these sectors have also integrated local/traditional knowledge. Some of the research activities were already considering climatic factors such as temperature and rainfall. Few of these researches focused on the way climate change/variation will affect products/services that are linked with the prioritized sectors. The research sector in Cameroon was already going through financial difficulties and operational budget had been difficult to mobilize. Sourcing for funding mainly abroad is the main way to keep the research up. With climate change becoming important "window of funding opportunity", the research centers had the challenge of taking advantages of the small previous research on climatic factors that exist already and mobilize their human resources to pro-actively tackle the climate change which is a new constraint on the development. Beside discipline closely related to the prioritized sectors, climatic data collection needs to occupy a good place in data collection in the entire agro-ecological zone of the country. Such information will be useful in understanding past climate modification, but can also help in modeling the future climate. Such past climate modification and future condition need to have applications in each of the sector prioritized. For example, this can help to understand past variation of crop/forest species phenology and knowing what will be the climate in the future can help to predict the response of this crop/forest species. For the moment a small research team doing modeling exist at the Department of Physic of the University of Yaoundé 1 and do not necessarily collaborate with research institutions in the above prioritized sectors. The research sector thus needs to be pro-active in proving orientations for adaptation to climate change in forest landscape. As climate change response needs to be holistic, the research also needs to be

multidisciplinary and deserves more coordination than before in developing sustainable responses.

3.5.2 Inter-Sectorial Analysis

There are many human-induced pressures on forest ecosystems other than climate change. These include land use change, landscape fragmentation, degradation of habitats, and over-extraction of resources, pollution, nitrogen deposition and invasive species (see Locatelli et al., 2008). These activities are highly noticeable already in Cameroon. Such pressures threaten not just ecosystem goods but also the services that, one hand, sustain these goods (e.g. water) and on another hand, sustain the collective wellbeing of the human population. In the case of freshwater, forest ecosystem services such as hydrological regulation and water quality will be affected through the impact of these human-induced pressures, increase in population of this region due to north-south migration will amplify the effects. The resulting consequence could be severe for the forests' capacity to provide adequate water resources for agriculture, public health, etc. Water and water management had implication on other sectors such as health, agriculture and energy. This is a reality in forest landscape. Here the energy partially depends on the hydrological dams built in the southern part of the country. More dams are currently planned to increase the energy capacity of the country. Water and sanitation facilities availability have impact on health situation of the country. Some illnesses related to water management are still endemic and susceptible to increase with the changing of climate condition. Irrigation system to control food production only exists sparely around peri-urban areas of the humid forest zone. Another way by which farmers manage water availability includes lowland exploitation mainly during drying season. Irrigation and cropping in wetland show how water management can be useful in reducing vulnerability of farmer to climate change/variability. Rainfall variability and extremes of weather conditions already being experienced in Cameroon (Molua and Lambi, 2006) will likely cause a decrease in freshwater resources, which presents a challenge for the food sector (both production and consumption) and the health sector (due to incidence of water borne diseases).

According to Byron and Arnold (1997) the supplies of wood fuels can influence nutrition (food sector) through their impact on the availability of cooked or processed food. If there is less fuel for cooking, consumption of uncooked food or food not properly cooked is most likely to increase. This may result in a considerable increase in disease incidence as parasites may persist (health sector). This may have damaging effect on child nutrition as the number of meals (often unbalanced diet) provided may be reduced (Byron and Arnold, 1997). Even where it seems it is just a particular sector (say energy) that is vulnerable to the impacts of climate change, due to the complex interlinkages between and among the sectors, other sectors (food or health) are inevitably affected. It is well established that energy services through electrification can increase refrigeration which indirectly can allow good storage of food and medical products (Meierding, 2011). With the planning and construction of hydropower dam in forest zone, one can expect that if electricity is well distributed in the region, we can expect a small improvement in the health and food sectors.

The vulnerability of the ecosystems to climate change brings important consequences for the climate system, as ecosystem changes may release carbon into the atmosphere, hence amplifying global warming (Canadell et al., 2004), which is considered a negative vegetation-climate feedback. Land use changes, with increased rate of logging and mining in the forest areas could increase the vulnerability of the forest. Under the international negotiation for avoided deforestation through the reducing emissions from deforestation and forest degradation (REDD+) scheme which Cameroon is actively interested in, the current and future vulnerability of the country's forest to climate and non-climate impacts could spell doom for REDD+ mechanism in a short time. In other words, the interest by Cameroon to contribute to the global mitigative effort to combat climate change could be counteracted by the urgent need for the forest ecosystem itself and its multiple-dependent population to adapt to climate impacts (Somorin et al., 2012). As the country is making effort to move ahead with mitigation (mainly REDD+), it needs to think also on the adaptation of forest resources and forest communities (Ecosecurities, 2009; Sonwa et al., 2011). Prioritized forest related sector (i.e. food security, water, energy and health) offers good entry points for the development of responses to face climate change.

Beside the forest related sectors already discuss in this paper, road infrastructure in southern Cameroon had already been highlighted in previous studies (ASB, 2000) as one important aspect related to the poverty alleviation of famers in the forest zone. The vulnerability of farmer will increase with climate change. For each of the forest prioritized sector, climate change will have more negative effect in rural area that is generally not connected to the city and/or is not on the paved road. For example irrigation seems to be well mastered around Yaoundé. The non-crop revenue that generally reflects greater diversification of rural economy is more common around Yaoundé (the main city of the humid forest zone of Cameroon) compare to other remote area around Ebolowa and Mbalmayo (Gockowski et al, 2004). With climate change/variability it is also evident that road infrastructure policy/maintenance needs to be properly rethink/adjust so that paved/maintain roads can resist climatic factor fluctuation. Without that other activities related to road will be negatively affected.

The linkage between forest and the related sector underlines the need of the multidisciplinary and multi-institutional response to face climate change. Collaboration between sectors and institutions needs to be promoted at different scales. National documents such as national communication on climate change and national plan of adaptation to climate change thus deserve to follow this multi-scale, multi-sector and multi-institution approaches that help to go beyond the current situation with is characterized by the few collaboration between several institutions on the area of climate change (Brown et al., 2010).

3.6 Conclusion

Both rural and urban populations depend directly and indirectly on the forest ecosystem goods and services (food, fuel, freshwater, medicinal plants etc) for their wellbeing. These ecosystem goods and services along with their dependent populations are however exposed and sensitive to changes in the forest, particularly those caused by climate. In the same vein, these sectors and communities lack adequate adaptive capacity or resilience to climate change variables (especially rainfall and temperature), which makes them vulnerable.

Vulnerability to climate impacts in the forest sector is quite related to other the vulnerability of other related sectors, for example, agriculture. Many of the factors that contribute to the vulnerability of the forest sector are not purely climate driven but also pressures on the forest systems that are purely human-induced, such as degradation, agricultural systems of slash and burn, land fragmentation, overexploitation of natural resources, etc. Adaptation remains a viable option to cope with the impacts of climate variability and change, along with impacts of those human-induced stresses.

Reducing vulnerability and increasing adaptive capacity becomes the core of the necessary adaptation strategies of the forest sector. At the political level, Cameroon has recognized the need to reduce poverty which indirectly can lead to the increase of adaptive capacity. As long as poverty remains the salient factor influencing many activities and practices of rural populations towards sustaining their livelihoods, reducing poverty should pervade all adaptation strategies and policy options. At the ecosystem level, an uninterrupted provisioning and functioning of the forest can offer structural defense against some climate impacts such as flooding, drought, etc. As the forest needs of the people would increase with increasing population, access to NTFPs should be supported by local and national policies and programs. Local participation in conservation and development efforts are inevitably intricate to the success of any adaptation strategy.

Forest management and conservation practices may help to decrease the vulnerability of the social system, while at the same time maintaining the mitigation capacity of the forests (Locatelli al., 2008). As the country in interested in the REDD mechanism, an obvious fact is that any REDD scheme that does not integrate adaptation in its design and implementation is not likely to produce the desired outcome. Despite the uncertainty surrounding the magnitude and frequency of the climate impacts the forest is exposed to, proactive adaptation of the Cameroonian forest sector could enhance the forest's resilience to new conditions or stresses apart from the current and potential climate impacts

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Chapter 4

Forest livelihoods, community forestry institutions and adaptation to climate variability in Cameroon

Somorin OA, Visseren-Hamakers IJ, Arts B, Locatelli B, Sonwa DJ. Forest livelihoods, community forestry institutions and adaptation to climate variability in Cameroon. ***Forest Policy and Economics*** (pending revisions)

Abstract

As climate variability and change threaten rural livelihoods in sub-Saharan Africa, adaptation becomes a necessary adjustment in responding to climate risks. However, the capacity to adapt is influenced by many factors, including institutions. In this paper, we assess the role of forest livelihoods and community forestry institutions in rural household adaptation to climate variability. Drawing from livelihoods and institutional theoretical perspectives, the paper combines quantitative and qualitative data from 120 households in three community forests in southern Cameroon. Results show that local households use forest to ensure food security and income generation and that around 23 percent of the total household incomes come from forests. Local adaptation strategies to respond to climate variability are either reactive or anticipatory. They include those within farming systems, within off-farm systems (e.g. paid labour), and those based on forests and trees. Community forestry institutions support adaptation by designing rules to regulate access, exploitation and sustainable management of forest resources. They also contribute to increasing households' adaptive capacity through non-forest interventions, such as facilitating information sharing, building capacity for new livelihood opportunities and providing improved crop varieties to households. The article concludes that household income represents both an opportunity and barrier to the adaptive capacity of local communities.

4.1 Introduction

There is an increasing political and scientific consensus that climate variability and change is likely to manifest around increased risks to rural livelihoods, especially for those in Africa. Sub-Saharan Africa is particularly vulnerable as a result of poverty, low infrastructure and technology, food insecurity, conflicts, and poor health and education systems (Sokona and Denton, 2001; IPCC 2007). This vulnerability is further exacerbated by the heavy reliance of its economies on climate-sensitive sectors such as agriculture, forestry, and fisheries (FAO, 2005). Over 80 percent of the population in Sub-Saharan Africa derives its livelihoods directly and indirectly from natural resources (World Bank, 2004). Literature holds that poor and natural resource-dependent rural households are likely to bear a disproportionate burden of climate-related impacts such as droughts, floods, heat waves, epidemics, and even conflicts (Thomas and Twyman, 2006; Bele et al., 2011).

Tropical forest ecosystems provide a number of goods and services that support the well-being of many rural poor (Innes and Hickey, 2006). The use and trade of forest products, particularly non-timber forest products (NTFPs), is a central component of rural life in many forested landscapes and provides significant local livelihood benefits (Sunderland et al., 2002; Ndoye and Tieguhong, 2004; Ghate et al., 2009). In Central Africa, these goods and services provide a security portfolio for over 80 percent of the population living in or near the forests and contribute to poverty alleviation and national development (CBFP, 2006; Nkem et al. 2010; Somorin et al., 2012). The complex interrelationship between ecological and human systems implies that an impact on one affects the other (Locatelli et al., 2008; Sonwa et al., 2012). The vulnerability of ecosystem goods and services to climate will likely result in an increased vulnerability of the local populations that directly depend on them. In spite of their vulnerability, local people nonetheless have historically developed coping and adapting strategies against climate variability, which are identified as options to reduce vulnerability of natural and human systems against actual or expected climate risks (IPCC, 2007; Somorin, 2010).

The capacity of local populations to cope with or adapt to climate risks is dynamic and influenced by many factors: the nature of the risk and associated impacts,

economic and natural resources, social networks, entitlements, property rights, institutions and governance, and technology (Adger, 2003; IPCC, 2007; Paavola, 2008). On institutions and climate change adaptation, Agrawal (2008) reports that households and communities have historically coped with or adapted to climate variability through many different strategies. However, their capacity to adapt depends in significant measures on the ways institutions at different scales regulate and structure their interactions (Batterbury and Forsyth, 1999; Young and Lipton, 2006).

Many studies have shown that local institutions are key to adaptation in water management, agricultural development, rural livelihoods, and forest governance (Adger, 2000; Droogers, 2004; Naess, 2005; Shepherd et al., 2006). It has been argued that institutions at different levels (global, national and local) affect the shape, efficiency and outcome of both short- and long-term adaptation (Adger et al., 2005). This is largely because the effectiveness of adaptation often depends on institutions through which incentives for individual and collective actions are structured (Agrawal, 2008). According to Agrawal and Perrin (2009), the success, and more generally the prospects of adaptation practices depend on specific institutional arrangements – adaptation never occurs in an institutional vacuum. First, institutions structure the distribution of climate risk impacts. Second, they constitute and organize the incentive structures for household-and community-level adaptation responses that shape the nature of these responses. Third, they mediate external interventions into local contexts, and articulate local social and political processes through which adaptation efforts unfold. For forest-dwelling rural households, local institutions organized around forest resources may be part of the institutional setting to cope with climate variability and change. Community forestry institutions in Cameroon are an example in this regard.

This paper seeks to investigate the role of forests and community forestry institutions in influencing households' strategies for coping or adapting to climate variability. Specifically, we aim to analyze (1) the contribution of forest resources to local livelihoods; (2) local adaptation strategies to climate risks; and (3) how local community forestry institutions mediate the use of forest resources and support the adaptation strategies of local households and communities against climate variability in southern Cameroon. The next

section briefly presents the theoretical perspective guiding the research. Section 3 details the methodology, including an overview of community forestry in Cameroon. The results and discussion are presented in section 4 structured along the objectives of the study; and we conclude in section 5.

4.2 Livelihoods, Local Institutions and Climate Change Adaptation

Livelihoods approaches have a long history in rural development thinking and practice. A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (Chambers and Conway, 1992; Carney, 1998; Scoones, 1998). Ellis (2000) presents 'livelihood strategy' as a chosen combination of assets and activities, undertaken usually at household level, and often encompassing not only activities that generate income, but many other elements of cultural and social choices. Livelihood strategies are dynamic; they respond to changing pressures and opportunities, and they adapt accordingly (Ellis, 2000). Scoones (1998) identifies three types of adaptation strategies of many natural resource-dependent households: agricultural intensification or extensification; livelihood diversification; and migration. As a strategy to deal with the impacts of external shocks, local households often increase their reliance on agriculture, either by intensifying resource use in combination with a given land area, or by bringing new land into cultivation. Another potential strategy is by employing diversification to other non-farm resource bases (forests, fisheries) or off-farm rural employment. In other cases, migration and remittances are adopted as household strategies (Ellis, 2000; Paavola, 2008).

In the forest sector, the contribution of forest resources to the welfare of rural livelihoods has received both theoretical and empirical investigations (Cavendish, 2000; Mamo et al., 2007; Saha and Sundriyal, 2012). Traditionally, such investigations have mostly focused on a poverty-environment nexus; where a variety of forest resources are exploited and traded to generate substantial revenue for rural poor, thus fulfilling a safety net function. Presumably,

the potential of NTFPs exploitation within sustainable forest management was based on the assumption that commercializing forest resources could simultaneously serve the biodiversity conservation and income generation to the poor (Ros-Tonen, 2000; Saha and Sundriyal, 2012). The recognition of the significant role of forests in local livelihoods has informed the establishment of management systems at state or local levels in many tropical countries. Managing the sustainability of forest resources for livelihoods involves alleviating the poverty of direct users; empowering users by securing property rights and their representation in decision-making systems; and improving the conditions of the forest ecosystems (Larsen et al., 2000; Ndoye and Tieguhong, 2004; Mutenje et al., 2010). These outcomes are considered all encapsulated in the practice of community forestry (Sunderlin, 2006; Charnley and Poe, 2007; Maryudi et al., 2012). In theory, community forestry hinges on the premise that when local people are given decision-making autonomy, they can design rules for forest management towards increasing their overall wellbeing.

Meanwhile, studies focusing on livelihoods and environmental change are gaining ground in climate change studies. Changing patterns of temperature and rainfall due to climate variability and change constitute shocks and stresses that can adversely affect the natural resource base that livelihoods draw resources from. The scientific consensus that climate change is already occurring makes understanding the adaptive capacity of the poor highly imperative (Fisher et al., 2010). Adaptation is defined as adjustment in response to actual or expected climate stimuli in order to moderate harm from climate change or exploiting beneficial opportunities (IPCC, 2007). Adaptation involves reducing the vulnerability and enhancing the adaptive capacity of individuals, households or communities to climate risks (Sonwa et al., 2012). Putting adaptation into the perspective of manifestation of adaptive capacity, we first present that the forces that influence the ability of a system to adapt are the drivers or determinants of the system's adaptive capacity (Smit and Wandel, 2006). Secondly, the ability to adapt is predicated on three fundamental characteristics: the degree to which the system is susceptible to change while still retaining structure and function; the degree to which it is capable of self-organization; and adaptive capacity (Folke, 2006). Adaptive capacity refers to the preconditions necessary to enable adaptation. It is represented by the set of available resources and the ability of the system to respond to disturbances

and includes the capacity to design and implement effective adaptation strategies to cope with current or future events (Adger et al., 2011). These resources include physical capital, technology and infrastructure, information, knowledge, social capital, the capacity to learn, and institutions (Tol and Yohe, 2007; Osbahr et al., 2007). Thirdly, adaptive capacity is context-specific and varies from country to country, from community to community, among social groups, households and individuals, not only in value but also in nature, and over time (Smit and Wandel, 2006).

To successfully address the adaptation of local livelihoods to climate variability and change, particularly in socio-ecological systems, institutions are essential (Locatelli et al., 2008). Institutions refer to the prescriptions that humans use to organize all forms of repetitive and structured interaction including those within families, markets, private associations and governments at all scales (Ostrom, 2005). The study of local institutions in natural resources management examines human ability to create and maintain self-governing sustainable socio-ecological systems (Imperial, 1999). Agrawal (2008) emphasizes the importance of assessing and strengthening local institutions, developing locally appropriate solutions and linking actors at various scales. Arguably, individual and collective actions within local institutions can promote components of resilience, including buffering of livelihood disturbance or climate shocks, self-organization, and adaptive capacity (Osbahr et al., 2010).

In the context of this paper, the focus on forest livelihoods integrates the fact that local households depend on goods and services provided by forest ecosystems for their livelihoods. As climate variability impacts the provisioning and regulating functions of these ecosystems, dependent livelihoods are intricately affected. Towards enhancing their coping and adaptive capacities, local households use a variety of resource assets, capabilities and networks to improve their overall livelihood strategies. To understand the role of institutions, we focus on the community forestry institution as an innovative and potential approach to improved forest management and conservation strategies with a comprehensive blend of ecological and socio-economic objectives (Maryudi et al., 2012).

4.3 Methods and Study context

4.3.1 Community forestry institutions in Cameroon

Under the decentralization policy introduced in Cameroon by the revision of the Forestry Law of 1994, management of forestry resources has been transferred to local institutions through community forestry. Community forestry has been a promising viable approach to forest conservation and poverty alleviation (Sunderlin, 2006; Charnley and Poe, 2007; Berg et al., 2007; Brown and Lassoie, 2010). Most studies on community forestry in Cameroon have largely focused on its effectiveness in timber logging and forest management, financial returns for socio-economic development and poverty alleviation (Assembe, 2006; Ezzine de Blas et al., 2008), with none considering its institutional role in facilitating adaptation to climate risks.

According to the Forestry Law (Art. 37) and the manual of procedure (MINEF, 1998), a community forest is defined as "*a part of the non-permanent forest estate, measuring up to 5000 ha, that is object of an agreement between government and a community in which communities undertake sustainable forest management for a period of 25 years renewable*". The community can be composed of one or more villages legally represented by an association or common initiative group which represent the local community forestry institution. The main principle guiding the creation of the community forest is to improve the local livelihoods and forest management by local resource users. In the management of their forests, the members of the community forest generally design rules of collective interest to sustainably manage the forest resources on which they depend.

4.3.2 The Study Context

The study was carried out in three community forest (CF) groups in southern Cameroon namely COPAL (*Cooperative des Paysans et Agriculteurs de la Lekie*), ASMIMI (*Association Mikong Missi*) and REPA CIG (*Rural Environment and Poverty Alleviation Community Initiative Group*). The three community forests are located in the southern part of Cameroon (Figure 1). The sites were selected based on a number of criteria: local communities organized under the decentralization

process; community's access to forest resources; and difference in ecological zones (Table 1). The three CF groups have existed for at least five years with at least a simple forest management plan already developed. We surveyed nine of the ten villages sharing the community forest in COPAL, the only village that manages the community forest in ASMIMI, and the four main villages of the eight sharing the forest in REPA CIG.

4.3.3 Field data collection

Between April and July, 2010 we used a semi-structured questionnaire to 120 households randomly selected in the 14 villages surveyed. The sample surveyed represented between 10-20 percent of the households in each village. Only households that are members of the community forests were surveyed. Collected household data include: socio-economic characteristics (age, gender, education, ethnicity, household size, income), forest ownership and access, forest product consumption and trade, climate variability, and coping strategies. Data collected on local adaptation strategies were not restricted to the forest sector alone. Second, we conducted a focus group discussion about local community forestry institutions with the community management boards (which comprised the local decision-making individuals representing the villages). We collected data on the status of the community forests, their organizational structure, composition and participation of community members.

Third, we conducted 18 in-depth interviews with key individuals and informants in the board and community. We discussed the rules used for collective interest to protect and manage the forests, sanctions and performance of the designed rules. Other relevant information included management of external interventions, knowledge and market systems, level of infrastructural development and relationship with state-based organizations as well as the local initiatives designed to support the adaptive capacity of the people to climate variability. Preliminary results of the local adaptation strategies were further discussed during the focus group discussion and interviews with key informants to gain more insights into how the local institutions influence these strategies.

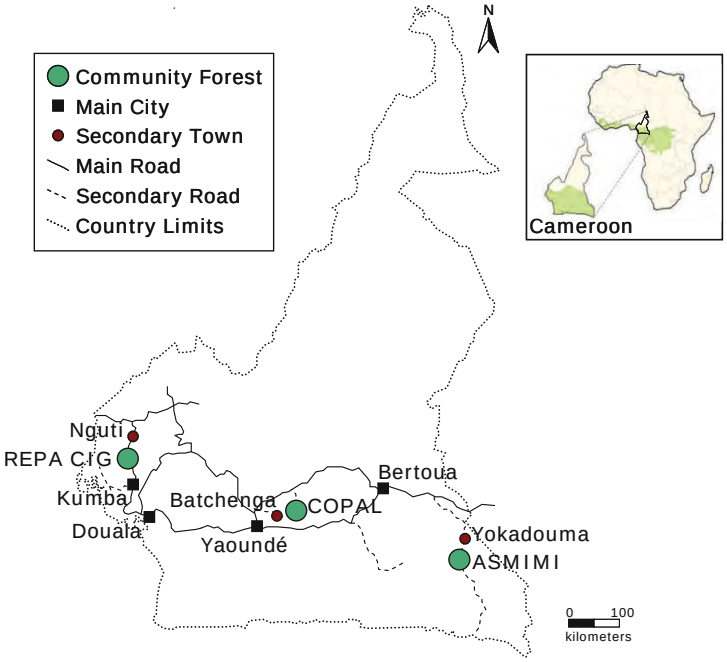

Figure 4-1: Map of the study sites (COPAL, ASMIMI and REPA CIG) in southern Cameroon

Table 4-1: Biophysical and social characteristics of the three community forests

Variables/Attributes	Community Forests		
	COPAL(*n=40*)	ASMIMI (*n=35*)	REPA CIG (*n=45*)
Location	Lekie - Centre	Mboumba et Ngoko – East	Kupe Maneguba – South west
Total forest area (ha)	4800	2600	5000
Forest type	Transition forest ecological zone	Humid equatorial rainforest	Humid equatorial secondary rainforest
Altitude (m)	750 – 800	600 – 760	800 – 950
Total number of households within the CF	431	210	571
No. of villages sharing the CF	10	1	8
Social infrastructure	9 schools and 3 health centres	1 school and 1 health centre	7 schools and 2 health centres
Ethnic composition	Largely indigenous and homogenous ethnic group	Largely indigenous and 2 ethnic groups	Largely indigenous and heterogeneous ethnic group
Distance from the nearest city (km)	30	7	83
Market access	High	High	Medium

4.3.4 Data analysis

From the data collected with the survey, we calculated the means (for quantitative data such as age or income) or the average distributions (for qualitative data such as gender or activities). We observed significant differences between CF groups with an ANOVA (quantitative data) or a chi-square text (qualitative data) and reported only significant differences ($p<0.05$). For identifying the variables (e.g. gender, age, religion, education, household size, ownership of forests, income) that are most likely to influence a dependent variable (e.g. the proportion of incomes coming from forests), we used hierarchical partitioning (HP) (Chevan and Sutherland, 1991). Because of multi-collinearity between independent variables, working with a single regression may fail to identify the explanatory power of the variables (Mac Nally, 2000). With HP, all 2^k multiple regression models are analyzed (k being the number of independent variables) and the explanatory power of a given variable is calculated as the mean improvement of the goodness of fit (e.g., R^2) caused by adding this variable to the models. We assessed the statistical significance of the explanatory power with a randomization approach with 1000 permutations of the data (Mac Nally, 2000). Only significant ($p<0.05$) were reported.

4.4 Results and Discussion

4.4.1 Forests and livelihoods

The result shows that more than 90% of the respondents reported that their principal activity is agriculture and that they have access to forest resources. Almost all households (93%) reported owning forested lands (Table 4-2). REPA CIG differed from the other groups by its lower average household size, its lower incomes and its high ownership of livestock. ASMIMI and COPAL differed in terms of gender (more households are female-headed in ASMIMI compared to COPAL) and origin of the households (more native people in COPAL than in ASMIMI). The total household incomes are used in priority for buying food (32% of the expenses). Health care and education are the next priorities (27% and 25%, respectively). Others include purchasing livestock to diversify economic portfolios, saving, acquiring technology (e.g. mobile phone), buying

fuel for motorcycles, financing social and cultural events, building houses, and supporting other family members.

Forests provide resources such as fuelwood, food, bushmeat, leaves and bark for economic, social, and cultural needs. Almost all households collect forest products (99% for NTFPs other than bush meat, 99% for fuel wood, 65% for timber, and 45% for bush meat). A larger proportion of respondents collect timber in COPAL (75%) than in ASMIMI (51%) ($p<0.05$). Around 16% of the respondents reported that they had to adapt to shortage or losses of forest products by changing the areas where they collected forest products. The three CF groups differed significantly in this regard (36% in COPAL, 14% in ASMIMI, and 0% in REPA CIG).

More than 21 different NTFPs are used by the households. Some NTFPs have multiple uses, for example, *Afromomum danielli* is a spice used in most cuisines either as condiment or as preservative but it also possesses medicinal value as the essential oil from the seeds is used against bacterial and fungi infections (Table 4-3).

NTFPs with multiple uses tend to be of higher priority to the local households than those of single uses. Some NTFPs are extracted for consumption alone, others for sale alone but the majority is both consumed and sold. All households consume part of the products they collect from forests. Sustaining household food security is the primary reason behind the exploitation of resources from the forests. About 70 percent of the NTFPs are primarily categorized as food-based resources but the consumption of these NTFPs varies from one CF group to another (Table 4-3), partly because of availability and cultural values. Most of the wildlife hunting and gathering of wild fruits by household members are for their dietary consumption. This consumption contributes to household food security and household diets, especially when agricultural food crops are low in quantity or not available. The need to achieve self-sufficiency, minimize risks from low agricultural yields and fill in food gaps is central to households' use of forests for food.

Table 4-2: Socioeconomic characteristics of the households surveyed.

Variable	Average	Significant differences between CF ($p<0.05$)
Gender	39.2% female-headed household	ASMIMI (54.3%) > COPAL (22.5%)
Age of household head	52.7 years	COPAL (55.9 years) > ASMIMI (48.3 years)
Origin of the household	74.2% of native	COPAL (87.5%) > ASMIMI (62.9%)
Education level of the head of the household	12% None, 63% Primary, 23% High school, 2% University	None
Number of dependents in the household	10 persons	COPAL (11.4) and ASMIMI (11.3) > REPA CIG (7.7)
Principal activity of the household	99.2% agriculture, 0.8% others	None
Secondary activity of the household	17.5% wine selling, 6.7% paid job, 13.3% trade, 0.8% craft,	Dominance of wine selling in ASMIMI (48%) compared to COPAL (7%) and REPA CIG (2%)
Household ownership of livestock	62.2% own	REPA CIG (78.4%) > COPAL (45%)
Household access to forest resources	99.2% have access	None
Household ownership of forest	93.3% own	None
Size of the owned forest	6.7% no forest, 44.2% less than 5 ha, 29.2% between 5 and 10 ha, 20.0% more than 10 ha	None
Forest income share of total household income	23%	REPA CIG (31%) > ASMIMI (16%)
Total household income (estimated)	700,000 FCFA per year	COPAL and ASMIMI (900,000) > REPA CIG (300,000)

Note: 1 USD ≈ 500 FCFA

Around 84% of the households sell forest products. The proportion of households selling forest products is significantly higher in ASMIMI (94%) than in COPAL (77%). Forest products contribute to 23% of the incomes on average. This proportion is significantly lower in ASMIMI (16%) than in REPA CIG (31%) as shown in Table 4-2. The only two significant predictors for the share of incomes coming from forests are gender (female-headed households draw a higher proportion of incomes from forests than male-headed ones) and total income (forests represent a high share of income for poor households).

Table 4-3: The 10 most significant NTFPs collected in the community forest sites

Scientific name	Common name(s)	Use category	Community forests
Gnetum africanum	Okok	Food	ASMIMI = COPAL > REPA CIG
Garcinia cola	Bitter Kola	Food and health	REPA CIG > ASMIMI
Ricinodendron heudelotii	Ezezang, Djanssang	Food	COPAL > ASMIMI > REPA CIG
Irvingia Gabonensis	Andock, Bush mango	Food	COPAL > ASMIMI > REPA CIG
Afromomum danielli	Mbong, Ndong	Food and health	ASMIMI > COPAL
Cola nitida	Kola	Food	COPAL > ASMIMI > REPA CIG
Afrostyrax lepidophyllus	Bush onion	Food	REPA CIG
Calamus spp, Lacosperma secundiflorum	Rattan	Construction material	REPA CIG > COPAL > ASMIMI
Baillonela toxisperma	Djabè	Food	REPA CIG
Maranthacée spp	Maranthacée	Food	COPAL > ASMIMI > REPA CIG

On average, people sell 67% of the collected products, with significant differences between CF groups: this proportion is lower in COPAL (50%) than in ASMIMI and REPA CIG (both 75%). The sold NTFPs are the surplus of the consumption or those with high market demand e.g. *Gnetum africanum*. We found that *Gnetum africanum* (Eru leaves) and *Irvingia gabonensis* (bush mango) are traded in COPAL and ASMIMI for international markets. In REPA CIG, *Apostyrax lepidophyllus* (bush onion) and *Irvingia gabonensis* are mostly traded to the neighboring Nigeria. For households whose majority of total income comes from forests, trade in NTFPs is often all-year round with different products traded at different times.

4.4.2 Local adaptation strategies to climate variability

Livelihoods are affected by different manifestations of climate variability. According to the respondents of the survey, agriculture is negatively affected by heavy rainfall, punctual droughts during the rainy season, and high temperatures during the dry season, while benefitting from occasional rainfall during the dry season. NTFPs appear generally insensitive to most climate variability events, except some vegetal NTFPs that are affected by strong winds or game and fish by low rainfall and heat waves. Other livelihood assets are influenced by climate variability, such as human health and infrastructure. Excessive rainfall can affect the conservation of harvest, destroy houses, and degrade roads.

Local communities have implemented strategies for coping with or adapting to climate variability and change. Coping strategies are generally reactive (after a climatic event occurred) or concurrent (during the event) and provide short-term adjustments (Smit et al., 2000). Adapting strategies, i.e. for altering the system to better suit climatic stimuli, are generally anticipatory but their implementation can be in reaction to an experienced event; in this case, they help to both cope with the event and anticipate future climate variability or climate change (Cooper et al., 2008).

When asked about their strategies for facing climate variability, the respondents reported more adapting then coping strategies and most of the strategies were targeted at dealing with climate risks in agriculture (Table 4-4). Examples of coping strategies in agriculture are: repeated planting or sowing when crop is affected by drought, early harvest when crops start to be affected by excessive rains, phytosanitary treatments when diseases are observed on crops, temporary irrigation when crops are drying. Adaptive strategies in agriculture are changes in agricultural practices and calendars "to avoid surprise" as one of the respondents said. For example, people start preparing their fields early to be prepared for an early arrival of rains, they increase the spacing between planted crops, they use new crops or improved varieties, and they apply new phytosanitary treatments or with different modalities. Two households reported the creation of new fields in better microclimatic conditions. For some households, a mix of strategies is often inevitable (depending on the crops grown) in order to deal with the impacts of climate variability.

Table 4-4: Numbers of occurrences of reported coping and adapting strategies (households may have reported several strategies)

	Coping	Adapting	Total
Agriculture	7	50	57
Off-farm	10	22	32
Forests and Trees	8	2	10
Total	25	74	99

In general, coping and adapting strategies in agriculture are more frequently implemented by larger households with higher income (Table 4-5). However, results show that larger households tend to implement more agricultural

coping strategies, while wealthier households implement more agricultural adapting strategies. This result suggests that low income might represent a barrier for moving from coping to adapting strategies.

Other common strategies are related to non-farm livelihoods activities and consumption. For example, households cope with the reduced incomes from affected harvests by finding a temporary paid job and cope with the impacts of climate variability on human health by buying medicine (e.g. against malaria). These coping strategies are more often implemented by male-headed household that do not own livestock, probably because males may find paid jobs more easily than women. As adaptation strategies, households diversify their activities (e.g. by developing trade activities) and change their consumption and eating habits, in particular changing from climate affected *Colocasia spp* (igbo coco) to staple food such as rice, plantain and maize, which are more often bought than produced. These adapting strategies are more often implemented by households with lower total income and no ownership of livestock. The income effect may be due to the fact that poorer households do not have other alternatives than developing new activities and are forced to modify their diet. In total, the coping and adapting strategies are often implemented by households without livestock and whose head has a higher education level. The effect of livestock ownership is clear for the livelihoods strategies as well as for the coping strategies in general (Table 5). This may suggest that livestock ownership buffers the economic impacts of climate variability and reduces the need to implement coping strategies or diversification of livelihoods activity. The effect of education is quite clear for getting paid jobs (especially those that might involve technical and managerial skills) outside the agricultural and forest sectors.

It is surprising that no household mentioned livestock in their strategies. Livestock could have been mentioned because it provides a safety net when harvests are reduced and because livestock can be adversely affected by droughts and heat waves (e.g. through animal diseases and heat stress). Two reasons can explain the fact that livestock was not mentioned. First, livestock is not in the core of the household economy and provides secondary consumption and incomes, which can explain why livestock did not come to the discussion when we discussed adaptation strategies. Second, no deliberative strategies

are implemented for helping animals to cope with climate variability, except punctual activities (e.g. giving water to animal during heat waves, an action observed in the villages but that people did not report as a coping strategy).

Table 4-5: Household characteristics influencing the choice of different strategies

	Coping	Adapting	Total
Agriculture	Larger household	Higher total income	Larger households and higher total income
Off-farm	Male-headed household and no ownership of livestock	Lower total income and no ownership of livestock	Higher education level of the household head and no livestock ownership
Forests and Trees	Ns	Not tested (small n)	Ns
	No ownership of livestock	Ns	Ns
Total			

Significant at $p<0.05$. ('ns' means that no significant influence was found).

Forests and trees are mentioned in only 10% of the strategies, mostly for coping. People said they collected forest products (fruits, traditional medicines, bush meat) for consumption or trade, when their harvests were reduced by climatic events. As an adaptive strategy, they reported planting or conserving trees in agricultural fields to protect their crops, particularly protecting young cocoa plants from the sun and excessive heat. No household characteristics influenced the implementation of strategies based on forests and trees. However, as for livestock, it is surprising that forests and trees were not mentioned more often, because almost all households collect forest products. The role of forest products in coping strategies (only 8 responses) may be underreported because people have been collecting forest products on frequent basis (daily for some households) and do not consider this activity as a strategy for coping with losses in agriculture. With agriculture being the primary activity or preoccupation of the local population, forests can be said to perform a supporting role.

Many studies on the use and management of forests by local communities in Cameroon have substantiated the role of forests in supporting local populations' efforts to reduce their poverty (Sunderland et al., 2002; Ndoye and Tieguhong, 2004). In the context of this study, around 23% of total household income comes from the forest and this ratio is higher for female-headed households

and poorer households, who may be considered more vulnerable to climate variability. In another question of the survey section on forests and livelihoods, 19 households reported that they had to modify their areas for collecting forest products because of changes in product availability. Although these changes are not necessarily climate-related and can be driven by natural cycles or local management systems (e.g. overharvesting), households have been adapting to changes in forests but they rarely reported forest product collection as a way to cope with climate impacts on agriculture.

It seems that households reported only adapting or coping activities that are exceptional or new, and not the ones that are part of business-as-usual, even though these activities contribute to diversifying livelihoods or providing incomes or consumption in complement to fluctuating agricultural harvests. This observation is reinforced by the fact that 46 of the 120 households did not report any coping or adapting strategy. Other similar studies have also shown that households do not always develop any coping or adaptive strategy to the impacts of climate variability and change (Bryan et al., 2009; Deresa et al., 2009).

Concluding, in local pursuit of coping with the impact of climate risks on their livelihoods, we found that rural households in southern Cameroon draw from a wealth of natural capital and income sources in order to adopt a range of strategies. According to Wood (2003) and Paumgarten (2005), rural households have learned to invest in an assortment of assets in order to achieve and maintain a sustainable livelihood. Building on what is already known; households and communities who are faced with external risks continue to manage their resources and livelihoods increasing their adaptive capacity (Eakin, 2000). But this resource and livelihood management often involves prioritizing between elements of the production, consumption and commercialization within a given response space for dealing with the external risks (Osbahr et al., 2010).

4.4.3 The role of community forestry institutions

According to the management board of each CF group and key persons in the communities, the local forest institutions focus on rule-making and enforcement systems towards sustainable forest management. These rules are targeted at managing, monitoring and reducing unsustainable land-use

practices that are prevalent in the communities (Table 4-6). Access to forests is an important component of the livelihoods of the studied forest-dependent local communities in southern Cameroon. By design, community forestry institutions under the decentralization policy have seemingly clarified the issues of land tenure through guaranteed access given to local people. Through a system of rules, all the three CF groups have targeted resource access and management rights that had been unclearly defined and unenforceable, in order to avoid over-exploitation. These local institutions allocate use rights to communal forests within the confines of a set of rules that all users must abide and be governed by.

Community forestry institutions have developed both formal and informal prescriptions for NTFP collection and market systems (Table 4-6). Whether formally or informally, the rules allow NTFP collection for household consumption (e.g. REPA CIG and COPAL). This is in recognition of the centrality of ensuring food security in the livelihood pursuits of the households. In addition, for high value NTFPs (e.g. *Gnetum africanum*), the rules support sustainable harvesting, domestication practices and collective market systems to maximize returns to the households. As local households involved in such trade increase their income, they build assets to diversify to other livelihood activities and invest in long-term livelihood strategies such as education and health care. Similar to Robledo et al. (2011), differences in forest-based income and income diversification potentials among villages and CF groups are based on their access to resources or their level of specialization, and financial, technical and institutional support. Invariably, this explains the differences in their coping and adaptive capacities.

As noted by some scholars, well-defined property rights and local institutions that regulate the use of, and access to resources are critical components of local management systems, and represent a key to ensuring sustainability (Berkes et al., 2000; Ostrom, 2005; Mutenje et al., 2010). With adaptation to climate variability or change in perspective, forests may be a natural capital for local livelihoods in the face of decreasing or variable agricultural yields. With unsecured access, local people will become more vulnerable as the future of their sources of livelihoods become bleak.

Table 4-6: Attributes of local community forestry institution identified in the study sites

Attributes	COPAL	ASMIMI	REPA CIG
Age of legal status of the CF (yrs)	9	8	8
Frequency of CF management board meeting	Very often but depending on CF's activities	Irregular	Once a month
Frequency of general meetings	Once or twice a year	Irregular	Once a year
Participation in the CF management board	Medium/High	None	Low/Medium
Initiation of forest conservation	Members of the community	Chief of clan	Chiefs of two of the eight villages sharing the forest
External interventions available to the CF group	State (MINFOF, MINADER), NGO, Research organizations, Local NGOs	Local NGOs	MINFOF, MINADER, Local NGOs[8]
Existence, nature and status of forest protection team	Yes, voluntary and operational	None	Yes, voluntary and operational
Rules on NTFP collection	Allows for household consumption. Collection in everyone's portion of forest and encouraged to be sold in group	No concrete prescription	Allows for household consumption. Collection in everyone's portion of forest
Climate change related roles or interest	Information, sensitization and distribution of improved crop varieties	Inexistent	Emerging – Information building and knowledge sharing

Not all forest resource use systems and coping strategies are sustainable: a current coping strategy based on forest product collection might seem effective in the present but could lead to maladaptation in the future if forests become degraded. We found in the CF groups that the increasing value of the forests for their provisioning and gap-filling functions, income and other livelihood assets encourages over-exploitation and unsustainable activities by local people. Community forestry institutions thus have roles in regulating local practices towards sustainable adaptation strategies. Nevertheless, there is recognition that even with the presence of such institution, the drive to increase returns from forestry activities to reduce poverty often overrides long-term sustainability and conservation.

