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PhD Thesis

Brazil in the Global Forest Governance: the Brazilian Initiative of Developing a National Strategy on REDD+ Policies

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Dissertation

Brasilien in der globalen Umweltpolitik: Die brasilianische Initiative bei der Umsetzung einer nationalen Strategie für REDD+ Politik

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STATEMENT OF AUTHENTICATION

I, Patrícia Gallo Barbosa Lima hereby declare that I have written the present thesis independently, without assistance from external parties and without use of other resources than those indicated. The ideas taken directly or indirectly from external sources (including electronic sources) are duly acknowledged in the text. The material, either in full or in part, has not been previously submitted for grading at this or any other academic institution. This research was carried out at the Brandenburg University of Technology Cottbus-Senftenberg, Germany within the framework of the doctorate Programme Environmental and Resource Management.

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Cottbus, 2017

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"It is not the most intellectual

of the species that survives;

nor the strongest that survives;

but the one most adaptable to the

changing environment in which it finds itself**‘**

Dr. Leon C. Megginson

(Lessons from Europe for American Business, 1963)

This dissertation is dedicated to my

beloved son Antonio Rudolf

and my dear husband Jens

ABSTRACT

Reducing Emissions from Deforestation and Forest Degradation (REDD+) is now a significant piece of the international climate agreement. This present dissertation aims to investigate the overall framework of REDD+ development as a national strategy in Brazil. Moreover, it focuses on identifying the major challenges and policy constraints of this development design process. A further aim is at the end of the research to proffer pathways for improvement of domestic forest governance in Brazil. Using the sustainable forest landscape governance approach as the overarching conceptual for an effective REDD+ implementation within the Brazilian context and, building on this analysis, the conclusions advance some considerations on what features should be prioritised in the development and establishment of the Brazilian REDD+ national strategy. This dissertation is a grounded theoretical analysis and is centered on the conception that although REDD+ is strongly treated by the Federal Government as an expansion of its actions with regard to sustainable development, by turning forests into an economic asset and strengthening institutions and laws, it is much more likely that Brazil can deal with the environmental challenges it has been facing.

Key Words: REDD+, landscape approach, forest governance, Brazil, grounded analysis, sustainable development, policy constraint, national strategy

ZUSAMMENFASSUNG

Die Reduktion von Emissionen aus Entwaldung und Schädigung der Wälder (REDD+) ist mittlerweile ein wichtiger Bestandteil des internationalen Klimaabkommens. Die vorliegende Dissertation zielt darauf ab, den Gesamtrahmen der Entwicklung des REDD+ Mechanismus als nationale Strategie in Brasilien zu untersuchen. Darüber hinaus werden die wichtigsten Herausforderungen und politischen Einschränkungen dieses Entwicklungsdesign-Prozesses identifiziert. Desweiteren wird am Ende dieser Forschungsarbeit eine Empfehlung für die Ablauforganisation des REDD+ Mechanismus im brasilianischen Kontext ausgesprochen. Als übergeordnetes Konzept für die wirksame Umsetzung von REDD+ in Brasilien werden mehrstufige und nachhaltige Ansätze zur politischen Steuerung von Landschaften verwendet. Aufbauend auf dieser Analyse werden als Schlußfolgerung einige Überlegungen angestellt, welchen Funktionen in der Entwicklung und Etablierung der brasilianischen REDD+ Strategie Priorität eingeräumt werden sollte. Diese Dissertation ist eine grundlegende theoretische Analyse und basiert auf der Auffassung, dass, obwohl die brasilianische Regierung REDD+ als Ansatz zur Ausweitung der staatlichen Maßnahmen bezüglich nachhaltiger Entwicklung forciert, die Umwandlung der Wälder in ein Wirtschaftsgut und die Stärkung von Institutionen und Gesetzen die Wahrscheinlichkeit erhöht, dass Brasilien die ökologischen Herausforderungen mit denen es konfrontiert ist, bewältigen kann.

RESUMO

Redução de Emissões por Desmatamento e Degradação Florestal (REDD+) se tornou um pedaço siginificativo do acordo internacional sobre o clima. A presente dissertação tem como principal objetivo investigar o atual cenário do desenvolvimento do mecanismo de REDD+ como estratégia nacional no Brasil. Além disso, o estudo identificará os principais desafios e restrições políticas deste processo de concepção e desenvolvimento. Sendo também um outro objetivo, ao final da pesquisa a sugestão de princípios para se atingir um nível melhorado da governança florestal no contexto doméstico brasileiro. A análise se constrói baseando-se no conceito de governança de paisagens florestais sustentáveis para uma efetiva implementação do REDD+ no Brasil. Neste sentido, as conclusões apontam quais funcionalidades devam ser priorizadas no desenvolvimento e estabelecimento da estratégia brasileira de REDD+. Esta dissertação desenvolve-se alicerçada na teoria fundamentada e está centrada no questionamento de que embora o REDD+ seja fortemente abordado pelo Governo Federal como uma extensão de suas ações ligadas ao desenvolvimento sustentável, por meio da transformação de florestas em ativos economicos e do fortalecimento de leis e instituições, eventualmente, seja muito mais provável que o Brasil possa lidar com os desafios ambientais que o mesmo vem enfrentando.