Of particular example is the case in REPA CIG, where *Baillonela toxisperma* (commonly called Djabe) exhibits multiple uses – food, medicine and timber. Djabe is currently at risk in south-west Cameroon due to its overharvesting because of its high timber and non-timber value, often resulting in conflicts

8 MINFOF – Ministry of Forest & Wildlife; MINADER – Ministry of Agriculture & Rural Development; NGO – nongovernmental organization

between logging companies and local communities (Clark and Sunderland, 2004). REPA CIG has acted as a mediating institution in two important ways. Firstly, it mediated in the efforts to manage the conflicts between the stakeholders by encouraging sustainable management and conservation of the species with the target of meeting the timber and NTFP demands. Secondly, perhaps more important, REPA CIG has encouraged local households through an informal prescription to temporarily limit the use of Djabe only for medicinal purposes. Given its medicinal importance for infertility, childbirth problems, and rheumatic pains, this local use has been more valued than others and therefore prioritized in order to reduce overharvesting and conserve Djabe. For REPA CIG, maximizing benefits from a NTFP for current needs as well as for the future is an adaptation strategy for responding to both climate and non-climate risks.

Within the community forestry institutional arrangement, we found that the level of organization of the management board and decision making process as well as their knowledge base on the external risks are pivotal to their overall success in mediating adaptation practices. Other attributes of the CF groups critical to their success towards increasing collective resilience of the households include: elements of *trust* among the people and broad *participation* of communities in the design, implementation and monitoring of rules and prescriptions for forest management. Putting this in perspective, these attributes to an extent determine how actions and responses to climate risks, and how interactions with other institutions and resources are articulated (Agrawal, 2008). For instance, the democratic rule-making, benefit-sharing and decision-making process in COPAL and REPA CIG tend to explain the degree of effectiveness of the local institutions compared to ASMIMI where evidence of 'elite capture' shows that the local institutional initiatives revolve around the village chief (Table 4-6). However, there is a caution to this assertion of institutional effectiveness through broad participation of different members and stakeholders of the CF groups. Without the strong commitment of the local elites, community forestry is doomed to fail. Despite the higher participation in the decision-making process in COPAL compared to other CF groups, most of the management activities have been centered on one man – the coordinator. Toward effectiveness in delivering livelihood outcomes, the challenge in most cases, is how to push the elites to use the benefits for collective welfare.

Another role of community forestry institutions is the management of the external interventions available to the communities. Depending on the characteristics of such intervention, the management board structures these interventions for the collective good; which could be in form of technical assistance, information and capacity building and financial support for development projects. These forms of intervention are targeted at increasing the overall well-being of the rural population. State interventions may include forest management training and technical support from the local forest officials or agricultural extension workers. These interventions can facilitate the implementation of strategies for climate adaptation, as in the case of COPAL (Table 4-6).

Furthermore, certain characteristics tend to shape the role of the local institutions in facilitating external interventions. The proximity of REPA CIG to markets has enhanced the returns on forest products. In addition, external interventions from Ministry of Forest and Wildlife (MINFOF), Ministry of Agriculture and Rural Development (MINADER) and local non-governmental organizations (NGOs) have targeted increasing capacities in new opportunities such as honey production, or domesticating bushmeat (e.g. grasscutter - *Thryonomys swinderianus*, a wild rodent). Conversely, COPAL leverages on its proximity to Yaoundé, the capital of Cameroon, where it takes advantage of its interactions with the state forestry ministry, international research organizations and NGOs. These interactions have further increased COPAL's awareness of climate change policy debates in Cameroon, and fostered collaboration with civil society organizations to support its local efforts to deal with climate stresses. Additionally, the management board of COPAL interacted with a research institute to get access to improved varieties of cassava which was distributed at household level and helped to deal with either drought or pests and diseases. COPAL took advantage of its relationship with a development organization to request for training of local people on domestication and local conservation of *Gnetum africanum, Irvingia gabonensis* and mushroom, which has resulted in more income for the member-households. This evidence further elucidates the capacity of CF groups to move outside the forestry sector, particularly the agricultural sector, in order to increase the adaptation outcome of their community members.

4.6 Conclusion

In this study, we have shown that local households and communities in southern Cameroon use forests for sustaining household food security and income generation from sale of NTFPs. Forest as a natural capital provides goods and services that local communities use to support their livelihoods. Local adaptation strategies, coping and adapting (reactive and anticipatory respectively) are adopted to respond to the impacts of climate variability, mainly within the farming systems, off-farm (paid labor) and based on forests and trees. Forests potentially offer a buffer for local households through ensuring food security and cash earnings, which help them to cope with lower agricultural yields or crop failure due to climate variability.

Overlooking the findings (Tables 4-6) on the adaptive capacity of the studied community forests, we can conclude the following. At household level, COPAL and ASMIMI's adaptive strength seems to stem from the advantage of their larger households to increase their total household income in order to move from coping to adapting strategies against climate impacts, particularly in the farming system. At community level, COPAL and REPA CIG possess community attributes that increase communal adaptation strategies, for example, sharing of improved crop varieties, training and knowledge sharing and conservation of high-value NTFPs. The adaptive strength of COPAL to respond to impacts of climate variability involves the combination of individual/household strategies (food security and income generation) and collective adaptation actions.

This study has underscored the fact that planning adaptation policy strategy for local communities whose livelihoods depend on climate sensitive sectors (including agriculture, forestry and fisheries) would not be an easy task. This is because the differences in socio-economic characteristics (age, gender, household size, education level) and livelihood systems (agriculture, paid jobs, NTFP gathering and marketing) means that people are not necessarily vulnerable in the same way, thus making adaptation needs to be different. For national policy design, adapting to climate variability and change might favour holistic thinking and action. The challenge, however, is how such a holistic policy framework can integrate the complexities in differential local vulnerabilities and adaptation needs. A potential solution, drawing from the findings of our

research, is to consider sustaining or increasing food security and income generation as basic adaptation strategy. As earlier reported, household income represents both opportunity and barrier to the adaptive capacity of local communities. Linking this to a national context, reducing household poverty - through increasing income from single or multiple livelihood source(s) offers a positive step towards long term adaptation to climate variability and change.

Despite the fact that the three studied community forestry institutions were not established with climate vulnerability in mind, they exhibit functions that support the coping and adapting capacities of the local households and communities to climate risks, though at varying degrees. However, the strength and effectiveness of such institutions are critical to enhancing long term adaptive capacity in the face of the uncertainties of the magnitude and frequency of climate impacts. Depending on their organization and structure, local institutions have the capacity to mediate the extraction and commercialization of forest resources (especially NTFPs), the sustainable management of forests, and external interventions towards increasing the coping or adapting capacity of local communities.

Chapter 5

REDD+ policy strategy in Cameroon: Actors, Institutions and Governance

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Abstract

Reducing emissions from deforestation and forest degradation (REDD+) is receiving increasing political and scientific attention as a climate change mitigation approach. The government of Cameroon has expressed an interest in participating in REDD+, and national deliberation on a policy strategy has attracted interest from different actors in the forest sector. This paper analyses the challenges of designing a governance structure for a REDD+ strategy in Cameroon. Theoretically, the paper builds on the literature on governance structures for resource management, focusing analytically on the interactions between actor constellations (state and non-state) and institutions (formal and informal) to produce policy outcomes. The paper draws on documentation of REDD+ policy events, policy texts and 23 in-depth interviews with members from government, civil society, research organizations, development partners and the private sector. It argues that although the actors involved in REDD+ are, to an extent, polarized around different issues and priorities, they are nonetheless increasingly distributing roles and responsibilities among themselves. The institutional arrangements within the policy process include: (1) rule-making systems for engagement; (2) expanding existing coordination mechanisms; (3) national safeguard standards; and (4) building on existing forest governance initiatives. The paper concludes that the multiple benefits promised by REDD+, such as poverty alleviation, biodiversity conservation and economic development, are critical for the legitimacy of the mechanism.

5.1 Introduction

The conversion of tropical forests to other land uses, leading to deforestation (i.e. loss of forest cover) and forest degradation (i.e. loss of forest quality), accounts for 12-20% of global carbon emissions (Houghton, 2005; IPCC, 2007; van der Werf et al., 2009). Given tropical forests' role in climate change as both source and sink (Miles and Kapos, 2008), the increase of carbon dioxide emissions from forests points to the potential of forest conservation as part of the solution to climate change (Schlamadinger, et al., 2007). Over the years, the international community has responded with the development of a mechanism to reduce emissions from deforestation and forest degradation, conservation, sustainable management of forests, and enhancement of forest carbon stocks, called REDD+, as a relatively cheap and promising approach for mitigating climate change (Angelsen 2009). In simple terms, REDD+ is intended to establish incentives for developing countries to protect and better manage their forest resources by creating and recognizing a financial value for the additional carbon stored in forest ecosystems (Corbera and Schroeder, 2011).

Many studies that have made prognoses about a future global architecture for the REDD+ mechanism in the post-Kyoto era. Angelsen (2009) and Okereke and Dooley (2010) point out that certain REDD+ elements have implications for national implementation. These elements include the scale at which crediting for carbon sequestration takes place (project or national), performance indicators (policy structures or quantified carbon) and financing (funds or markets). However, the trend of the REDD+ debate is gradually shifting away from the initial concerns on technical and methodological issues such as additionality (whether the reductions in emissions are new), permanence (the extent to which forests can permanently store carbon), leakage (reduced emissions in a project area cause unsustainable practices and increased emissions elsewhere) and setting a reference baseline (relative to a projected business-as-usual scenario) (IPCC, 2007). Increasingly, (inter)national debates on REDD+ among experts focus on structural issues (policy reforms and socio-economic transformations) such as: should REDD+ be market-based or fund-based; is REDD+ cost-effective compared to other mitigation options; do deforesting countries have the capacity to successfully implement REDD+; can REDD+ generate enough investment flows to compete with other land uses;

and can REDD+ deliver beyond its emission reduction mandate to include biodiversity conservation, poverty reduction and economic development (so-called co-benefits and safeguards) (Grainger et al., 2009; Streck, 2010; Skutsch and McCall, 2010; Karsenty and Ongolo, 2012; Dkamela, 2011; Kanowski et al., 2011; Agrawal et al., 2011; Vatn and Vedeld, 2011; Lederer, 2012; Visseren-Hamakers, Gupta et al., 2012; Visseren-Hamakers, McDermott et al., 2012).

National governments of many forested tropical countries, especially those of the three major tropical forest biomes (Amazon, Congo Basin and Borneo-Mekong) have expressed their interests in REDD+. In Central Africa, all six countries sharing the Congo Basin forests, including Cameroon, consider REDD+ a useful initiative to reward national forest conservation and management efforts (Okereke and Dooley, 2010). Cameroon's interest in REDD+ stems from various past and present problems. First, the current deforestation rate in Cameroon, at about 1% per annum (2000-2010), is arguably the highest in the Congo Basin region (FAO, 2011), and slowing the deforestation rate and maximizing social and economic benefits by promoting sustainable forest management (SFM) has over the years become the core of many forest-related reforms in the country. Second, the main drivers of deforestation and forest degradation in Cameroon are known to be agriculture, particularly shifting slash and burn cultivation, and wood extraction (Bele, 2011; Dkamela, 2011). This understanding of the direct and proximate causes of deforestation and forest degradation represents a solid starting point for implementing REDD+. Third, forest governance is considered an important part of Cameroon's broader forest and environmental policies. On top of its international commitment to forests, biodiversity and climate change, Cameroon has embraced diverse governance initiatives such as forest decentralization (community forestry), certification schemes and the Forest Law Enforcement, Governance and Trade (FLEGT) process of the European Union (EU) aimed at achieving legal and sustainable forest management (Dkamela, 2011).

Many studies have focused on different aspects of the REDD+ mechanism in Cameroon, including organizational and management set-up, policy discourses, perceptions of opportunities and challenges, technical capacity for carbon measurements, social issues and implementation capacity (Dkamela, 2011; Bosquet, 2011; Somorin et al., 2012; Brown et al., 2011; Brown, 2011;

Awono et al. 2013). This paper builds on these approaches while focusing on the centrality of governance arrangements as a determinant of positive REDD+ outcomes. As a point of departure, the paper builds on the idea that a country's mix of actors and stakeholders and its institutional context are critical for its REDD+ governance architecture. It also presupposes that governance debates integrate other issues such as monitoring, verification and reporting (MRV) systems, co-benefits, tenure and land-use rights, and benefit-sharing.

The data for this article draws on an extensive documentation of the policy events on REDD+ in Cameroon between 2008 and 2011. These policy events include workshops, symposia, national dialogues, and project meetings organized by different organizations including those from government, civil society, development partners and the research community on REDD+ policy strategy in Cameroon. A number of research and development project documents on REDD+ were also consulted in order to understand the research gaps identified by these projects. We reviewed the country's readiness plan idea note (R-PIN) submitted to the World Bank's Forest Carbon Partnership Facility (FCPF). Finally, we conducted interviews with 23 stakeholders from government, national and international non-governmental organizations (NGOs), development partners, research organizations and the private sector. The selected interviewees have been actively and consistently involved in the REDD+ process in Cameroon during the research period. All interviews were conducted face-to-face using a conversational approach in order to give room for deeper probing on the issues under discussion.

The remainder of the paper is organized as follows. The forest contexts in Cameroon, including the factors causing deforestation in the country, are presented in section 2. Section 3 presents a theoretical focus on governance structures for REDD+. Section 4 presents the results and discussion along two main ideas: actor constellations and institutional arrangements. In section 5, the paper looks ahead into the future of REDD+ in Cameroon. The paper concludes in section 6 with a summary of the findings.

5.2 The forest context of Cameroon: deforestation and its drivers

For the last two decades, Cameroon has been at the forefront of the Congo Basin countries due to its innovative forestry legal framework. Promoting the sustainable management of forest resources through conservation and production has been at the heart of Cameroon's 1994 Forest Law, regulating forests, wildlife and fisheries and implemented in the 1995 Forest Decree (Cerutti et al., 2008; Sonwa et al., 2012). Forests cover about 20 million hectares, representing 42% of the total land area, in Cameroon (FAO, 2011). The forest is predominantly distributed throughout the southern half of the country and is divided into the permanent forest domain (PFD) and non-permanent forest domain (nPFD). The PFD includes the timber concessions, or forest management units (FMU), and protected areas (national parks, wildlife reserves and sanctuaries) while the nPFD includes the community forests, private forests, agreed cutting areas (*vente de coupe*) and areas for mining (Cameroon R-PIN, 2008). Deforestation has been increasing over the decades. Dkamela (2011) reports that the 2006 FAO's data on the annual average deforestation rate in Cameroon was 0.6% for the period 1980-1995. The rate reportedly increased to 0.9% for the 1990-2000 period and peaked at 1.0% between 2000 and 2005. The latest data suggests that the most recent deforestation rate (2005-2010) is 1.07% (FAO, 2011). Forest degradation is also widespread in the country's forests, although statistical data are relatively scarce. Dkamela (2011) reports that a 2003-2004 evaluation of the national forest resources indicates that a quarter of Cameroon's forests has not been disturbed; therefore, 75% of the forest cover is subject to human pressure, especially from selective logging, which is known to be the main cause of forest degradation in Cameroon.

Analyzing the drivers of deforestation and forest degradation in Cameroon is a very complex undertaking. First, this complexity is partly due to the problem of defining what constitutes a forest, which is critical to analyzing the forest cover dynamics across the diversity of vegetation types of many tropical countries. Second, there is a dearth of accurate and reliable data on forest cover in most Central African countries, including Cameroon. Third, most of the often-mentioned drivers are themselves consequences of underlying political, economic and social factors affecting the management of resources

in the country. For this study we report deforestation and forest degradation drivers listed in the country's R-PIN, which include: development of agricultural activities (especially slash and burn agriculture), illegal exploitation of timber, fuelwood exploitation, selective logging in FMUs, development of the mining sector, and demographic growth. Robiglio et al. (2010) suggest that the changing nature and patterns of deforestation and forest degradation drivers in Cameroon mean that past drivers might not necessarily be indicative of future drivers (e.g. large-scale commercial agriculture), an observation which might have implications for implementing REDD+.

The fact that historical data on carbon in Cameroon have not been consistently compiled has led to many estimates of carbon stocks in forest biomass due to the different methodologies used by the various sources. According to data from FAO (2011), carbon stocks in Cameroon show a decrease from 3.29 Gt in 1990 to 2.69 Gt in 2010. In addition, at the reported 135 tons/ha of forest biomass carbon and a deforestation rate of about one percent in a forest that is considered biologically rich in flora and fauna, Cameroon is one of Africa's most viable and relevant REDD+ countries.

5.3 The governance arrangement for REDD+: a theoretical perspective

In the last two decades, the concept of governance has become one of the key concepts in political sciences, political geography and public administration (Pierre, 2000; Krajer, 2004). In its broadest interpretation, Arts and Visseren-Hamakers (2012) report that governance is about the many ways in which public and private actors from the state, market and civil society govern public issues at multiple scales, autonomously or in mutual interaction. A growing interest in the study of governance can be viewed as a response to the mounting complexity and multilayered nature of environmental problems which are not adequately addressed by government (Bulkeley, 2005; Buizer et al., 2011). To address the myriad of complex environmental issues facing humanity today, environmental governance has received increasing scientific attention. Environmental governance is about forming institutional structures that create values, rules and norms influencing actions, processes and outcomes

intended to solve environmental problems. It entails how environmental goals are established, how rules are defined for reaching the established goals and, finally, how policy outcomes are produced following the use of the defined rules (Lemos and Agrawal, 2006; Paavola, 2007; Vatn, 2010).

Generally speaking, both the theory and practice of governance emphasizes the complex set of institutions and actors that are both drawn from but also beyond government towards collective decision-making (Stoker, 1998; Ansell and Gash, 2008). Vatn and Vedeld (2011) argue that two main elements are fundamental to governance: the *type of actors* involved, characterized by their capacities and competencies; and the (formal and informal) *institutions* that facilitate interaction and coordination between actors (see Figure 5-1). In the context of REDD+, the interactions between actor constellations and institutions form the pillar of REDD+ governance at the local, national and global levels. Vatn and Angelsen (2009) emphasize that any national REDD+ architecture should involve a governance structure which defines the capacities and responsibilities of the different actors involved, and the institutional rules for their interaction. Similarly, Agrawal et al. (2011) have asserted that implementing a future REDD+ mechanism requires collaboration across the actors and institutions interested in enhancing carbon, biodiversity and livelihood outcomes.

At the global level, despite the fact that governments are playing leading roles in the negotiations for an international architecture of forest-based mitigation and coordinating national structures for implementation, REDD+ should nonetheless be seen as a form of governance. This is because there are multiple actors and interests involved, an example of the notion of 'governance beyond government' in managing natural resources, including the forest sector. For this reason various scholars have argued that the processes that shape the REDD+ mechanism exhibit a contemporary form of governance (Schroeder, 2010; Kanowski et al., 2011; Thompson et al., 2011). REDD+ is a governance process with multiple actors, interests and activities, involving several sources of formal and informal power and authority (UN bodies, multilateral organizations, governments, but also community and indigenous organizations, NGOs and the private sector), which influence each other in ways that may or may not coincide with their interests and vision on what a strategy of forest governance

should actually look like (Bulkeley and Newell, 2010; Corbera and Schroeder, 2011; Visseren-Hamakers and Verkooijen, 2012).

As it takes shape on the ground, nationally and locally, REDD+ involves a particular framing of the problem of climate change and its solutions that validates and legitimizes specific tools, actors and solutions while marginalizing others (Thompson et al., 2011). In sum, seeing REDD+ as a form of governance acknowledges that there are: multiple interests and actors with stakes in forests; multiple forest ecosystem services or outcomes (carbon, livelihoods and biodiversity); differentiated management systems; intricately complex drivers of deforestation and forest degradation; and unresolved methodological issues (additionality, leakage, permanence). Some have argued that REDD+ is a 'climate governance experiment' which is not only about keeping carbon in forests, rather how the world's tropical forests are governed (Lederer, 2012).

Governance failure has been considered to be the source of many resource management problems (Pahl-Wostl, 2009). From this perspective it follows that effective governance will be the linchpin that determines the success or otherwise of REDD+ (Angelsen, 2009; Corbera and Schroeder, 2011; Lederer, 2012). While international negotiations are still ongoing for a REDD+ regime (Angelsen, 2009) many countries are already negotiating national REDD+ policy strategies. Similar to those researchers who have analyzed the institutional and governance arrangements and frameworks for REDD+ (Vatn, 2010; Peskett et al., 2011; Thompson et al., 2011), we focus on the interaction between actor constellations and the institutional arrangements that will produce the desired REDD+ outcomes (Figure 5-1).

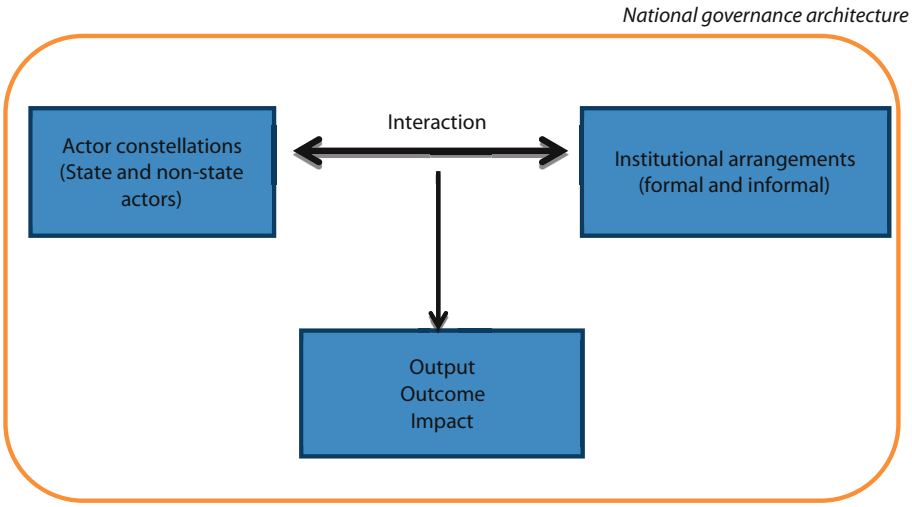

Figure 5-1: Conceptual framework for the governance structure for REDD+

5.3.1 Actor constellation: types, roles and capacity

Understanding agency (the capacity of actors to exert influence) in governance studies requires an analysis of how state and non-state actors actively shape policy actions and outcomes. Here, actors refer to the individuals, communities, organizations and networks that participate in decision-making related to REDD+ (Corbera and Schroeder, 2011). Actors may contribute to the purposeful steering of constituents either indirectly (by influencing the decisions of other actors) or directly (by taking decisions). They are thus an integral part of the cumulative steering effort towards responding to global and local environmental change (Biermann et al., 2010; Schroeder, 2010). Actors can exert agency in policy-making through various ways, including consultations in which they provide input or feedback; involvement as a partner seeking to ensure that their views and concerns are reflected in outcomes; collaborating on an equal footing with policy makers; and empowerment through being conferred decision-making authority (Schroeder, 2010).

A pluralist view of actors involved directly and/or indirectly in international forest governance highlights the role of different stakeholder groups, including government and non-governmental organizations, local community groups,

research institutes, indigenous peoples, forest owners, timber companies, development partners and other actors all of which contribute to what may be seen as an international forest regime complex (Rayner et al., 2010). In the context of REDD+, there is a need to investigate who participates at different levels of governance and how these actors exercise their agency (Corbera and Schroeder, 2011). The analytical questions for understanding agency in the REDD+ policy strategy in Cameroon therefore are: who are the actors and stakeholders involved in the REDD+ process; what specific roles and responsibilities do these actors have; and how do these roles contribute to the overall national REDD+ policy strategy?

5.3.2 Institutional arrangements: formal and informal rules

The institutionalist perspective on providing solutions to the complex problems of environmental deterioration and human well-being in natural resource management is grounded on the belief that a system of rules and norms that extends from the global to the local level can provide a basis for governance by defining, constraining and shaping actors' expectations in different domains (Ostrom, 2005; Biersteker, 2009). As structures, institutions, Scott (2001) argues, include the norms and values that define goals, impose constraints on social behavior and empower social action. Given that no international agreement on REDD+ yet exists, we refer to institutional arrangements in the context of REDD+ governance as the constellations of formal and informal rules, rule-making systems and norms relevant for REDD+ policy implementation. According to Stacey and Rittberger (2003), formal institutions are conscious creations of political actors that are enforceable and which include laws and regulations. Informal institutions are not necessarily synonymous with norms; they are patterns of behavior - sometimes intended, sometimes not - that accrue over time on the basis of repeated interactions. The relative strength of formal and informal institutions are important for any governance regime (Pahl-Wostl, 2009), including REDD+.

Focusing on the constraining influence of rules and norms on actors' strategies and forms of behavior for REDD+ is essential for understanding the mechanism's implementation approaches. As Peskett et al. (2011) have noted, as a form of payment for environmental services (PES), the development and

operationalization of REDD+ institutions in practice will likely vary in details, particularly at the national and local levels. This relates to the fact that different types of actors will be affected by different formal or informal sets of rules (including standards, guidelines, agreements, and market incentives) operating at different scales. To guide our research, we therefore ask: what sets of formal and informal rules and guidelines are being designed or deliberated for the national REDD+ process?

5.4 Negotiating a REDD+ strategy in Cameroon

5.4.1 REDD+ actors in Cameroon

Like many other REDD+ countries, Cameroon has its own unique mix of actors and stakeholders involved in the deliberation, negotiation and design processes of a national REDD+ policy strategy. These actors consist of a blend of state (government ministries, parliamentary commissions and regional political bodies) and non-state (research, civil society, international organizations and development partners) actors. The coordination of the REDD+ process in Cameroon has been spearheaded by the Ministry of Environment and Nature Conservation (MINEP). MINEP has established a Climate Change Unit under the Ecological Monitoring and Control Unit within the ministry to oversee the management of the events and processes involved in designing a national REDD+ strategy. As the voice of the government of Cameroon, MINEP submitted the country's R-PIN to the World Bank FCPF in August 2008. MINEP is also coordinating the consultation process towards the readiness preparation proposal (R-PP) submission. The Ministry of Forest and Wildlife (MINFOF) is another state actor involved in the REDD+ process as the manager of the country's forests. While the organizational role of MINFOF is not as pronounced as MINEP, MINFOF's expertise in forest management systems and policies, which includes forest cover, deforestation rates and drivers, forest monitoring and forest legislation, is essential for different aspects of REDD+. The interaction between MINEP and MINFOF is critical to the overall coordination of the national REDD+ processes. However, their current interaction is challenged by leadership issues related to managing the overall coordination of the national REDD+ strategy.

Civil society in Cameroon is deeply involved in the REDD+ process. NGOs perform roles such as advocating for interests and rights of local communities in the national REDD+ policy process. Within the civil society community, international and national NGOs including IUCN (International Union for the Conservation of Nature and Natural Resources), Centre for Environment and Development (CED) and World Conservation Society (WCS) have clearly expressed their interest in a REDD+ program that is pro-poor and which does not undermine the livelihoods of local forest-dependent communities. To make a case for this, some NGOs are front-running the implementation of REDD+ pilot projects in Cameroon in order to gain experience and develop an understanding of the potential challenges and conditions for success (Awono et al., 2013). These NGOs act as a bridge between the local communities and the state. On the one hand, they spread REDD+ awareness among local communities and collect information on local systems related to REDD+. On the other hand, they participate in national dialogues and stakeholder engagement meetings to contribute to the design process. Only a few of the international NGOs were among those consulted during the R-PIN preparation, but a growing interest from civil society has led to more engagement in the R-PP consultation process. The series of policy events and our interviews showed the selectivity involved in REDD+ echoed by civil society actors in Cameroon. Their interest in REDD+ focuses on the human components: local livelihoods, tenure and access, benefit-sharing, equity and capacity building. They are rarely concerned with methodological issues such as leakage, permanence and additionality. Civil society actors have especially raised the profile of the social safeguards in the national REDD+ strategy.

As a coordinating actor, MINEP continues to build on the technical expertise currently available in Cameroon through its interaction with research organizations, including Institute for Agricultural Research and Development (IRAD), Center for International Forestry Research (CIFOR), French Institute for Agricultural Research and Development (CIRAD) and national universities. These organizations are frequently invited to provide scientific analyses across a myriad of domains related to the REDD+ debate, including forest governance, forest carbon monitoring, deforestation mapping and biodiversity with the aim of building knowledge systems needed for a successful policy strategy. Beyond providing scientific information, some of these research organizations also play

other roles, including organizing information workshops (facilitation) where stakeholders are brought together to engage in dialogues and exchange of information that can feed into the national process. The authority that the research community exercises in mapping the knowledge systems for REDD+ in Cameroon contributes to their agency as they are able to influence the decisions on the MRV system and governance requirements for achieving the REDD+ outcomes stated in the R-PIN. As actors with an array of technical expertise, the research community brings the attention of other REDD+ actors to the implications of 'carbonizing' the Cameroonian forests through REDD+ in the light of other pressing development challenges such as poverty and low infrastructural and economic development.

Development partners, both state and non-state actors and including the World Bank, African Development Bank (AfDB), German International Development Cooperation (GIZ) and European Union (EU), continue to be among the leading actors involved in the REDD+ process in Cameroon. Their roles consist of direct funding of REDD+ pilot projects, financing stakeholder meetings and workshops, providing technical expertise and experience for capacity building and occasionally mediating the information flow between state and non-state actors. For instance, the EU financed the Central Forest Observatory project which produced the first homogenous cartographic cover of deforestation and forest degradation in Congo Basin countries. Similarly, GIZ has commissioned a number of forest monitoring projects throughout the country (Cameroon R-PIN, 2008). Furthermore, as the funding agency for the REDD+ process in Cameroon, the World Bank monitors and assists in the development of the national strategy through the Bank's participation in many of the stakeholder meetings and dialogues. More importantly, the Bank supervises the R-PP consultation process and offers advisory services on policy implementation. While development partners might not be directly involved in the decision-making process, their transformative role in shaping the behavior of other actors is undeniable. Enforcing a participatory process as a condition for accessing the FCPF, influencing the REDD+ outcomes by reconfiguring the interactions between the actors and rule-making systems, and creating space for an equitable approach, are among the ways these actors exercise their agency.

Unlike other actors, the private sector, mainly timber companies and agri-business groups, is less involved in the REDD+ process, at least at this stage. A network of private players in the agriculture, agro-industry and mining sectors claim they have lay knowledge of the REDD+ mechanism in Cameroon, although they are yet to be fully involved in the process. This is unfortunate where these actors' activities are closely related to the drivers of deforestation and forest degradation in Cameroon. The fact that implementing REDD+ would inevitably need the private sector to make sustainable land use decisions makes their inclusion or exclusion critical for successful implementation.

Understanding the agency around REDD+ in Cameroon might first entail defining in which institutional context REDD+ should be placed. Choosing the appropriate state actor expected to lead the coordination of REDD+ partially depends on whether the mechanism is regarded as a climate change or forestry project. Among many of the possible options for effective leadership, establishing a National REDD+ Committee which brings together state and non-state actors seems to resonate with most actors. However, concerns continue to exist on the willingness of different actor groups to cooperate, particularly those outside the forest sector. Equally important to the coordinating roles of the government actors is the design of the required institutional arrangements to meet specific REDD+ outcomes. Besides its active role in leading national debates on policy design, the state explores collaboration with other countries in the region through the Central Africa Forests Commission (COMIFAC) and globally through the United Nations Framework Convention on Climate Change (UNFCCC), in order to contribute to the negotiation of international agreements for REDD+ as well as to learn from other countries' policy strategies. The capacity of the state to reinvent itself as a learning organization that takes advantage of the expertise offered by other actors in global networks is critical to its ability to perform the required leadership and coordination role in designing a national REDD+ strategy.

Overall, the interactions between actors reflect their vested interests and preferences in the REDD+ process. In order to amplify the expression of their interests, some actors have formed coalitions within and across their actor groups to draw attention to specific aspects of the policy process. Additionally, some actors have become increasingly active in national dialogues concerning

the structure and content of REDD+ projects, policy measures and even international negotiations. For instance, a national NGO like CED attends most international meetings and engages in multiple partnerships, to the extent that the organization is arguably more knowledgeable on REDD+ issues than most government actors, especially on social safeguards. In most cases, interactions among actor networks have led to more cooperation in information sharing and capacity building. A network of non-state actors, including IUCN and AFMN (African Forest Model Network), has increasingly made technical and financial resources available to support the activities of the state, especially where the state recognizes its deficiencies in providing timely leadership for the REDD+ mechanism.

5.4.2 Institutional arrangements for REDD+ in Cameroon

There are currently no formal rules, such as laws or regulations, designed specifically for REDD+. As mentioned above, the fact that no international agreement exists on REDD+ under the UNFCCC means there are no formal rules or binding principles at the global level governing REDD+. Furthermore, Cameroon is still at the early stage of negotiating a REDD+ policy strategy, as it is currently involved in a consultation process towards its readiness preparation proposal. Therefore the focus in this analysis is largely skewed towards the informal institutions related to different rule-making systems. For the multiple actors involved in the REDD+ process, envisaging what set of rules and norms would be critical for implementation under a REDD+ regime is extremely important in shaping actors' interactions and delivering REDD+ outcomes.

The institutional arrangements within the REDD+ policy process in Cameroon fall into two broad categories: the negotiations for designing new (formal and informal) rule systems to structure actors' participation in the REDD+ governance process; and existing institutional practices and norms within the environment and forest sectors that the REDD+ mechanism could build on. The former raises the question of whether countries should proceed with REDD+ implementation outside globally-agreed rules and norms. With respect to the latter it may be argued that even if specific internationally-agreed REDD+ rules are developed, they will likely be similar to existing environmental norms and practices. We now consider four dimensions of a possible REDD+ institutional

arrangement for Cameroon: (i) rule-making platform system, (ii) coordination mechanism (iii) existing institutional initiatives, and (iv) safeguard standards.

First, fuelled by allegations of low engagement of different stakeholders in the national REDD+ process (Dkamela, 2011), Cameroon is currently designing informal engagement rules for organizing and coordinating roles and responsibilities through a stakeholder platform. The platform under negotiation is a rule-making system that will govern the national REDD+ strategy. It would structure the participation of the actors along with their interests and roles across multiple aspects of REDD+. Two models have been proposed. First, a platform could be structured along thematic areas (such as MRV, benefit sharing and social safeguards) where different stakeholders are members of each sub-platform. Representatives of each sub-platform would then be members of the national platform. The second model is for the platform to be structured along actor groups, where sub-platforms of civil society, development partners, research community, government and the private sector are formed. Similarly, representatives of each sub-platform then become members of the national platform. These platforms would seek to define, negotiate and design institutional rules for the national REDD+ strategy. This lends itself to the idea of governance beyond government, in so far as the future institutional rules for REDD+ might not be developed top-down by the government alone. The direction the R-PP process is taking suggests that Cameroon supports the actor group based model to engage multiple actors in defining rules, priorities and approaches for the REDD+ policy strategy at the national level. As an institutional arrangement, the rule-making platform focuses on fundamental elements such as the governance of benefit-sharing, communication, MRV, guaranteeing rights (customary, land title, community forestry and carbon rights), capacity building, financing mechanisms, and education and research. These elements form the core of the political institutions for REDD+ in Cameroon.

Second, the expansion of a longstanding consultation mechanism in Cameroon called the Consultation Circle of Partners of MINFOF/MINEP (CCPM) to REDD+ issues is providing a vital coordination mechanism for implementation. For over ten years, the CCPM has brought together donors and international organizations to support the work of the two ministries MINFOF and MINEP. As a

new initiative, REDD+, which is located at the interface of the two ministries, has gained the interest of CCPM. The CCPM functions as a coordination mechanism which sets operational rules for the two ministries in delivering SFM within the Forest and Environment Sector Programme (FESP). SFM is well-entrenched in forest management policy in Cameroon, and the interest in REDD+ policy in the Congo Basin led by COMIFAC is based on its experience with SFM, suggesting that CCPM's institutional functions are relevant for REDD+ policy in Cameroon. The CCPM has initiated a broad set of national rules, guidelines and practices for coordinating the REDD+ process in Cameroon, particularly in the light of other pressing development issues such as poverty and economic development. National commentators have argued that REDD+ strategies and approaches in Cameroon need to be defined, along with the boundaries of engagement of rules and norms, that is, not just rules on the participation of actors, but also on their responsibilities towards making REDD+ implementation a reality. This helps explain why actors perceive CCPM as a vehicle for bringing these interests to the attention of the state actors. Additionally, as a coordination mechanism which provides institutional functions, CCPM's ability to manage the interactions between state and non-state actors in designing rules relevant for forest management under a REDD+ regime is fundamental to REDD+ governance in Cameroon. Under CCPM's recommendation, there is currently an ongoing effort to design a new forest policy and law that is compliant with climate and biodiversity issues.

Third, a prominent question for the policy process in Cameroon is how the national REDD+ policy strategy could build on the experiences with the existing institutional arrangements such as certification schemes, community forestry, FLEGT and its voluntary partnership agreement (VPA) process, and the forest taxation regime. Many commentators have raised the importance of learning from the implementation of these tools for REDD+. Specific examples include how actors developing the MRV system within REDD+ can learn from the independent auditing system of the FLEGT process. In the same vein, other aspects of REDD+, such as rules and guidelines for benefit sharing mechanisms, could be designed based on lessons from community forestry and forest taxation schemes. Dkamela (2011) suggests that Cameroon's experience during the past decade with the redistribution of forest and wildlife fees could be instructive for REDD+ rules for benefit-sharing. Conversely, experience

in private, governance-driven certification schemes could provide insights on governance systems outside the state as well as how markets incentivize good practices in forest management. Some interviewees argued for the transformation of all existing tools and schemes towards a REDD+ regime, as emission reductions would be as much a priority as other co-benefits. One respondent argued for strengthening existing institutions rather than designing entirely new ones.

Fourth, the longstanding issues of community access and tenure in Cameroon's forest sector have led to the negotiation of national REDD+ safeguard standards. The national safeguard standards are being negotiated to structure the participation of local community groups and their access and tenure arrangements under REDD+. Awono et al. (2013) have investigated how such safeguard standards, especially tenure and local participation, can both manage the expectations around REDD+ and structure incentives for sustaining local livelihoods. Most non-state actors are of the opinion that such standards would need to prescribe sustainable land-use systems for emission reductions as well as benefit-sharing mechanisms. The standards would also need to consider questions like 'who owns the carbon and who has the rights to any stored carbon?' Although the standards' negotiation in Cameroon is still in an early stage, leading actors from civil society groups are advocating for the R-PP consultation and drafting process to consider them as a critical element of the policy strategy. The importance of these standards is also likely to be extended to incorporate evaluative indicators and criteria for monitoring the co-benefits that REDD+ promises. As earlier alluded to as a premise for this research, the range of social issues on safeguards and the collective search for solving the complex issues of balancing multiple forest outcomes (carbon, biodiversity and livelihoods) are very much embedded in the governance structure for REDD+ in Cameroon.

The highlighted institutional arrangements for a national REDD+ strategy seek to institutionally strengthen the process by accentuating (formal and informal) rules that are *regulative* in nature and which tend to constrain the activities of different actors. Interestingly, despite the potential of these rules to regulate the participation and practices of the actors, there nonetheless seems to be a consensus among these same actors for the need to design these rules. In a

way, this reflects the collective eagerness to get REDD+ started in Cameroon. Furthermore, beyond engagement rules, the heightened awareness of the need for national rules and guidelines on REDD+ projects and policies has paved the way for evaluating all current forest laws and policies for their compatibility with REDD+. More importantly, the character of these informal rule-making systems still suggests that formal rules would need to be in place before national projects are implemented. One might argue that the informal rules might be effective in engaging multiple actors. However implementation and delivering outcomes would require formal rules and laws with an efficient legal and institutional framework.

5.5 A REDD+ mechanism in Cameroon: looking ahead

In making sense of the governance arrangement for implementing REDD+ in Cameroon, there is a need to balance the current political will with the required implementation capacity. There is a general consensus that although the capacity is yet to be proven, actors remain positive that mechanisms can be put in place in the short term to achieve implementation in the long term. The long-term implementation time-frame of REDD+ espouses the need for consistency of national leadership as key to coordination. Such national leadership might need to focus on two issues in delivering its coordination mandate: continue to provide enabling conditions for national actors interested in different aspects of REDD+ to interact, perhaps through the emerging stakeholder platforms; and to build external partnerships with donor groups, including the Global Environment Facility (GEF), Congo Basin Forest Fund (CBFF), development partners, and finance corporations, and capacity-building agencies, such as IUCN. The former is required for national actors to actively participate in contextualizing global REDD+ issues and to carve out direction on the national implementation. The latter is important for mobilizing external resources (financial, technical and managerial) for successful implementation.

There is a call for a stronger leadership role for MINFOF in the REDD+ process because of its vast experience with forest distribution, cover, management and resources. Many interviewees confirmed that MINFOF's executive and legislative roles in forest production and conservation, enforcement of

sustainable forest management, and management of forest-related issues are all indispensable to the overall REDD+ process. Dkamela (2011) is of the opinion that the MINEP-MINFOF relationship is central to the development of both horizontal and vertical coordination, and hence a condition for effective REDD+ implementation. In the event that a National REDD+ Committee becomes operational, MINFOF is expected to provide future insights on the forest dynamics in Cameroon in the light of a REDD+ regime, particularly in terms of deforestation drivers, afforestation and reforestation potentials, and the role of forest concessions and production forests.

A number of REDD+ projects are currently being implemented in Cameroon, mostly by NGOs, local community groups and research institutes, leading to a growing community of practice on REDD+. Some of these projects have been undertaken in community forests, protected areas and former agricultural landscapes. Project design and implementation is drawn from local experiences on other initiatives such as reduced impact logging, SFM, agroforestry and sustainable agriculture. In some cases, experiences from pilot projects have shown that little needs to be changed in order for these projects to contribute to REDD+ outcomes. It is in this respect that there seems to be a floodlight on the importance of learning from existing tools, such as integrated conservation and development projects, community forestry, FLEGT and the VPA process, the forest taxation scheme, and certification schemes. Compared to other Congo Basin countries, Cameroon has enormous opportunities to leverage its years of expertise and experience and knowledge on the merits and pitfalls of these instruments and their relative impacts on forest sector development (Brown et al., 2011).

Both as a single state and as a COMIFAC member, Cameroon's commitments to international conventions and norms related to forests, wildlife and biodiversity anchors on sustainable forest management. The increasing rate of deforestation might suggest that SFM is yet to have real impact on the ground. Insofar as REDD+ could generate large investment flows (financial, technical, managerial) and institutionalize governance, the multiple benefits for Cameroon might reach beyond reducing GHG emissions, and also meet targets such as reducing biodiversity loss and desertification. Our analysis leads to the assertion that Cameroon's political will to successfully implement REDD+ stems from the

opportunity the mechanism offers to meet all its international sustainability commitments through a single strategy. However, the feasibility of a "one-size-fits-all" approach working for REDD+ in Cameroon is yet to be proven. It is thus incumbent on the state to design the REDD+ strategy to critically incorporate these multiple objectives or co-benefits.

As the drivers of forest loss are often outside the forest sector, achieving REDD+ should involve coordinating with these sectors in reducing GHG emissions. Given that agriculture is the major driver of deforestation in Cameroon, the passive role of the agricultural sector in the REDD+ process is worrisome. In the same vein, many ongoing national development efforts such as increasing food security, rural development, energy security and infrastructural developments are quite disconnected from the REDD+ process. As poverty reduction is central to any developmental efforts, it is in REDD+'s best interest to align its programs and policies to these mentioned targets, if it is to gain credibility (Nkem et al., 2010). Hence, REDD+ actors and rule systems should foster both vertical and horizontal, and inter- and intra-sectorial coordination mechanisms.

Reflecting on governance as interactions between actors and institutional arrangements, the case study of the REDD+ mechanism in Cameroon shows two intersecting types of interaction. The first relates to how institutions, whether formal or informal, structure interactions between actors. Inherent in these interactions is the role of different actors in structuring their specific roles and responsibilities within the policy process. Apart from seeking to regulate the multiple diverging interests and priorities of these actors, the body of rules and norms being advocated can incentivize REDD+ actors to exercise agency. The second type of interaction relates to the rules, guidelines and shared practices guiding actors in making and implementing decisions towards achieving REDD+ outcomes. The governance structure for REDD+ in Cameroon entails how these two types of interaction are embedded in the policy process.

5.6 Conclusion

Cameroon's interest in designing a national policy strategy for REDD+ is based on the country's desire to reduce deforestation, contribute to climate change mitigation and enhance opportunities for social, economic and environmental benefits. In this paper we have analyzed the policy process through the interactions between the mix of state and non-state actors involved, and the rules and norms in use and being negotiated. The ultimate aim of these interactions is reduced emissions from forests and climate change mitigation, as well as social and biodiversity co-benefits. The willingness of state actors to engage with non-state actors in knowledge exchange, fostering collaboration, building on local experiences from pilot projects and extensive consultation, represents positive steps towards a national REDD+ strategy. However, and as with previous forest policies and initiatives, implementing REDD+ policies in Cameroon is likely to be confronted by a number of challenges which include inadequate institutional capacity, lack of engagement from agricultural actors and inadequate enforcement and monitoring systems (Brown et al., 2011). However the complexity of the causes of deforestation and forest degradation and the human, technical and physical capacity deficits that Cameroon faces mean that achieving all desired REDD+ outcomes is far from guaranteed even if all relevant actors are engaged in the process and effective rules are in place.

Given the combination of the increasing rate of deforestation and forest degradation, an effective REDD+ policy in Cameroon is urgent, desirable and feasible. However, as Kanowski et al. (2011) suggest, the policy and institutional reforms necessary for successful implementation of REDD+ will be substantial and realizing the potential of REDD+ will be "neither fast nor easy". Adaptive structures should be designed that offer room for "learning by doing" during the implementation of the different approaches and elements of REDD+. In addition, the co-benefits promised by REDD+, such as poverty alleviation, biodiversity conservation and economic development, are critical for the overall legitimacy and effectiveness of the mechanism.

Our analysis has identified a number of implementation challenges for Cameroon in the pursuit of a national strategy; they range from the coordinating dynamics of the MINEP-MINFOF relationship to defining the roles of other actors,

particularly civil society and the private sector; from the process of designing institutional rules and guidelines for tenure, rights and safeguards to building on the experiences of existing governance tools for REDD+ effectiveness; and from addressing the underlying causes of deforestation and forest degradation to delivering the co-benefits of poverty reduction, biodiversity conservation and economic development.

Chapter 6

Integration through interaction? Synergy between adaptation and mitigation (REDD+) in the Congo Basin forests

Somorin OA, Visseren-Hamakers IJ, Arts B, Sonwa DJ, Tiani A-M. Integration through interaction? Synergy between adaptation and mitigation (REDD+) in the Congo Basin forests ***Environment and Planning C: Government and Policy*** (to be re-submitted after reviews)

Abstract

Adaptation and mitigation constitute policy responses to climate change at national and global levels across different sectors. As sub-regimes within the climate regime, both adaptation and mitigation have their own actor networks, institutions and management structures. In the forest sector, including the Congo Basin forests, policy strategies such as reducing emissions from deforestation and forest degradation (REDD+) mechanism have potential to contribute to global climate mitigation effort. Similarly, the forests contribute to support the adaptation of populations and economies dependent on climate-sensitive sectors including agriculture, fisheries and energy. Using Cameroon to represent the Congo Basin, this article investigates the strategies of policy actors in building synergies, to the extent that the *priority* of adaptation interacts with the *opportunity* of REDD+, and vice-versa. Theoretically, the paper combines the concepts of policy integration, institutional interaction and interaction management. Results show that on institutional interaction: adaptation and REDD+ actors employ a broad range of cognitive elements, including ideas, knowledge, expertise and information to foster synergy. A prominent means of managing these interactions include: the establishment of ONACC as an overarching institutional framework to provide operational guidelines for policy implementation. Beyond adaptation and REDD+, Cameroon's interest is to integrate other environmental issues such as biodiversity conservation and desertification control along with poverty reduction into economic and development policies and planning.

6.1 Introduction

Climate change is regarded as one of the greatest environmental problems humanity currently faces. Within the United Nations Framework Convention on Climate Change (UNFCCC), the global responses to climate change broadly fall in two main categories: those seeking to curb or stabilize the level of emissions of greenhouse gases into the atmosphere - mitigation; and those seeking to boost natural and human systems resilience to respond and recover from potential impact of a changing climate - adaptation (Lemos and Agrawal, 2006; IPCC, 2007). Despite both responses (adaptation and mitigation) sharing the ultimate purpose of reducing the impacts of climate change, there still exists inherent differences in their respective approaches (Klein et al, 2005; Locatelli et al, 2011). These differences, including relevant sectors, urgency, spatial and temporal scales, can cause potential trade-offs between both climate responses (Tol, 2005; Locatelli et al, 2011). Nevertheless, many authors have recognized the existence of common features between adaptation and mitigation. They argue that they often both share common social, economic and political issues including governance, institutions, local livelihoods, tenure and rights of indigenous people, protection of vulnerable groups, democratic decision-making process, and links between scales (Ravidranath, 2007; Swart and Raes, 2007; Jones et al, 2007; Ayers and Huq, 2009; Campbell, 2009; Somorin et al, 2012).

Tropical forests play important roles in both adaptation and mitigation, as they provide local ecosystem goods and services relevant for adaptation, as well as the global service of carbon sequestration relevant for mitigation (Dang et al, 2003; Brown et al, 2011). Many forested countries in the tropics, including the Congo Basin region, have recognized the dual roles of their forests to contribute to their adaptation and mitigation strategies. The Congo Basin forests provide important ecosystem goods and services such as non-timber forest products, timber, watershed managements, and water and biodiversity conservation, to support local efforts in reducing vulnerability to climate risks (Nkem et al, 2010, Pramova et al, 2012; Sonwa et al, 2012). For mitigation, the vast amount of carbon stocks the forest harbours underpins its potential for REDD+, reducing emissions from deforestation and forest degradation, including the role of conservation, sustainable management of forests and enhancement of carbon

stocks in developing countries (Brown et al, 2011, Visseren-Hamakers et al, 2012; Somorin et al, 2013).

Politically, national strategies for adaptation and mitigation in the Congo Basin region continue to attract debates on issues of institutional frameworks for effective policy implementation. Actors involved in the adaptation and mitigation debates in the region, however, seem to agree on several main perspectives. First, there exists a clear recognition that adaptation is a *priority* for the millions of people directly dependent on forests for their livelihoods. Adaptation policies and strategies would involve using the forests to increase people's adaptive capacity against climate risks as well as reducing the threats that could potentially make the forest ecosystem more vulnerable to climate risks (CBFP, 2010; Sonwa et al, 2012; Bele et al, 2013). Second, there is wide recognition that mitigation, particularly REDD+ is an *opportunity* to contribute to global mitigation efforts, and that the financial compensation accrued from such contribution can incentivize poverty reduction, forestry development and biodiversity conservation efforts within the region (Brown et al, 2011; Awono et al, 2014; Somorin et al, 2014). Finally, many actors support pursuing synergies between adaptation and mitigation strategies such that the *opportunity* of REDD+ can meet the *priority* of adaptation, and vice-versa.

This article studies the relationships between climate change adaptation and mitigation (REDD+) policies in the Congo Basin, and the efforts by policy practitioners to improve these relationships and thereby enhance synergies. It combines the concepts of policy integration, institutional interaction and interaction management. We thus analyze the interactions and/or integration between two forest-related climate change policies, adaptation and REDD+, with both policies influencing one another. In doing so, we use Cameroon to represent the Congo Basin region.

The three concepts are all in essence meant to study similar phenomena, namely the relationships between different policies, but at different levels of governance, with policy integration focused on the national and regional (EU) levels, and institutional interaction and interaction management on the global level. Whereas for years, the theoretical debates on policy integration on the one hand and institutional interaction and interaction management on the

other hand evolved in relative isolation from each other, only recently have attempts been made to bridge the gap among these concepts (Oberthür, 2009; Nisson et al, 2009).

Contrary to Oberthür, who stresses the differences between the concepts, we choose to combine these concepts on the basis of their similarities. Oberthür (2009) argues "*While the integration of sectoral policies is a common challenge at all governance levels, policy integration at the international level cannot rely on the political structures available at the national or European level. It requires interplay management, i.e. managing the interaction of various independent sectoral governance systems and their policies without elaborate structures and designated fora – rather than coordinating…*" (page 374). Oberthür's main argument for highlighting the differences is thus that policy coordination at the global level takes place in different manners than at the national level, due to the lack of a global central authority. While this is true, we argue that given the fact that at all levels of governance, steering authority is increasingly shared by different types of actors, including not only governments, but also market and civil society actors, 'classical' policy integration also plays a less prominent role at the national level. Thus, after the 'shift from government to governance' (Rosenau and Czempiel, 1992), the differences between the manner in which policy coordination takes place at the global and national level are decreasing, although governments and intergovernmental organizations of course retain a prominent role, also in contemporary governance (Visseren-Hamakers et al, 2012). All three concepts can therefore be applied to study the relationships between different (public and private) policy instruments.

With this article, we thus aim to contribute to the further conceptualization of the combination of the concepts of policy integration, institutional interaction and interaction management. Important argument for bringing the debates on these concepts together, as highlighted above, is the fact that even though the literatures have a lot in common, authors involved in these debates have only recently started communicating with each other. Moreover, policy integration could be regarded as being under-theorized (Lafferty and Hovden, 2003; Nilsson and Persson, 2003), and could therefore benefit from the detailed operationalization of the concepts of institutional interaction and interaction management. Also, the concept of policy integration is often approached from

a normative point of departure, especially when focused on environmental issues (environmental policy integration), in which environmental issues are considered more important than others (Lafferty and Hovden, 2003), while the concepts of institutional interaction and interaction management are meant to be used more analytically, to simply 'map' the linkages between different policies. This more analytical perspective can be considered more appropriate to study the relationships between two climate change policies.

In making the case for 'synergy' in this article, reference is drawn to the definition of synergy given by IPCC (2007). It refers to the interaction of adaptation and mitigation so that their combined effect is greater than the sum of their effects if implemented separately (see the equation below). As a starting point, for synergy to occur, there should be interaction between the strategies, approaches, policies or institutions of adaptation and mitigation. In addition, in order for their combined effect to be greater than the sum of individual effects, such interactions might have to be managed to maximize their synergetic outcomes.

$$Synergy = f(Adaptation + Mitigation) > [f(Adaptation) + f(Mitigation)]$$

The rest of the paper is as organized as follows: Section 2 provides the theoretical foundation guiding the research. It presents a conceptualization of the relationship between the concepts policy integration, institutional interaction and interaction management. Section 3 provides an institutional context of forest and climate change adaptation and mitigation in Cameroon. Section 4 provides the information on the methodological account, while the results on the interactions between adaptation and mitigation are presented in section 5. Section 6 presents how such interactions are managed; and section 7 discusses and highlights the main findings of the paper.

6.2 Theoretical and conceptual perspective

Below, we first introduce the concepts of (environmental) policy integration, institutional interaction and interaction management, after which we conceptualize the relationships between them.

6.2.1 (Environmental) Policy Integration

The call for more policy integration or coordination is increasingly heard among scholars and policy practitioners, especially in the area of environmental policy making (Meijers and Stead, 2004). The discussion on Policy Integration (PI) and Environmental Policy Integration (EPI) has become increasingly intertwined, since most of the policy integration literature is often focused on environmental issues (Geerlings and Stead, 2003; Hamdouch and Depret, 2010).

The underlying motivation for EPI is grounded on the need to integrate environmental perspectives as part of the goals, strategies and decision-making procedures of public policy (Nilsson et al, 2009). As an initiative for coordination, EPI implies that environmental objectives are incorporated in non-environmental policy sectors (Lafferty and Hovden, 2003). Such sectors might include, for example, economic and social development, agriculture, trade, energy, infrastructure and transport (Biermann et al, 2009a). Some authors approach EPI from a 'strong', normative stance, arguing for a 'principled authority' of environmental policies over sectoral policies (Lafferty and Hovden 2003, page 9), while others apply a 'weaker' conceptualization of EPI, focused more on coordination (Jordan and Lenschow, 2010).

According to Biermann et al. (2009a), integration within the environmental policy domain may be either external or internal. External integration denotes integration between the environmental policy domain and other policy domains while internal integration relates to that within the environmental realm. Especially in the EU, EPI has attained a formal status in different policies and processes (Nilsson and Persson, 2003). We will use the term policy integration here to refer to both policy integration more generally and environmental policy integration more specifically.

6.2.2 Institutional interaction

Regimes can be regarded as social institutions that define practices, assign roles and guide the interaction of actors of such roles within given issue areas (Young, 1994; Stokke, 2001), with institutions being defined as sets of rules, norms and decision-making procedures (Young et al., 2008). It is now recognized

among scholars of regime theory that the effectiveness of specific institutions often depends not only on their own features but also on their interactions with other institutions (Young, 2002). For instance, the effectiveness of the biodiversity regime would not only be determined by its own set of designed rules, norms and processes, but also through its close interactions with other regimes including climate change, marine and trade (Rosendal, 2001; Oberthür and Gehring, 2006; Visseren-Hamakers et al, 2011).

Understanding the manner in which institutions influence each other is becoming increasingly urgent, since the number of global environmental regimes has grown exponentially over the last decades (Mitchell, 2003), and these intergovernmental arrangements are currently complemented by numerous private and public-private steering instruments (Visseren-Hamakers, 2013). Global environmental governance has thus become increasingly fragmented and complex (Biermann et al., 2009b). In this article we apply these insights to study interactions within one regime, namely the climate regime where within the UNFCCC structure, adaptation and mitigation have their own institutional processes, norms and implementation mechanisms, and thus can be regarded 'sub-regimes' in their own right.

As a first step towards building a theory on institutional interaction, Gehring and Oberthür (2009) developed a conceptual framework for the systematic analysis of institutional interaction.
Building on previous works of other scholars on the importance of understanding the cause-and-effect relationship between institutions (see Stokke, 2001; Raustalia and Victor, 2004; Underdal, 2004; Oberthür and Gehring, 2006), the conceptual framework examines *how* institutions may exert causal influence on each other's development and effectiveness, by exploring causal mechanisms of institutional interaction.

The framework explores four causal mechanisms that elucidate the distinct routes through which influence can travel from one institution (the source) to another (the target) and reveal the roles of various actors in the process. The first causal mechanism, *cognitive interaction*, is based on the power of knowledge, information and ideas, which often relates to inter-institutional learning. Gehring and Oberthür (2009) argue that information and knowledge produced

within one institution, the source institution, may modify the perception of decision-makers operating within the target institution and this significantly affects the decision-making process of this institution. The second, *interaction through commitment*, occurs where normative commitment provides a driver for interaction, based on the premise that international obligations create at least some binding force on those they address (Oberthür and Stokke, 2011). Commitments entered into under one institution may induce actors to modify their preferences and negotiating behaviour regarding issues related to another institution (Gehring and Oberthür, 2009). *Behavioural interaction*, the third causal mechanism, is based on the interconnectedness of behaviour across the domains of institutions. This implies that the source institution triggers behavioural changes among actors that affect the target institution (Gehring and Oberthür, 2009). The fourth causal mechanism, *impact interaction*, rests on the interdependence in the ultimate governance targets of the interacting institutions involved. For example, since climate change impacts biodiversity, the climate change regime automatically influences the biodiversity regime.

6.2.3 Interaction management

Interactions between institutions can be managed in order to improve their effects. We use the definition of interaction management by Oberthür and Stokke (2011: page 6), namely "*conscious efforts by any relevant actor or group of actors, in whatever form or forum, to address and improve institutional interaction and its effects*". Interaction management thus denotes efforts to shape and govern institutional interaction (Stokke, 2001; Oberthür, 2009). It assumes that where institutional interaction may occur even without the knowledge/action of the actors concerned (*automatism*), interaction management requires actors' knowledge and reflection on the interaction (*deliberatism*). Essentially, interaction management thrives on deliberate action by relevant actors meant to shape the outcomes of the interaction (Oberthur and Stokke, 2011). The agency-focus of interaction management is oriented towards the ability of individual actors or group of actors to respond to institutional interactions and may even shape their effects when implementing decisions (Oberthür, 2009; Oberthür and Stokke, 2011).

Oberthür (2009) further distinguishes four levels of interaction management or coordination according to differences in decision-making and governance conditions. At the first and highest level, interaction management could rely on *overarching institutional frameworks,* which requires decision-making beyond the interacting institutions. At the second level, *joint interaction management* of the institutions concerned involves targeted efforts to coordinate the activities of interacting institutions and possibly to even create joint rules governing the interaction. Here, the authors argue that coordination requires a communication process across the interacting institutions. At the third level, *unilateral management of individual institutions* requires an even lower degree of coordination. It involves "independent collective action and decision-making within one or more of the interacting institutions, without any coordination between them" (Oberthür and Stokke, 2011: 9). At the fourth and lowest level of coordination, governments and such other actors as civil society organizations (CSOs) and businesses may engage in *autonomous management* efforts at national and regional levels. Individual actors who take decisions on the implementation of international rules and norms, face obvious choices that might influence the institutional interactions.

In addition to the aforementioned levels of coordination towards operationalizing the concept of interaction management, Oberthür (2009) further considers two principal modes of interaction management. The first mode, *regulatory interaction management*, focuses on prescribing, proscribing or permitting certain behaviour, ascribing regulatory authority, and setting rules and norms, to manage interaction. The second mode, *enabling interaction management*, employs cognitive elements (communication, information and knowledge) and the allocation of resources in order to persuade relevant actors, overcome barriers to knowledge and information processing.

6.2.4 Conceptualizing the relationships between policy integration, institutional interaction and interaction management

For the purpose of this article, namely studying the interactions during the policy development and implementation process of REDD+ and adaptation at the national level in Cameroon, the relationship between the concepts can be regarded as follows. Policy integration can be viewed as a specific form of

both institutional interaction and interaction management. Policy integration as institutional interaction is not specifically aimed at enhancing synergies, and can take place as an *automatism*, sometimes even without actors being aware of the interactions or policy integration taking place. Policy integration as interaction management is meant specifically to enhance or enable synergies, and takes the shape of *deliberatism,* as conscious efforts by policy actors.

For *institutional interaction,* policy integration can be conceptualized for the first three types of interactions as differentiated by Oberthür and Gehring (2006). Both cognitive interaction and interaction through commitment can be considered policy integration if *content-related* ideas or knowledge (for the former) and *content-related* rules (for the latter) from the source institution are integrated into the target institution. Behavioral interaction can always be considered policy integration. Impact interaction, however, cannot be conceptualized as policy integration, although impact interaction could be the outcome of policy integration. Moving on to *interaction management*, all four levels of interaction management can be considered policy integration.

Summarizing, we differentiate between three types of institutional interaction, and four levels of interaction management that can be considered policy integration. With this, our conceptualization of the relationship between the concepts of policy integration, institutional interaction and interaction management is inspired by Oberthür's (2009) approach. However, where he integrates the concepts for application at the global level, we argue that our integrated approach can be applied at any level of governance, from global to local, although we apply it here at the national level. Also, where Oberthür translates the concept of policy integration, designed for the national and regional level, for the global level, we apply the concepts of institutional interactions and interaction management, designed for the global level, at the national level (see also Ochieng et al., 2013). Moreover, by relating policy integration to both the concept of institutional interaction and interaction management, we highlight that policy integration can take place not only deliberately, but also not deliberately.

6.2.5 Forest policy and climate change in Cameroon

The natural resources and forests of Cameroon have continuously been at the centre of economic, social, political and environmental debates on their management and sustainability. With a total forest area of 20 million hectares covering about 42% of its territory, Cameroon's forest accounts for about 10% of the massive block of the Congo Basin forests (FAO, 2011). The forest's formal sector contributes up to 10% of the country's gross domestic product (CBFP, 2010). More importantly, the forest is of great significance for local livelihoods of the eight million rural and poor people that depend directly on its goods and services. Over 80% of the local communities are dependent on natural and forest resources for their farming activities and for the collection of fuel wood. No less than 65% of the local communities use fuel wood as primary source of household energy (Topa et al, 2009).

Different economic, social and ecological perspectives have dominated the debates on forest management systems and use. Recently, a new debate on forests' role in climate change is fast emerging as a new political 'struggle' in Cameroon. On the one hand, the forests can offer opportunities for climate mitigation through the REDD+ mechanism (Brown et al, 2011). On the other hand, the impacts of climate change on the forest and other forest-related sectors, including agriculture, water and energy, imply that the forests (and their dependent livelihoods) are vulnerable to climate risks; and as such should adapt (Bele et al, 2011; Sonwa et al, 2012; Munji et al, 2013). Cameroon's forest, which for centuries has represented a national legacy with livelihood portfolios shared by the majority of the population, is now challenged with policy-making systems and strategies for responding to climate change.

Since the early 1990s, Cameroon has undertaken a number of forestry reforms using market-based and legal instruments to promote forest governance, participatory and transparent devolution of management authority to local communities as well as prescriptions for timber harvest and benefit-sharing (Cerutti et al, 2008; Topa et al, 2009). The 1994 Forest Law regulating the forests, wildlife and fisheries (Republic of Cameroon, 1994) under the Ministry of Forest and Wildlife considers sustainable forest management (SFM) as a means of promoting the multiple functions of the forests in the country. SFM

is arguably at the core of Cameroon's ratification and adoption of many global treaties and instruments on forests, biodiversity and climate change (Dkamela, 2011). Cameroon is also considered to be a benchmark for other Congo Basin countries with its innovative forestry legal framework which seeks to entrench forest governance in the sector (Cerutti et al, 2008).

Despite the country's progress in SFM and forest governance, the national architecture of adaptation and mitigation policies and strategies lags behind other countries in the region. Cameroon has just submitted its readiness preparation proposal (R-PP) to the World Bank's Forest Carbon Partnership Facility (FCPF). The R-PP details the institutional arrangement which includes the establishment of a Steering Committee and Technical Secretariat to lead the development of a national REDD+ strategy. The REDD+ national debate involves many actors including several across the government (ministries), civil society, private sectors and research communities. Unfortunately, the national architecture for adaptation policy and strategy has not received the same measure of scientific and political attention. Cameroon does not have a national adaptation programme of actions (NAPA) under the UNFCCC since it is not a least developed country (LDC). Despite reference to the importance of a national adaptation policy in the latest National Communications submitted to the UNFCCC in 2005, Cameroon is yet to design such a policy system. Nonetheless, lessons learned from a collection of climate risks, vulnerability and adaptation projects are now being fed into an entity called National Program for Climate Change Adaptation (PNACC[9]). PNACC is considered as a step towards building a national framework for an integrated and comprehensive adaptation to climate change in Cameroon. Gradually, adaptation is beginning to find its own policy space at the national level in Cameroon.

6.3 Methodology

The article draws from extensive documentation of policy events on adaptation and REDD+ policy developments in Cameroon in the period 2009-2012. These policy events (workshops, national dialogues, conferences, symposia) involved

9 PNACC is a French acronym for Programme National d'Adaptation aux Changements Climatiques. It was established in July 2012 under the auspices of the Ministry of Environment. The PNACC evolved from a US$ 3 million Japanese-funded national adaptation project through the UNDP.

a mix of policy actors from government, civil society, development partners, research organizations and the private sector. Three of the authors have been actively involved in these policy events during this period.

In addition, we reviewed a number of documents on adaptation and mitigation including policy texts, project reports and conference proceedings. On adaptation, as there is no NAPA, reviewed documents include national reports on vulnerability and adaptation studies and proceedings of many national workshops and policy dialogues. For REDD+, we reviewed the readiness plan idea note (R-PIN) and the R-PP submitted to FCPF and a number of other relevant documents.

Finally, we conducted 22 in-depth interviews with governmental, private actor, development partners and civil society stakeholders who are actively involved in the policy process for either adaptation or REDD+, or both. The interview questions focused on their knowledge of national adaptation and REDD+ strategies, organizational mechanisms, and coordination systems. The interviewees also provided information about interactions between adaptation and REDD+ and how in practice such interactions could be managed to produce synergetic outcomes.

6.4 Interactions between adaptation and REDD+ in Cameroon

As a predominantly agrarian society with more than 60% of the total population involved in agriculture and at the same time, about 40% of the land area covered by forests, the policy contentions and/or interactions between adaptation and REDD+ in Cameroon are multi-faceted and multi-dimensional both in space and time. Exploring these interactions is essential for elucidating the opportunities of obtaining maximum benefits from adaptation and REDD+ by enhancing synergies between them. Logically, most of the interactions found are cognitive interactions, given the relative youth of both sub-regimes.

6.4.1 Cognitive interaction

A common and quite-often mentioned point of interaction between adaptation and REDD+ in Cameroon by interviewees is the exchange of information at the management level. The organizational bureaucracy for adaptation and REDD+ are both situated within the Ministry of Environment and Nature Protection under different coordinating units. Interviewed experts of the research community, development partners and NGOs attested to the fact that, in recent times, the adaptation profile of the country has been raised within the Ministry. It is assumed that the flow of information and ideas from the management and decision-making structures of REDD+ has, to a large extent, intensified the policy debate on adaptation. Additionally, a few experiences of localized adaptation-related experiences on the ground have often been presented as lessons for REDD+ projects on the ground. Thus, the regular interaction between the management structures, and their actors, of adaptation and REDD+ has created room for constant exchange of knowledge and ideas, thereby fostering institutional learning between them.

The separate policy development processes on adaptation and REDD+, each involving several meetings, workshops and dialogues, were found to involve the same group of actors and stakeholders. These actors and stakeholders represent the main organizations involved in the national policy dialogue. Accordingly, the actors are well conversant with the specific and common issues confronting policy design of both adaptation and REDD+ at the national level. Invariably, cognitive interaction through flow of ideas and knowledge has undoubtedly shaped each institution's policy process.

For instance, the strong focus of civil society on social safeguards and poverty reduction issues during the stakeholder meetings on REDD+ was largely inspired by the intensity of discussions on vulnerability issues under adaptation meetings. In its bid to be participatory and gain broad consensus of multiple stakeholders, the REDD+ development process has been 'forced' to integrate non-carbon values and social safeguards in its policy process. Policy actors, especially civil society organizations, capture the safeguards commitments of REDD+ as important for adaptation success. These respondents are of the opinion that the more REDD+ incorporates and promotes adaptation-

oriented approaches/strategies, the more it stands a chance of successful implementation. To them, this is because local vulnerable populations are the ones to make land-use decisions consistent with REDD+ targets. A respondent from a prominent non-governmental organization says:

> *The biggest beneficiary of a well-functioning REDD+ policy or project should be the vulnerable forest-dependent local populations. Increasing adaptive capacity of local populations should be the focus of any direct protection or conservation of the forests……..After working in the region for many years and being involved in many conservation programs and initiatives, I can tell you that any program that does not positively impact upon the livelihoods of the people does not stand any chance of success.*

Obviously, the integration of adaptation priorities in REDD+ in its design and implementation is mainly driven by its own framing of conditions for long-term success. This supports Long's (2013) conclusion that REDD+ appears poised to overcome key political struggles that have thwarted earlier efforts to reduce tropical forest loss by making commitment to environmental and social values vital for local livelihoods.

An ample 'window of opportunity' for synergy also lies in the overlap between adaptation and REDD+. For example, a range of potential activities being targeted under REDD+, as discussed in Cameroon's R-PIN and R-PP, include afforestation, reforestation, sustainable forest management and forest conservation. Incidentally, these are the same activities being promoted to enhance adaptive outcomes of both social and ecological systems in Cameroon, as produced in the UNDP/PNAAC Report. The realization of these shared potential activities has seemingly increased collaboration, information exchange and policy learning between the main units in charge of adaptation and REDD+ within the Ministry of Environment and Nature Conservation.

Another central area of overlap between adaptation and REDD+ in Cameroon is agriculture, due to its nature as the main driver of deforestation. Agriculture, particularly shifting cultivation, still remains the chief cause of deforestation and forest degradation in Cameroon. It is also central for local adaptation practices of many forest-dependent communities. The commitment to integrate climate-

smart agriculture and better farming systems and practices as REDD+ strategy within the R-PP interacts with priorities for proactive adaptation in Cameroon. The R-PIN was silent on agriculture being a significant component of REDD+ strategy. The R-PP is however much more clear on agriculture and livestock farming being a sector strategy for REDD+. Some key informants reported that integrating elements of agriculture as local adaptation practices became necessary during the R-PP consultation processes. Again, the discussions under the adaptation sub-regime influence those under REDD+.

6.4.2 Interaction through commitment

Within the adaptation policy arena, policy actors' awareness of potential financial compensations and benefit-sharing mechanisms within the REDD+ policy debate has somewhat influenced their design of what is considered 'good or bad' adaptation. Interviewed experts in the research community and development partner groups attested to the fact that farmers and local communities are increasingly becoming conscious of their environmental stewardship within their livelihood systems and adaptation strategies. Towards a new idea of conservation-friendly management of forests and agriculture, local adaptation agents are using existing governance tools such as community forestry to devise (new) ecological behaviour that is compatible with carbon emission reduction priorities of REDD+. This form of interaction shows how adaptation policy actors are willing to incorporate mitigation concerns in order to benefit from policy incentives that actors are committing to under REDD+.

6.4.3 Behavioural interaction

More recently, capacity-building systems in Cameroon, largely driven by the need to develop human capacity to measure, report and verify (MRV) carbon emissions, have been expanded in scope to include wide range of technology transfer opportunities to farmers in order to support climate-smart agricultural systems that reduce their vulnerability to climate variability and change. For instance, a few ongoing REDD+ demonstration projects in Cameroon by the Centre for Environment and Development (CED) are largely integrating adaptation-relevant knowledge into the capacity-building exercises for MRV

systems (Chia et al, 2013; Awono et al, 2013). The CED expert interviewed recalls the following experience:

> *Before we started the project, we developed a model along with our international partners. The model was based on PROJECT-CARBON-COBENEFITS. However when we started engaging the communities on different aspects of the project, and after much struggle with them, we found out that we needed to change our model to PROJECT-CORE BENEFITS-CARBON……..The adaptation needs of the people are important for REDD+ implementation to be successful.*

While the capacity-building initiative was driven towards REDD+, the project proponents clearly understood that providing local communities with information relevant for their own adaptation would incentivize their commitments to long-term MRV systems. In this case, REDD+ policy actors take elements of adaptation onboard in the implementation of REDD+ activities in order to sustain its own sustainability, and perhaps its legitimacy, while thereby also influencing the adaptation sub-regime.

6.5 Managing adaptation and REDD+ interactions for synergetic outcomes

This section presents a number of deliberate actions taken by different actors and their networks as management options for the interaction between adaptation and REDD+ in Cameroon. More importantly, how these deliberate actions are rooted in the national climate policy strategy is relevant for the future of adaptation and REDD+ policies in Cameroon. Interestingly, most efforts to manage the interactions between adaptation and REDD+ in Cameroon take the shape of the development of overarching institutional frameworks. No evidence was found for joint interaction management or autonomous management.

6.5.1 Creating an overarching institutional framework

For many policy actors in Cameroon, the quest for synergy extends beyond searching for, and managing interactions between adaptation and REDD+. There are other policy domains, even though related, that are still fragmented. It then makes sense to have a holistic environmental policy framework or roadmap that combines all environmental issues of interest to Cameroon.

A prominent policy direction for managing the interaction between adaptation and REDD+ to enhance their synergies is the creation of an overarching body by the Presidency called the *l'Observatoire national sur les changements climatiques* (ONACC) – the national climate change observatory. Under the auspices of both the technical supervision of the Ministry of Environment and financial supervision of the Ministry of Finance, ONACC functions as the operational and institutional instrument for elevating Cameroon's adaptation and mitigation responses to the highest level of economic planning. ONACC seeks to function across the broad range of issues within the climate regime, from climate data on Cameroon to institutional arrangements for policy implementation of adaptation and REDD+. In a way, the creation of ONACC reflects national attention to EPI where synergies within environmental domains are not only enhanced, but environmental issues such as climate change are integrated into the development priorities of the Ministry of Finance, thus including both internal and external EPI.

As a means of meeting Cameroon's commitment to the biodiversity regime, there is also an increasing consideration for using biodiversity commitments as a bridge between adaptation and REDD+. The policy actors proposing this management option interpret any policy dialogue on natural ecosystems to anchor on biodiversity, which is considered to be at the core of adaptation and REDD+ policies and programs. Accordingly, Cameroon has recently revised its National Biodiversity Strategy and Action Plan (NBSAP). The NBSAP seeks to synergize the potential of the REDD+ mechanism with guaranteeing the biodiversity safeguards and benefit sharing system relevant for improving local-national adaptive capacity. On a broader scale, as an Action Plan, the orientation of the NBSAP is to foster inter-linkages between biological diversity, climate change and sustainable development.

More specifically, a working group within the Ministry of Environment has been set up to foster information exchange and collaboration on the following capacity needs: knowledge, resources, implementation and institutional capacity among the actors across the relevant policy domains. These domains are not limited only to adaptation and REDD+ but also to desertification, environmental pollution and biodiversity conservation. The long-term goal of this information-sharing on different capacities is to develop a national policy framework for enhancing synergies among environmental commitments. It is anticipated that the outputs of this working group would feed into useful advice and recommendations for the operation and management of ONACC.

A subtle, yet evident form of managing the interactions between adaptation and REDD+ interaction is through their linkages with the much larger debate on sustainable development. The relevance of forestry for traditional sectors such as agriculture, water and energy, and more recently for climate change, has opened a new space for discussion on sustainable development especially in the post Rio+20 era. Policy actors from both adaptation and REDD+ are involved in a national-level science-policy dialogue on sustainable development. The importance ascribed to adaptation and REDD+ in this dialogue draws from the central role of effective climate policy in Cameroon's sustainable development agenda. This management option offers enormous opportunity to continuously negotiate maximizing the synergies between adaptation and REDD+. Beyond managing the interactions between adaptation and REDD+, the long-term goal of this national dialogue is twofold: (i) to develop coordination mechanisms required for providing leadership and organizational management for all the sectors involved; and (ii) to develop integration models for different sectors relevant for sustainable development, for example, climate policy into economic planning; biodiversity into agriculture and forestry, and others.

These efforts to build more overarching, integrative frameworks are echoed by scholars, who, based on the peculiarities of the Congo Basin, advocate for national policies and programs to adopt an integrated landscape approach for a broad range of development objectives, including environmental conservation, climate mitigation and adaptation, enhanced agricultural productivity and improved livelihoods (Campbell, 2009; Brown et al, 2011;

Molua, 2011; Somorin et al, 2012). Also, Parry (2009) highlights that a strategy of sustainable development that combines mitigation and adaptation in a whole package of other development strategies, including high levels of efficiency and equity in resource use, investment, governance and income growth, is much more likely to be successful.

6.5.2 Unilateral management

The slow development of the R-PP process in Cameroon, compared to other Congo Basin countries, has enormous advantages for adaptation, since the adaptation community has had relatively more time to influence the REDD+ debate. Multiple stakeholder consultation workshops for REDD+, organized by the Ministry of Environment, IUCN, WWF, CED, CIFOR, ICRAF, World Bank, GIZ and many other international and local organizations, in different sub-national regions and local communities, have increased the profile of non-carbon content of a future REDD+ program in Cameroon. Fobissie et al. (2012) mentioned that three important social safeguards issues of heightened importance for the REDD+ process in Cameroon are: local participation, land tenure and benefit-sharing. These social safeguard concerns are fast becoming the operational and distributional procedures for: (i) what REDD+ should focus on; (ii) who has the rights to forests and carbon under REDD+; and (iii) who benefits from REDD+ rents. Arguably, these same issues are related to the fundamental conditions for sustainable livelihood systems and adaptation outcomes (e.g. enhanced adaptive capacity) of forest-dependent people at the local level. Therefore, the unilateral management through collective decision-making by actors and stakeholders to address those policy issues confronting REDD+ policy implementation is for the benefit of adaptation. According to some commentators, adaptation priorities are now seen as co-equal goals with carbon emissions, even without any formal coordination between adaptation and REDD+ policies.

6.6 Discussion and conclusions

The multiple interactions between the actors and strategies of adaptation and REDD+ in Cameroon are central to understanding what synergy constitutes in

practice. Scholars have posited that in order for synergy between adaptation and REDD+ policies to be effective, a few pillars are vital, including communication, collaboration, partnership, networking and knowledge-sharing among actor-networks (Howden et al, 2007; Locatelli et al, 2011). As Klein et al. (2005) suggest, recognizing the actions and processes that have consequences for both adaptation and REDD+ outcomes is additionally an important step to identifying potentials for synergy. For instance, new partnerships like the Congo Basin Forest Fund (CBFF) are financing innovative mechanisms and approaches that can enhance synergy between adaptation and REDD+ in Cameroon and other Congo Basin countries.

Increasingly, the exacerbation of current socio-economic pressures by climate change in Cameroon demands a national response that prioritizes the integration of environmental issues into economic and development planning and actions. The prominent actors in the REDD+ debate, including the Ministry of Environment and Nature Conservation, are embracing the interaction and potential synergy with adaptation due to its relevance to Cameroon's long-term sustainable development goals. The underlying interest in the interaction management options empirically evident in Cameroon remains sustainable development. This matches efforts for policy integration globally, since attention for policy integration has been indeed inspired by sustainable development (Lafferty and Hovden, 2003). Thus, national Cameroonian interests in enhancing synergy extend beyond adaptation and REDD+ to other domains such as biodiversity conservation, reducing desertification and poverty reduction.