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LIST OF ACRONYMS AND ABBREVIATIONS (in order of appearance)

IPCC Intergovernmental Panel on Climate Change
GDP Gross Domestic Product
GHG Greenhouse Gas
GWP Global warming potential
CO_2 Carbon Dioxide
H_2O Water vapour
CH_4 Methane
N_2O Nitrous Oxide
CFC Chlorofluorocarbons
UN United Nations
UNCED (UN) Conference on Environment and Development
UNFCCC (UN) Framework on Climate Change
KP Kyoto Protocol
CDM Clean Development Mechanism
LDC Least Developed Country
HDI Human Development Index
EIT Economies in transition
OECD Organization for Economic Cooperation and Development
CER Carbon Credits
CDM AR CDM Afforestation/Reforestation
REDD REDD+ REDD++ Reducing Emissions from Deforestation and Forest Degradation
ES Environmental Services
PES Payment for Environmental Service
COP Conference of Parties
BASIC Brazil, South Africa, India and China
SIS Small Island State
INDC NDC (Intended) Nationally Determined Contribution
USA United States of America
CMA Meeting of the Parties to the Paris Agreement
FAO Food and Agriculture Organization of the UN
NPCC National Policy on Climate Change
NGO Non-governmental organisation
MLG Multi-level governance
EU European Union
GCF Green Climate Fund
NAMA Nationally Appropriate Mitigation Actions
CBD Convention on Biological Diversity
GATT Global Agreement on Tariffs and Trade
CITES Convention on International Trade in Endangered Species
UNFF (UN) Forum on Forests
FSC Forest Stewardship Council
UNESCO (UN) Educational, Scientific and Cultural Organization
UNEP (UN) Environment Programme
RAMSAR Convention on Wetland of International Importance
WHC World Heritage Convention
CMS Convention on Migratory Species
WRI World Resources Institute
TFAP Tropical Forestry Action Plan
ITTO International Tropical Timber Organization
UNCCD (UN) Convention to Combat Desertification
IPF Intergovernmental Panel on Forests
IFF Intergovernmental Forum on Forests
UNCSD (UN) Commission on Sustainable Development
ECOSOC (UN) Economic and Social Council

PfA Proposal of Action
CPF Collaborative Partnership on Forests
WSSD World Summit on Sustainable Development
ET Evapotranspiration
iCLF Integrated crop-livestock-forest system
NPP Net primary productivity
NEP Net ecosystem productivity
WCP World Climate Programme
SCCF – Special Climate Change Fund
LULUCF Land use, Land use change and Forestry
MOP Meeting of Parties
AWG-KP Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
ETS Emissions trading scheme
JI Joint implementation
ERU Emission Reduction Units
EB Executive Board
PDD Project Design Document
tCER temporary carbon credit
lCER long term carbon credit
DNA Designated national authority
CIMGC Inter-ministerial Commission on Global Climate Change
LoA Letter od approval
DOE Designated Operational Entity
CPLC Carbon Pricing Leadership Coalition
EU ETS European Union emissions trading scheme
GGAS New South Wales Greenhouse Gas
RGGI US Regional Greenhouse Gas Initiative
OTC over-the-counter
CCX Chicago Climate Exchange
CFI Carbon Financial Instrument
AAU Assigned Amount Unit
VER Verified Emissions Reduction
VCS Voluntary Carbon Standard
VGS Voluntary Gold Standard
CAR Climate Action Registry
CCBS Climate Community and Biodiversity Standard
CFS Carbon Fix Standard
MF Ministry of Finance
MBRE Brazilian Carbon Market (Mercado Brasileiro de Redução de Emissões)
BV RIO Bolsa de Valores do Rio de Janeiro
MDCI Ministry of Development, Industry and Foreign Trade
RED Reducing Emissions from Deforestation
REALU Reducing Emissions from All Land Uses
AFOLU Agriculture, Forestry and Land Use
SIS Safeguards information system
AWG-LCA Ad Hoc Working Group on Long-term Cooperative Action
UN-REDD UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
FCPF Forest Carbon Partnership Facility
FIP Forest Investment Programme
UNDP (UN) Development Programme
GEF Global Environment Facility
PMF Performance Measurement Framework
FMT Facility Management Team
CIF Climate Investments Fund