The establishment and future functioning of ONAAC as an overarching or umbrella institutional frameworks for managing the interplay between REDD+, adaptation and other environmental interests is a major milestone for Cameroon. Is such umbrella institutional framework sufficient for enhancing synergies between adaptation and REDD+? We argue that developing policy strategies that exploit synergy between adaptation and REDD+ is crucial for making climate policies more efficient, effective, equitable and complete. In order to make a case for such umbrella or overarching institutional framework, we build on a few arguments made by others. First, Tompkins and Adger (2005) argue that both adaptation and mitigation depend on the capability of a society

to develop and diffuse new ideas and to change; and suggest integrating society's adaptive capacity and mitigative capacity into a single concept of response capacity. Second, Locatelli et al. (2011) argue that understanding the potential synergies between adaptation and mitigation would be the basis for mainstreaming climate change policies into many countries' development policies.

At the core of creating synergies in climate policy is the development of policy measures that seek to reduce adverse effects of climate change while reducing greenhouse gases emissions to produce a win-win situation (Klein et al, 2005). More broadly, Ayers and Huq (2009) argue that an integrated approach through synergy between and mitigation could go a long way to narrow the gap between the development and adaptation needs of the developing countries and the global efforts to achieve mitigation. In Cameroon, the intuitive and cognitive appeal for searching for synergies could be twofold. First, to create policy incentives to implement adaptation and REDD+ strategies and approaches simultaneously such that both carbon and non-carbon values are given equal priority in the forest sector. Second, to create synergies with other commitments of national interest including: desertification control, biodiversity conservation, natural resources management, water resources management and poverty reduction. The evolution of the policy debates in Cameroon and other Congo Basin countries surrounds increased recognition of the linkages between climate change and development. Nevertheless, there are still concerns about institutional capacity of these countries to maximize the benefits of synergies between adaptation and REDD+. Obviously, while the theory and idea of synergy is convincing, at least following IPCC's definition, the challenge however is the practice on the ground. Such that the combined effects of adaptation and REDD+ would be greater than the sum of individual effects if implemented separately.

However, there are potential challenges confronting the management of interactions between adaptation and REDD+. Even where interactions between adaptation and REDD+ are quite obvious, managing such interactions to produce the anticipated 'win-win' outcomes could be challenging for various reasons. First, the adaptation policy system, though still in its infancy in Cameroon, follows more of a bottom-up approach. Existing local adaptation

and livelihood practices in the forest sector are expected to provide impetus and content for the national policy strategy. On the other hand, a national REDD+ strategy is expected to provide guidelines for local practices on the ground – thus following a top-down approach. The challenge thus is how to manage the interaction between these two institutions with rather different policy-development approaches. Second, REDD+ is more advanced and receives more political, scientific, financial and technical attention than adaptation in Cameroon. This disparity in their levels of progress and resources if further confirmed from the empirics as REDD+ has been more of a source institution than target.

On managing the interaction between adaptation and REDD+, the empirical findings point to the two principal modes of interaction management: regulatory- and enabling interaction management. The proscriptions that REDD+ has to be designed following specific structures, where higher values are given to social safeguards and adaptation-related attributes could be said to be regulatory. Oberthür (2009) argues that these proscriptions or prescriptions often ascribe a level of regulatory authority, and if matched with sufficient authority, may determine substantive standards of implementation behavior. On its linkage with EPI approaches, Lafferty and Hovden (2003) stress the need for integrating appropriate safeguards and priorities into existing institutional structures.

On the other hand and most obviously is the empirical evidence of enabling interaction management. Either as a source or target, both adaptation and REDD+ policies in Cameroon employ a broad range of cognitive elements, including communication, information, ideas and knowledge, for intra- and inter-institutional learning. Investments in capacity building, knowledge-sharing on technical and managerial expertise and joint collaboration between the actors of adaptation and REDD+ in Cameroon have provided an enabling environment for interaction management. Many authors have reflected on the cognitivist insight of knowledge, capacity building and ideas on influencing the politics of environmental governance (Oberthür, 2009; Stokke, 2009). Peculiar to this mode of interaction management is the importance of policy learning along the entire phases of policy cycle. Finally, as Oberthür (2009) observes,

these two modes are not mutually exclusive. In Cameroon, managing the interactions between adaptation and REDD+ has employed and drawn upon both modes, thus point to the possibility that both can be combined in reality.

An interesting finding for discussion and which has implications for our understanding of the concepts of policy integration and institutional interaction is the 'motive' behind interaction. In Cameroon, out of determination for success, REDD+ policy actors are willing to integrate critical elements of adaptation in the design of the national REDD+ strategy. Over the years, the prominent issues has gradually shifted from methodologically issues such as MRV to socio-economic issues such as land tenure, social safeguards, benefit-sharing, equity and carbon rights (Somorin et al, 2013). It is instructive to observe that actors involved in an institution like REDD+ could be focused on its successful implementation to the extent that they would only consider interaction with another institution, adaptation, as a precondition for its own success. This empirical reality calls for deeper understanding of why institutions interact. While this resonates with the notion that the effectiveness of one institution does not only depend on its own features but also on their interaction with other institutions (Young, 2002, Visseren-Hamakers et al, 2011), the specific underlying motive of interaction calls for further research. The assumption that 'effectiveness' is the only motive behind interactions between two institutions might be limiting.

Theoretically, and drawing from the empirics, the relationship between 'integration' and 'interaction' in the context of this paper is of paramount interest, specifically in understanding to what extent policy integration is achieved in this case study. Interaction between adaptation and REDD+ might occur when certain elements of adaptation are deliberately integrated by actors in the design of the REDD+ mechanism – thus suggesting that integration could be a means for achieving interaction. In another way, the actors of the interacting institutions employ diverse cognitive elements, cooperative behaviour and communicative actions to foster their integration into the country's much-broader environment and development policies – which then suggests interaction as a vehicle for integration. Empirical evidence shows that not all interactions between adaptation and REDD+ would lead to their integration.

Nevertheless, interaction management in Cameroon, particularly through the establishment of overarching institutional framework such as ONAAC offers opportunity for achieving policy integration.

In conclusion, as two 'sub-regimes' at different phases of development, adaptation and REDD+ in Cameroon, have interacted more through sharing of ideas, information and knowledge between their actors - cognitive interaction. The paper has also highlighted other existing and potential interactions between the two sub-regimes. Managing these interactions is considered central for enhancing synergies between adaptation and REDD+. More important for Cameroon is enhancing synergetic outcomes such as poverty reduction, biodiversity conservation and economic development by making sure that the *opportunity* of REDD+ meets the *priority* of adaptation, and vice versa.

Chapter 7

Conclusions, Discussion and Reflections

7.1 Introduction

In this chapter, the main findings with regard to the research objective and questions are summarized. General conclusions and discussions on the findings of the research are also presented. The chapter is divided into five main sections. Following the introductory section where the research objectives and questions are revisited, the next section presents the main findings of the research supported by the evidence provided by the empirical chapters. Section 3 discusses in detail the main findings with relevant literature. Section 4 reflects upon the theoretical perspective on environmental governance using the discursive institutionalism approach. It also includes the methodological reflections and reflections on the complexity of policymaking on adaptation and mitigation strategies in the Congo Basin forests. Finally, recommendations for policy and research are presented in Section 5.

The idea of a research to understand and contribute to the governance processes of adaptation and mitigation strategies in the Congo Basin forest sector, originated from debates among relevant policy actors ranging from government, civil society, development partners, scientific community and private sector on a few yet crucial issues. First, these actors are currently exploring and discussing institutional arrangements and policy frameworks for policymaking on adaptation and mitigation. Second, policy debates are cognizant of the overall low human and weak governance capacities of the Congo Basin countries to implement the reducing emissions from deforestation and forest degradation (REDD+) and adaptation strategies in the face of high poverty and poor infrastructures that characterize the region. Third, it is not yet clear how the *opportunity* accrued from contributing to global emissions reductions through the REDD+ mechanism might positively interact with the *priority* for reducing the vulnerability of local populations and forest ecosystems through adaptation.

It is against this backdrop that the objective of this thesis was to better understand and contribute to the scientific knowledge on the governance processes of adaptation and mitigation strategies in the Congo Basin. Given the fact that responding to climate change (through adaptation and mitigation) poses a governance challenge for policy actors, the thesis specifically

investigated: (i) the frames and discourses shaping the policymaking processes of adaptation and mitigation strategies in the Congo Basin region; and (ii) the interactions between policy actors (roles, diversities and capacity) and existing or new institutions (rules, values and norms) in achieving adaptation and mitigation outcomes. With the outlook on the Congo Basin region as a whole, the research focused mainly on Cameroon (as a miniature of the region) in order to gain deeper understanding at national and local level.

The following research questions were formulated to operationalize the research objective:

1. What are the dominant frames and discourses on adaptation and mitigation strategies in the Congo Basin, and what implications do these discourses have for policy design?
2. How are adaptation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape adaptation outcomes?
3. How are mitigation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape mitigation outcomes?
4. How do adaptation and mitigation strategies interact? What institutional arrangements or policy frameworks are policy actors developing towards maximizing the synergies?

7.2 Conclusion: Governing adaptation and REDD+ in the Congo Basin

In general terms, this thesis is about the governance of the complex interactions between (tropical) forests and climate change. There is a growing recognition that forests and climate change need to be treated as interrelated policy domains (Böcher et al., 2008; Buizer et al., 2014). It is this intersection that I refer to in this thesis as the forest-climate nexus. Nevertheless, governance-related questions have remained largely unanswered among scholars and policymakers on how the policies, principles, priorities, institutions, organizations, strategies, mechanisms and decision-making procedures of the two domains interact and

are managed in practice to produce desirable outcomes (Humphreys, 2008; Levin et al., 2008; Skutsch and McCall, 2010; Corbera and Schroeder, 2011; Angelsen et al., 2012; Vatn and Vedeld, 2012; Gupta et al., 2013; Brockhaus et al., 2014). This thesis contributes to both the scientific discussion on the intersection of the two policy domains, and answers some of the main governance-related questions related to managing the second largest tropical forest biome in the world, the Congo Basin forest, under a changing climate.

More specifically, the thesis investigates the governance processes of adaptation and mitigation strategies in the Congo Basin. By focusing on adaptation and REDD+ strategies within the forest-climate nexus, the thesis investigates the discursive framing of the issues within the policy processes, and the interactions between the actors involved, institutional settings and arrangements in the Congo Basin. As mentioned in the introductory chapter, the five empirical chapters have been organized to answer the research questions above.

Before I move into the details of the main findings, let me first present a summarized overview of adaptation and REDD+ in the Congo Basin based on the evidence of the empirical chapters. Table 7-1 compares the actors and networks, frames and discourses, institutional structures for adaptation and REDD+.

Table 7-1: Overview of characteristics of adaptation and REDD+ strategies in Cameroon

Attributes	Adaptation	REDD+
Actors and networks	· Lower diversity and engagement of actors · The Ministry of Environment leads the policy process · Civil society's interest is largely linked to improved local livelihood systems · Other actors collaborate through the government and civil society to contribute to the policy process	· Higher diversity and engagement of actors · The Ministry of Environment leads the policy process. · Strong engagement of the civil society networks, scientific community, private actors around different aspects of REDD+ · Networks of international, regional, national and local actors involved in the policy process

Table 7-1: Continued

Attributes	Adaptation	REDD+
Frames and discourses	· Framed to be reactive – contested on the grounds of climate uncertainties · About the everyday life of people – developing a specific policy for adaptation is complex · Adaptation in the forest sector alone is challenging – need to link with other sectors such as energy, agriculture, water and health	· Multiple opportunities for development objectives, both nationally and regionally · Framed as a 'grand' forest governance instrument. · Solutions and capacities are within reach for the technical and methodological issues for REDD+ implementation
Institutions (setting, arrangements and interactions)	· No formalized institutional arrangement currently exists for adaptation. · Deliberations on arrangement options and rule-making systems are emerging among actors. · Potential for institutional setting of community forestry shaping adaptation practices of forest users · Adaptation practice at local level can potentially interact with local land-use decisions for REDD+ · Opportunity to benefit from REDD+ resources (finances, knowledge, etc)	· No formalized institutional arrangement currently exists for REDD+. · Different models of rule-making systems being explored e.g. actor-based vs. content-based · Recognition of the significance of existing forest governance instruments for REDD+. · Social safeguards and co-benefits from REDD+ are seen to work for the good of adaptation. · SFM as a forest management practice offers opportunity for synergy with local-national adaptation needs and strategies.

What are the dominant frames and discourses on adaptation and mitigation strategies in the Congo Basin, and what implications do these discourses have for policy design?

On the policy discourses on adaptation and REDD+ in the Congo Basin region (CAR, Cameroon and DRC), the thesis finds three dominant discourses: mitigation-only; separatist policy of adaptation and REDD+; and integratist policy of adaptation and REDD+. The 'mitigation-only' discourse focuses on the potential of REDD+ to deliver the region's adaptation needs; it presumes that due to the uncertainties and contestations around adaptation, a policy intervention for adaptation is (currently) not necessary. The separatist discourse highlights the differences between adaptation and REDD+ in terms of their separation at the global level under the UNFCCC, and differences in financial instruments and scales of operation. It thus suggests that both adaptation and REDD+ should be separated for implementation success and effectiveness. The integratist discourse highlights opportunity for synergy due to shared forest-based activities and development outcomes in terms of poverty reduction and biodiversity conservation. This discourse asserts that to maximize the benefits of both adaptation and REDD+, they should be integrated in one policy framework.

The thesis (Chapter 2) reports that underlying these three discourses are competing frames and discursive devices (shared meanings, ideas and interpretations) held by different actors and coalitions, which are not devoid of their interests and positions. Of the three discourses, the integratist discourse has the most diverse coalitions, including those from the scientific community, civil society and development partners. Government actors are more divided between separatist and integratist discourses. The private sector is mainly in support of the mitigation-only discourse. Overall, the thesis finds the discourses in favour of REDD+ to be stronger than those for adaptation. This is due to the fact that: (i) there is no 'adaptation-only' discourse suggesting that focusing on adaptation alone is not a policy option for the actors; and (ii) elements of financial resources, knowledge, power and influence that characterize REDD+ gives it an 'edge' over adaptation in the policy arena. Institutionalization of these discourses (and their frames) has a number of implications for the Congo Basin, which include: (i) adaptation considered to be either non-existent or secondary to REDD+; (ii) REDD+ to be given more political and scientific attention because of the promises it offers; (iii) demonstrating cost-efficiency and effectiveness during implementation is easier for REDD+ than adaptation; and (iv) maximizing their synergies is beneficial for both of them and for the development of the region.

How are adaptation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape adaptation outcomes?

Adaptation strategies include plans of action for addressing the impacts of climate variability and change. They involve measures with the overarching objective of reducing vulnerability for the forest sector, including its dependent population, livelihoods, economies, and the ecosystems, by increasing the adaptive capacity of the sector. Forest-related activities that constitute adaptation strategies in the Congo Basin include: sustainable forest management, agroforestry, reforestation, ecological restoration and development of non-timber forest products (NTFPs).

The thesis finds that a national adaptation strategy is still being debated in the case of Cameroon. As a starting point, an assessment of the Cameroonian

forest sector shows that its vulnerability to climate variability and change, has negative consequences for food security, energy, water resources, health and the overall wellbeing of the population (chapter 3). The vulnerability assessment reveals the low adaptive capacity of the forests because of the additional human pressures such as forest degradation over-exploited forest resources and unsustainable agricultural practices. The thesis finds that among the policy actors in Cameroon, there is recognition that a future adaptation strategy will involve reducing poverty and promoting sustainable forest management and conservation practices. The four major constraints identified within the policy debates on adaptation include: (i) the complex linkage between forests and other sectors such as agriculture, energy and water implies that adaptation policy for the forest sector alone cannot succeed; (ii) poverty in Cameroon is complex and beyond the forest sector; (iii) low institutional capacity to coordinate the policy agenda for adaptation; and (iv) inadequate knowledge, and lack of financial, managerial and technical resources. Nevertheless, policy actors continue to explore how current forest policies, legislations and institutions can provide current adaptation needs until adaptation-specific institutional frameworks are designed within a national adaptation strategy.

At the local level, the thesis finds that communities are already using forest resources for sustaining food security, income generation and livelihood diversification as the basis for their local coping and adaptation strategies against climate variability and change (chapter 4). With most of the communities predominantly agrarian in nature, the adaptation strategies employed are both within the forest and agriculture sectors. These strategies resulted mainly from deliberate and innovative modifications of local livelihood systems within the two sectors. The thesis finds that, to a large extent, adaptation practices and outcomes were shaped by community forestry institutions in the following ways: (i) by designing rules to regulate access, exploitation and sustainable management of forest resources; (ii) by structuring collective marketing of valuable forest products for higher incomes; and (iii) by facilitating interventions such as capacity building for new livelihood opportunities and provision of improved crop varieties, from external actors such NGOs and development partners. The thesis reports that planning adaptation at the local level is challenging because of differences in socio-economic characteristics (age, household size, gender, capital assets and education level) and livelihood

systems within populations. This is because people are not necessarily vulnerable in the same way, thus making adaptation needs to be different.

How are mitigation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape mitigation outcomes?

In the Congo Basin, REDD+ is considered as an opportunity to contribute to global mitigation efforts to combat climate change, as well as an opportunity to achieve poverty reduction, economic development and biodiversity conservation. Forest-based activities such as SFM, afforestation, reforestation, agroforestry and forest conservation have been identified to address the multiple drivers of deforestation and forest degradation within the REDD+ strategy. Using the case of a governance structure for REDD+ Cameroon, the thesis reports two major findings.

First, a broad range of policy actors, including state and non-state actors, are actively involved in the deliberation and design processes of a national REDD+ strategy. Although these actors are polarized around different issues and priorities for REDD+, they are nonetheless increasingly distributing roles and responsibilities among themselves, based on their capacities (chapter 5). In the case of Cameroon, the state leads the overall coordination process through its two focal ministries: Ministry of Environment (MINEP) and Ministry of Forestry (MINFOF). As the focal point to the UNFCCC, MINEP led the consultation process towards the development of the R-PIN and R-PP which has been regarded to be highly participative and consultative. The consultation process provided room for open debates about different aspects of REDD+, including the financing structures, MRV systems, deforestation drivers, social safeguards and implementation strategy. MINFOF on the other hand brings its experience of forest management and forest legislations into the REDD+ debate. Other non-state actors are involved in different ways related to the aspects of the REDD+ mechanism of interest to them: advocacy, knowledge generation, capacity building, facilitating information exchange among actors, funding demonstration projects, and facilitating information flow from local to global and vice versa. These actors and their networks have actively contributed to

the advancement of the policy process through their knowledge, technical expertise and capacity, and financial resources.

Second, as institutional framework for REDD+ in Cameroon is yet to be formalized, institutional structures for REDD+ fall into two broad categories. The first category relates to the institutional settings for REDD+, that is, existing rules, norms, coordination mechanisms and governance instruments within the forest and environment sectors that REDD+ can build on. They include instruments such as community forestry, certification schemes, conservation initiatives the FLEGT-VPA process on illegal logging and the forest taxation regime. The second relates to the rule-making systems to structure actors' participation in the REDD+ governance process (institutional arrangement). The debates on specific rules for REDD+ among actors are whether such rules focus on participation of different actors in the governance process (engagement rules) or rather on REDD+ contents (such as MRV systems, benefit sharing, and safeguard standards). Overall, Cameroon's interest in implementing REDD+ draws from its commitment to reduce deforestation, contribute to global mitigation efforts, and enhance opportunities for social, economic and environmental benefits.

How do adaptation and mitigation strategies interact? What institutional arrangements or policy frameworks are policy actors developing towards maximizing the synergies?

The thesis finds that adaptation and REDD+ strategies in Cameroon interact in two important ways: (i) sharing of ideas, information and knowledge to promote inter-institutional learning; (ii) cooperative behaviour and communicative actions between the actors involved in the policy processes for both adaptation and REDD+ (see chapter 6). However, the motivations for synergetic interactions are different for both adaptation and REDD+. It was found that REDD+ policy actors are committed to integrating vital elements of adaptation such as environmental and social values essential for local livelihoods, in the design of a REDD+ strategy, out of determination for successful implementation. Adaptation actors see interaction with REDD+ as a window of opportunity to elevate the low profile of adaptation and to benefit from the financial and technical resources available for REDD+.

Importantly, for policy actors, managing these interactions is considered crucial to enhancing synergetic outcomes between adaptation and REDD+. The thesis reports that interaction management is a conscious and deliberate action of policy actors. In Cameroon, a prominent policy direction in managing the interactions between adaptation and REDD+ is the creation of an overarching institutional framework called the national climate change observatory (ONACC). If effective, ONAAC is expected to provide operational guidelines on national-level response to climate change. Beyond enhancing synergies between adaptation and REDD+ within the climate regime, broader debates on the linkages with national commitments to the biodiversity and desertification regimes within an overarching sustainable development agenda are ongoing in Cameroon.

7.3 Discussion of the main findings

The next four sub-sections present the discussions on adaptation, REDD+, their discursive struggles, and their synergetic interactions. The main points discussed are inspired by the empirical findings, in relations to other literature, and the thesis' analytical lens of actors, discourses and institutions.

7.3.1 Adaptation in the Congo Basin forests: a priority, yet complex and contested?

Unpacking adaptation into its constituent elements of vulnerability, sensitivity and adaptive capacity is essential for understanding the scientific complexity that most debates on adaptation allude to. This is because despite the consensus among policy actors that adaptation is a priority, adaptation still remains clouded in many uncertainties and contestations. One of such contestations is how to assess the extent of vulnerability of the forest sector to climate impacts and 'adapting' current forest policy and management systems to climate change (Locatelli et al., 2008; Williamson 2012; Bele et al., 2014). Chapter 3 addresses these contestations by assessing the relationships between vulnerability and adaptive capacity of the forest sector as a starting point for planning national adaptation strategies (NAS). While many forest vulnerability assessments have been undertaken in developed countries towards their NAS

(Luers, 2005; Johnston and Williamson, 2007; Williamson et al., 2007; Lindner et al., 2010; Wellstead et al., 2014), fewer assessments have been reported for developing countries. This thesis contributes to filling that gap using the case of Cameroon. It contends that adaptation strategy needs to integrate the non-climate factors driving the forest's vulnerability. The argument is made for NAS in Cameroon to consider the interconnection between food security, energy, water resources and health in relation to the forest, and poverty reduction in its policy development (Nkem et al., 2010; Chia et al., 2013).

Most of the framing of adaptation by actors tends to amplify a perceived higher complexity and contestation as compared to mitigation. The question of why such perception has impeded the advancement of the policy process for adaptation is crucial for discussion. The thesis considers the interplay of those reported complexities and contestations as the core of the governance challenge facing adaptation in the region (Brooks and Adger, 2005; Yohe and Strzepek, 2007). The negative perceptions of complexity coupled with multiple challenges of governance and institutional capacities, financial and technical strength, and power relations are constraining adaptation policymaking in the Congo Basin (Brown et al., 2010; Bele et al., 2011; Somorin et al., 2012). This is irrespective of the consensus that changing patterns of temperature and rainfall are already affecting the livelihoods and overall wellbeing of the population.

The constellation of state and non-state actors involved in the adaptation policy arena of Cameroon shows an interesting dynamics. The government and civil society are the two most prominent actors in the adaptation debate. The state, the Ministry of Environment, exercises its agency by interfacing with the global community and the UNFCCC on adaptation processes. The civil society and its networks (various community-based organizations) engage more in accentuating local adaptation practices and realities to inform national policy systems. The goal of the state is to keep the national policy processes in close proximity with global decisions and practices on adaptation while the interest of the civil society is to use local practices to inform national policymaking. One of the governance challenges facing adaptation in Cameroon is disconnect between these two layers of interest: top-down vs. bottom-up approaches. The other two categories of actors involved in the adaptation policy process

(development partners and the scientific community) contribute mainly through these two dominant actors. Nevertheless, definition of roles and responsibilities among actors at the national are emerging, which reinforces the notion that adaptation cannot be purely local, leaving national actors little or nothing to do with adaptation (see Tol, 2005).

A formalized institutional framework specifically for adaptation at the national level has not been designed. Deliberations on institutional arrangement options and rule-making systems at the national level by actors are still at their earliest stages. Nevertheless, existing institutional settings such as the community forestry institutions already have the potential to influence adaptation (Chapter 4). Interestingly, even though many of the existing governance instruments in the Cameroonian forest sector can work for adaptation in theory, only community forestry institutions are being explored as the most promising adaptation option in the policy debates. Suffice to say that national actors are yet to fully explore institutional settings for structuring adaptation practices and outcomes. But the view that most of adaptation actions are entirely motivated by self-interest of affected populations, with the implicit assumption that institutions possess little significant influence (Dang et al., 2003), is not consistent with the finding of this research.

7.3.2 REDD+ in the Congo Basin forests: opportunity meets complexity?

Since the mid-2000s, the REDD+ mechanism has engulfed the forest sector and policy arena of all the six Congo Basin countries. The countries have produced individual national strategies (R-PINs and R-PPs) to publicly express their interests in contributing to global mitigation efforts by reducing emissions from deforestation and forest degradation[10]. In return, countries anticipate financial payments for every additional unit of carbon stored in the forests. The thesis reckons that as a form of (international) payments for environmental services (PES), REDD+ seems rather simple in theory but is not necessarily so in practice. This thesis contributes to the scientific understanding of REDD+ in practice – in terms of the prevailing discourses of what it constitutes in reality,

10 Globally, the full definition of REDD+ clearly delineates that eligible forest activities possible under the mechanism include sustainable management of forests, forest conservation and enhancement of forest carbon stocks. These activities consciously form the fundamental core of REDD+ strategy and implementation in the Congo Basin.

the actors and networks involved, the institutions to structure the interactions among actors, and ultimately the governance system of REDD+ in a region known for its low capacities and weak states.

By setting out to understand how REDD+ is framed by a broad range of actors and how these frames converge around policy discourses within the Congo Basin region, the thesis provides insights into: the cognitive structures of actors' biases, overarching global discourses on forest and climate change, actors' allocation of significance and shared meanings to REDD+, and actors' underlying interests and positions in the REDD+ debate (Chapter 2). The notion that policies are not necessarily neutral tools but rather products of discursive struggles (Bäckstrand and Lövbrand, 2006) further gives impetus to the relevance and contribution of this thesis. A number of dominant ideas and interpretations of REDD+ in Congo have emerged in this thesis. I will discuss two of these ideas and what their institutionalization by actors might suggest for the governance of REDD+ in the region. First, REDD+ is considered by many actors as a development project – an idea that, if successfully implemented, can deliver its multiple promises of economic development, poverty reduction and biodiversity conservation. For a region like the Congo Basin with its low development status, any policy idea that creates incentives for national development would understandably receive highest policy attention. Brown et al. (2011) reported that the scale of political interest in REDD+ is largely driven by its perceived contribution to national development. Another dominant idea on REDD+ in Congo shared by actors is the idea of 'complex but feasible'; the idea presupposes that implementing REDD+ in Congo will be a daunting task but the actors are confident that irrespective of the perceived complexity, it is still feasible. Fundamental to this assertion of implementation feasibility, despite intricate issues of deforestation drivers, monitoring, reporting and verification (MRV) systems and land tenure systems that have pervaded the forest sector for years, is the significance of increased flow of financial resources, knowledge systems and expertise from the global arena. Obviously, these resource in-flows have contributed to the advancement of the policy process[11] and ultimately

11 IUCN (2011), FCPF (2012) and Alemagi et al. (2014) in their reports show that starting from one REDD+ project in 2007, there are currently 31 REDD+ pilot projects and initiatives in Cameroon alone. These projects cover the most of the forest regions of the entire country and they are largely around forest monitoring, emissions baseline scenarios, developing national capacities, carbon stock assessments, social safeguards, technical support to the government on coordination, synergies with adaptation, land tenure issues, amongst others. Many of these initiatives have been funded by international organizations and donor-communities either directly or through national actors.

provided impetus for REDD+ implementation in the Congo Basin (Brown et al., 2011; Maniatis et al., 2013; Somorin et al., 2014).

Important for the discussion on agency in REDD+ in Cameroon are two points. The first relates to how certain actors build coalitions around specific aspects of REDD+ as a form of strategic manifestation of their agency within the policy domain. For example, a few actors from development partners and civil society understand the technical and methodological challenge MRV would pose for a country like Cameroon, and at the same time the significance of MRV as a condition for REDD+ performance. By investing in demonstration projects and building capacities for MRV over time, these actors form coalitions that the government would need to consult on MRV issues. In that event, these coalitions ultimately influence decisions on the MRV system for REDD+ in Cameroon. This finding supports the argument by some scholars that coalition building allows 'powerful' (or even marginalized) actors to pool their resources and voices together in order to influence the REDD+ agenda (Schroeder, 2010; Hoang et al., 2013; Brockhaus et al., 2014). The second point relates to how different state and non-state actors exercise their agency by using their comparative advantages to contribute to the development of the REDD+ process. These comparative advantages include: forest management experience, scientific knowledge, financial resources, and facilitating the policy process. Alemagi et al. (2014) and Chia et al. (2014) have argued that the distribution of roles and responsibilities among the actors is largely anchored on the comparative advantage of these actors.

On REDD+ institutions in Cameroon, the thesis sets out to emphasize that there is currently no formalized institutional and legal framework for REDD+ in the country. Other authors have commented on the absence of an institutional framework that defines an operational mechanism for REDD+ (Saunders and Reeve, 2010; Brown et al., 2011; Dkamela, 2011; Ngendakumana et al., 2014). The debates among actors on the different institutional arrangement options for REDD+ in Cameroon merit a further discussion. Debates among actors around appropriate institutions for REDD+ are polarized around two potential models: an actor-oriented model and a content-oriented model. The actor-oriented model considers an institutional arrangement that targets the actions of the engaged actors. It seeks to define the rules for engagement, defining tasks for

actors and allocating resources towards implementing REDD+. As alluded to in Chapter 5, examples of an actor-oriented model of institutional design is a stakeholder platform, which seeks to define engagement rules for the actors within the boundary of the policy domain. The content-oriented model is more focused on designing institutions for the components of the REDD+ process – components such as the financing options, forest management, MRV systems, and social safeguards. This model focuses less on the actors involved rather more on defining operational frameworks (*modus operandi*) for each component, and when in place, would ultimately guide interactions of the actors engaged in the particular component. The thesis argues that the underlying assumption for the content-oriented model is the recognition that actors are differentiated along REDD+ components of interest to them. In Cameroon, the R-PP suggests an actor-oriented model but authors are beginning to question the adequacy of this model for REDD+ (Dkamela, 2011; Freudenthal et al., 2011). The argument for a content-oriented model is further justified by internal push by civil society and development partners for specific institutions for issues like social safeguards, which can be nested within the broader institutional framework for REDD+. For example, a specific national benefit-sharing framework to structure the flow of REDD+ benefits from the global and national to the local level. In conclusion, the thesis shares the position of Buizer et al. (2014: 4) that the 'future of REDD+ will depend not only on the policies that it seeks to promote but also on the institutional arrangements that govern it'.

In terms of the governance of REDD+ in the Congo Basin region, one of the dominant frames of REDD+ in Cameroon is its potential to entrench strong governance systems within the forest sector. It is in this context that REDD+ is framed as the 'grand' forest governance instrument. A major highlight for Cameroon is the opportunity for the country to learn from its experiences with the current governance instruments operational within the forest sector. Policy actors are increasingly linking future REDD+ strategies and approaches to different governance instruments (Hoare et al., 2008; Cerruti et al., 2010; Dkamela, 2011; Assembe-Mvondo et al., 2013). Growing bodies of literature on REDD+ governance have asserted that even outside a global policy architecture, national and local actions are already advanced (Corbera and Schroeder, 2011; Kanowski et al., 2011; Angelsen et al., 2012; Lederer, 2012; Visseren-Hamakers and Verkooijen, 2012; Buizer et al., 2014). Nationally-driven REDD+ governance

processes are both contributing to and drawing from global negotiations for an international political context for REDD+. This focus of the thesis to unpack the governance dynamics in Cameroon is valuable for the ongoing discussions at the global arena.

7.3.3 Discursive struggles between adaptation and REDD+ strategies: dichotomy within a nexus?

In the introductory chapter, the general differences between adaptation and mitigation from literature were highlighted in Table 1-1. By investigating the discursive struggles between adaptation and REDD+, the thesis implicitly analyzes the differences between adaptation and mitigation. Table 7-1 presents the characteristics of adaptation and REDD+ from the empirical evidence of this research. Furthermore, the thesis here probes deeper to understand the political dynamics of the discourses on adaptation and REDD+ within the forest-climate nexus. The latter is essential for our understanding of the underlying factors, such as interests and power, influencing the competing discourses between adaptation and REDD+ in the Congo Basin.

It is worth highlighting that the policy debate on mitigation in the Congo Basin started after the adaptation debate. The National Communications submitted to the UNFCCC by the countries in the early 2000s were mainly on the adaptation needs and options of these countries in responding to the impacts of climate change, with less reference to climate mitigation. However, the policymaking processes for the mitigation agenda, through the REDD+ mechanism, have advanced much faster than adaptation. The dominance of the REDD+ over the adaptation in the policy process was due to the emergence of a number of determining factors in favour of REDD+ in Congo Basin, which include: new knowledge systems, cooperative partnerships, financial resource flows and increasing consensus on possible 'solutions' to the technical and methodological issues confronting REDD+ implementation. These determining factors are also responsible for the increased coalition building for REDD+ more than for adaptation.

Importantly, whether along scientific or political arguments, the discursive struggles between adaptation and REDD+ in the Congo Basin are largely driven

by how a number of issues are framed by actors. First, on costs and benefits of designing and implementing REDD+ and adaptation, both mechanisms are assumed to have both costs and benefits attached to them. While the costs for REDD+ are presumably known and where financial resources to meet the cost will likely come from; adaptation costs are unknown. On benefits, differences in the scale of the benefits have been framed to give more advantage to REDD+ than for adaptation. REDD+ is believed to have benefits from global climate mitigation to national economic development and biodiversity conservation to local poverty reduction. Adaptation on the other hand is only considered to be beneficial to local and national levels. Second, on efficiency and effectiveness, coalitions and agents of the separatist and integratist discourses of REDD+ and adaptation have used different arguments to support their framings. For example, one coalition argues that integrating REDD+ and adaptation will reduce transaction costs which enhances cost-effectiveness. The other coalition argues that to achieve effectiveness, REDD+ and adaptation should be separated along their different coordination mechanisms, strategic priorities, and financial instruments. Third, different framings of how the evolution of knowledge and capacity systems over the last decade have structured the present perceptions of REDD+ and adaptation are existent. Incremental knowledge and capacity systems are more consistent with the REDD+ policy process than for adaptation. These issues' framing, along with their discursive contexts, are largely responsible for the differences in the political and scientific attention, institutional and management structures and ultimately the level of advancement of the policymaking process for REDD+ and adaptation in the Congo.

Furthermore, the regional and national dynamics of the policy processes of adaptation and mitigation in the Congo Basin forests are reflective (a mirror image) of the dynamics in the climate policy architecture at the global level. To a large extent, global discourses on adaptation and mitigation shape regional and national discourses in a number of ways. First, both adaptation and mitigation are separated as policy responses to climate change at the global (UNFCCC) level. Despite the climate convention recognizing linkages between the two, they still remain separated as sub-regimes with different policy architectures, coordinating systems and financial instruments. It is thus understandable that national and regional systems tend to follow global

systems. Second, regional- or national-level policy discussions and processes can hardly progress beyond the global processes. The 'speed' of the global process will likely have impacts on the rate at which national processes advance. Discussions on REDD+ under the UNFCCC, and also outside the Convention, have fairly advanced over the last few years (Den Besten et al., 2014; Pistorius, 2012). Policy processes and negotiations on REDD+ at regional and national levels within the Congo Basin have fairly progressed in tandem with the global REDD+ policy process (Aquino and Gray, 2013). On the other hand, global adaptation policy still remains mired in many barriers of design, resources, implementation and governance (Pielke and Sarawitz, 2005; Adger et al., 2012; Wolf, 2012; Biesbroek, 2014). Similarly, adaptation policymaking in the Congo is constrained by many factors already mentioned. Lastly, the institutionalization of certain global discourses on adaptation and mitigation strategies would ultimately influence lower-level institutionalization of similar discourses which often leads to the emergence of new (counter) discourses and possibly new (opposing) coalitions. For instance, the proposal to include forests in the post-Kyoto international climate agreements which paves the way for REDD+ has increased the political focus on the forest sector in Congo Basin, resulting into new ideas of managing the forests sustainably to meet economic, social and environmental needs. Similarly, framing deforestation in relation to climate change has opened a new world of actors, interests, institutions, etc. (Pistorius, 2012; Visseren-Hamakers et al., 2012).

Another argument is that even without a national adaptation strategy (NAR) or a policy framework to govern adaptation in Congo Basin, local coping and adaptation practices structured around livelihood systems and sustainable resource uses are already ongoing. This is unlike the case for REDD+ where local land use systems compatible with REDD+ cannot exist outside a national institutional policy framework which regulates REDD+ performance accounting and MRV systems on which payment-based incentives system would be structured. Drawing from these positions, the discursive divide between REDD+ and adaptation has a significant global-local dimension to its framing, actors and institutions. The flow of ideas and interpretations, frames and discourses as well as the multiple layers of interactions between different actors and institutions from global to local (and vice-versa) underline the scalar dimensions of governing adaptation and REDD+.

7.3.4 Interactions for Synergy: Mitigative Adaptation and Adaptive Mitigation?

On the governance and potential institutionalization of the discursive struggles earlier discussed, the question remains: is there a trade-off or opportunity for synergy between adaptation and REDD+? The thesis explores the interactions between adaptation and REDD+ at multiple frontiers: strategies, approaches, discourses, agency and institutions. The integratist policy discourse on adaptation and REDD+ in Chapter 2 provides basis for the understanding of synergetic interactions between adaptation and REDD+ strategies at the policy level in Chapter 6. From an analytical perspective, how the 'combined effect'[12] is managed by actors to produce greater outcomes than the sum of its individual effects is crucial for our scientific understanding of how synergy exists and operates in practice. In lieu of this, the thesis posits that interactions between adaptation and REDD+ to produce desired outcomes must be deliberate through a management system that seeks to coordinate the strategies and approaches of both within a given policy framework.

The thesis acknowledges the potential of an 'automatic' interaction between REDD+ and adaptation through shared forest-related activities being discussed within the policy process. Sustainable forest management (SFM) for instance is considered crucial for both adaptation and REDD+. Poverty reduction is similarly shared as the common outcome that both adaptation and REDD+ seek to achieve. Therefore, one assumes that creating synergies between the two becomes natural and acceptable. Other examples of such automatic interaction are forest-related activities such as afforestation and reforestation (A/R) that provide carbon sequestration for REDD+ but also forest products (food, energy, health), water/soil conservation and ecological restoration which are crucial for adaptation of the society and the forest ecosystem itself (Guariguata et al., 2008; Reyer et al., 2009; Locatelli et al., 2011). The implicit assumption of automatic synergy is that outside the climate change or forest policy debate, this interaction occurs without deliberate interventions of the actors concerned. In the contexts of the Congo Basin, the example of automatic synergy using A/R for instance, reinforces the values embedded within the forest sector to meet multiple (and often competing) demands.

12 I revisit the IPCC's definition of synergy which refers to the interaction between adaptation and mitigation so that their combined effect is greater than the sum of their effects if implemented separately.

Nevertheless, the main arguments in this thesis are the deliberate interventions of policy actors at all levels to ensure that synergetic outcomes between adaptation and REDD+ are well-maximized in policy design and implementation. Examples of these deliberate actions include: (i) ensuring that REDD+ policy and practice integrate the need to protect forest-dependent livelihoods against the impacts of climate variability and change; (ii) adaptation strategies at local communitarian level incorporating improved forest management to maximize the potential of forests for providing ecosystem services, especially carbon (REDD+); (iii) adaptation projects benefitting from carbon funding and capacity building instruments from REDD+; and (iv) donors favouring forestry projects that incorporate the need to lower emissions while helping to create more resilient communities and ecosystems.

Increased opportunity for synergy is seen by actors as a policy innovation to make the *opportunities* from REDD+ meet the *priorities* for adaptation. In this case, institutional frameworks to facilitate the integration of both are being 'experimented' by the actors, where each is becoming a prerequisite for successfully implementing the other. In the case of Cameroon, the active role that the Ministry of Environment plays in coordinating the policy processes of adaptation and REDD+ is crucial. Similarly, within the civil society community, the social aspects of REDD+ are given prominent attention, due to their close relationship with adaptation priorities of local communities.

Where the integratist discourse institutionalizes into policy prescription for adaptation and REDD+ in the Congo Basin, one imagines synergy becoming a 'governance tool' in itself. Such that synergy could become an evaluative criterion for the design and implementation of both adaptation and REDD+ in the Congo Basin. That is, adaptation cannot be considered or judged successful if it leads to emissions of greenhouse gases or if it jeopardizes the mitigation activity on the ground. This is what I term "*mitigative* adaptation". In a similar vein, the effectiveness of any forest-based mitigation strategy, especially REDD+, should be measured by how much it has increased the adaptive capacities of both the forest ecosystems and dependent-communities through biodiversity conservation, poverty reduction and increased livelihood opportunities. This is what I term "*adaptive* mitigation". I argue that the deliberate actions of policy actors in Congo Basin to coordinate

mitigative adaptation and *adaptive* mitigation are crucial to the future of the Congo Basin forests under a changing climate.

Several authors have proposed different argumentations for supporting synergetic interactions between adaptation and mitigation. Some have argued that facilitating the development of adaptation and mitigation strategies within the same spatial components offers comprehensive and pragmatic solutions to an effective response to climate change (Bulkeley, 2006; Biesbroek et al., 2009; Molua, 2011). Others have argued that the determinants of adaptive and mitigative capacities for most countries are the same, which include: economic resources, income, institutions, information, technology, property rights and equity. In this context, synergy has been approached from the angle of the interplay of the determinants of adaptive and mitigative capacities (Michaelowa, 2001; Klein and Smith, 2003; Brooks and Adger, 2005; Yohe and Strzepek, 2007). Ultimately, this thesis argues that addressing climate change through a single pathway, either mitigation or adaptation, leads to expensive trade-offs and does not bring about desired outcomes, especially in the forest sector. Focusing on mitigation alone can result in a failure to anticipate climate impacts on forests, which in turn can jeopardize the permanence of carbon storage. At the same time, relying only on adaptation approaches fails to take into account that mitigation actions are also needed to limit changes in the climate system (Yengoh et al., 2010; Sonwa et al., 2012; Chia et al., 2014).

Suffice to discuss the politics of synergy in the context of the Congo Basin forests. The question that becomes crucial is: whose idea is synergy? The question further reinforces the agency dimension behind building synergy in policy domain. In Congo Basin, the concept of 'mainstreaming' is deliberately used by actors to suggest synergy as a panacea for elevating the current low profile of adaptation in the policy process. Despite its consideration as a priority, adaptation does not receive the scientific and political attention that REDD+ enjoys within the region. In a struggle for survival, some actors are interested in bringing attention of policy practitioners to the significance of adaptation by demanding that critical elements of adaptation are 'mainstreamed' in the REDD+ national strategy. Where synergy as an idea springs from REDD+ actors, it is mainly out of determination for successful implementation - that is, interaction with adaptation is only acceptable to REDD+ actors as a precondition

for success, particularly for the case in Cameroon. This argument thus suggests that synergy may not necessarily be an interaction of 'two equals'.

Another discussion on synergy within the Congo Basin is the integration of both adaptation and REDD+ into the broader issues of sustainable development. Policy actors have long debated the need for a holistic environmental policy framework that integrates main environmental issues such as loss of biodiversity, desertification, deforestation, environmental pollution, and land degradation. It is within this policy debate that adaptation and REDD+ are encouraged to be integrated into national development planning. It is thus argued that most commitments to other environmental regimes, especially for biodiversity and desertification, can be synergized with those of the climate regime within an operational framework that is consistent with the sustainable development agenda of the country and region at large. A few authors have argued for the need to enhance synergies amongst fragmented environmental domains (Jacquemont and Caparros, 2002; Swart and Raes, 2007; Wilbanks and Sathaye, 2007). Other authors have also suggested the need to develop integration models for linking different environmental issues (especially climate change) with development priorities and planning in order to avoid trade-offs (Dang et al., 2003; Kok et al., 2008; Gupta, 2009).

Lastly, I would argue that synergy is not necessarily new in the global climate discourses and governance. For instance, part of the contribution for the Adaptation Fund[13] comes from CDM. Even if this is not framed as synergy, the motive behind using financial flows from mitigation for adaptation suggests it to be based on the recognition that benefits from mitigation (at the global level) should be beneficial for supporting adaptation policies and programs at national and local levels. In addition, at the global level, many scholars and practitioners of REDD+ are beginning to conceptualise non-carbon benefits (NCB) and safeguards of REDD+ as principles for supporting adaptation of

13 The Adaptation Fund (AF) is a financial instrument under the UNFCCC and Kyoto Protocol (KP) and has been established to finance concrete adaptation projects and programs in developing country Parties to the KP, in an effort to reduce the adverse effects of climate change facing communities, countries and sectors. The Fund is financed with a share of proceeds from Clean Development Mechanism (CDM) project activities as well as through voluntary pledges of donor governments. The share of proceeds from the CDM amounts to 2% of certified emission reductions (CERs) issued for a CDM activity. Overall, the AF aims to support concrete adaptation activities that reduce the adverse effects of climate change facing communities, countries and sectors.

communities to climate change (Cotula and Mayers, 2009; Fobissie et al., 2012; Visseren-Hamakers et al., 2012; Awono et al., 2014).

7.4 Theoretical and Methodological Reflections

7.4.1 Theoretical Reflections

The thesis adopted a theoretical perspective of governance within the environmental domain. As an organizing concept, the theoretical focus on governance, as applied in this thesis, is useful because it encompasses the context, content and process of designing and implementing environmental policy (and policymaking). The governance concept here applies to two intersecting policy domains: forest and climate change. The focus of this intersection is on adaptation and mitigation as responses to climate change through forests. From a governance perspective, the main interest is how the society is steered towards a particular goal as well as the process of coordination within actor networks (Kooiman, 2003). As a specific category of governance, the concept of environmental governance entails interventions aiming at changes in environmental related incentives, knowledge, institutions, decision-making and behaviours (Lemos and Agrawal, 2006).

In explaining the complexity and dynamics of policy processes on adaptation and REDD+ in the Congo Basin, different analytical perspectives of governance are essential. A theoretical approach that combines different analytical components of governance, such as actors and institutions, in assessing policy processes is then useful. Discursive institutionalism (DI) puts emphasis on actors, discourses and institutions – the three analytical elements for understanding the policy processes for adaptation and REDD+ in this thesis. Drawing from the works of several scholars, DI offers a framework to understand the role of discourses in politics, how actors frame issues, problems and solutions, how these frames converge around certain discourses, and how these discourses translate into values, rules and norms within policy processes (Hajer, 1995; Schmidt and Radaelli, 2004; Arts and Buizer, 2009; Ratio, 2013).

The choice of adopting discursive-institutionalism as a theoretical approach to understand the governance processes of adaptation and REDD+ in the Congo Basin proved to be useful in two important ways. First, by taking into account the institutional contexts in which discourses emerge and the way in which they are institutionalized in social or policy practices (Buizer, 2008; Schmidt, 2008, Den Besten et al., 2012), DI becomes relevant for analyzing policy discourses on adaptation and REDD+ in Congo Basin and how these discourses influence negotiations for institutional arrangements within relevant policy processes. In its characteristics, as a bridge between discourse analysis and institutional analysis, DI was useful in understanding the discursive interpretations and dynamics of adaptation and REDD+ within a given institutional setting, while new institutional arrangements were in the making. Second, DI assumes the important role of discourses in influencing or constructing actors' preferences, interests and behaviour (Schmidt and Radaelli, 2004; Hajer and Vesteeg, 2005; Betsill and Bulkeley, 2006). In the context of the thesis, it was insufficient to analyze how different actors (and their coalitions) frame issues of adaptation and REDD+. It was also important to investigate the underlying ideas, interpretations, preferences and interests of these actors within the discursive-institutional context they operate in. This is critical for understanding the contents, contexts and process of policymaking on using, managing and conserving the Congo Basin forests in responding to climate change.

However, DI exhibits a number of drawbacks and limitations in the context of this research. Although it was useful to explain how discourses influence debates on institutional arrangement for both adaptation and REDD+, it was limited in analyzing institutional interactions between them, and how these interactions are managed. Where interaction management entails the deliberate interventions of policy actors to shape and govern institutional interaction, DI offers limited explanation on how actors manage such interactions as well as on the mode of interaction management they employ. To overcome this drawback, and to answer the fourth research question on interactions between adaptation and REDD+, a conceptual framework detailing relationships among policy integration, institutional interaction and interaction management was developed. Another limitation of DI is its 'over-determination' of ideas and discourse to the exclusion of the issues of power in environmental policymaking. Power concerns the ability of actors or actor

coalitions to mobilize resources and influence policy outcomes (Arts and Buizer, 2009). DI is silent on the power dynamics (and struggles) of competing discourses and eventual institutionalization of such discourses in the policy process. Evidence from the thesis shows that the dominance of REDD+ over adaptation in the Congo Basin is driven by different sources of power: knowledge, finances and capacity.

Situated on the traditional theoretical foundation of the interplay between *structure* and *agency*, this thesis undertakes two theoretical innovations, useful for analyzing governance processes, including those of adaptation and REDD+. The first relates to a combination of frame analysis and discourse theory, building on the work of van der Brink (2009). The *agency-focus* of frame analysis recognizes that policy actors construct ideas and responses in a given policy domain. However, such framing processes do not take place in a societal vacuum, rather they are influenced by and nested in wider overarching discourses (social structure). Combining the agency focus of framing with the structure focus of discourse offered opportunities to analyze how different actors hold frames on adaptation and REDD+ in the Congo Basin, and how these frames are influenced by and converge around certain discourses. The second involves the development of a conceptual framework to analyze interactions between adaptation and REDD+ towards a win-win synergetic outcomes, building on the work of Visseren-Hamakers et al. (2011). It combines concepts such as institutional interaction, interaction management and environmental policy integration to explain how two institutions interact as well as integrate elements of the other in their policy design and implementation. This is extremely useful for elucidating how synergies result from conscious and deliberate efforts of policy actors.

7.4.2 Actors, Discourses and Institutions

As already highlighted, DI integrates actors, discourses and institutions in a framework useful for understanding governance processes for managing environmental issues. In this sub-section, I will be reflecting on these three analytical elements of DI in relation to the governance of adaptation and REDD+ in the Congo Basin.

The participation of a multiplicity of actors in the policy process on adaptation and REDD+ in the Congo Basin is essential for the governance process. A broad range of actors is involved in assuming specific roles and responsibilities, individually or collectively, towards policymaking within the region. A mode of governance based on a diversity of actors is often referred to as *multi-actor governance* and is well-appreciated in governance studies to explain the many ways in which public and private actors from the state, market and civil society govern public issues at multiple scales, autonomously or in mutual interaction (Biermann et al., 2009; Paavola et al., 2009; Arts and Visseren-Hamakers, 2012).

Reflecting on the roles that actors play in the governance of environmental issues, a crucial question emanating from this thesis is: What is more critical for governance outcome, the diversity of actors or their capacity/competence to actively participate in the process? Most studies on governance are quite divergent on this viewpoint. For some authors, the notion of 'governance beyond government' suggests that involvement of non-state actors in the decision-making process is a precondition for the credibility of the governance process (Pierre, 2000; Bulkeley, 2005; Armitage and Plummer, 2010; Buizer et al., 2011). The argument here, especially for environmental issues, is the mounting complexity and interconnected nature of environmental problems which governments cannot adequately address on their own. In this research, the mix of actors engaged in the policy process of adaptation and REDD+ have contributed to consensus-building on institutional and governance arrangements. The idea of 'governance beyond government' in making environmental policies such as REDD+, adaptation, and biodiversity conservation is valuable and growing within the scientific community (Corbera and Schroeder, 2011; Kanowski et al., 2011; Visseren-Hamakers and Verkooijen, 2012). On the other hand, the capacity of actors to actively participate or

contribute to the policy process is extremely crucial. Rooted in this capacity to influence a policy process is the concept of *agency* (Pattberg and Stripple, 2008; Schroeder, 2010; Vatn and Vedeld, 2011). The ability of an actor to shape the norms and values related to decision-making and to exercise its authority in identifying problems and proposing solutions is central for governance (Pattberg and Stripple, 2008; Dellas et al., 2011). From the empirical evidence of this research, both actors' diversity and actors' capacity to contribute to the policy process are crucial for governance outcomes. In my opinion, both constitute the quality of participation in the governance process.

Still on actors and environmental governance, the configurations of actor-networks have been argued as a critical element of environmental governance (Haas, 2007). From the evidence of this thesis, coalition building between or among actors is a rational behaviour where cooperation becomes necessary to achieve certain goals within the policy process. Coalitions of heterogeneous and self-interested actors (which can involve both state and non-state actors) seek to influence the policy agenda, in this case for adaptation and REDD+. These coalitions employ and coordinate their knowledge, resources and capacities to pool their interests, and sometimes eventually shape the policy process to their advantage. Some coalitions indeed result from partnerships between different actors motivated by the realization that the issues at hand (e.g. adaptation and REDD+) are seemingly complex that neither one actor can solve them (Lemos and Agrawal, 2006; Visseren-Hamakers, 2009). Furthermore, the relevance of using discursive institutionalism for analyzing the governance process of adaptation and REDD+ in Congo is apparent through how actors build coalitions along with their abilities to draw from discursive categories or (re)frame discourses within the policy context.

In the context of DI, the relevance of discourse analysis (DA) for this research includes its strength of analyzing the roles that ideas, meanings and interpretations play in the allocation of significance to adaptation and REDD+ in the policy processes. Through DA, I was able to analyze how different actors deal with ambiguity, interpret complexity, or deliberately accept/reject certain meanings of a concept based on their perception of what reality constitutes. By combining the concepts of framing and frame articulations with discourses, it was possible to systematically analyze how the three dominant discourses

on adaptation and REDD+ resulted from convergence of similar frames, shared meanings, ideas and interpretations. Admittedly, combining frames with discourses posed a theoretical challenge for the research (chapter 2). The reason is because both are considered different in their ontological and epistemological assumptions (see van der Brink and Metze, 2006). Nevertheless, the recognition that framing processes do not take place in a societal vacuum, rather are influenced by and nested in wider overarching discourses, provided a solace to combine them in a theoretical framework for this research.

Institutions in the context of understanding the governance processes of adaptation and REDD+ is considered in three forms: institutional setting, institutional arrangement and institutional interaction. The first two forms have been analyzed from the position of their behaviour- constraining attributes: normative, regulative and cognitive. Whether existing or being arranged, institutions for governing adaptation and REDD+ constitute the body of rules, norms, values and decision-making procedures to define goals, impose constraints on behaviour and empower actions for societal outcomes. However, the third form of institutions in this research, institutional interaction, differs from the other two. It is more at the level of interaction between two (sub) regimes which involve specific actors, rules, coordination processes, and policy approaches. From this perspective, both adaptation and REDD+ become institutions in *themselves*. Nevertheless, institutional interaction can still be viewed from the interplay of institutional settings and arrangements in the two fields of adaptation and REDD+. This further attests to the limitation of discursive institutionalism in explaining how interactions evolve and are managed.

7.4.3 Reflecting on Governance 'Trajectories' for Adaptation and REDD+

In this thesis, I have analyzed the governance process of adaptation and REDD+ using three analytical elements: actors, discourses and institutions. In reflecting on the governance trajectories for adaptation and REDD+, I consider two fundamental elements: the types of *actors* involved, characterized by their capacities and competencies; and the formal and informal *institutions* that facilitate interaction and coordination between actors (see Figure 5-1). By trajectory, I mean the path that governance systems have to take within a given

timeframe to reach an 'end' state from a 'present' state. The assumption is that where multiple trajectories are possible, invariably they will likely be different in their focus, priorities, drivers, constraints, strengths and weaknesses. Analyzing these differences, theoretically and empirically, is useful for understanding the governance processes and outcomes of adaptation and REDD+.

Excluding discourses here is deliberate because both discourses and institutions take the form of 'social structure' in this thesis. Hence, they are conceptually the same at a 'higher' theoretical level of analysis. Moreover, I exclude 'discourse' for the sake of simplicity. Constructing three-dimensional figures – instead of the two-dimensional ones below – would render the analysis overly complex. In preferring either discourse or institution in this reflection, the latter was prioritized by me, because – in line with discursive institutionalism's view – it is through institutions that policy discourses become effective, and not the other way around. In summary, the *diversity of actors* coupled with the *quality of institutions* constitute the two key elements for constructing relevant governance trajectories for adaptation and REDD+ in my reflection below.

I will combine these two key elements in a matrix using a scale of low-high to conceptualize the different forms of governance possible. Afterwards, I will situate both adaptation and REDD+ in this matrix in order to understand what trajectories have to be taken to reach 'strong' governance, assuming that such strong governance is the precondition for successful implementation. But first, I will clarify what I mean by diversity of actors and quality of institutions.

Diversity of actors refers to the constellations of actors, including state actors (governments) and non-state actors (civil society, development partners, private sector). Actors' diversity here could also encompass diversity within an actor group, for instance, actors within the domain of the state interested in forest and environmental issues; after all, there are line ministries involved, state agencies, commissioned groups within the parliament, etc. The assumption is that a diversity of actors also includes their capacities and competences. Drawing from the assertion that the relative strength of formal and informal institutions are important for any governance regime (Pahl-Wostl, 2009), I consider *quality of institutions* as the enforceability of existing rules, norms and values that tend to shape the interactions of actors within the policy process.

The quality could also imbibe the different institutional tools available for governing an environmental issue. While institutional pluralism (diversity of institutions) might be relevant for environmental governance (see. Gibson, 2001; Benneker, 2008), the qualitative attribute of constraining behaviors through strict adherence to the prevailing rules and institutional structures is more applicable here.

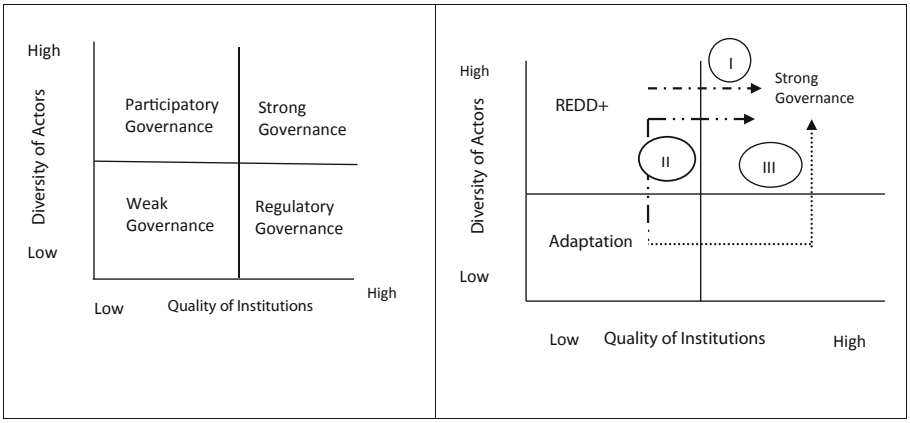

Figure 7-1: Conceptual framework for governance trajectory for adaptation and REDD+

The combination of the two dimensions (actor diversity and institutional quality) in a low-high scale matrix results in four ideal-typical outcomes (weak, strong, regulatory and participatory governance) as shown in Figure 7.1. In relation to the trajectory, strong governance which constitutes high actor diversity and high institutional quality is the ideal condition for effective policymaking on adaptation and REDD+. On the other hand, weak governance is characterized by low actor diversity and low institutional quality. Participatory governance is high actor diversity with low institutional quality while regulatory governance is the reverse.

As the findings of the thesis suggest in Chapters 2, 5 and 6 as well as presented in the earlier sections of this chapter, the high diversity of actors involved in the REDD+ mechanism in the Congo Basin is overwhelming and evident; the quality of the institutions however is low, thus suggesting a participatory governance style, as shown in Figure 7-1. This is understandable given that the actors are still at the stage of rule-making systems and ideas on how existing

institutions and governance instruments such as the FLEGT process, certification schemes, community forestry institutions and conservation approaches are being explored for REDD+. The *governance trajectory* for REDD+ (Trajectory-I) would be to increase the quality of its institutional setting and arrangements. Evidence from the policy debates on REDD+ suggests that as the quality of the institutions increases, the 'REDD+ is complex' framing fades out of the policy process, while more optimism for successful implementation will set the stage.

The findings on adaptation are less positive compared to REDD+, largely due to its low diversity of actors and its low quality of institution. Evidence from Chapters 2, 3, 4 and 6 suggests that on the interplay between actors and institutions, adaptation in the Congo Basin is characterized by weak governance as shown in Figure 7-1. The discourse on the complexity of adaptation is further exacerbated by the low diversity of actors involved in the policymaking process at the national level, along with low qualitative institutions to shape the interactions of the actors involved in the process. Two potential governance trajectories are possible for adaptation to move from being characterized by weak governance to strong governance. First, by increasing its diversity of actors beyond a few actors within the state and a few civil society categories to include the direct participation of state actors of other relevant sectors (agriculture, water, energy), local NGOs, development partners, community-based organizations, scientific institutes and the private sector. These actors can bring their knowledge, resources, technologies, capacities and expertise to the advantage of adaptation in the Congo Basin. Presumably, under increased diversity of actors within a given timeframe, adaptation can attain participatory governance similar to REDD+. The next phase would be to increase the quality of its institutional setting and arrangements similar to the trajectory for REDD+ (Trajectory-II).

The second governance trajectory for adaptation could emerge by increasing the institutional quality by the few actors involved through which adaptation-related rules, norms and values are set in place in the form of an operational framework for governing adaptation at all levels (Trajectory-III). The argument here is that institutional quality needs to be in place first before a diversity of actors is promoted. The advantage is that an operational framework that assigns roles, structure behaviour and define goals for adaptation is already

established to manage interactions and coordination among self-interested actors. One possible disadvantage is that such a framework might be biased towards the discursive assumptions and interests of the few actors involved in its design, which might impair the governance outcomes for adaptation at a later stage.

An obvious question then is why not consider a hybrid of Trajectories II and III for adaptation, where you move directly from weak to strong governance by increasing the diversity of actors and institutional quality simultaneously (potentially Trajectory IV). Given my research and experience in the Congo Basin, the hybrid trajectory for adaptation (IV) is less likely and practical. This will be too ambitious and not consistent with the contexts of the region, especially where adaptation does not receive as much political attention as REDD+. What I personally consider practical for governing adaptation in the Congo Basin is the path of Trajectory II. By engaging more actors from state and non-state groups, within the forest and forest-related sectors, adaptation might attain a form of participatory governance. These multiple actors are expected to bring their knowledge, expertise, financial resources, and capacities to support the adaptation policy process. The Ministry of Environment continues to lead the coordination process, define roles and responsibilities for different actors based on their competencies and manage the disconnect between global direction for adaptation and local priorities. Once participatory governance is achieved, increasing the institutional quality over time can follow.

7.4.3 Methodological Reflections

Right from its start, it was clear that this research was about the interaction of actors and institutions in the process of designing policies for adaptation and mitigation in the Congo Basin forest sector. This starting point did not immediately present any major methodological challenge. However with the choice of discursive-institutionalism as the key theoretical approach, methodological steps for discourse analysis needed to be developed in tandem with those for actors and institutions. The thesis adopted many of the methodological steps suggested by van der Brink and Metze (2006).

As already mentioned in the methodological sections of each empirical chapter, the thesis combined a mixed methods approach of data collection: qualitative method (in-depth interviews), quantitative method (household surveys), participatory observations, and document and literature review, to give meaning to the analytical elements (actors, discourses and institutions) of this study. Triangulation of these data sources was useful in improving the credibility and validity of the results (Altrichter et al., 2008). The thesis undertook a degree of methodological rigour in each empirical chapter due to a minimum of two data collection methods in a cross-method fashion. Different data collection methods also required different data analysis methods, depending on the research question at hand.

Two of these four data collection methods stand out for further reflection due to their importance for the credibility and legitimacy of my research findings: qualitative in-depth interviews and participatory observations. The former proved to be a vital form of data collection, especially to understand the governance problem of a complex environmental issue such as climate change. By adopting a more conversational form of in-depth interviews, I was able to gain a deeper understanding of actors' framing of issues, consistency of storylines and narratives and the depth of up-to-date knowledge of the issues being discussed. Based on in-depth interviews with 103 actors with direct stakes in the policy process from three countries, Chapter 2 benefitted from significant interview data on different discursive framings of adaptation and REDD+, which were further aggregated into three main policy discourses. I would assume fewer frames to be deduced from fewer interviews would have limited aggregation into main discourses on adaptation and REDD+ in Congo.

Furthermore, the advantage of participatory observations in more than 30 policy-related events, workshops, project launchings, science-policy dialogues and symposia on adaptation and REDD+ within Cameroon, CAR and DRC, and other countries of Congo Basin, over a period of four years (2009- 2012) cannot be overemphasized. Participatory observations offered me a space to study actors' arguments, actions, interpretations of policy issues, presentations of their own ideas of what the policy process on adaptation and REDD+ should entail, and their coalitions (see Hammersley and Atkinson, 2007; Ayana, 2014; Wairimu, 2014). The fact that many of these events were attended by key and

'powerful' policy actors highly engaged in the policy debates, and that most of them were the same people I interviewed at different points in time, helped me to triangulate my data for validation. This was essential for grasping the discourses and the institutional contexts in which these discourses emerged. Indeed, interviewing a wide range of policy actors at different levels and domains, and taking part in the multiple meetings on policy processes on adaptation and REDD+, led to considerable understanding of the politics of governance and policymaking.

On the methodological limitation of the study, the research setting was initially designed to collect data from three countries (Cameroon, CAR and DRC) for each empirical chapter towards gaining a regional understanding of adaptation and REDD+ in Congo. While this was successful for Chapter 2, it was not possible to continue for other chapters due to costs and risks, related to multiple conflicts in CAR and DRC. Nevertheless, as a miniature of the Congo Basin in terms of forest systems, administrative settings and relatively developed forest governance systems, Cameroon turned out to be a good case study for understanding the governance process of adaptation and REDD+ in the Congo Basin.

7.4.4 Personal Reflection

When I joined CIFOR as a researcher in 2008 to work on climate change adaptation in the Congo Basin, through the Congo Basin Forest and Climate Change Adaptation (CoFCCA) project[14], it did not take long to realize that adaptation had a long way to go. The project organized a number of science-policy dialogues which brought together many policymakers, scientists, practitioners and CSOs from Cameroon, CAR and DRC, on defining what adaptation meant in the Congo context, regionally, nationally and locally. What was shocking to me was that while these dialogue-meetings were designed to purely focus on adaptation, the discussions were often hijacked by debates on avoided deforestation (eventually called REDD+). The excitements of the promises of REDD+ engulfed the policy arena within the region to the point that a proliferation of policy events on REDD+ became the new order. It was at this point that I began to ask questions that led to this thesis.

14 The Congo Basin Forests and Climate Change Adaptation (CoFCCA) project from 2008 was the first project looking at adaptation policy in the forest sector. It uses a science-policy dialogue approach to define what adaptation options and priorities the region needs at regional and national levels.

As a researcher that has been actively following the adaptation and REDD+ processes in the Congo Basin since 2008, I have observed how the word 'complex' has evolved and still characterizes adaptation to date, while the same word has gradually faded out for REDD+. This observation stands out for further personal reflection. This is because two concepts of climate change started out in Congo Basin framed as complex but one, that is REDD+, managed to 'address its complexity' presumably in its design process, while the other still remains mired in the mud of complexity. This thesis provides an answer to this mismatch. The proponents of REDD+ used the pool of financial[15] and technical resources available for the REDD+ process to engage diverse actors and stakeholders (what I call 'participatory governance') to build consensus on developing a national strategy where existing and new institutions are negotiated for successful implementation. In addition, REDD+ also benefitted from the dynamics of the global discourses and policy architectures, where cooperative partnerships and knowledge systems within and outside the UNFCCC increasingly flowed from the global arena to regional and national levels. Unfortunately, this was not the case for adaptation, at least in the case of Cameroon. Adaptation remains local in nature, as many proponents of adaptation claim. Nevertheless, in this thesis, I considered the value of looking at adaptation at the national level by unpacking its elements of vulnerability, sensitivity and adaptive capacity in the Cameroonian forest sector.

One of the key highlights of this thesis is the *priority-opportunity* dichotomy between adaptation and mitigation within the forest-climate nexus. It was instructive to discover that despite the shared framing of adaptation as a priority (among the actors) for the Congo Basin in responding to the magnitude and frequency of climate impacts, adaptation never received the depth of political attention commensurate to its priority framing. With REDD+ being framed for the opportunities (poverty reduction, economic development, and biodiversity conservation) it holds for the countries, it was not surprising that its policy process has fairly advanced in relatively short time. Despite the concerns on the feasibility of REDD+ in countries characterized by pockets of fragility, conflict, weak institutions and low capacities (Hansen et al., 2009; Phelps et al., 2010; Streck, 2010; Muzong, 2011; Karsenty and Ongolo, 2012), REDD+ policy

15 Maniatis et al. 2013 in their critical analysis of the financing and capacity for REDD+ readiness in the Congo Basin report that between 2010 and 2012, about USD550 million, representing 50% of the REDD+ financing to the African continent, has flown to the Congo Basin

design and implementation is nonetheless 'muddling through' in the Congo Basin. The priority-opportunity divide between adaptation and REDD+ reveals the politics of climate governance in the Congo Basin in two related ways. First, it shows that there exists a strong political will to overcome the challenges confronting REDD+ towards a successful implementation in order to deliver its promised multiple benefits. Second, the divide has implicitly created a 'window of opportunity' for synergy, where policy actors are proposing that the opportunity of REDD+ meets with the priority of adaptation. It is on this basis that synergy becomes a deliberate and conscious effort from policy actors to achieve a coordinated response to climate change in the Congo Basin.

A major challenge in conducting this thesis was on researching a subject (climate change) that is rapidly evolving globally and locally. From 2009 onwards, when I started this research, significant milestones have been reached within the policy processes on adaptation and REDD+ relatively in a short period of time. Even at the global level, the discourses on what REDD+ entails and how it should be governed are rapidly changing, for instance, from the idea of Avoided Deforestation (AD) to Reducing Emissions from Deforestation (RED) to Reducing Emissions from Deforestation and Degradation (REDD) and finally to REDD+ (see Humphreys, 2008; Pistorius, 2012; Den Besten et al., 2014). The changing landscape of global discourses on REDD+ influenced regional and national dynamics. Researching the subject in its dynamic form was challenging, especially when new actors entered the national policy process and when old discourses gave way for new ones. For instance, the addition of '+' to REDD enormously expanded the actor diversity to include people outside the forest sector; with some 'powerful' ones seeking to sway the policy process to different directions.

Lastly, this thesis benefitted from my work as a researcher with CIFOR in many ways. First, I had access to and significant time with key actors for interviews. A few of these actors included Ministers and Deputy Ministers of Forest/Environment, Heads of Commissions and Programmes, and many members of the 'powerful' Consultation Circle of Partners to Ministries of Forestry and Environment in Cameroon, called CCPM. These interviews provided firsthand information on the policy process. My affiliation with CIFOR gave them the confidence to provide valuable information as long as they were assured of confidentiality. Secondly, as the government and civil society actors often needed technical

advice and support of international organizations like CIFOR, I had access to a few unpublished and confidential documents directly or indirectly related to my research interests on adaptation and REDD+. Thirdly, given that CIFOR itself either organized or facilitated a number of these policy events and workshops on adaptation and REDD+, participating in these meetings was relatively easy for me, and as earlier mentioned, participatory observations turned out to be a vital data collection method for this thesis. Lastly, I made a number of presentations during a few of these policy meetings on some preliminary findings of my research. This gave me an opportunity to further refine the analysis and findings, in line with my research questions. Finally, recognizing that CIFOR itself is actively involved in the adaptation and REDD+ policy process, I was cognizant of the need to always take a stance of objectivity during data collection and analysis, as well in the reporting of the findings.

7.5 Recommendations for Policy and Research

With five years gone since I started researching the governance process of adaptation and REDD+ in the Congo Basin, and with many questions about forest-based strategies for responding to climate change, this thesis sets out to answer some of these questions. Nevertheless, many questions still remain for the scientific community and for policy practitioners on the realities of adaptation and REDD+ in the Congo Basin. The thesis therefore presents a number of recommendations for research and policy.

Given that adaptation in the Congo Basin remains clouded in uncertainties, and remains highly contested, scientific research to gain better understanding on the complex barriers challenging adaptation would be essential. The following questions come to mind: Why is adaptation so complex? What are the constraints to governing adaptation in developing countries? What innovative theoretical approaches might be useful in analyzing adaptation governance, particularly in resource-rich countries like the Congo Basin region? I would recommend that more science-policy dialogue are needed to generate and exchange information on adaptation needs, an exchange of best practices and viable policy options among a diverse set of actors to generate relevant information to answer these questions.

Empirical evidence from chapters 3 and 4 suggests the existence of non-climate factors driving the vulnerability of the Congo Basin forests to climate risks. In lieu of this, for policy practice, I would recommend that adaptation policy would be based on holistic thinking and action (through a policy framework), which integrates multiple sectors (forests, agriculture, energy and water), multiple administrative levels (local council, subnational regions, national and supranational) and multiple institutions (customary rights, rules, norms, allocation mechanisms and legislations). To achieve this, I recommend that COMIFAC provides regional leadership to support the countries towards their current and future adaptation needs and capacities.

Along the same line of thinking, policy actors of adaptation must take deliberate efforts to raise the profile of adaptation for policymaking in the region. Not necessarily to match the level of scientific and political attention that REDD+ receives, but to accord a considerable degree of attention in public policy. Translating this policy attention to an institutional framework would be a positive step for the Congo Basin countries. This would be beneficial for the countries to take advantage of new global financing architecture, called the Green Climate Fund (GCF), where up to USD 100 billion is expected to be annually mobilized by 2020. The GCF has been given a mandate for a balanced allocation between adaptation and mitigation.

An obvious recommendation for research and policy practice flows from my theoretical reflection on potential governance trajectories for adaptation and REDD+. Further research would be needed to critically analyze the three governance trajectories in Figure 7-1, both conceptually and empirically (Trajectory1-3). Research could focus on what strong governance would translate to in practice for both adaptation and REDD+, as well as their synergies, in the context of the Congo Basin. In parallel, policy practitioners could also experiment with increasing the diversity of actors of adaptation, possibly to the level of REDD+, if possible. For adaptation in particular, research could focus on developing a conceptual framework for analyzing trajectories 2 and 3, and also to understand under what policy conditions such trajectories could take place.

On institutional arrangements for adaptation and REDD+ in the Congo Basin, the thesis recommends that understanding national circumstances and existing technical and managerial capacities as preconditions for developing such arrangements is crucial. A country like Cameroon has a myriad of forest institutions and governance instruments, e.g. FLEGT, certification schemes, legality standards, community forestry and conservation approaches, more than other countries in the region. Yet, Cameroon still has the highest rate of deforestation within the region. Particularly for REDD+, institutional arrangements should be context-specific, nationally-driven to the available capacities and resources, and should have well-coordinated enforcement mechanisms to govern the interactions of the different actors involved in the policy process. The scientific community could support this policy process by taking analytical inventories of existing governance instruments, on their causal factors for success or failure, and their compatibility to govern REDD+ implementation.

Propensity for synergy resulting from the integratist discourses on adaptation and REDD+ is a major finding in this thesis. Identifying opportunities for enhancing synergy between adaptation and REDD+ is one step of a long process of achieving synergetic outcomes. Scientific investigation into policy pathways for interactions or integration models for designing, implementing and monitoring interactions between adaptation and REDD+ specific to the Congo Basin context is essential. Further research on interaction management systems for coordinating interactions across scales (regional, national and local) is crucial for understanding synergetic practices during implementation. Additionally, experimenting with policymaking options for adaptation and REDD+ beyond the domains of forest and climate change to include biodiversity conservation, desertification eradication and environmental sustainability within the much-larger agenda of sustainable development is crucial for holistic management of the Congo Basin forests.

Still on synergy, further research is required for conceptualizing a set of metrics, including criteria and indicators, useful for analyzing the benefits of synergetic interaction between adaptation and REDD+. As earlier alluded to in this chapter (section 7.3.4), if synergy becomes a governance tool, an evaluative criterion for assessing interactions between adaptation and REDD+ becomes

crucial. This would entail performance metrics for measuring to what extent adaptation is *mitigative* and mitigation is *adaptive*. Further research is also recommended on the optimal mix of forest-related practices and management systems at different levels to achieve maximum benefits out of synergy. Given the divergences between adaptation and REDD+ at actor and institution levels, scientific research could consider the set of enabling conditions, partnerships and institutional arrangements crucial for synergy to provide the required holistic approach for efficiency and effectiveness of adaptation and REDD+ strategies in the Congo Basin.

But designing appropriate policies to coordinate adaptation and REDD+ strategies in Congo Basin is not going to be enough. Building bridges between policy (overarching policy framework), science (knowledge systems - natural and social) and management is critical for both to succeed. Bearing in mind that these three triads have their own actors, rules, norms and values as well as mechanisms for coordination, bringing them together will likely remain a huge puzzle for the political community, hence it should be given considerable scientific attention. Whether to follow separated policies for adaptation and REDD+ or combine them in an integrated one, coordinating the intricate relationship among policy, science and management at all levels remains crucial for the Congo Basin. I would therefore strongly recommend to scientifically test these linkages conceptually and empirically, as an important first step towards building these bridges.

References

Acemoglu, D., Johnson, S., Robinson, J.A. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *The American Economic Review*, 91(5), 1369-1401.

Adger, W.N., Barnett, J., Brown, K., Marshall, N. O'Brien, K. (2012) Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, 3, 112-117

Adger, W.N., Brown, K., Nelson, D.R., Berkes, F., Eakin, H., Folke, C., Galvin, K., Gunderson, L., Goulden, M., O'Brien, K., Ruitenbeek, J., Tompkins, E. L. (2011). Resilience implications of policy responses to climate change. *Wiley Interdisciplinary Reviews*, 757–766.

Adger, W.N., Lorenzoni, I., O'Brien, K.L. (Eds.). (2009). *Adapting to climate change. Thresholds, values, governance.* Cambridge: Cambridge University Press.

Adger, W.N. (2006). Vulnerability. *Global Environmental Change*, 16, 268–281.

Adger, W.N., Arnell, N.W., Tompkins, E. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, 15(2), 77-86.

Adger, W.N., (2003). Social capital, collective action and adaptation to climate change. *Economic Geography,* 79(4), 387-404.

Adger, W.N., Huq, S., Brown, K., Conway, D., Hulme, M. (2003). Adaptation to climate change in the developing world. *Progress in Development Studies,* 3(3), 179- 195.

Adger, N.W., Benjaminsen, T.A., Brown, K., Svarstad, H. (2001). Advancing a political ecology of global environmental discourses. *Development and Change*, 32, 681-715.

Adger, W.N. (2000). Institutional adaptation to environmental risk under the transition in Vietnam. *Annals of the Association of American Geographers,* 90(4), 738-58.

Agrawal, A. (2008). *The Role of Local Institutions in Adaptation to Climate Change. Social Dimensions of Climate Change*. Washington DC, World Bank.

Agrawal, A., Chhatre, A., Hardin, R. (2008). Changing governance of the world's forests. *Science*, 320, 1460-1462.

Agrawal, A., Perrin, N. (2009). Climate adaptation, local institutions and rural livelihoods. In: Adger W.N. (eds.) *Adapting to Climate Change: Thresholds, Values, Governance* (pp. 350-367). Cambridge: Cambridge University Press.

Agrawal, A., Nepstad, D., Chhatre, A. (2011). Reducing emissions from deforestation and forest degradation. *Annual Review of Environmental Resources*, 36, 373-396.

Alemagi, D., Minang, P.A., Feudjio, M., Duguma, L. (2014). REDD+ readiness process in Cameroon: an analysis of multi-stakeholder perspectives. *Climate Policy*. dx.doi.org/10.1080/14693062.2014.905439

Angelsen, A., Brockhaus, M., Sunderlin, W.D., Verchot, L.V. (Eds) (2012). *Analyzing REDD+: Challenges and Choices*. Bogor. CIFOR.

Angelsen, A. (2009). *Realizing REDD+: National Strategy and Policy Options*, Center for International Forestry Research (CIFOR), Bogor.

Agrawal, A. (2005). *Environmentality: Technologies of Government and the Making of Subjects.* Duke University Press, Durham and London

Agyenim, (2011). *Investigating institutional arrangements for integrated water resource management in developing countries: the case of White Volta Basin, Ghana*. PhD thesis, Vrije Universiteit, Netherlands, 287 p.

Altrichter, H., Feldman, A., Posch, P. & Somekh, B. (2008). *Teachers investigate their work: An introduction to action research across the professions*. Routledge (2nd edition).

Andonova, L., Betsill, M., Bulkeley, H. (2009). Transnational climate governance. *Global Environmental Politics*, 9(2), 52–73.

Ansell, C., Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571.