DGM Dedicated Grant Mechanism
BFP Bolsa Floresta Programme
FRL Forest Reference Level
FREL Forest Reference Emissions Level
MRV Monitoring, reporting and verification
BAU Business as usual
SFB Brazilian Forest Service
MMA Ministry of Environment
CCS Carbon Capture and Storage
CIFOR Center for International Forestry Research
NCB Non carbon benefits
PROALCOOL National Ethanol Programme
PNPB National Programme for Production and Use of Biodiesel
PROINFA Programme of Incentive to Alternative Sources of Electric Energy
UNICA Sugar Cane Industrial Union
ILUC Indirect land use change
EU-RED EU Renewable Energy Directive
BRICS Brazil, Russia, India, China and South Africa
IEA International Energy Agency
PNE National energy plan
RL Legal reserve
APP Permanent preservation area
RPPN Private Natural Heritage Reserve
IBDF Brazilian Institute for Forestry
SEMA Secretary of State for the Environment
IBAMA Brazilian Institute of the Environment and Renewable Natural Resources
PNMA National Environmental Policy
SNUC Conservation Units National System
CONAMA National Environmental Council
SISNAMA National Environmental System
MP Provisional Measure
CRA Environmental Reserve Quota
CAR Rural Environmental Registry
SICAR National Rural and Environmental Registry System
PRA Environmental Adjustment Programme
CIM Committee on Climate Change
GEX Executive Group
PPCDAm National Action Plan for Prevention and Control of Deforestation in the Legal Amazon
PPCerrado National Action Plan for Prevention and Control of Deforestation and Forest Fire in the Cerrado
ABC Low Carbon Agriculture Plan
SNIF National Forest Information System
DETER Real Time Deforestation Detection System
CU Conservation Unit
ISA Socio-Environmental Institute
ICMBio Chico Mendes Institute for Biodiversity Conservation
BACEN Central Bank
IIASA International Institute for Applied Systems Analysis
PPCAD PA Plan for Deforestation Prevention, Control and Alternatives
INPE National Institute for Space Research
WG Working group
GTT REDD+ Working Group on REDD+
SAE Strategic Affairs Secretary Secretariat of Strategic Affairs of the Brazilian Presidency
MAPA Ministry of Agriculture, Livestock and Supply
FUNAI Indigenous National Foundation
MRE Ministry of Foreign Affairs

MDA Ministry of Agrarian Development
MOP Ministry of Planning, Budget and Management
ENREDD+ National strategy on REDD+
CONAREDD+ National commission on REDD+
ABEMA Brazilian Association of State Environmental Entities
ANAMMA National Association of Municipal Environmental Agencies
TAB Thematic advisory board
CNUC National Register of Protected Areas National
SISREDD+ Safeguards Information System on REDD+
SIS Safeguards Information System
EMBRAPA Brazilian Agricultural Research Corporation
PRODES Amazon Deforestation Monitoring Project
DEGRAD Mapping of Degradation in the Brazilian Amazon
DETEX Monitoring System for Selective Timber Exploitation
TERRACLAS Land Use Classification Programme
GIS Geographic Information System
SMMARE Modular System for Monitoring GHG Emissions Reductions
FAP Protected Area Fund
ARPA Amazon Protected Areas Programme
IPAM Amazon Environmental Research Institute
UEA University of the State of Amazonas
UFMG Federal University of Minas Gerais
SPE Secretariat of Public Policy and Economy
UNB University of Brasilia
PFES Payment scheme for forest ecosystem services
SISA State System of Incentives for Environmental Services
EIA Environmental impact assessment
ITAMARATY Ministry of Foreign Affairs
PAS Sustainable Amazon Plan
EFI European Forest Institute
SAN Sustainable Agriculture Network
FPIC Free, Prior and Informed Consent
UNDRIP United Nations Declaration on the Rights of Indigenous Peoples
OAS Organization of American States
FAS Sustainable Amazon Foundation
FLEGT Forest Law Enforcement, Governance and Trade
VPA Voluntary Partnership Agreement
CF Community forestry
RRI Rights and Resources Initiative
FNFD National Fund for Forest Development
NTFP Non timber forest product
GIT Community Integrated Geographic Information Technology
EEZ Ecological-economic zoning
CCZEE Coordinating Commission for the Ecological-Economic Zoning of the National Territory
CPRM Geological Service of Brazil
BNDES National Bank for Economic and Social Development
INCRA National Institute of Colonization and Land Reform
SNCR National System of Rural Cadastre
CNPF National Public Forest Registry
FCP Palmares Cultural Foundation
SPU Federal Property Management Office
ITR Rural land tax

CHAPTER 1 Introduction

This first chapter of the present dissertation outlines the objective of the research in its context, providing also an insight into the problem statement and research justification; it describes the aims, the main research questions and the methodological approach.