Aquino, A., Guay, B. (2013). Implementing REDD+ in the Democratic Republic of Congo: An analysis of the emerging national REDD+ governance structure. *Forest Policy and Economics*, 36, 71-79

Archer, M. (2003). *Structure, agency and the internal conversation.* Cambridge: Cambridge University Press.

Armitage, D., Plummer, R. (2010). *Adaptive Capacity and Environmental Governance*. New York. Springer Heidelberg Dordrecht

Arts, B., Visseren-Hamakers, I.J. (2012). Forest governance: A state of the art review. (pp. 241–259) in Arts, B., S. van Bommel, M. Ros-Tonen and G. Verschoor (Eds.). *Forest- people interfaces.* Wageningen: Wageningen Academic Publishers

Arts, B., Visseren-Hamakers, I.,J. (2012). *Forest governance: mainstream and critical reviews*. ETFRN News, 53, 3-10.

Arts, B., et al. (2011). *Discourses, Actors and Instruments in International Forest Governance. In: Embracing Complexity – Meeting Global Forest Governance Challenges. Report of the Global Forest Expert Panel on the International Forest Regime to the Collaborative Partnership on Forests*. Vienna: IUFRO.

Arts, B., Buizer, M. (2009). Forests, discourses, institutions: A discursive-institutional analysis of global forest governance. *Forest Policy and Economics,* 11, 340-347.

Arts, B., Noortmann, M., Reinalda, B. (Eds.). (2001). *Non-state actors in international relations.* Aldershot: Ashgate.

Arts, B. (1998). *The political influence of global NGOs: Case studies on the climate and biodiversity conventions*. Utrecht: International Books.

Assembe-Mvondo, S., Brockhaus, M., Lescuyer, G. (2013). Assessment of the effectiveness, efficiency and equity of benefit sharing schemes under large scale agriculture: Lessons from land fess in Cameroon. *European Journal of Development and Research*, 25, 641-656

Assembe, S. (2006). Forestry income management and poverty reduction: empirical findings from Kongo, Cameroon. *Development in Practice*, 16(1), 68-73.

Avant, D., Finnemore, M., Sell, S. (Eds.), (2010). *Who governs the globe?* New York: Cambridge University Press.

Awono, A., Somorin O.A., Eba's Atyi, R., Levang, P. (2014). Tenure and participation in local REDD+ projects: insights from southern Cameroon. *Environmental Science and Policy* 35, 76-86.

Ayana, A.A. (2014). *Forest governance dynamics in Ethiopia: histories, arrangements, and practices*. PhD thesis, Wageningen University, NL, 140 p.

Ayers, J., Huq, S. (2009). The Value of Linking Mitigation and Adaptation: A Case Study of Bangladesh. *Environmental Management,* 43,753-764

Ayres, M., Karnosky, D., Thompson, I. (2009). Forest Responses and Vulnerabilities to Recent Climate Change. In Seppala, R., Buck, A., Katila, P. (eds.) Adaptation of Forests and People to Climate Change – *A Global Assessment Report. IUFRO World Series*, 22, 29-52.

Bäckstrand, K., Lövbrand, E. (2006). Planting trees to mitigate climate change: contested Discourse of ecological modernization, green governmentalism, and civic environmentalism. *Global Environmental Politics,* 6(1), 50-75.

Barnet, J., O'Neil, S. (2010). Maladaptation. *Global Environment Change*, 20, 211-213

Barzelay, M., Gallego, R. (2006). From "New Institutionalism" to "Institutional Processualism": Advancing Knowledge about Public Management Policy Change. *Governance*, 19, 531–557.

Batterbury, S., Forsyth, T. (1999). Fighting back: Human adaptations in marginal environments. *Environment*, 41(6), 7–30.

Beck, T., G. Clarke, A. Groff, P. Keefer, P. Walsh. (2002). *New Tools and New Tests in Comparative Political Economy: The Database of Political Institutions, Regulation and Competition Policy, Development Research Group*. World Bank, Washington, D.C.

Behagel, J.H. (2012). *The politics of democratic governance: the implementation of the Water Framework Directive in the Netherlands*. PhD thesis, Wageningen University, NL, 233 p.

Bele, M.Y., Sonwa, D.J., Tiani, AM. (2014). Adapting the Congo Basin forests management to climate change: Linkages among biodiversity, forest loss, and human well-being. *Forest Policy and Economics* (online first)

Bele, M.Y., Somorin O., Sonwa, D.J., Nkem J.N., Locatelli, B. (2011). Forests and climate change adaptation policies in Cameroon. *Mitigation and Adaptation Strategies for Global Change*, 16, 369-385.

Bele, M. Y., Tiani, A. M., Somorin O A, Sonwa D J. (2013). Exploring vulnerability and adaptation to climate

change of communities in the forest zone of Cameroon. *Climatic Change,* 119, 875-889

Benford, R.D., Snow, D.A. (2000). Framing Process and Social Movements: An overview and assessment. *Annual Review of Sociology*, 26, 611-639.

Benneker, C. (2008). *Dealing with the State, Market and NGOs: the impact of institutions on the constitution and performance of community forestry enterprises (CFE) the lowlands of Bolivia*. PhD thesis, Wageningen University, NL.

Berg van der, J., Wiersum, K.F., van Dijk, H. (2007). The role and dynamics of community institutions in the management of NTFP resources. *Forest, Trees and Livelihoods,* 17, 183-197.

Berkes, F., Colding, J., Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, 10, 1251 – 1262.

Betsill, M. M., Bulkeley, H. (2006). Cities and the multilevel governance of global climate change. *Global Governance*, 12, 141–159.

Betsill, M., Corell, E. (2001). NGO influence in international environmental negotiations: A framework for analysis. *Global Environmental Politics*, 1(4), 65–85.

Bieler, M. (2001). The Gordian Knot of Agency—Structure in International Relations: A Neo-Gramscian Perspective. *European Journal of International Relations March 2001*, 7(1), 5-35

Biermann, F., Betsill, M.M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhuner, B., Zondervan, R. (2010). Earth system governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, 10(4).

Biermann, F., Betsill, M.M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhuner, B. (with contributions from Conca, K., da Costa Ferreira, L., Desai, B., Tay, S., Zondervan, R.) (2009). Earth system governance: people, places and the planet. Science and implementation plan of the earth system governance project. *Earth System Governance Report 1, IHDP Report* 20. Bonn: IHDP

Biermann, F., Davies, O., Grijp van der, N. (2009a). Environmental policy integration and the architecture of global environmental governance. *International Environmental Agreements: Politics, Law and Economics,* 9, 351-369

Biermann, F., Pattberg, P., Van Asselt, H., Zelli, F. (2009b). The Fragmentation of Global Governance Architectures: A Framework for Analysis. *Global Environmental Politics,* 9, 14-40

Biermann, F. (2007). Earth system governance as a crosscutting theme of global change Research. *Global Environmental Change*, 17(3–4), 326–337

Biermann, F., Dingwerth, K. (2004). Global environmental change and the nation state. *Global Environmental Politics*, 4, 1–22.

Biersteker, T.J. (2009). Global governance. In: Cavelty, M.D., Mauer, V. (Eds) *Routledge Companion to Security*. New York and London: Routledge Publishers.

Biesbroek, G.R. (2014). *Challenging barriers in the governance of climate change adaptation*. PhD thesis, Wageningen University, NL, 288 p.

Biesbroek, G.R., Swart, R.J., van der Knaap, W.G.M. (2009). The mitigation-adaptation dichotomy and the role of spatial planning. *Habitat International*, 33(3), 230-237

Blaikie, P., Cannon, T., Davis, I., Wisner, B. (1994). *At risk. Natural Hazards, People's Vulnerability and Disaster*. London, New York.

Böcher, M., Giessen, L., Kleinschmit, D. (Eds) (2008). *Environmental and Forest Governance: The roles of discourses and expertise*. Proceedings of International Conference, Gottingen, IUFRO.

Bodegom, van A.J., Savenije, H., Wit, M. de. (2009). *Forests and Climate Change: adaptation and mitigation*. ETFRN News 50, Wageningen,

Bogason, P. (2000). *Public Policy and Local Governance: Institutions in Post-modern society* (Cheltenham: Edward Elgar)

Bohle, H.G., Downing, T.E., Watts, M.J. (1994). Climate change and social vulnerability: toward a sociology and geography of food insecurity. *Global Environmental Change*, 4, 37–48.

Bombelli et al. (2009). An outlook on the sub-Saharan Africa carbon balance. Biogeosciences, 6, 2193-2205

Bonan, G.B. (2008). Forests and climate change: forcings, feedbacks, and the climate benefits of forests. *Science*, *320*(5882), 1444-1449.

Bose, P. (2012). *Forest rights: the micro-politics of decentralization and forest tenure reform in tribal India*.

PhD thesis, Wageningen University, NL, 185 p.

Bosquet, B. (2011). Cameroon: not ready for REDD+. *Nature*, 474, 36. Bowles, S. (1998). Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions. *The Journal of Economic Literature*, 36(1), 75-111.

Breitmeier, H., O. R. Young, et al. (2006). *Analyzing International Environmental Regimes*. Cambridge, MIT Press.

Bressers, H.T., Kuks, S.M.M. (2003). What does 'governance' mean? From conception to elaboration. In Bressers, H.A., Rosenbaum, W.A. (eds), *Achieving Sustainable Development*, Praeger, Westport, Connecticut, pp. 65-88

Brewer, G., P. C. Stern, Eds. (2005). *Decision Making for the Environment*. Washington D.C, National Academies Press.

Brink, M. van den. (2009). *Rijkswaterstaat on the horns of a dilemma.* Delft: Eburon. PhD thesis Radboud University Nijmegen, Netherlands.

Brink, M van Den., Metze, T., (eds.) (2006). Words matter in policy and planning – Discourse Theory and Method in the Social Sciences. *Netherlands Geographical Studies,* 344, Utrecht: KNAG/Nethur.

Brockhaus, M., Di Gregorio, M., Mardiah, S. (2014). Governing the design of national REDD+: an analysis of the power of agency. *Forest Policy and Economics*. http://dx.doi.org/10.1016/j.forpol.2013.07.003

Brooks, N., Adger, W.N., Kelly, P.M. (2005). The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change,* 15, 151-163.

Brown, K., Westaway, E. (2011). Agency, capacity, and resilience to environmental change: lessons from human development, well-being, and disasters. *Annual Review of Environment and Resources*, *36*, 321-342.

Brown, H.C.P., Lassoie, J.P. (2010). Institutional choice and local legitimacy in community-based forest management: lessons from Cameroon. *Environmental Conservation,* 37(3), 261-269.

Brown, H.C.P., Nkem, J.N., Sonwa, D.J., Bele, M.Y. (2010). Institutional adaptive capacity and climate change response in the Congo Basin forests of Cameroon. *Mitigation and Adaptation Strategies to Global Change*, 15, 263-282.

Brown, H.C.P. (2011). Gender, climate change and REDD+ in the Congo Basin forests of Central Africa. *International Forestry Review,* 13(2), 163-176.

Brown, H.C.P., Smit, B., Somorin, O.A., Sonwa, D., Nkem, J.N. (2011). Institutional perceptions of opportunities and challenges of REDD+ in Congo Basin. *Journal of Environment and Development*, 20(4), 381-404.

Bryan, E., Deresa, T.T., Gbetibuou, G.A., Ringler, C. (2009). Adaptation to climate change in Ethiopia and South Africa: options and constraints. *Environmental Science and Policy,* 12, 413-426.

Buijs, A.E., Matthijssen, T., Arts, B.J.M. (2014). The man, the administration and the counter-discourse: An analysis of the sudden turn in Dutch nature conservation policy. *Land Use Policy,* 38, 676-684

Buizer, M., Humphreys, D., De Jong, W. (2014). Climate change and deforestation: The evolution of an intersecting policy domain. *Environmental Science and Policy*, 35, 1-11

Buizer, M., Arts, B., Kok, K. (2011). Governance, Scale and the Environment: The importance of recognizing knowledge claims in transdisciplinary arenas. *Ecology and Society,* 16(1), 21 http://www.ecologyandsociety.org/vol16/iss1/art21/.

Buizer, M., Van Herzele, A. (2012). Combining deliberative governance theory and discourse analysis to understand the deliberative incompleteness of centrally formulated plans. *Forest Policy and Economic,* 16, 93-101.

Bulkeley, H. (2006). A changing climate for spatial planning? *Planning Theory and Practice* 7(2): 203-214.

Bulkeley, H. (2005). Reconfiguring environmental governance: towards a politics of scales and networks. *Political Geography,* 24, 875-902.

Bulkeley, H., Newell, P. (2010). *Governing climate change*. London: Routledge.

Bulkeley, H., Mol, A.P.J. (2003). Participation and environmental governance: Consensus, ambivalence and debate. *Environmental Values* 12(2): 143-154.

Bulmer, S.J. (1993). The Governance of the European Union: A New Institutionalist Approach. *Journal of Public Policy*, 13, 351-380

Burton, I., Huq, S., Lim, B., Polifosova, O., Schipper, E. (2002). From impacts assessments to adaptation

priorities: the shaping of adaptation policies. *Climate Policy*, 2, 145–159.

Byron, N., Arnold, M. (1997).*What futures for the People of the Tropical Forests*. CIFOR Working Paper No 19. Bogor Indonesia

Canadell, J.G., Ciais, P., Cox, P., Heimann, M. (2004). Quantifying, understanding and managing the carbon cycle in the next decades. *Climatic Change*, 67, 147-282.

Cameroon R-PIN. (2008). *The Forest Carbon Partnership Facility (FCPF) Readiness Plan Idea Note*. Ministry of the Environment and Nature Protection, Yaoundé, Cameroon.

Campbell, B. (2009). Beyond Copenhagen: REDD+, agriculture, adaptation strategies and poverty. *Global Environmental Change,* 19, 397-399

Caplow, S., Jagger, P., Lawlor, K., Sills, E. (2010) Evaluating land use and livelihood impacts of early forest carbon projects: lessons for learning about REDD+. *Environmental Science and Policy*, 14, 152-167.

Carney, D. (1998). *Sustainable rural livelihoods: what contribution can we make?* London: DFID.

Cashore, B. (2002). Legitimacy and the privatization of environmental governance: How non- state market driven (NSMD) governance systems gain rule-making authority. *Governance*, 15, 503–529.

Cavendish, W. (2000). Empirical regularities in the poverty-environment relationship of rural households: evidence from Zimbabwe. *World Development,* 28, 1979-2000.

CBFP, (2010). The forests of the Congo Basin: state of the forest 2010. Congo Basin Forest Partnership

CBFP, (2006). The forests of the Congo Basin: state of the forest 2006. Congo Basin Forest Partnership

CCBA. (2008). *The Climate, Community and Biodiversity Project Design Standards (CCB Standards), 2nd version*. Conservation International.

Cerutti, P.O., Lescuyer, G., Assembe-Mvondo, S. and Tacconi, L. (2010) The challenges of redistributing forest-related monetary benefits to local governments: A decade of logging area fees in Cameroon. *International Forestry Review*, 12(2), 130–138

Cerruti, P.O., Ingram, V., Sonwa, D. (2008). The Forests of Cameroon in 2008. Chapter 2 – The Forests of the Congo Basin: *State of the Forest 2008,* pp. 43-56.

Cerutti, P.O., Nasi, R., Tacconi, L. (2008). Sustainable forest management in Cameroon needs more than approved forest management plans. *Ecology and Society,* 13, 36-48.

Chambers, R., Conway, G. (1992). Sustainable rural livelihoods: practical concepts for the 21st Century. *IDS discussion paper, 296*. Brighton: IDS

Charnley, S., Poe, M.R. (2007). Community Forestry in Theory and Practice: Where Are We Now? *Annual Review Anthropology,* 36, 301–336.

Chevan, A., Sutherland, M. (1991). Hierarchical Partitioning. *The American Statistician,* 45, 90–96.

Chia, E.L., Somorin, O.A., Sonwa, D.J., Bele, M.Y., Tiani, M.A. (2014). Forest-climate nexus: linking adaptation and mitigation in Cameroon's climate policy process. *Climate and Development*. doi.or g/10.1080/17565529.2014.918867

Chia, E, L., Somorin, O. A., Movik, S., Sonwa, D. J., Tiani, A. M. (2013). Local vulnerability, forest communities and forest-carbon conservation: the case of southern Cameroon. *International Journal of Biodiversity and Conservation*, 8, 498-507

Chomitz et al. (2006). *At Loggerheads? Agricultural expansion, poverty reduction and environment in the tropical forests*. World Bank Policy Research Report. Washington, D.C.

Clark, D.A. (2007). Detecting tropical forests' responses to global climatic and atmospheric change: current challenges and a way forward. *Biotropica,* 39(1), 4-19

Clark, L.E., Sunderland, T.C.H. (2004). *The Key Non-Timber Forest Products of Central Africa: state of the knowledge*. Technical Paper No. 122. USAID.

Cooper, P., Dimes, J., Rao, K., Shapiro, B., Shiferaw, B., Twomlow, S. (2008). Coping better with current climatic variability in the rain-fed farming systems of sub-Saharan Africa: An essential first step in adapting to future climate change? *Agriculture, Ecosystems & Environment*, 126, 24-35.

Costanza et al. (1997). The value of the world's ecosystem services and natural capital. *Nature,* 387, 253-260

Corbera, E., Schroeder, H. (2011). Governing and implementing REDD+. *Environmental Science and Policy*, 14, 89-99.

Cotula, L., Mayers, J. (2009). Tenure in REDD – Start-point or afterthought? Natural Resource Issues No. 15.

International Institute for Environment and Development. London, UK.

Cowie, A., Schneider, U.A., Montanarella, L. (2007). Potential synergies between existing multilateral environmental agreements in the implementation of land use, land use change and forestry activities. *Environmental Science and Policy,* 10, 335-352.

Dale, V.H., Joyce, L.A., McNulty, S., Nelson, R.P. (2000). The interplay between climate change, forests, and disturbances. *The Science of the Total Environment*, 262(3), 201-204.

Dang, H.H., Michaelowa, A., Tuan, D.D. (2003). Synergy of adaptation and mitigation strategies in the context of sustainable development: the case of Vietnam. *Climate Policy*, 3, 81-93

Davoudi, S., Crawford, J., Mehmood, A. (2009). *Planning for climate change: Strategies for mitigation and adaptation for spatial planners*. London: Earthscan/James & James.

Dellas, E., Pattberg, P., Betsill, M. (2011). Agency in earth system governance: Refining a research agenda. *International Environmental Agreements*, 11(1), 85–98.

Den Besten, J.W., Arts, B., Verkooijen,P. 2014. The evolution of REDD+: an analysis of discursive-institutional dynamics. *Environmental Science & Policy* 35, 40-48

Deresa, T.T., Hassan, R.M., Ringler, C., Alemu, T., Yesuf, M. (2009). Determinants of farmer's choice of adaptation methods to climate change in the Nile Basin of Ethiopia. *Global Environmental Change,* 19, 248-255.

Dietz, T., Ostrom, E., Stern, P.C. (2003). The struggle to govern the commons. *Science*, *302*(5652), 1907-1912.

Dkamela, G.P. (2011). *The context of REDD+ in Cameroon: drivers, actors and institutions*. Occasional Paper 57. CIFOR, Bogor.

Doulton, H., Brown, K., (2009). Ten years to prevent catastrophe? Discourses of climate change and international development in the UK press. *Global Environmental Change*, 19, 191-202.

Dowding, K. (2008). Agency and structure: Interpreting power relationships. *Journal of Power*, 1(1), 21-36.

Droogers, P. (2004). Adaptation to climate change to enhance food security and preserve environmental quality: example of southern Sri Lanka. *Agricultural Water Management*, 66(1), 15–33.

Dryzek, J.S. (2005). *The Politics of the Earth: Environmental Discourses*. Oxford University Press.

Dupuis, J., Biesbroek, G.R. (2012). *The dependent variable problem in comparing and evaluating climate change adaptation policies in Western European Countries*. Paper presented at the Second Nordic International Conference on climate change adaptation.

Eakin, H. (2000). Smallholder maize production and climate risk: a case study from Mexico. *Climatic Change*, 45, 19-36.

Ecosecurities, (2009). Gestion des terres et options de financement lies aux changements limatiques en Afrique centrale: activités d'atténuation et d'adaptation aux changements climatiques en afrique centrale et options pour améliorer l'accès aux financements liés aux changements climatiques et pertinents pour la ccd. Document de travail Mécanisme Mondial de l'UNCCD, Rome Italie. 89 pp.

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford: Oxford University Press.

Essama-Nsah, B., Gockowski, J.J. (2000). *Forest sector development in a difficult political economy: an evaluation of Cameroon's forest development and the World Bank. Evaluation Country Case Study Series*. The World Bank, Washington, D.C.

Ezzine de Blas, D., Ruiz Perez M., Sayer J.A., Lescuyer G., Nasi R., Karsenty, A. (2008).External Influences on and Conditions for Community Logging Management in Cameroon. *World Development*, 37(2), 445-456.

FAO. (2011). *The State of the World's Forest 2011*. Food and Agriculture Organization of the United Nations Rome, 2011

FAO. (2007). *State of the World's Forests*; Food and Agriculture Organization of the United Nations, Rome

FAO. (2006). *The new generation of watershed management programmes and projects. A resource book for practitioners and local decision-makers based on the findings and recommendations of an FAO review*. FAO Forestry Paper No. 150. Rome

FAO. (2005). *State of the world's forests 2005*. Food and Agriculture Organization of the United Nations, Rome.

FAO. (1998). *Forest products, 1992-1996*; Food and Agriculture Organization of the United Nations, Rome

FCPF (Forest Carbon Partnership Facility). (2012). *REDD+ readiness preparation proposal (R-PP) for Cameroon*. Washington, DC: Forest Carbon Partnership Facility, World Bank.

Fisher, M., Chaudhaury, M., Mccusker, B. (2010). Do forests help rural household adapt to climate variability? Evidence from southern Malawi. *World Development,* 38(9), 1241-1250.

Fischer, F. (2003). *Reframing Public policy. Discursive Politics and Deliberative Practices*. Oxford: Oxford University Press

Fischer, F., Forester, J. (Eds). (1993). *The Argumentative Turn in Policy Analysis and Planning.* Durham NC: Duke University Press.

Fobissie, B. K., Essomba, E. P., Sonne, N., Ndobe, S. N., Retana, V. (2012). *Social safeguards and the rights of indigenous peoples in the REDD+ process in Cameroon: lessons from experiences in natural resources management* (Technical Report), Yaounde: WWF and CED

Folke (2007). Social-ecological systems and adaptive governance of the commons. *Ecological Research*, 22, 14-15

Folke, C. (2006). Resilience: the emergence of a perspective for social-ecological system analyses. *Global Environmental Change*, 16(3), 253-267.

Forsius, et al. (2013). Impacts and adaptation options of climate change on ecosystem services in Finland: a model based assessment. *Current Opinion in Environmental Sustainability* 5, 26-40.

Freudenthale, E., Nnah, S., Kemrick, J. (2011). *REDD+ and rights in Cameroon: A review of the treatment of indigenous peoples and local communities in policies and projects* (Rights, Forests and Climate Briefing Series). Moreton-in-Marsh: Forest Peoples Programme

Frohlich, J., Knieling, J. (2013). Conceptualising Climate Change Governace. In: Knieling, J., Filho, W.L. (Eds): *Climate Change Governance*, p. 9 – 26. Berlin, Springer

Fussel, H. (2007). Vulnerability: A generally applicable conceptual framework for climate change research. *Global Environmental Change*, 17, 155–167

Fussel, H.M., Klein, R.J.T. (2006). Climate change vulnerability assessments: an evolution of conceptual thinking. *Climatic Change*, 75,301–329.

Geerlings, H.D.S. (2003). The integration of land use planning, transport and environment in European policy and research. *Transport Policy,* 10, 187-196

Gehring, T., Oberthur, S. (2009). The causal mechanisms of interaction between international institutions. *European Journal of International Relations,* 15, 125-156

Geist, H.J., Lambin, E.F. (2001). What drives tropical deforestation. *LUCC Report Series*, *4*, 116.

Ghate, R., Mehra, D., Nagendra, H. (2009). Local institutions as mediators of the impact of markets on non-timber forest product extraction in central India. *Environmental Conservation*, 36(1), 51-61.

Gibson, C.C. (2001). Forest Resources: Institutions for Local Governance in Guatemala. In Burger et al. (Eds): *Protecting the Commons: a Framework for Resource Management in the Americas* (Island Press), pp 71-89.

Giddens, A. (1984), *The Constitution of Society: Outline of the Theory of Structuration*. Polity Press, Cambridge.

Giddens, A. (1979). *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis*. London: Macmillan.

Glasbergen P. (Ed.),(1998) *Co-operative Environmental Governance: Public–private Agreements as a Policy Strategy* (Kluwer Academic, Boston, MA)

Glück et al. (2005). Changes in the Governance of Forest Resources. In *Forest in the Global Balance - Changing Paradigms*. IUFRO World Series 17.

Gockowski, J., Baker, D., Tonye, J., Legg, C., Weise, S., Ndoumbé, M., et al. (2004). *Characterization and diagnosis of farming systems in the forest margins benchmark of southern Cameroon* (IITA social science working paper no. 1). International Institute of Tropical Agriculture, Ibadan, Nigeria.

Grainger, A. et al. (2009). Biodiversity and REDD at Copenhagen. *Current Biology,* 19(21): 974-976.

Greif, A., Laitin, D.D. (2004). A Theory of Endogenous Institutional Change. *American Political Science Review*, 98(4), 633-652

Guariguata, M., Cornellius, J., Locatelli, B., Forner, C., Sanchez-Azofeifa, G. (2008). Mitigation needs adaptation: Tropical forestry and climate change. *Mitigation Adaptation Strategies Global Change*, 13, 793-808

Gunderson, L.H., Holling, C.S. (2002). *Panarchy: understanding transformations in Human and Natural Systems*. Washington DC: Island Press.

Gupta, J., Van der Grijp, N., Kuik, O. (eds.). (2013). *Climate Change, Forests and REDD: Lessons for Institutional Design*. Routledge

Gupta, J. (2012). Glocal Forest and REDD+ Governance: Win-Win or Lose-Lose, *Current Opinion in Environmental Sustainability*, 4: 1-8.

Gupta, J. (2005). Non-State Actors in International Governance and Law: A Challenge or Blessing, *ILSA Journal of International and Comparative Law*, 11(3), pp 497 - 517.

Gupta, J. (2003). The Role of Non-State Actors in International Environmental Affairs, *Heidelberg Journal of International Law,* 63(2), 459-486.

Haas, P. M. (2007). *Epistemic Communities. The Oxford Handbook of International Environmental Law D. Bodansky, J. Brunnee and E. Hey*. (791-806). New York: Oxford

University Press.

Haas, P.M. (Eds) (1995). Institutions for the Earth: sources of effective international environmental protection. Global Environmental Accords Series. Cambridge, Massachusetts, MIT Press.

Haggard, A., Simmons, B.A. (1987). Theories of international regimes. International Organization, 41(3), 491-517.

Hajer, M., Laws, D. (2006). Ordering through Discourse (pp. 249-266) In: Michael et al. (eds.) *The Oxford Handbook of Public Policy*

Hajer, M. (2006) Doing discourse analysis: coalitions, practices, meaning. In: van den Brink M, Metze T, (Eds) Words matter in policy and planning: discourse theory and method in the social sciences. Utrecht: Netherlands Graduate School of Urban and Regional Research; 2006. p. 65-74.

Hajer, M.A., Versteeg, W. (2005). A decade of discourse analysis of environmental politics:

Achievements, challenges, perspectives. *Journal of Environmental Policy & Planning*, 7(3), 175-184.

Hajer, M. (1995). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford: Clarendon Press.

Hall, R. B., Biersteker, T. J. (Eds.). (2002). *The emergence of private authority in global governance*. Cambridge: Cambridge University Press.

Hall, P. A., Taylor, R.C.R. (1996). Political Science and the three New Institutionalisms, *Political Studies* 44, No. 4, 952-973.

Hallegatte, S. (2009). Strategies to adapt to an uncertain climate change. *Global Environmental Change*, 19, 240-247

Hamdouch, A., Depret, M.H. (2010). Policy integration strategy and the development of the 'green economy': foundations and implementation patterns. *Journal of Environmental Planning and Management,* 53, 472-490

Hammersley, M., Atkinson, P. (2007). *Ethnography: Principles in Practice*. London, Routledge Hay, C., Wincott, D. (1998). Structure, agency and historical institutionalism. *Political Studies*, *46*(5), 951-957.

Hill, M., Wallner, A., Furtado, J. (2010). Reducing vulnerability to climate change in the Swiss Alps: a study of adaptive planning. *Climate Policy*, 10, 70-86

Hoang, M.H., Do Trong, H., Pham, M.T., Van Noordwijk, M., Minang, P.A. (2013).Benefit distribution across scales to reduce emissions from deforestation and forest degradation (REDD+) in Vietnam. *Land Use Policy*, 31, 48-60

Hoare, A.L. (2007). *Clouds on the horizon: the Congo Basin forests and climate change.* London: The Rainforest Foundation.

Hoare, A., Macqueen, D., Muzong K..,Counsell, S., Long, C., Hardcastle, P. (2008). Towards *sustainable management and financing of the Democratic Republic of Congo's Forests. Research Report*. London, UK: Chatham House

Hooper, B. (2006). Integrated water resources management: Governance, best practice and research challenges. *Journal of Contemporary Water Research and Education* 135, 1-7.

Houghton, R.A. (2005). Above-ground forest biomass and the global carbon balance. *Global Change Biology*, 11(6), 945-958.

Howarth, D. (2000). *Discourse*. Buckingham: Open University Press

Howden, M., Soussana, J., Tubiello, F., Chhetri, N., Dunlop, M., Aggarwal, P. (2007).

Adaptation strategies for climate change. *PNAS,* 104, 19691-19698

Humphreys, D. (2008). The politics of "Avoided Deforestation": Historical context and contemporary issues. *International Forestry Review*, 10, 433-442

IPCC. (2007). Impacts, *Adaptation, and Vulnerability. Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK/New York: Cambridge University Press

IPCC. (2007). *Mitigation of Climate Change, Working Group III Fourth Assessment Report, Intergovernmental Panel on Climate Change*, IPCC.

IPCC -Intergovernmental Panel on Climate Change. (2007a). *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press

IPCC - Intergovernmental Panel on Climate Change (IPCC). (2007b). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press

IPCC. (2001). *Climate Change 2001, Impacts, adaptation and vulnerability, summary for policy makers and technical summary of the Working Group II report. Intergovernmental Panel on Climate Change*, Geneva, Switzerland.

IPCC (2001). *Climate change 2001. The scientific basis: Contribution of Working Group II to the third assessment report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Imperial, M.T. (1999). Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development framework. *Environmental Management,* 24, 449-465.

Innes, J.L., Hackey, G.M. (2006). The importance of climate change when considering the role of forests in the alleviation of poverty. *International Forestry Review,* 8(4), 406-416.

IUCN (International Union for the Conservation of Nature). (2011). *Identification et essai de typologie des initiatives REDD+ au Cameroun.* Yaounde´: IUCN.

Jacquemont, F., Caparrós, A. (2002). The Convention on Biological Diversity and the Climate Change Convention 10 years after Rio: Towards a Synergy of the Two Regimes? *Review of European Community & International Environmental Law*, 11, 169–180.

Jagers, S.C., Stripple, J. (2003). Climate Governance beyond the State. *Global Governance* 9(3), 385–400.

Jasanoff, S. (1990). *The Fifth Branch: Science Advisers as Policymakers*. Cambridge. Harvard University Press

Jentoft, S. (2004). Institutions in Fisheries: What They Are, What They Do, and How They Change. *Marine Policy*, 28 (2), 137-149

Jepperson, R.L. (1991) Institutions, institutional effects and institutionalism. In *The new institutionalism in organizational analysis,* W.W Powell. And P. J DiMaggio (eds.), (143-163) .Chicago: The University of Chicago Press

Johnson, C. (2004). Uncommon ground: the 'poverty of history' in common property discourse. *Development and Change* 35(3), 407-434.

Johnston, M., Williamson, T. (2007). A framework for assessing climate change vulnerability of the Canadian forest sector. *The Forestry Chronicle*, 83(3), 358-361.

Jones, R. N., Dettmann, P., Park, G., Rogers, M., White, T. (2007). The relationship between adaptation and mitigation in managing climate change risks: a regional response from North Central Victoria, Australia. *Mitigation and Adaptation Strategies for Global Change,* 12, 685-712

Jordan, A., Huitema, D., Van Asselt, H., Rayner, T., Berkhout, F. (Eds.). (2010*). Climate Change policy in the European Union: confronting the dilemmas of mitigation and adaptation*. Cambridge: University Press.

Jordan A, Lenschow, A., (2010). Environmental policy integration: a state of the art review. *Environmental Policy and Governance*, 20, 147- 158

Jordan, A., Schout, A. (2006). *The Coordination of the European Union: Exploring the Capacities of Networked Governance*, Oxford: Oxford University Press.

Jütting, J. (2003): *Institutions and Development: A Critical Review, OECD Development Centre, Working Paper* No. 210, Paris.

Kaimowitz, D., Angelsen, A. (1998). *Economic Models of Tropical Deforestation: A Review. Bogor, Indonesia*:

Center for International Forestry Research

Kalame, F.B. (2011). *Forest governance and climate change adaptation: Case studies of four African countries*. Academic dissertation, University of Helsinki, Viikki Tropical Resources Institute VITRI, Tropical Forestry Reports.

Kanowski, P.J., McDermott, C.L., Cashore, B.W. (2011). Implementing REDD+: lessons from analysis of forest governance. *Environmental Science and Policy*, 14, 111-117.

Kant, P., Wu, S. (2012). Should adaptation to climate change be given priority over mitigation in tropical forests? *Carbon Management*, 3(3), 303-311.

Kasperson, J.X., Kasperson, R.E. (2001). *International workshop on vulnerability and global environmental change*: a workshop summary. Stockholm Environmental Institute, Stockholm.

Kates, R.W. (1997). Climate Change 1995 – impacts, adaptations, and mitigation. *Environment* ,39 (9), 29-33.

Karsenty, A., Assembe-Mvondo, S. (2011) Les régimes fonciers et la mise en oeuvre de la REDD+ en Afrique centrale. *Land Tenure Journal*, 2, 105–129

Karsenty, A., Ongolo, S. (2012). Can "fragile states" decide to reduce their deforestation? The inappropriate use of the theory of incentives with respect to the REDD mechanism. *Forest Policy and Economics*, 18, 38-45

Karkainen, B. C. (2004). Post-Sovereign environmental governance. *Global Environmental Politics*, 4, 72–96.

Kelly, P.M., Adger, W.N. (2000). Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climate Change,* 47, 325–352

Keohane, R.O. (1982). The demand for international regimes. International Organization, 36(2), 325-356.

King, D.A. (2004). Climate Change Science: Adapt, Mitigate or Ignore? *Science*, 303, 176-177.

Kirilenko, A.P., Sedjo, R.A. (2007). Climate change impacts on forestry. *PNAS,* 104(50), 19697-19702 Klein, R.J.T., Schipper, E.L.F., Dessai, S., (2005). Integrating mitigation and adaptation into climate and development policy: three research questions. *Environmental Science and Policy*, 8, 579-588

Klein, R.J.T., Smith, J.B. (2003). Enhancing the capacity of developing countries to adapt to climate change: A policy relevant research agenda. In Smith, J.B., Klein, R.J.T., Huq, S. (Eds.), *Climate change, adaptive capacity and development* pp.317-334. London: Imperial College Press

Kok, M., Metz, B., Verhagen, J., Van,Rooijen, S. (2008). Integrating development and climate policies: National and international benefits. *Climate Policy*, 8(2), 103-118.

Kooiman, J. (2003). *Governing as governance.* London: Sage.

Kooiman, J. (2000). Societal governance: Levels, models, and orders of social political interaction In *Debating governance: Authority, steering and democracy,* ed. J. Pierre. Oxford: Oxford University Press, pp.138-164.

Kooiman, J. (1999). Social-political governance: Overview, reflections and design. Public Management*: An international journal of research and theory,* I (January), 68-92.

Kooiman, J. (Ed.). (1993). *Modern governance: New government-society interactions.* London: Sage.

Krajer, A. (2004). *Governance*. Cambridge: Polity Press.

Krasner, S.D. (1982). Structural causes and regime consequences: regimes as intervening variables. International Organization, 36(2), 185-206.

Lafferty, W. M., Hovden, E. (2003). Environmental policy integration: towards an analytical framework? *Environmental Politics,* 12, 1-22

Larsen, H.O., Olsen, C.S., Boon, T.E. (2000). The non-timber forest policy process in Nepal: actors, objectives and power. *Forest Policy and Economics,* 1, 267-281.

Laukkonen, J., Blanco, P. K., Lenhart, J., Keiner, M., Cavric, B., Kinuthia-Njenga, C. (2009). Combining climate change adaptation and mitigation measures at the local level. *Habitat International*, *33*(3), 287-292

Lederer, M. (2012). REDD+ governance. *WIRES Climate Change*, 3, 107-113.

Lemos, M.C., Agrawal, A. (2006). Environmental governance. *Annual Review of Environmental and Resources*, 31, 297-325. Leroy, P., Arts, B., (eds). (2006) *Institutional dynamics in environmental governance*. Dordrecht: Springer.

Levin, K., McDermott, C., Cashore, B. (2008). The climate regime as global forest governance: can reduced emissions from deforestation and forest degradation (REDD) initiatives pass a 'dual effectiveness' test? *International Forestry Review*, 10, 538-549.

Liefferink, C. (2006). The dynamics of policy arrangements: turning round the tetrahedron. In: Arts B, Leroy P, editors. *Institutional dynamics in environmental governance*. (pp. 45-68) Dordrecht: Springer

Lindahl, K.B. (2008). *Frame Analysis, Place Perceptions and the Politics of Natural Resource Management: exploring a forest policy controversy in Sweden*. PhD thesis, Swedish University of Agricultural Sciences, Uppsala. Lindner, M., Maroschek, M., Netherer, S., Kremer, A., Barbati, A., Garcia-Gonzalo, J., Marchetti, M. (2010). Climate change impacts, adaptive capacity, and vulnerability of European forest ecosystems. *Forest Ecology and Management*, *259*(4), 698-709.

Locatelli, B., Evans, V., Wardell, A., Andrade, A., Vignola, R. (2011). Forests and climate change in Latin America: linking adaptation and mitigation. *Forests*, 2, 431-450

Locatelli, B., Kanninen, M., Brockhaus, M., Colfer, C.J.P., Murdiyarso, D., Santoso, H. (2008). *Facing an uncertain future: How forests and people can adapt to climate change*. Forest Perspectives No.5. Centre for International Forestry Research, Bogor, Indonesia.

Long, A. (2013). REDD+, Adaptation and Sustainable Forest Management: toward effective polycentric global forest governance. *Tropical Conservation Science* 6(3), 384-408

Luers, A. (2005). The surface of vulnerability: An analytical framework for examining environmental change. *Global Environmental Change*, 15, 214–223

MacNally, R. (2000). Regression and model-building in conservation biology, biogeography and ecology: the distinction between - and reconciliation of - 'predictive' and 'explanatory' models. *Biodiversity and Conservation*, 9, 655–671.

Malhi, Y., Wright, J. (2004). Spatial patterns and recent trends in the climate of tropical forest regions. *Philosophical Transactions of the Royal Society of London Series, B*, 359, 311-329.

Malhi, Y., Mier, P., Brown, S. (2002). Forests, carbon and global change. *Philosophical Transactions of the Royal Society of London A*, 360, 1567-1591

Mamo, G., Sjaastad, E., Vedeld, P. (2007). Economic dependence on forest resources: A case from Dendi District, Ethiopia. *Forest Policy and Economics,* 9, 916-927

Maniatis, D., Gaugris, J., Mollicone, D., Scriven, J., Corblin, A., Ndikumagenge, C., Aquino, A., Crete, P., Sanz-Sanchez, M-J. (2013). Financing and current capacity for REDD+ readiness and monitoring, measurement, reporting and verification in the Congo Basin. *Philosophical Transactions of the Royal Society of London B,* 368(1625), 20120310

Mansourian, S., Belokurov, A., Stephenson, P.J. (2009). The role of forest protected areas in adaptation to climate change. *Unasylva,* 231/232, 63–69

Martens, P., McEvoy, D., Chang, C. (2009). The climate change challenge: linking vulnerability, adaptation, and mitigation. *Current Opinion in Environmental Sustainability,* 1, 14-18.

Marsh, D., Stoker, G. (eds.) (2002). *Theory and Methods in Political Science*, Basingstoke: Palgrave.

Maryudi, A., et al. (2012). Back to basics: Considerations in evaluating the outcomes of community forestry. *Forest Policy and Economics,* 14, 1-5

Mayaux, P., Bartholome, E., Fritz, S., Belward, A. (2004). A new land-cover map of Africa for the year 2000. *Journal of Biogeography,* 31, 861–877.

Mayers, J., Bass, S. (1998). The role of policy and institutions. In Goldsmith, F.B. (ed.) *Tropical Rainforests: a wider perspective*. London: Chapman and Hall

Mayntz, R. (2004). *Governance Theory als fortentwickelte Steuerungstheorie*? MPIfG Working Paper 04/1, Koln: Max-Planck-Institut fur Gesellschaftsforschung

Mbatu, R.S. (2009). Forest policy analysis praxis: Modelling the problem of the forest loss in Cameroon. *Forest Policy and Economics*, 1, 26-33

McCay, B. (2002). Emergence of Institutions for the Commons: Contexts, Situations, and Events. In *Drama of the Commons*, Ostrom, et al. (eds.), Weber, 361-402. Washington, DC: National Academy Press.

McDermott, C.L., Coad, L., Helfgott, A. and Schroeder, H. (2012). Operationalizing Social Safeguards in REDD+: Actors, Interests and Ideas. *Environmental Science and Policy,* 21, 63-72. McEvoy, D., Lindley, S., Handley, J. (2006). Adaptation and mitigation in urban areas: synergies and conflicts. Proceeding of the Institution of Civil Engineers, *Municipal Engineers*, 159(4), 185-191.

MEA (Millenium Ecosystem Assessment). (2005). *Ecosystem and Human Well-Being: Our human planet*. Summary for Policy makers. Island Press

Meadowcroft, J. (2009). *Climate change governance*. Background paper to the 2010 World Development Report. Washington, DC: World Bank, Development Economics, World Development Report Team

Meijers, E., Stead, D. (2004). *Policy integration: what does it mean and how can it be achieved? A multi-disciplinary review*. 2004 Berlin Conference on the Human Dimensions of Global Environmental Change: Greening of Policies – Interlinkages and Policy Integration.

Meierding, E. (2011). Energy security Sub-Saharan Africa (pp. 55–73). *International Development Policy Series*. Graduate Institute of International and Development Studies, Geneva.

Meyer, J.W and Rowan, B. (1977) Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83, 340-363.

Mfopouo Mewouo, Y.C., Ndam Ngoupayou, J.-R., Yemefack, M. (2011). *Variation quantitative et physic-chimique des pluies du Sud-Cameroon forestier*. IRAD, Yaounde Cameroon.

Michaelowa, A. (2001). *Mitigation versus Adaptation: The Political Economy of Competition between Climate Policy Strategies and the Consequences for Developing Countries*. HWWA Discussion Paper 153. Hamburg Institute of International Economics, Hamburg, Germany.

Miles, L., Kapos, V. (2008). Reducing greenhouse gas emissions from deforestation and forest degradation: global land-use implications. *Science*, 320, 1454-1455.

Miles et al. (2001). Environmental Regime Effectiveness: confronting theory with evidence. Cambridge, Massachusetts, MIT Press. MINEFI. (2006). *Audit économique et financier du secteur forestier au Cameroun-Draft No 1 – Août 2006*. Yaoundé, Cameroon, Ministere de l' Economie et des finances (MINEFI)

MINEFI (Ministry of Economy and Finance/World Bank). (2002). *Living Conditions and Poverty Profile in Cameroon in 2001* – Final Results. Yaoundé, Cameroon

MINEF. (1998). *Manual of the procedures for the attribution, and norms for the management of community forests*. Ministry of Environment and Forestry.

Mitchell, R. B. (2003). International Environmental Agreements: A Survey of Their Features, Formation, and Effects. *Annual Review of Environment and Resources,* 28, 429-461

Molua, E L. (2011). Discourse on climate-smart agriculture for REDD+ strategy in the Congo Basin. *Journal of Sustainable Development,* 5, 77-88

Molua, E.L., Lambi, C.M. (2006). *The Economic Impact of Climate Change on Agriculture in Cameroon,* CEEPA Discussion Paper No. 17

Mottier, V. (2002). Discourse analysis and the politics of identity/difference. *European Political Science*, 2 (1), 54-57

Munji, C. A., Bele, M. Y., Nkwatoh, M. E., Somorin, O. A., Sonwa, D. J. (2013). Vulnerability to coastal flooding and response strategies: the case of settlements in Cameroon mangrove forests. *Environmental Development*, 5, 54-72

Mutenje, M.J., Ortmann, G.F., Ferrer, S.R.D. (2011). Management of non-timber forestry products extraction: local institutions, ecological knowledge and market structure in south-eastern Zimbabwe. *Ecological Economics*, 70(3), 454-461

Muzong, K. (2011). *Implementing REDD+ in the Democratic Republic of the Congo: how to manage the risk of corruption*. NORAD (May).

Naess, L. O., Bang, G., Eriksen, S., Vevatne, J. (2005). Institutional adaptation to climate change: Flood responses at the municipal level in Norway. *Global Environmental Change*, 15, 125-138.

Ndibi, B.P., Kay, E.J. (1997). The regulatory framework for the exploitation of medicinal plants in Cameroon: the case of *Prunus africana*. *Biodiversity and Conservation*, 6, 1409-1412.

Ndoye, O., Ruiz Perez, M., Eyebe, A. (1998). *The market of Non-timber Forest products in the Humid Forest Zone of Cameroon*. Rural Development Forestry network paper 22c. ODI, London.

Ndoye, O., Awono, A. (2005). *The markets of Non Timber Forest Products in the Provinces of Equateur and Bandundu, Democratic Republic of Congo*. Congo livelihood Improvement and Food security Project. December 2005, CIFOR

Ndoye, O., Tieguhong, J.C. (2004). Forest resources and rural livelihoods: The Conflict between timber and Non-timber forest Products in Congo Basin. Scandinavian. *Journal of Forestry*, 19(4), 36-44

Ndoye, O., Tieguhong, J.C. (2002). *Timber harvesting, non-timber forest products and local livelihood in central Africa.* Paper presented at the 4th Conference on the Central African Moist Forest Ecosystems (CEFDHAC), Kinshasa, Democratic Republic of Congo, 10/13 June 2002

Ndoye, O., Ruiz Perez, M., Eyebe, A. (1999). Non-wood forest products markets and potential forest resource degardation in Central Africa. In: T.C.H. Sunderland, L.E. Clark, P. Vantomme (eds). (pp. 183-206) *Current Research Issues and Prospects for Conservation*. FAO. Rome.

Ngendakumana, S., Minang, P.A., Feudjio, M., Speelman, S., Van Damme, P., Tchoundjeu, Z. (2014). Institutional dimensions of the developing REDD+ process in Cameroon. *Climate Policy*, (ahead-of-print), 1-19.

Nilsson, M., Eklundk M., Tyskengk S. (2009). Environmental integration and policy implementation: competing governance modes in waste management decision making. *Environment and Planning C: Government and Policy,* 27, 1-18

Nilsson, M., Persson, A. (2003). Framework for analyzing environmental policy integration. *Journal of Environmental Policy and Planning,* 5, 333-359

Nkamleu, B., Endama, D., Gockowski, J., Ndoye, O., Sundelin, W. (2002). Analyse économique de la consommation du bois de feu en régions forestières: leçons de la zone urbaine camerounaise. *Sécheresse*, 13(2), 81-86

Nkem, J., Kalame, F.B., Idinoba, M., Somorin, O.A., Ndoye, O., Awono, A. (2010). Shaping forest safety nets with markets: Adaptation to climate change under changing roles of tropical forests in Congo Basin. *Environmental Science and Policy*, 13, 498-508.

Nkem, J. (2009). Altering the climate of poverty under climate change in Sub-Saharan Africa: Setting priorities for adaptation with forests to climate change. *Annual Report*, CIFOR.

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press

Nyong, A., Adesina, F., Osman, E. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitig Adapt Strategies Glob Change* 12, 787–797.

Oberthur, S., Stokke, O. S., (Eds.). (2011). *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*. Cambridge: MIT Press.

Oberthur S. (2009). Interplay Management: Enhancing Environmental Policy Integration among International Institutions. *International Environmental Agreements: Politics, Law and Economics*, 2, 317-340

Oberthür, S., Gehring T. (2006). Institutional interaction in global environmental governance: the case of Cartagena Protocol and the World Trade Organization. *Global Environmental Politics*, 6, 1-32

O'Brien, K., Eriksen, S., Schjolden, A., Nygaard, L. (2004). *What's in a word? Conflicting interpretations of vulnerability in climate change research*. CICERO Working Paper.

Ochieng R M, Visseren-Hamakers I J, Nketiah K S. (2013). Interaction between the FLEGT-VPA and REDD+ in Ghana: Recommendations for interaction management. *Forest Policy and Economics*, 32, 32-39

Offe, C. (2009). Governance: an "empty signifier"? *Constellations* 16 (4): 550-562 Okereke, C., Dooley, K. (2010). Principles of justice in proposals and policy approaches to avoided deforestation: towards a post-Kyoto climate agreement. *Global Environmental Change*, 20, 82-95

O'Riordan, T., Jordan, A. (1999). Institutions, Climate Change and Cultural Theory: Towards a Common Analytical Framework, *Global Environmental Change*, 9, 81-93

Osbahr, H., Twyman, C., Adger, W.N., Thomas, D.S.G. (2010). Evaluating successful livelihood adaptation to climate variability and change in southern Africa. *Ecology and Society*, 15(2).

Osman-Elasha, B. (2009). *Adaptation of forests to climate change / socio-economic considerations. IOP Conference Series: Earth and Environmental Series,* 6, 382013.

Ostrom, E. (2010). A multi-scale approach to coping with climate change and other collective action problems. *The Solutions Journal*, 1(2), 27–36.

Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton University Press, Princeton.

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective Action*. Cambridge, UK: Cambridge University Press Paavola, J., Kluvankova-Oravska, T., Gouldson, A. (2009). Institutions, ecosystems and the interplay of actors, scales, frameworks and regimes in the governance of biodiversity. *Environmental Policy and Governance* 19(3)

Paavola, J. (2008). Livelihoods, vulnerability and adaptation to climate change in Morogoro, Tanzania. *Environmental Science and Policy*, 11, 642-654 Paavola, J. (2007). Institutions and environmental governance: A reconceptualization. *Ecological Economics*, 63, 93-103

Paavola, J., Adger, W.N. (2006). Fair adaptation to climate change. *Ecological Economics*, 56, 594-609

Pahl-Wostl, C. (2009). A conceptual framework for analyzing adaptive capacity and multi-level processes in resource governance regimes. *Global Environmental Change,* 19, 354-365.

Pahl-Wostl, C. (2007). Transition towards adaptive management of water facing climate and global change. *Water Resource Management*, 21(1), 49–62.

Pai, S., Sharma, P. K. (2005). *New Institutionalism and Legislative Governance in the Indian States: a Comparative study of West Bengal and Uttar Pradesh*. CSLG Working Paper Series, Palmer, C., Engel, S. (2007). *Avoided Deforestation: prospects for mitigating climate change*. Routledge London and New York.

Parry, M. (2009). Climate change is a development issue, and only sustainable development can confront the challenge. *Climate and Development*, 1, 5-9

Pattberg, P. (2005). The institutionalization of private governance: How business and non-profits agree on trans-national rules. Governance: *An International Journal of Policy, Administration, and Institutions*, 18, 589–610.

Pattberg, P., Stripple, J. (2008). Beyond the public and private divide: remapping transnational climate governance in the 21st century. *International Environmental Agreements: Politics, Law and Economics*, *8*(4), 367-388.

Paumgarten, F. (2005). The role of non-timber forest products as safety-nets: A review of evidence with a focus on South Africa. *GeoJournal*, 64, 189-197.

Peters, B.G. (2000a). Governance and comparative politics. *In Debating governance: Authority, steering and democracy, ed*. J. Pierre, Oxford: Oxford University Press, pp. 36-53

Peters, B.G. (2000b). *Institutional Theory: Problems and Prospects*. Political Science Series 69, Institute for Advance Studies (HIS), Stumpergasse, 56 Vienna,

Peters, B.G. (1999). *Institutional Theory in Political Science: The "New Institutionalism"*, Pinter, London and New York.

Peters, B.G., Pierre, J. (1998). Governance without government? Rethinking public administration. *Journal of public administration research and theory*, *8*(2), 223-243.

Perri, A. (2005). What's in a frame? Social organization, risk perception and the sociology of knowledge. *Journal of Risk Research*, 8, 91–118.

Peskett, L.M., Schreckenberg, K., Brown, J. (2011). Institutional approaches for carbon financing in the forest sector: learning lessons for REDD+ from forest carbon projects in Uganda. *Environmental Science and Policy,* 14, 152-167

Phillips, N., Lawrence, T.B., Hardy, C. *Discourse and institutions*. Academy of Management Review (2004) 29: 635-652.

Pielke, R., Prins G., Rayner S., Sarewitz D. (2007). Lifting the taboo on adaptation. *Nature*, 445, 597-598.

Pierre, J. (Ed.) (2000). *Debating Governance: Authority, Steering and Democracy*. Oxford: Oxford University Press.

Pierre, J., Peters, B. G. (2000). *Governance, politics and the state*. New York: St. Martin's Press

Pierre, J., Peters, B.G. (2005). *Governing Complex Societies: Trajectories and Scenarios*, Basingstoke: Palgrave Macmillan.

Pierson, P. (2000). Increasing Returns, Path Dependence, and the Study of Politics. *American Political Science Review*, Vol. 94 (2), 251-267

Pistorius, T. (2012). From RED to REDD+: the evolution of a forest-based mitigation approach for developing countries. *Current Opinion in Environmental Sustainability*, 4(6), 638-645.

Pollack, M. A. (1996). The New Institutionalism and EC Governance: The Promise and Limits of Institutional Analysis. *Governance*, 9, 429–458.

Pramova, E., Locatelli, B., Djoudi, H., Somorin, O.A. (2012). Forests and trees for social adaptation to climate variability and change. *WIRES Climate Change*, 3, 581-596

Raitio, K. (2013). Discursive institutionalist approach to conflict management analysis-The case of old-growth forest conflicts on state-owned land in Finland. *Forest Policy and Economics*, 33, 97-103.

Raitio, K. (2008). '*You can't please everyone'- Conflict management practices, frames and institutions in Finnish state forestry*. PhD thesis University of Joensuu, Finland.

Raustalia K, Victor D G. (2004). The regime complex for plant genetic resources. *International Organization,* 58, 277-309

Raustiala, K. (1997). States, NGOs, and international environmental institutions. *International Studies Quarterly*, 41, 719–740

Rayner, J., Buck, A., Katila, P. (Eds.). (2010). *Embracing complexity: Meeting the challenges of international forest governance. A global assessment report. Global Forest Expert Panel on the International Forest Regime*. IUFRO World Series Volume 28. Vienna. 172 pp.

Ravindranath, N. H. (2007). Mitigation and Adaptation synergy in forest sector. *Mitigation and Adaption Strategies for Global Change*, 12, 843-853 Reyer, C., Guericke, M., Ibisch, P. (2009). Climate change mitigation via afforestation, reforestation and deforestation avoidance: And what about adaptation to environmental change? *New Forests*, 38, 15-34

Rhodes, R.A.W. (2000). Governance and public administration (pp. 54-90) *In Debating governance: Authority, steering and democracy, ed. Pierre*. Oxford: Oxford University Press

Rhodes, R.A.W. (1997). *Understanding governance: Policy networks, governance, reflexivity and accountability*. Buckingham: Open University Press.

Ritchie, J., Lewis, J. (2003). *Qualitative Research Practice. A guide for social science students and researchers*. London and Thousand Oaks: Sage Publications.

Rittberger, V. (Ed) (1993). *Regime Theory and International Relations*. Oxford, Clarendon Press Rittel, H., Webber, M.M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169

Roberts, N. (2000). Wicked problems and network approaches to resolution. *International Public Management Review*, 1(1), 1–19.

Robiglio, V., et al. (2010). *Reducing emissions from all land uses in Cameroon. Final National Report*. ASB Partnership for Tropical the Forest Margins, 110pp.

Robledo, C., Clot, N., Hammill, A., Riche, B. (2011). The role of forest ecosystems in community-based coping strategies to climate hazards: three examples from Africa. *Forest Policy and Economics* 24, 20-28

Rogers-Hayden, T., Hatton, F., Lorenzoni, I. (2011). 'Energy security' and 'climate change': Constructing UK energy discursive realities. *Global Environmental Change,* 21, 134-142.

Rosenau, J.N., Czempiel, E. (Eds.). (1992). *Governance without Government: Order and Change in World Politics*. Cambridge: Cambridge University Press.

Rosenau, J.N. (1992). Governance, order, and change in world politics. In E-O. Czempiel (ed.), *Governance without Government: Order and Change in World Politics*, Cambridge: Cambridge University Press, pp. 1–29.

Rosendal, K. (2001). Impacts of Overlapping International Regimes: The case of Biodiversity. *Global Governance*, 7, 95-117

Rudel, T., DeFries, R., Asner, G.P., Laurance, W. (2009). Changing drivers of deforestation and new opportunities for conservation. *Conservation Biology,* 23(6), 1396-1405.

Saha, D., Sundriyal, R.C. (2012). Utilization of non-timber forest products in humid tropics: implications for management and livelihood. *Forest Policy and Economics*, 14, 28-40.

Sama, N.J., Tawah, E.B. (2009). Origin and background of REDD+ in Cameroon. In J. Costenbader (Ed.), *Legal frameworks for REDD*. Design and Implementation at the national level (pp.139-150). Gland: International Union for the Conservation of Nature

Sassen, M., Jum, C. (2007). Assessing local perspectives in a forested landscape of central Cameroon. *Forests, Trees and Livelihoods*, 17, 23–42.

Saunders, J., Reeve, R. (2010). Monitoring governance for implementation of REDD+ Expert workshop. *International Forestry Review*, 14, 213-226

Schafer, A. (2006). A new form of governance? Comparing the open method of co-ordination to multilateral surveillance by the IMF and the OECD, *Journal of European Public Policy* 13(1), 70–88.

Scharpf, F.W. (1997) *Games Real Actors Play: Actor Centered Institutionalism in Policy Research*, Boulder, CO: Westview Press.

Schelling, T.C. (1995). Intergenerational discounting. *Energy Policy*, 23, 395-401. Schlamadinger, B., et al.

(2007). A synopsis of land use, land-use change and forestry (LULUCF) under the Kyoto Protocol and Marrakech Accords. *Environmental Science and Policy,* 10, 271–282.

Schmidt, V.A. (2013). Speaking to the markets or to the people? A discursive institutionalist analysis of the EU's sovereign debt crisis', *British Journal of Politics and International Relations* 16(1), 188–209.

Schmidt, V.A. (2010). Taking ideas and discourse seriously: explaining change through discursive institutionalism as the fourth 'new institutionalism'. *European political science review*, 2 (1), 1-25

Schmidt, V.A. (2008). Discursive Institutionalism: the explanatory power of ideas and discourse. *Annual Review of Political Science*, 11, 303-326.

Schmidt, V.A., Radaelli, C. (2004). Policy change and discourse in Europe. Conceptual and methodological issues, *West European Politics* 27(2), 183–210.

Schmidt, V.A. (2002a). Does discourse matter in the politics of welfare state adjustment? *Comparative Political Studies* 35(2), 168 -193

Schmidt, V.A. (2002b). *Futures of European capitalism*. Oxford: Oxford University Press.

Schon, D.A., Rein, M. (1994). *Frame reflection: toward the resolution of intractable policy controversies*. New York: Basic Books Schroeder, H., Lovell, H. (2012). The role of non-nation-state actors and side events in the international climate negotiations. *Climate Policy*, 12(1), 23–37.

Schroeder, H. (2010). Agency in international climate negotiations: the case of indigenous peoples and avoided deforestation. *International Environmental Agreements: Politics, Law and Economics*, 10(4), 317-332.

Schure, J. (2014). *Woodfuel for urban markets in the Congo Basin: a livelihood perspective*. PhD thesis, Wageningen University, NL, 186 p.

Scoones, I. (1998). *Sustainable rural livelihoods: a framework for analysis*. IDS working paper, 72. Brighton: IDS.

Scott, W.R. (2001). *Institutions and organizations*. 2nd ed. Thousand Oaks: Sage Publications

Scott, W.R. (1995). *Institutions and organizations.* 1st ed. Thousand Oaks, CA: Sage.

Seppala, R., Buck, A., Katila, P. (eds.) (2009). *Adaptation of Forests and People to Climate Change: A Global Assessment Report*. IUFRO World Series Vol. 22. IUFRO, Vienna.

Sewell, W.H Jr. (1992). A theory of structure: Duality, agency and transformation. *American Journal of Sociology*, 98, 1-29.

Shackleton, C.M, Shackleton, S.E., Buiten, E., Bird, E. (2007). The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa. *Forest Policy and Economics*, 9(5), 558-577.

Shepherd, P., Tansey, J., Dowlatabadi, H., (2006). Context matters: What shapes adaptation to water stress in the Okanagan? *Climatic Change,* 78(1), 31-62.

Sighomnou D. (2004) *Analyse et redéfinition des régimes climatiques et hydrologiques du Cameroun : perspectives d'évolution des ressources en eau. Thèse d'Etat ès-Sciences Naturelles, Option: Sciences de l'Eau,* Département des sciences de la terre Université de Yaoundé 1, Cameroon. 291 pp.

Skutsch, M.M., McCall, M.K. (2010). Reassessing REDD: governance, markets and the hype cycle. *Climatic Climate*, 100, 395-402.

Smit, B., Wandel, J., (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16, 282-292.

Smit, B., Burton, I., Klein, R.J.T., Wandel, J. (2000). An Anatomy of Adaptation to Climate Change and Variability. *Climatic Change*, 45, 223-251.

Sokona, Y., Denton, F. (2001). Climate change impacts: can Africa cope with the challenges? *Climate Policy*, 1, 117–123. Somorin, O.A. (2010). Climate impacts, forest-dependent rural livelihoods and adaptation strategies: a review. *African Journal of Environmental Science and Technology*, 4(13), 903-912.

Somorin, O.A., Brown, H.C.P., Visseren-Hamakers, I.J., Sonwa, D., Arts, B., Nkem, J.N. (2012). Congo Basin forests in a changing climate: policy discourses on adaptation and mitigation. *Global Environmental Change*, 22 (1), 288-298 Somorin, O. A., Visseren-Hamakers, I. J., Arts, B., Sonwa, D. J., Tiani, A-M. (2014). REDD+ policy strategy in Cameroon: actors, institutions and governance. *Environmental Science & Policy* 35: 87-97

Sonwa, D., Bele, Y., Somorin, O., Jum, C., Nkem, J. (2009). *Adaptation for forests and dependent-communities*

in the Congo Basin: the CoFCCA experience. ETRFN News 50:93–100

Sonwa, D.J, Bele, Y.M, Somorin, O.A, Nkem, J.N. (2011a). Central Africa is not only carbon stock: preliminary efforts to promote adaptation to climate change for forest and communities in Congo Basin. *Nature & Fauna*, 25(1), 52–57

Sonwa, D.J., Nkem, J.N., Idinoba, M.E., Bele, M.Y., Jum, C. (2012). Building regional priorities in forests for development and adaptation to climate change in the Congo Basin. *Mitigation and Adaptation Strategies to Global Change* 17(4), 441-450.

Sonwa, D.J., Somorin, O.A., Jum, C., Bele, M.Y., Nkem, J.N. (2012). Vulnerability, forest-related sectors and climate change adaptation: The case of Cameroon. *Forest Policy and Economics*, 23, 1-9.

Spittlehouse, D.L. 2005. Integrating climate change adaptation into forest management. *The Forestry Chronicle* 81:91–95.

Spittlehouse, D.L., Stewart, R.B. (2003). Adaptation to climate change in forest management. *BC Journal of Ecosystems and Management*, Volume 4, 1-11.

Stacey, J., Rittberger, B. (2003). Dynamics of formal and informal institutional change in the EU. *Journal of European Public Policy,* 10(6), 858-883.

Steinmo, S., Thelen, K., Longstreth, F. (1992), *Structuring Politics: Historical Institutionalism in Comparative Analysis*, Cambridge University Press, Cambridge

Stern, N. (2006). *The Stern Review-The Economics of Climate Change*. H.M. Treasury, UK. Stoker, G. (1998). Governance as theory: five propositions. *International Social Science Journal*, 50 (155), 17-28.

Stokke, O. S. (2009) .Trade measures and the combat of IUU fishing: institutional interplay and effectiveness governance in the Northeast Atlantic. *Marine Policy*, 33, 339-349

Stokke, O. S. (2001). *The interplay of international regimes. Putting effectiveness theory to work* - Lysaker: Fridtjof Nansen Institute. (FNI Report 14/2001)

Streck, C. (2010). Reducing emissions from deforestation and forest degradation: national implementation of REDD schemes. *Climatic Change*, 100, 389-394.

Streck, C., and Scholz, S. (2006). The role of forests in global climate change: whence we come and where we go. *International Affairs,* 82 (5), 861-879.

Suchman, M.C. (1995). Managing legitimacy - strategic and institutional approaches. *Academy of Management Review*, 20, 571-610.

Sunderlin, W. (2006). Poverty alleviation through community forestry in Cambodia, Laos, and Vietnam: An assessment of the potential. *Forest Policy and Economics*, 8, 386-396.

Sunderlin, W.D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L., Wunder, S. (2005). Livelihoods, Forests, and Conservation in developing countries: an overview. *World Development*, 33, 1383-1402.

Sunderland, T.C.H., Besong, S., Ayeni, J.O.S. (2002). *Distribution, Utilization and Sustainability of the Non-timber forest products of the Takamanda Forest Reserve, Cameroon. A consultancy report for the Project: "Protection of the forests around Akwaya"* (PROFA).

Swart, R., Raes, F. (2007). Making integration of adaptation and mitigation work: Mainstreaming into sustainable development policy? *Climate Policy*, 7, 288-303

Tatenhove, van J.P., Leroy, P. (2003). Environment and participation in a context of political modernization. *Environmental values*, *12*(2), 155-174.

Termeer, C.J.A.M., Dewulf, A.R.P.J., Breeman, G.E. (2013) Governance of wicked climate adaptation problems. In: Knieling, J., Filho, W.L. (Eds): *Climate Change Governance*, p. 27 – 39. Berlin, Springer Thomas, D.S.G., Twyman, C., (2006). Equity and justice in climate change adaptation amongst natural-resource-dependent societies. *Global Environmental Change*, 15, 115-124.

Thompson, M.C., Baruah, M., Carr, E.R. (2011). Seeing REDD+ as a project of environmental governance. *Environmental Science and Policy*, 14, 100-110

Tieguhong, J.C., Betti, J.L. (2008). Forest and protected area management in Cameroon. *ITTO Tropical Forest Update*, 18(1), 6-9

Tol, R.S.J., Yohe, G. (2007). The weakest link hypothesis for adaptive capacity: an empirical test. *Global Environmental Change*, 17, 218-227 Tol, R.S.J. (2005). Adaptation and mitigation: trade-offs in substance and methods. *Environmental Science and Policy*, 8, 572-578.

Tompkins E L, Adger W N. (2005). Defining response capacity to enhance climate change policy.

Environmental Science and Policy, 8, 562-571

Topa, G., Karsenty, A., Megevant, C., Laurent, D. (2009). *The Rainforests of Cameroon: experience and evidence from a decade of reform*. World Bank, Washington DC.

Tschakert, P. (2007). Views from the vulnerable: Understanding climatic and other stressors in the Sahel. *Global Environmental Change*, 17, 381-396.

Tchatat, M., Nasi, R., Ndoye, O., (2003). *Produits forestiers autres que le bois d'oeuvre (PFAB): Place dans l'aménagement durable des forets denses humides d'Afrique Centrale. Gestion durable des forets denses d'Afrique Centrale et occidentale*: Un panorama du projet FORAFRI. 95 (Document Serie FORAFRI No 18.). Turner, B., Kasperson, R., Matsone, P., McCarthy, J., Corellg, R., Christensene, L., Eckleyg, N., Kasperson, J., Luers, A., Martellog, M., Polsky, C., Pulsipher, A., Schiller, A., (2003). A framework for vulnerability analysis in sustainability science. *PNAS*, 100(14), 8074–8079.

Underdal, A. (2004). Methodological challenges in the study of regime effectiveness. In Underdal A, Young O R (Eds.): *Regime Consequences: methodological challenges and research strategies*, 27-48

United Nations. (2011). *World Urbanization Prospects*: The 2007 Revision Population Database, available at www.esa.un.org/unup Van der Werf, G.R., et al. 2009. CO_2 emissions from forest loss. *Nature Geoscience*, 2, 737-738.

Vatn, A., Vedeld, P.O. (2012). National governance structures for REDD+. *Global Environmental Change*, 23, 422-432

Vatn, A., Vedeld, P. (2011). *Getting ready! A study of national governance structures for REDD+*. Vol. Report Number 59. Noragric and Aas: Department of International Environment and Development Studies, Norwegian University of Life Sciences

Vatn, A. (2010). An institutional analysis of payments for environmental services. *Ecological Economics*, 69, 1245-1252.

Vatn, A., Angelsen, A. (2009). Options for national REDD+ architecture. In Angelsen A. (Eds). (pp. 57-74) *Realizing REDD+: National Strategy and Policy Options*. CIFOR Bogor, Indonesia Verchot, L.V., Van Noordwijk, M., Kandji, S., Tomich, T., Ong, C., Albrecht, A., ... & Palm, C. (2007). Climate change: linking adaptation and mitigation through agroforestry. *Mitigation and Adaptation Strategies for Global Change*, *12*(5), 901-918.

Visseren-Hamakers, I.J. (2013). Partnerships and Sustainable Development: the Lessons Learned from International Biodiversity Governance. *Environmental Policy and Governance*, 23, 145-160

Visseren-Hamakers, I.J., Gupta, A., Herold, M., Peña-Claros, M., Vijge, M. (2012). Will REDD+ work? The need for interdisciplinary science to address key challenges. *Current Opinion in Environmental Sustainability*. 4(6), 590-596. Visseren-Hamakers, I.J., McDermott, C., Vijge, M., Cashore, B. (2012). Trade-offs, co-benefits and safeguards: Current debates on the breadth of REDD+. *Current Opinion in Environmental Sustainability*. 4(6): 646-653.

Visseren-Hamakers, I. J., Leroy, P., Glasbergen, P. (2012). Conservation Partnerships and Biodiversity Governance: Fulfilling Governance Functions through Interaction." *Sustainable Development*, 20, 264-275.

Visseren-Hamakers, I.J., Verkooijen, P. (2012). The Practice of Interaction Management: Enhancing Synergies among Multilateral REDD+ Institutions. In: Arts, B. et al, (Eds). *Forest and nature governance: A practice-based approach*. Dordrecht: Springer; pp.133-149.

Visseren-Hamakers, I J, Arts, B., Glasbergen, P. (2011). Interaction Management by Partnership: The case of biodiversity and climate change. *Global Environmental Politics*, 11, 89-107

Visseren-Hamakers, I.J. (2009). Partnerships in biodiversity governance: an assessment of their contributions to halting biodiversity loss, PhD thesis. Utrecht University.

Visseren-Hamakers, I.J., Glasbergen, P. (2007). Partnerships in Forest Governance. *Global Environmental Change*, 17,408-419. Wallace, H. (2000).The institutional setting: five variations on a theme. In: Wallace H, Wallace W, editors. (pp. 3-37) *Policy making in the European Union*. Oxford: Oxford University Press. Wairimu, W.W. (2014). *Transition or Stagnation? Everyday life, food security and recovery in post-conflict northern Uganda*. PhD thesis, Wageningen University, NL, 188 p.

Wang, S. (2002). Wicked problems and metaforestry: Is the era of management over? *The Forestry Chronicle*, 78(4), 505-510.

Weiss, R.S. (1994). *Learning from strangers: the art and method of qualitative interview studies*. Free Press. New York.

Wellstead, A., Howlett, M., Rayner, J. (2014). Beyond the black box: forest sector vulnerability assessments and adaptation to climate change in North America. *Environmental Science and Policy*, 35,109-116

Wilbanks, T.J., Leiby, P., Perlack R., et al., (2007). Toward an integrated analysis of mitigation and adaptation: some preliminary findings. *Mitigation Adaptation Strategy Global Change*, 12, 713-725.

Wilbanks, T., Sathaye, J. (2007). Integrating mitigation and adaptation as responses to climate change: A synthesis. *Mitigation and Adaptation Strategies for Global Change*, 12, 957-962

Wilkie, D.S., Carpenter, J.F., Zhang, Q. (2001). The under-financing of protected areas in the Congo Basin: so many parks and so little willingness-to-pay. *Biodiversity & Conservation*, *10*(5), 691-709.

William, A.J. (1999). Dualism, duality and the complexity of economic institutions, International *Journal of Social Economics*, 26(4), 545 – 558

Williamson, T., Hesseln, H., Johnston, M. (2012). Adaptive capacity deficits and adaptive capacity of economic systems in climate change vulnerability assessment. *Forest Policy and Economics*, 15, 160-166.

Williamson, T.B., Price, D.T., Beverly, J.L., Bothwell, P.M., Parkins, J.R., Patriquin, M.N., Pearce, C.V., Stedman, R.C., Volney, W.J.A. 2007. *A framework for assessing vulnerability of forest-based communities to climate change*. Nat. Resources Canada. Inf. Rep. NOR-X-414.

Williamson, O.E. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *The Journal of Economic Literature*, 38(3), 595-613.

Willner, R. (2011). Micro-politics: an underestimated field of qualitative research in political science. *German Policy Studies*, 7(3), 155-185

Wolf, J. (2012) Climate Change Adaptation as a Social Process. In J.D. Ford and L. Berrang-

Ford (Eds.) *Climate Change Adaptation in Developed Nations: From Theory to Practice*, 42, 21-32. Netherlands: Springer

Wood, G. (2003). Staying secure, staying poor: the "Faustian Bargain". *World Development*, 31, 455-471.

World Bank. (2004). *Sustaining forests: a development strategy*. The World Bank, Washington, DC.

World Resources Institute, (2007). Congo Basin Forest Atlases. http://www.wri.org/our-work/project/congo-basin-forest-atlases

World Resources Institute. (2005). *The Wealth of the Poor-Managing Ecosystems to Fight Poverty*. UNDP, UNEP, World Bank, WRI, Washington DC.

WWF. (2007). *Strategic orientations for the management of Ngoyla-Mintom forests*. Yaounde: WWF-Cameroon.

Yengoh, G., Armah, F., Svensson, M. (2010). Impact of prolonged rainy seasons on food crop production in Cameroon. *Mitigation and Adaptation Strategies for Global Change*, 15, 825-841.

Yin, R.K. (1994). *Case study research: design and methods*. Thousand Oaks CA: Sage

Yohe, G., Strzepek, K. (2007) Adaptation and mitigation as complementary tools for reducing the risk of climate impacts. *Mitigation Adaptation Strategy Global Change,* 12,727-739. Yohe, G., Tol, R.S.J., (2002). Indicators for social and economic coping capacity: moving toward a working definition of adaptive capacity. *Global Environmental Change*, 12, 25-40.

Young, O. R., King, L.A., Schroeder, H. (Eds.) (2008). *Institutions and environmental change: principal findings, applications, and research frontiers.* MIT Press: Cambridge Massachusetts.

Young, K.R., Lipton, J.K. (2006). Adaptive governance and climate change in the tropical highlands of western South America. *Climatic Change*, 78, 63-102.

Young, O.R. (2002). *The Institutional Dimension of Environmental Change: Fit, Interplay and Scale*. Cambridge: MIT Press.

Young, O.R. (1994). *International Governance: Protecting the Environment in a Stateless Society*. Ithaca, NY: Cornell University Press.

Zhang, Q., Justice, C.O. (2001) Carbon emissions and sequestration potential of central African ecosystems. *Ambio,* 30(6), 351-355.

Summary

The impacts of human-induced climate change on economies, societies and the planet has been receiving both scientific and political attention over the last few decades. Within the global climate convention (UNFCCC), adaptation and mitigation are two necessary components of a strategy to tackle climate change. Mitigation comprises all human activities and interventions aimed at reducing emission sources or enhancing the sinks of greenhouse gases. Mitigation actions are expected to delay and reduce damages caused by climate change, thus providing environmental and socio-economic benefits. Adaptation in the context of climate change refers to any adjustment in systems in response to climate change impacts, aimed at moderating harm or exploiting beneficial opportunities. Several authors have argued that despite adaptation and mitigation sharing the common objectives of responding to climate change, differences still exist in their approaches, including spatial scale, relevant sectors, and urgency. Nevertheless, there is a growing recognition that both are intricately linked in certain sectors, especially in forestry. In forestry, mitigation is largely about reducing emissions from deforestation and forest degradation (REDD+) while adaptation is about using the forests to reduce societal vulnerability to climate risks and harnessing the provisioning and regulating functions of forest to increase adaptive capacity. Many forest activities such as sustainable forest management, afforestation and forest conservation have been reported to constitute the main strategies of adaptation and REDD+.

The Congo Basin forest, a transboundary pool of natural resources across six countries in central Africa (Central African Republic, Cameroon, Democratic Republic of Congo, Equatorial Guinea, Gabon and Republic of Congo), is at the centre of discourses on adaptation and REDD+ as policy responses to climate change. The deliberations among the mix of policy actors involved in the policy processes are focusing on contextualizing global discourses on adaptation and REDD+ on the one hand, and on designing institutional and management structures for policy implementation on the other hand. Governing adaptation and REDD+ in the Congo Basin presents a number of challenges for both scientists and policy practitioners. These challenges include: (i) competing discourses on institutional arrangements and policymaking on adaptation and mitigation; (ii) the low governance capacity of existing instruments for timber

exploitation, biodiversity conservation and sustainable livelihood systems to deliver adaptation and REDD+ outcomes; (iii) socio-economic contexts of low human capacity, weak institutions and governance systems, high poverty and a low infrastructure base; and (iv) designing adaptation and REDD+ policies/ strategies to maximize their synergetic interactions. The objective of this thesis is therefore twofold. First, it seeks to gain a better understanding of the governance processes of adaptation and REDD+ in terms of the actors involved, the overarching discourses and the existing and emerging institutions. Second, it aims to contribute to scientific analysis of governance of a forest-climate nexus using the case of a region that is relatively less studied in the literature.

Chapter 1 introduces the central theme of the thesis, which is the governance process of adaptation and REDD+ in the Congo Basin region. The chapter presents an overview of the role that tropical forests play in climate change adaptation and mitigation. It presents the context of the Congo Basin forests and the prevailing governance challenges confronting the forests in responding to climate change. The chapter further explains how the concepts of governance, with a specific focus on environmental governance, are relevant for understanding the policy processes of adaptation and REDD+ in the Congo Basin. Discursive institutionalism is introduced as the main theoretical approach to understand the types of actors involved along with their capacity and competence to contribute to the policy processes; the overarching global to local discourses on the issues; and the institutional structures considered relevant for adaptation and REDD+ in the Basin. Four key questions guide the research: 1. What are the dominant frames and discourses on adaptation and mitigation strategies in the Congo Basin, and what implications do these discourses have for policy design (chapter 2)? 2. How are adaptation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape adaptation outcomes (chapters 3 and 4)? 3. How are mitigation strategies defined and designed, and what institutional arrangements exist or are being designed by policy actors to shape mitigation outcomes (chapter 5)? 4. How do adaptation and mitigation strategies interact? What institutional arrangements or policy frameworks are policy actors developing towards maximizing the synergies (chapter 6)? Finally, the chapter sets out the research methodology, which consists of a mix of different data collection methods such as qualitative (in-depth interview) methods,

quantitative surveys, participatory observation and document and literature review. The research context involves a nested approach from a regional discourse, national debates on design and implementation to local practices.

Chapter 2 studies the framing of adaptation and REDD+ by different policy actors ranging from governments, civil society, development partners, scientific community and private sector at the regional level (CAR, Cameroon and DRC).Drawing from the global discourses on climate change, the chapter theoretically combines the agency-focus of frame analysis with the structure-focus of discourse analysis, in order to analyze how different actors frame adaptation and mitigation responses in the region given their social, economic and political contexts. It further analyzes how different frames converge around dominant discourses and their discourse coalitions. The chapter reports three dominant policy discourses: mitigation only; separatist policy of adaptation and mitigation; and integratist policy of adaptation and mitigation. The mitigation-only discourse focuses on the potential of REDD+ to deliver the region's adaptation needs; it presumes that due to the uncertainties and contestations around adaptation, a policy intervention is not necessary. The separatist discourse highlights the differences between adaptation and REDD+ in terms of their separation under the UNFCCC at the global level, and differences in financial instruments and scales of operation. It thus suggests that both adaptation and REDD+ should be separated for implementation success and effectiveness. The integratist discourse highlights opportunity for synergy due to their shared forest-based activities and development outcome of poverty reduction and biodiversity conservation. Hence, asserting that to maximize the benefits of both adaptation and REDD+, they should be integrated in one policy framework. Of the three discourses, the integratist discourse has the most diverse coalitions, including those from the scientific community, civil society and development partners. Overall, the mitigation discourse, through its mix of actors, resources and interests seems to be stronger than the adaptation discourse. Additionally, the thesis reports that underlying these three discourses are competing frames and discursive devices (shared meanings, ideas and interpretations) held by different actors and coalitions, which are not devoid of their interests and positions. Institutionalization of these discourses into policy systems has implications for the overall capacity of the Congo Basin forests to respond to the impacts of climate change.

Chapter 3 analyzes national-level understanding of adaptation in the forest sector using the case of Cameroon. Given the significance of the multiple functions of the forests for livelihoods, biodiversity and the national economy of Cameroon, the chapter assesses the vulnerability of the forest sector to the impacts of climate change. It does so by developing a vulnerability framework through multiple science-policy dialogues to analyze the sensitivity and adaptive capacity of the forest sector to climate change. The results show that the vulnerability of the Cameroonian forest sector has negative consequences for food security, health, energy and the overall well-being of the population. The chapter explains that the vulnerability assessment provides an evidence-based need for prioritizing and planning adaptation at the national level. The chapter further reports on two important constraints to an adaptation strategy at the national level in Cameroon: (i) many of the factors that contribute to the vulnerability of the forest sector are not entirely climate-driven but represent human pressures from unsustainable resource use; and (ii) high incidence of rural and urban poverty as the bane of vulnerability to climate risks. The implication of these constraints is that adaptation cannot be limited to responding only to climate-driven impacts, and has the 'burden' of reducing poverty and promoting sustainable management of forest resources too. The chapter finally recommends that an institutional response to climate change in Cameroon has to integrate: the linkages between forest and other, related sectors such as agriculture, energy and water; the multiple (and often competing) claims to forest resources; and different forest management and conservation practices.

Chapter 4 takes a step further to investigate adaptation practices at the local levels since climate variability is already happening and affecting rural livelihood systems of communities that depend on climate-sensitive sectors such as agriculture and forestry. The study area included three community forests in southwestern Cameroon. The chapter analyzes local coping and adaptive strategies by (mostly agrarian) communities by using different forest resources for sustaining food security, income generation and livelihood diversifications. Theoretically, the chapter adopts a conceptual framework based on the relationships between livelihoods and institutions in understanding adaptation practices and outcomes. The results show that local adaptation strategies are both anticipatory and reactive within the farming systems, off-farm systems (e.g.

paid jobs) and forest sectors. The adaptation outcomes of communities are partly influenced by differences in socio-economic characteristics (age, household size, gender, capital assets and education level) and livelihood systems within the population. By focusing on how institutions influence adaptive capacity, the chapter reports that community forestry institutions support adaptation by designing rules to regulate access, structure marketization of valuable forest products, and determine exploitation and management of forest resources. They also contribute to increasing households' adaptive capacity through non-forest interventions, such as facilitating information sharing, building capacity for new livelihood opportunities and provision of improved crop varieties to households.

Chapter 5 focuses on the debate among policy actors on the design and implementation of a national REDD+ strategy in Cameroon. The chapter provides an overview of the forest context of Cameroon, including the historical forest cover dynamics, the multiple drivers of deforestation and forest degradation, and forest management systems. It analyzes the process of designing a governance structure for a REDD+ strategy in Cameroon that defines the capacities and responsibilities of the different (state and non-state) actors involved, and the institutional structures for their interaction to produce REDD+ outcomes. The chapter reports that although the constellation of actors involved in REDD+ are, to an extent, polarized around different issues and priorities, they are nonetheless increasingly distributing roles and responsibilities among themselves based on their capacities. The state takes the lead in coordination of the policy process and in cooperation with the international community on policy design and implementation. Non-state actors play diverse roles from advocacy, knowledge generation, capacity building, and funding demonstration projects to facilitating information flows from local to global. These actors and their networks have actively contributed to the advancement of the policy process through their knowledge, technical expertise and capacity and financial resources. On the institutions for REDD+ in Cameroon, the chapter reports along two broad categories: *existing* rules, norms, coordination mechanisms and governance initiatives (e.g. certification schemes, the FLEGT VPA process on illegal logging and forest taxation regime) within the environment and forest sectors that REDD+ can build on (institutional setting); and *rule-making* processes (e.g. engagement rules and

national safeguard standards) to structure actors' participation in the REDD+ governance process (institutional arrangements). The interest of policy actors to design and implement REDD+ in Cameroon is largely due to: (i) commitment to reduce deforestation; and (ii) aim to access the multiple opportunities (e.g. poverty alleviation, biodiversity conservation and economic development) that REDD+ promises to deliver.

Chapter 6 explores the institutional interactions between adaptation and REDD+ policies in Cameroon. It analyzes the strategies of policy actors in building synergetic outcomes, to the extent that the priority of adaptation interacts with the opportunity of REDD+, and vice versa. Importantly, the chapter studies the deliberate efforts by policy practitioners to improve the interactions between the two. It theoretically combines the concepts of policy integration, institutional interaction and interaction management to analyze the interactions and/or integration between adaptation and REDD+ in Cameroon. On institutional interaction, the chapter reports that both adaptation and REDD+ actors employ a broad range of cognitive elements, including ideas, knowledge, expertise and information to foster synergy (cognitive interaction). More so, capacity development initiatives crucial for REDD+ implementation increasingly integrate adaptation concerns through climate-smart technologies to reduce climate vulnerability. A prominent means of managing these interactions include the establishment of a national climate change observatory (ONACC) as an overarching institutional framework to provide operational guidelines for policy implementation. Beyond adaptation and REDD+, Cameroon's interest is to integrate other environmental issues such as biodiversity conservation, pollution and desertification control along with poverty reduction into economic and development policies and planning. In this context, interaction management entails conscious and deliberate efforts by policy actors to maximize synergies. On the motivation for synergy, the chapter reports that REDD+ policy actors are willing to integrate critical elements of adaptation in the design of national strategies for as far as this might contribute to successful implementation. In the same way, synergy is seen as an opportunity to elevate REDD+'s adaptation profile by allocating much priority to non-carbon values, such as social safeguards, poverty reduction and biodiversity conservation.

Chapter 7 presents the main conclusions, discussion and reflections on the governance process of adaptation and REDD+ in the Congo Basin. The first part presents the conclusions based on the empirical findings and are structured along the four research questions. The conclusions include: (1) The three dominant discourses on adaptation and REDD+ reveal the differences in how actors frame the use of Congo Basin forests to respond to climate change. The main discursive contention is whether adaptation and REDD+ should be separated or integrated in their policy design and implementation. (2) Policy debates on adaptation are ongoing at the national level, although with lesser diversity of actors compared to REDD+, the constraints of developing a national adaptation strategy are enormous. Nevertheless, local communities are already coping with or adapting to climate variability by innovatively modifying their livelihood systems. These local adaptation practices are influenced by the communitarian forestry institutions. (3) Deliberations toward a national RED+ strategy are fairly more advanced than adaptation due to more engagement of diverse actors who have been assigned specific roles and responsibilities in the policy process. Institutional structures are being negotiated for REDD+ by actors on how to govern REDD+ to deliver the desired opportunities (poverty reduction, biodiversity conservation and economic development) it promises. (4) Interactions between adaptation and REDD+ are recognized through exchange of knowledge and ideas to promote inter-institutional learning; and through cooperative behaviour between the two actors. Managing the interactions in Cameroon is through the creation of an overarching institutional framework called ONAAC. The chapter further discusses a number of insights such as the divergences in the discursive framing of issues; the influences of resources (finances, knowledge and capacity) on the policy process; the local-global dimension of ideas, resources and knowledge; agency-institutions dynamics; and the politics of synergy. Furthermore, the chapter also presents a reflection on the analytical framework of discursive institutionalism (actors, discourses and institutions) in explaining the governance process of adaptation and REDD+ in the Congo Basin. It further reflects on governance trajectories for adaptation and REDD+ by combining the diversity of actors with quality of institutions in a single matrix. It also reflects on the research methodology used in this study. In addition, the chapter explores personal reflections on: the framing of 'complex' adaptation and REDD+; the priority-opportunity dichotomy between adaptation and REDD+ within the forest-climate nexus;

and the challenges of studying a dynamic and rapidly evolving issue such as climate change. The chapter presents a number of recommendations for both science and policy practice.

Samenvatting

De afgelopen decennia is er zowel wetenschappelijke als politieke aandacht besteed aan de effecten van de door de mens veroorzaakte klimaatverandering op economieën, samenlevingen en onze planeet. Binnen het mondiale klimaatverdrag (UNFCCC) vormen adaptatie en mitigatie twee noodzakelijke onderdelen van de strategie tegen klimaatverandering. Mitigatie omvat alle menselijke activiteiten en interventies die gericht zijn op het verminderen van emissiebronnen of het verder ontwikkelen van plekken voor de opslag van broeikasgassen. Door middel van mitigatie verwacht men de schade door klimaatverandering te vertragen en te verminderen, en daarmee milieugerelateerde en sociaaleconomische voordelen te behalen. Adaptie heeft in de context van klimaatverandering betrekking op alle aanpassingen in systemen in een reactie op de effecten van klimaatverandering. Adaptatie heeft tot doel de nadelige effecten van klimaatverandering te verzachten en de kansen die ze biedt, te baat te nemen. Diverse auteurs hebben betoogd dat adaptatie en mitigatie twee verschillende aanpakken zijn, ondanks het feit dat ze hetzelfde doel nastreven wat betreft klimaatverandering. Het verschil is voornamelijk gelegen in ruimtelijke omvang, relevante sectoren en urgentie. Desondanks groeit het besef dat beide aanpakken onlosmakelijk verbonden zijn met bepaalde sectoren, met name met de bosbouwsector. In de bosbouw draait mitigatie voornamelijk om vermindering van de uitstoot door ontbossing en bosdegradatie (REDD+). Adaptatie heeft hier tot doel de bossen te gebruiken om maatschappelijke kwetsbaarheid voor klimaatrisico's te verlagen en de voorzienende en regulerende functie van bossen te gebruiken om de adaptieve capaciteit te vergroten. De hoofdstrategie van adaptatie en REDD+ zou bestaan uit diverse bosactiviteiten, zoals duurzaam bosbeheer, bebossing en bosbescherming.

Het bos van het Congobekken, een grensoverschrijdend gebied verspreid over zes landen in Centraal-Afrika (Centrale Afrikaanse Republiek, Kameroen, Democratische Republiek Congo, Equatoriaal-Guinee, Gabon en de Republiek Congo), vormt het middelpunt van discoursen over adaptatie en REDD+ als beleidsreacties op klimaatverandering. De beraadslagingen tussen de gemengde groep van beleidsactoren die bij de beleidsprocessen zijn betrokken, richten zich op het contextualiseren van mondiale discoursen over

adaptatie en REDD+ enerzijds, en op het vormgeven van institutionele en managementstructuren voor beleidsimplementatie anderzijds. Regulering van adaptatie en REDD+ in het Congobekken levert zowel binnen de wetenschap als binnen de beleidspraktijk een reeks uitdagingen op. Tot deze uitdagingen behoren: (i) tegenstrijdige discoursen over institutionele regelingen en beleidsvorming op het gebied van adaptatie en mitigatie; (ii) de beperkte regulerende capaciteit van bestaande instrumenten voor houtproductie, behoud van biodiversiteit en duurzame systemen van levensonderhoud om resultaten op het gebied van adaptatie en REDD+ te behalen; (iii) de sociaaleconomische context van beperkte menselijke capaciteit, zwakke instanties en governance systemen, grote armoede en slechte infrastructuur; en (iv) het opstellen van beleid/strategieën op het gebied van adaptatie en REDD+ om hun synergetische interactie te maximaliseren. Het doel van dit proefschrift is daarom tweeledig. Ten eerste wil het proefschrift een beter begrip kweken van de governance processen van adaptatie en REDD+ wat betreft de betrokken actoren, de overkoepelende discoursen en de bestaande en opkomende instanties. Ten tweede heeft het proefschrift tot doel een bijdrage te leveren aan de wetenschappelijke analyse van de samenhang tussen bos en klimaat aan de hand van een regio waaraan relatief weinig literatuurstudies zijn gewijd.

Hoofdstuk 1 vormt een inleiding op het centrale thema van de thesis: het governance proces van adaptatie en REDD+ in het Congobekken. Het hoofdstuk geeft een overzicht van de rol die tropische bossen spelen in de adaptatie aan en mitigatie van klimaatverandering. Binnen de context van de bossen van het Congobekken geeft het hoofdstuk een uiteenzetting van de grootste uitdagingen op governancegebied waar de bossen in een respons op klimaatverandering mee te maken krijgen. Het hoofdstuk legt verder uit hoe de concepten van governance, met een specifieke focus op governance op milieuvlak, relevant zijn voor een beter begrip van de beleidsprocessen van adaptatie en REDD+ in het Congobekken. Discursief institutionalisme wordt geïntroduceerd als theoretische hoofdbenadering om meer begrip te krijgen van het type betrokken actoren en hun capaciteit en competentie om een bijdrage te leveren aan de beleidsprocessen; de overkoepelende mondiale tot lokale discoursen over de kwesties; en de institutionele structuren die relevant worden geacht voor adaptatie en REDD+ in het Congobekken. Vier

sleutelvragen geven richting aan het onderzoek: 1. Wat zijn de dominante kaders voor en discoursen over adaptatie- en mitigatiestrategieën in het Congobekken, en welke implicaties hebben deze discoursen voor het opstellen van beleidsmaatregelen (hoofdstuk 2)? 2. Hoe worden adaptatiestrategieën gedefinieerd en ontwikkeld, en welke institutionele regelingen bestaan er of worden er door beleidsactoren opgesteld om adaptatieresultaten vorm te geven (hoofdstukken 3 en 4)? 3. Hoe worden mitigatiestrategieën gedefinieerd en ontwikkeld, en welke institutionele regelingen bestaan er of worden er door beleidsactoren opgesteld om mitigatieresultaten vorm te geven (hoofdstukken 3 en 5)? 4. Hoe verloopt de interactie tussen adaptatie- en mitigatiestrategieën? Welke institutionele regelingen of beleidskaders worden er door beleidsactoren ontwikkeld om de synergiën te maximaliseren (hoofdstuk 6)? Ten slotte geeft het hoofdstuk een uiteenzetting van de onderzoeksmethodologie bestaande uit een mix van verschillende methodes voor gegevensverzameling, zoals kwalitatieve methodes (diepte-interview), kwantitatieve onderzoeken, participerende observatie en document- en literatuuronderzoek. De onderzoekscontext heeft betrekking op een geneste aanpak om vanuit een regionaal discours en nationale debatten over ontwerp en implementatie tot lokale praktijken te komen.

Hoofdstuk 2 bestudeert de uitwerking van adaptatie en REDD+ door verschillende beleidsactoren, variërend van overheden, burgermaatschappij, ontwikkelingspartners, wetenschappelijke gemeenschappen en private sectoren op regionaal niveau (in CAR, Kameroen en DRC). Met de mondiale discoursen over klimaatverandering als uitgangspunt maakt het hoofdstuk een theoretische combinatie van de op actoren gerichte kaderanalyse met de op structuur gerichte discoursanalyse om zo te analyseren hoe verschillende actoren in de regio vorm geven aan adaptatie- en mitigatieresponsen vanuit hun maatschappelijke, economische en politieke context. Het hoofdstuk maakt een verdere analyse van de manier waarop verschillende kaders samenkomen rondom dominante discoursen en hun discourscoalities. Het hoofdstuk maakt melding van drie dominante beleidsdiscoursen: alleen mitigatie, een separatistisch beleid van adaptatie en mitigatie en een integrerend beleid van adaptatie en mitigatie. Het discours 'alleen mitigatie' richt zich op de mogelijkheid dat REDD+ de adaptatiebehoeften van de regio kan inwilligen. Het gaat ervan uit dat een beleidsinterventie niet nodig is gezien de onzekerheden

en betwistingen die rondom adaptatie bestaan. Het separatistische discours benadrukt de verschillen tussen adaptatie en REDD+ wat betreft hun scheiding volgens het klimaatverdrag (UNFCCC) op mondiaal niveau, en de verschillen wat betreft financiële middelen en operationele omvang. Hiermee wordt dus gesuggereerd dat adaptatie en REDD+ gescheiden dienen te worden voor een succesvolle en effectieve implementatie. Het integrerend discours benadrukt de mogelijkheid tot synergie gezien de gedeelde bosbouwactiviteiten en ontwikkelingsresultaten van armoedebestrijding en behoud van biodiversiteit. Hier wordt gesteld dat adaptatie en REDD+ tot één beleidskader dienen te worden geïntegreerd om de voordelen van beide benaderingen te maximaliseren. Van de drie discoursen beschikt het integrerend discours over de meest uiteenlopende coalities, waaronder coalities uit de wetenschappelijke gemeenschap, burgermaatschappij en ontwikkelingspartners. Over het algemeen lijkt het mitigatiediscours sterker te zijn dan het adaptatiediscours vanwege zijn mix van actoren, hulpmiddelen en belangen. Daarnaast maakt het proefschrift melding van het feit dat achter deze drie discoursen tegenstrijdige frames en discursieve middelen (gedeelde meningen, ideeën en interpretaties) van verschillende actoren en coalities schuilgaan, die niet losgekoppeld van belangen en posities kunnen worden gezien. Institutionalisering van deze discoursen in beleidssystemen heeft implicaties voor de algehele capaciteit van het Congobekken om op de effecten van klimaatverandering te kunnen reageren.

Hoofdstuk 3 geeft een analyse van het begrip van adaptatie dat op nationaal niveau binnen de bosbouwsector aanwezig is. Hiervoor wordt Kameroen als voorbeeld gebruikt. De bossen in Kameroen spelen een belangrijke rol in het levensonderhoud van de inwoners en de biodiversiteit en nationale economie van het land. Dit hoofdstuk evalueert de kwetsbaarheid van de bosbouwsector voor de effecten van klimaatverandering. Dit gebeurt door via meerdere wetenschappelijke beleidsdialogen een kwetsbaarheidskader te ontwikkelen om de gevoeligheid voor en het aanpassingsvermogen van de bosbouwsector aan klimaatverandering te analyseren. De resultaten geven aan dat de kwetsbaarheid van de Kameroense bosbouwsector negatieve gevolgen heeft voor de voedselveiligheid, gezondheid, energie en het algehele welzijn van de bevolking. In dit hoofdstuk wordt uitgelegd dat de kwetsbaarheidsanalyse leidt tot een op feiten gebaseerde behoefte aan het prioriteren en plannen

van adaptatie op nationaal niveau. Het hoofdstuk geeft verder meer uitleg over twee belangrijke beperkingen voor een adaptatiestrategie op nationaal niveau in Kameroen: (i) veel factoren die bijdragen aan de kwetsbaarheid van de bosbouwsector worden niet volledig door klimaatverandering veroorzaakt, maar ontstaan door een niet duurzaam gebruik van natuurlijke hulpbronnen; en (ii) een grote mate van armoede op het platteland en in steden als gevolg van kwetsbaarheid voor klimaatrisico's. Deze beperkingen hebben tot gevolg dat adaptatie niet kan worden beperkt tot een reactie op klimaatgedreven effecten alleen. Adaptatie is ook 'belast' met het terugdringen van armoede en het stimuleren van een duurzaam beheer van bosbestanden. Het hoofdstuk beveelt ten slotte aan dat een institutionele reactie op klimaatverandering in Kameroen de volgende elementen moet integreren: de samenhang tussen de bossector en overige gerelateerde sectoren zoals landbouw, energie en water, de diverse (vaak tegenstrijdige) claims op bossen en uiteenlopende praktijken voor het beheer en behoud van bossen.

Hoofdstuk 4 gaat een stap verder in het onderzoek naar adaptatiepraktijken op lokaal niveau. Dit is noodzakelijk omdat de klimaatverandering die hier reeds plaatsvindt, invloed heeft op het levensonderhoud van lokale plattelandsbewoners die afhankelijk zijn van klimaatgevoelige sectoren als land- en bosbouw. Het onderzoeksgebied omvatte drie gemeenschappelijk beheerde bossen in het zuidwesten van Kameroen. Het hoofdstuk analyseert de lokale overlevings- en aanpassingsstrategieën van (voornamelijk agrarische) gemeenschappen. Door verschillende bosbestanden te gebruiken, trachten deze gemeenschappen door middel van diversificatie hun voedselzekerheid, inkomen en bestaansmiddelen veilig te stellen. Het hoofdstuk past een conceptueel kader toe dat is gebaseerd op de relatie tussen levensonderhoud en instanties bij het krijgen van inzicht in adaptatiepraktijken en de resultaten hiervan. De resultaten laten zien dat de lokale adaptatiestrategieën zowel proactief als reactief zijn binnen landbouwsystemen, buiten landbouwsystemen (bijv. betaald werk) en bosbouwsectoren. De resultaten van adaptatie door gemeenschappen worden gedeeltelijk beïnvloed door verschillen in sociaaleconomische karakteristieken (leeftijd, gezinsgrootte, geslacht, bezit/inkomen en opleidingsniveau) en systemen van levensonderhoud binnen de bevolking. Het hoofdstuk concentreert zich op de manier waarop instanties adaptieve capaciteit beïnvloeden. Hieruit blijkt dat bosbouwinstanties binnen

de gemeenschap adaptatie ondersteunen door regels te ontwerpen om toegang te reguleren, vermarkting van waardevolle bosproducten structuur te geven en houtkap en beheer van bosbestanden vast te stellen. Ze leveren ook een bijdrage aan het verhogen van de adaptieve capaciteit van huishoudens door middel van interventies buiten de bosbouw, zoals het faciliteren van informatie-uitwisseling, het opbouwen van nieuwe mogelijkheden om in het levensonderhoud te voorzien en het bieden van verbeterde gewasvariëteiten aan gezinnen.

Hoofdstuk 5 is gericht op het debat onder beleidsactoren over ontwerp en implementatie van een nationale REDD+ strategie in Kameroen. Het hoofdstuk biedt een overzicht van de boscontext van Kameroen, waaronder de historische dynamiek van bosbedekking, de diverse aanjagers van ontbossing en aantasting van bossen en bosbeheersystemen. Dit hoofdstuk geeft een analyse van het ontwerpproces van een governancestructuur voor een REDD+ strategie in Kameroen. Deze structuur geeft daarbij een definitie van de capaciteiten en verantwoordelijkheden van de verschillende betrokken actoren (al dan niet in staatsverband) en de institutionele structuren om via interactie REDD+ resultaten te realiseren. Het hoofdstuk meldt dat, ondanks het feit dat de constellatie van betrokken actoren in REDD+ tot op zekere hoogte rond verschillende kwesties en prioriteiten is gepolariseerd, zij desondanks in toenemende mate bezig zijn rollen en verantwoordelijkheden onder zichzelf te verdelen op basis van hun capaciteiten. De staat neemt de leiding in de coördinatie van het beleidsproces en in de samenwerking met de internationale gemeenschap bij het opstellen en uitvoeren van beleid. Actoren buiten staatsverband spelen verschillende rollen, variërend van pleitbezorging, kennisontwikkeling, capaciteitsopbouw, financiering van demonstratieprojecten en ondersteuning van informatiestromen van lokaal naar mondiaal niveau. Deze actoren en hun netwerken dragen actief bij aan de verbetering van het beleidsproces door middel van kennis, technische expertise en capaciteit en financiële middelen. Wat betreft de instanties voor REDD+ in Kameroen wordt er een breed onderscheid in twee categorieën gemaakt: *bestaande* regels, normen, coördinatiemechanismen en governance-initiatieven (bijv. certificeringsschema's, de FLEGT VPA-overeenkomst inzake illegale kap, en bosbelastingregeling) binnen de milieu- en bosbouwsectoren waarop REDD+ kan voortbouwen (institutionele setting); en *regelgevende*

processen (bijv. inzetregels en nationale vrijwaringsnormen) om de deelname van de actoren aan het REDD+ governanceproces structuur te geven (institutionele regelingen). Beleidsactoren hebben er voornamelijk belang bij om REDD+ in Kameroen op te stellen en te implementeren vanwege: (i) hun commitment om ontbossing tegen te gaan; en (ii) hun streven om gebruik te maken van de diverse kansen (bijv. armoedebestrijding, behoud van biodiversiteit en economische ontwikkeling) die REDD+ belooft te leveren.

Hoofdstuk 6 verkent de institutionele interacties tussen adaptatie en REDD+ beleid in Kameroen. Het hoofdstuk geeft een analyse van de strategieën van beleidsactoren bij het opbouwen van synergetische resultaten die ervoor zorgen dat de prioriteit van adaptatie in wisselwerking staat met de mogelijkheden van REDD+ en vice versa. Een ander belangrijk punt is dat het hoofdstuk onderzoek verricht naar de doelgerichte pogingen van beleidsuitvoerders om de interactie tussen de twee te verbeteren. Er wordt een theoretische combinatie gemaakt van de concepten van beleidsintegratie, institutionele interactie en management van interacties om de interactie en/of integratie tussen adaptatie en REDD+ in Kameroen te analyseren. Op het gebied van institutionele interactie meldt het hoofdstuk dat actoren op het gebied van adaptatie en REDD+ gebruikmaken van een brede reeks cognitieve elementen, waaronder ideeën, kennis, expertise en informatie om synergie (cognitieve interactie) te bevorderen. Daarnaast worden initiatieven voor capaciteitsontwikkeling (die cruciaal zijn voor de implementatie van REDD+) steeds vaker geïntegreerd met aandachtsgebieden voor adaptatie door middel van duurzame technologieën om de kwetsbaarheid voor klimaatverandering te verminderen. Een prominent onderdeel van het beheer van deze interacties is onder andere de oprichting van een nationaal observatorium voor klimaatverandering (ONACC) als overkoepelend institutioneel kader dat operationele richtlijnen voor beleidsimplementatie aanreikt. Naast adaptatie en REDD+ heeft Kameroen er belang bij dat overige milieukwesties, zoals het behoud van biodiversiteit, de strijd tegen vervuiling en woestijnvorming en armoedebestrijding, worden opgenomen in een economisch en ontwikkelingsbeleid met beleidsplanning. In deze context vergt het management van interacties een bewuste en doelgerichte inspanning door beleidsactoren om synergiën te maximaliseren. Wat synergie betreft, meldt het hoofdstuk dat REDD+ beleidsactoren bereid zijn kritieke adaptatie-elementen te integreren in het ontwerp van nationale

strategieën voor zover dat zou bijdragen aan een succesvolle implementatie. Op dezelfde manier wordt synergie gezien als een kans om het adaptatieprofiel van REDD+ te verhogen door veel prioriteit toe te kennen aan niet koolstof-gerelateerde waarden, zoals sociale zekerheden, armoedebestrijding en behoud van biodiversiteit.

Hoofdstuk 7 bevat de belangrijkste conclusies, discussies en beschouwingen over het governanceproces van adaptatie en REDD+ in het Congobekken. Het eerste deel bevat de conclusies op basis van empirische bevindingen, gestructureerd volgens de vier onderzoeksvragen. Deze conclusies zijn onder andere: (1) De drie dominante discoursen over adaptatie en REDD+ laten verschillen zien in de manier waarop actoren het gebruik van de bossen van het Congobekken in een reactie op klimaatverandering 'framen'. Het voornaamste discursieve twistpunt is de vraag of adaptatie en REDD+ gescheiden of geïntegreerd dienen te worden in het ontwerp en de implementatie van hun beleid. (2) Er zijn op nationaal niveau beleidsdebatten over adaptatie gaande, en hoewel daarbij minder actoren betrokken zijn dan bij REDD+, zijn de beperkingen bij het ontwikkelen van een nationale adaptatiestrategie enorm. Toch proberen lokale gemeenschappen al om te gaan met of zich aan te passen aan een veranderend klimaat door hun systemen van levensonderhoud op innoverende wijze te veranderen. Deze lokale adaptatiepraktijken worden beïnvloed door de bosbouwinstanties van de gemeenschappen. (3) Beraadslagingen richting een nationale REDD+ strategie zijn veel geavanceerder dan bij adaptatie. Dit komt door een hogere mate van betrokkenheid van de diverse actoren aan wie specifieke rollen en verantwoordelijkheden in het beleidsproces zijn toebedeeld. Er wordt door actoren onderhandeld over institutionele structuren voor REDD+. Middels deze structuren moet worden bepaald hoe REDD+ invulling kan geven aan de gewenste resultaten (armoedebestrijding, behoud van biodiversiteit en economische ontwikkeling) die het belooft. (4) Interacties tussen adaptatie en REDD+ worden erkend door middel van uitwisseling van kennis en ideeën om interinstitutioneel leren te stimuleren en door middel van coöperatief gedrag tussen de verschillende actoren. De interacties in Kameroen worden beheerd door het opstellen van een overkoepelend institutioneel kader genaamd ONAAC. Het hoofdstuk bespreekt verder een aantal inzichten, zoals de verschillen in de discursieve framing van kwesties; de invloeden van hulpmiddelen (geld, kennis en capaciteit) op het

beleidsproces; de lokaal-mondiale dimensie van ideeën, hulpbronnen en kennis; de dynamiek tussen actoren en instanties; en de politiek van synergie. Daarnaast vormt het hoofdstuk ook een weerspiegeling van het analytische kader van discursief institutionalisme (actoren, discoursen en instanties) bij de uitleg van het governanceproces van adaptatie en REDD+ in het Congobekken. Het hoofdstuk buigt zich verder over governancetrajecten voor adaptatie en REDD+ door de diversiteit aan actoren in een enkele matrix te koppelen aan de kwaliteit van instituties. Er wordt ook gekeken naar de onderzoeksmethode die in deze studie wordt gebruikt. Het hoofdstuk verkent bovendien persoonlijke reflecties over het framen van 'complexe' adaptatie en REDD+; de tweedeling in prioriteiten en kansen tussen adaptatie en REDD+ binnen de samenhang tussen bos en klimaat; en de uitdagingen bij het studeren van een dynamisch en zich snel ontwikkelend probleem als klimaatverandering. Het hoofdstuk presenteert een aantal aanbevelingen voor zowel de wetenschappelijke als beleidsvormende praktijk.

About the Author

Olufunso Somorin was born on 12th of October, 1981 in Lagos, Nigeria. After finishing his High School at St Luke's Grammar School, Lagos in 1998, he went to study Forest Resources Management at the University of Ibadan, Nigeria (1999-2005). He graduated as the Best Student of the Department. He was awarded the prestigious Commonwealth Bureau of Forestry Award for his academic excellence in the field of Forest Policy and Administration.

In 2006, Olufunso started his MSc programme as an Erasmus Mundus scholar under the European Forestry program involving a consortium of seven universities in Europe. Under this programme, he earned a double MSc degree: MSc Agriculture and Forestry (University of Eastern Finland, Joensuu, Finland) and MSc Forest and Nature Conservation Policy (minor in International Environmental Policy) at Wageningen University, Netherlands. For his MSc thesis at WUR, Olufunso researched on global policy architectures for REDD+. During this period, he interned at Forest and Climate Change Unit of FAO in Rome, working on Forests and Climate Change Adaptation in Africa.

Immediately after his MSc degree, he joined the Environment Economics and Natural Resources (ENR) Group of Wageningen University as a Junior Researcher. Barely four months after joining the ENR Group, Olufunso joined the Center for International Forestry Research (CIFOR) in December 2008 as an Associate Professional Officer, working on Congo Basin forests and climate change. He started his PhD research in early 2009 based on his research work on Governance of Congo Basin forests in a changing climate.

After 3 years with CIFOR, Olufunso joined the African Development Bank in December 2011 under the highly-competitive Young Professional Program. He was one of the final 22 professionals out of over 10,000 applications received globally. Within the Bank, he worked on a number of climate change and development policy issues including Green Growth, Sustainable Development Goals (SDGs), climate financing instruments, etc. His work in the Bank exposed him to the governance and institutional challenges confronting Africa's socio-economic development. Two years after joining the Bank, he was promoted to Senior Policy Analyst, based in the Bank's Regional Office in Nairobi. He manages the Bank's strategic interventions in reducing fragility and increasing drought resilience within the Horn of Africa region.

Olufunso is an alumnus of the Cambridge Programme for Sustainability Leadership (CPSL) at Cambridge University, UK. He also holds a PG Certificate on Project Management from Bradford University, UK. He has published a number of articles in many leading journals around climate policy, adaptation, REDD+, forest governance and institutions and NRM.

Olufunso Somorin - funsosomorin@yahoo.com

List of Publications

A. Articles under review/revision

Somorin OA, Visseren-Hamakers IJ, Locatelli B, Arts B, Sonwa DJ. 2014. Forest livelihoods, community forestry institutions and adaptation in Cameroon. ***Forest Policy and Economics***

Somorin OA, Visseren-Hamakers IJ, Arts B, Sonwa DJ, Tiani A-M, 2014. Integration through interaction? Synergy between adaptation and mitigation (REDD+) in Congo Basin forests. ***Environment and Planning C: Government and Society***

Brown HCP, **Somorin OA**, and Sonwa DJ (2014). Institutional linkages, Climate change and REDD+ in DRC. ***Forests***

B. Peer-reviewed articles in scientific journals

Brown HCP, Smit B, **Somorin OA**, Sonwa DJ and Nkem JN (2014). Climate change and forest communities: prospects for building institutional adaptive capacity in the Congo Basin forests. ***Ambio*** (in press)

Chia EL, **Somorin OA**, Sonwa DJ, Bele YM and Tiani AM (2014). Forest-climate nexus: linking adaptation and mitigation in Cameroon's climate policy process. ***Climate and Development*** (in press)

Somorin OA, Visseren-Hamakers IJ, Arts B, Sonwa DJ, Tiani A-M. 2014. REDD+ policy strategy in Cameroon: actors, institutions and governance. ***Environmental Science and Policy*** 35: 87-97

Awono A, **Somorin OA**, Eba'Atyi R, and Levang P (2014). Tenure and Participation in local REDD+ projects: insights from southern Cameroon. ***Environmental Science and Policy*** 35: 76-86

Brown HCP, Smit B, **Somorin OA**, Sonwa DJ and Ngana F (2013). Institutional perceptions, adaptive capacity and climate change response in a post-conflict country: a case study of Central African Republic. ***Climate and Development*** 5(3): 206-216.

Bele MY, Tiani AM, **Somorin OA** and Sonwa DJ (2013). Exploring vulnerability and adaptation to climate change of communities in the forest zone of Cameroon. ***Climatic Change*** 119: 875-889.

Munji CE, Bele MY, Nkwatoh AF, Idinoba ME, **Somorin OA** and Sonwa DJ. (2013). Vulnerability to coastal flooding and response strategies: The case of settlements in Cameroon mangrove forests. ***Environmental Development*** 5: 54-72

Chia EL, **Somorin OA**, Sonwa DJ and Tiani AM (2013). Local vulnerability, forest communities and forest-carbon conservation: case of southern Cameroon. ***International Journal of Biodiversity and Conservation*** 5(8): 498-507.

Nkem JN, **Somorin OA**, Jum C, Idinoba M, Sonwa DJ and Bele MY (2013). Profiling climate change vulnerability of forest indigenous communities in the Congo Basin. ***Mitigation and Adaptation Strategies for Global Change*** 18(5): 513-533.

Somorin OA, Brown HCP, Visseren-Hamakers IJ, Sonwa D, Arts B and Nkem JN (2012). Congo Basin forests in a changing climate: Policy discourses on adaptation and mitigation (REDD+). ***Global Environmental Change*** 22(1): 288-298

Pramova E, Locatelli B, Djoudi H. and **Somorin OA** (2012). Forests and trees for social adaptation to climate variability and change. ***WIRES: Climate Change*** 3(6): 581-596.

Sonwa D, **Somorin OA**, Jum C, Bele MY and Nkem JN (2012). Vulnerability, Forest-related sectors and Climate Change Adaptation: the case of Cameroon. ***Forest Policy and Economics*** 23(1): 1-9

Brown HCP, Smit B, Sonwa DJ, **Somorin OA** and Nkem JN (2011). Institutional perceptions of opportunities and challenges of REDD+ in the Congo Basin. ***Journal of Environment and Development***. 20(4): 381-404.

Bele MY, **Somorin OA**, Sonwa DJ, Nkem JN and Locatelli B (2011). Forests and Climate Change Adaptation Policies in Cameroon. ***Mitigation and Adaptation Strategies for Global Change*** 16: 369-385.

Somorin OA (2010). Climate Impacts, Forest-dependent rural livelihoods and Adaptation Strategies: a review. ***African Journal of Environmental Science and Technology*** 4(3): 903-912

Nkem JN, Kalame F, Idinoba M, **Somorin OA**, Awono A and Ndoye O (2010). Shaping forest safety nets with markets: Adaptation to climate change under changing roles of tropical forests in the Congo Basin. ***Environmental Science and Policy*** 13: 498-508.

C. Other peer-reviewed articles published

Somorin OA, Brown HCP, Sonwa D and Arts B (2010). Institutional and Governance Space for Adaptation and Mitigation in Congo Basin forests**.** ***International Forestry Review*** 12(5): 74.

Somorin OA, Brown HCP, Sonwa D and Arts B (2010). Congo Basin forests and Climate Change: between discourse and institutional analysis. ***International Forestry Review*** 12(5): 433-434.

Sonwa DJ, Bele MY, **Somorin OA** and Nkem JN (2010). Central Africa is not only carbon stock: preliminary efforts to promote adaptation to climate change for forests and communities in Congo Basin. ***Nature and Faune*** 25(1): 52-57

Somorin OA (2009). Viewpoints on the preconditions for jumpstarting or scaling up the transfer of environmentally sound technologies for climate change to developing countries. ***Natural Resources Forum,*** 33(4): 334-337

Nkem JN, Idinoba M, Fobissie K, Awono A and **Somorin OA** (2009). Tropical forest products markets and addressing adaptation priorities of forest communities in West and Central Africa. ***IOP Conf. Series: Earth and Environmental Science*** 6:102002

Sonwa DJ, Bele MY, **Somorin OA** and Nkem JN (2009). Adaptation for forests and dependent communities in the Congo Basin. ***ETFRN News*** 50: 93-100

D. Blog Articles (on the thesis chapters)

Reducing deforestation emissions in Cameroon demands variety of expertise. 22 May, 2013. CIFOR. http://blog.cifor.org/15357/reducing-deforestation-emissions-in-cameroon-demands-variety-of-expertise-study#.U9niJOOSySo

Forest communities in Cameroon cannot adapt to climate change alone. 14 November, 2012. CIFOR http://blog.cifor.org/11467/forest-communities-in-cameroon-cannot-adapt-to-climate-change-alone#.U9nmi-OSySo

In Congo Basin rainforests, the success of REDD+ leaves adaptation efforts trailing. 19 September, 2011. CIFOR. http://blog.cifor.org/4159/in-congo-basin-rainforests-the-success-of-redd-leaves-adaptation-efforts-trailing#.U9niIOOSySo

Forest governance key to success of Central Africa's green economy. 16 June, 2011
http://forestindustries.eu/content/forest-governance-key-success-central-africa%E2%80%99s-green-economy

To adapt, to mitigate or both alike? Congo Basin forests in a policy dilemma. 11 May, 2011. CIFOR. http://blog.cifor.org/2982/to-adapt-to-mitigate-or-both-alike-congo-basin-forests-in-a-policy-dilemma#.U9nflOOSySo

Olufunso A. Somorin

Completed Training and Supervision Plan
Wageningen School of Social Sciences (WASS)

Name of the learning activity	Department/Institute	Year	ECTS*
A) **Project related competences**			
Writing Research Proposal	CIFOR / WUR	2009	6.0
Adaptation to Global Change – Challenges for Research and Ecosystem Management	University of Bayreuth, Germany	2009	5.0
REDD+Science+Governance: Opportunities and Challenges	WUR	2012	1.5
B) **General research related competences**			
CERES Basic Training Course	CERES	2010	5.0
'Tropical forest product markets and addressing adaptation priorities of forest communities in West and Central Africa'	International Scientific Congress On Climate Change	2009	1.0
'Congo Basin forests and climate change: between discourse and institutional analysis'	23rd IUFRO World Congress	2010	2.0
'Designing a legal framework for REDD: positions and perceptions of different stakeholders'	XIII World Forestry Congress	2009	1.0
'Engendering local coping strategy to climate variability: evidence from southern Cameroon'	ICARUS II Conf. University of Michigan	2011	1.5
'Forest-Dwelling Communities, Local Livelihoods and Coping Strategies to Climate Variability in the Congo Basin'	Resilience Alliance, University of Arizona	2011	2.0
'Policy discourses on Adaption and Mitigation (REDD+) in Congo Basin'	University of Cambridge	2011	2.0
C) **Career related competences/personal development**			
Scientific Writing	WGS	2010	1.8
Presentation Skills	WGS	2010	1.0
French language training	CIFOR	2009	1.1
Statistics, Data Analysis and SPSS	CIFOR	2010	1.4
Qualitative data analysis – Atlas.ti	WASS	2010	1.0
Teaching of MSc Course and Supervision of MSc thesis	WUR	2011 / 2012	4.0
PhD Competency Assessment	WGS	2012	0.3
Total			**37.6**

*One credit according to ECTS is on average equivalent to 28 hours of study load

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