1.1 Research context

Currently, one of the major problems that concerns environmentalists, political authorities and society in general is the warming of the atmosphere, which brings potentially irreparable changes to the planet's climate balance. Global warming may threat sustainable development because of its impacts on health system, infrastructure, settlements, agriculture, food security as well as forest ecosystems (van Bodegom et al., 2009). The temperature increase on Earth directly raises the ocean levels due to thermal expansion of water and melting glaciers, endangering coastal areas, cities below the sea level and some offshore islands (Manfrinato et al., 2005). According to the Intergovernmental Panel on Climate Change (IPCC), another risk can be the changes in rainfall regimes, causing floods or severe droughts, resulting in the reduction of crops productivity (IPCC, 2014). In the case of Brazil, the country is already experiencing shifts in precipitation patterns and changes in regional temperatures (IPCC, 2014). For instance, recent droughts and floods have been partially attributed to the consequences of climatic change, and their frequency may escalate in the future (Fraundorfer and Rabitz, 2015).

As another example, a study developed by Marcovitch (2010), foresees the effects of climate change in Brazil concluding that if the predictions about climate change are correct, especially those regarding rainfall regimes, it will reduce up to 2.3% of the Brazilian Gross Domestic Product (GDP) in the next 40 years, causing the loss of an entire year of the country’s GDP. In addition, Brazil may lose about US$ 4 billion per year in its production from 2020. Almost all commercial plant varieties in areas with low production potential will suffer loss in productivity, particularly soyabeans (30-34%), coffee (17-18%) and maize (15%). Productivity will fall mainly in subsistence crops in the Northeast region, which is coincidently the region in Brazil that most faces strong human and environmental development obstacles.

This scenario can even be worsened by the difficulty in forecasting weather. Moreover, one of the main consequences of global warming can be an intensification of occurrences of natural phenomena such as hurricanes and cyclones, which may become more frequent and even less predictable (IPCC, 2014). The IPCC has concluded that most of the warming observed over the last half of the 20th century can be attributed to human activities that have increased greenhouse gas (GHG) [1] concentrations in the atmosphere, mainly by human perturbations to the global carbon cycle (Apps, 2003). They also warned that these changes will continue to drive accelerated climate change for several centuries to come. On the other hand, the existence of historical documents proving that the climate fluctuates naturally is one of the main arguments used by scientists contesting the findings of the IPCC in relation to global warming and the influence of human activity (Neves, 2012). Molion (2008) argues that it is not possible to confirm (as the IPCC claims) that the 35% increase of CO_2 concentration in the past 150 years has caused the increase in temperature.

Nevertheless, the Industrial Revolution had a big part to play in the amount of CO_2 being released in the atmosphere (Lallanilla, 2015). The search for the most appropriate source of energy to meet the market development determined the replacement of charcoal by fossil fuels derived from organic compounds containing carbon and hydrogen (hydrocarbons). Such fuels as oil (petroleum), coal and natural gas used today, for example, in thermoelectric plants, industrial plants and vehicles in circulation are not renewable throughout human time scale (Gebara, 2005). Before, CO_2 fluctuated between about 180 ppm (part per million) during ice ages and 280 ppm during interglacial warm periods (NOAA, 2013). Currently, the mean concentration level of carbon dioxide in the atmosphere surpassed the 400 ppm (NOAA, 2016).

Climate change is a phenomenon which has a global impact, but conflictingly, nations will be affected to different degrees. It is commonly argued that although the problem is a global one, developed nations who are more heavily industrialised –

[1] A greenhouse gas is any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere. The GHGs are largely responsible for the greenhouse effect. The greenhouse effect is therefore one of the leading causes of global warming. The most significant GHGs are water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Fluorinated gases (gases to which the element fluorine was added), including hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride, are created during industrial processes and are also considered GHGs. Though they are present in very small concentrations, they trap heat very effectively, making them high "global-warming potential" (GWP) gases. Chlorofluorocarbons (CFCs), once used as refrigerants and aerosol propellants until they were phased out by international agreement, are also GHGs. Some GHGs, like methane, are produced through agricultural practices including livestock manure management. Others, like CO_2, largely result from natural processes like respiration and from the burning of fossil fuels like coal, oil and gas (Lallanilla, 2015).

historically – have released more GHG per capita than developing ones.[2] Thus, in response to the evidence of human activities' responsibility for climate change and environmental damage, the United Nations (UN) during the UN Conference on Environment and Development (UNCED) at that time in 1992 adopted, along with two other Conventions, the United Nations Framework on Climate Change – UNFCCC[3] (see further details in Chapter three).

The international community signed the Kyoto Protocol (KP) in 1997, with the objective of 'the stabilisation and reconstruction of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system', as described in the article 2 of the document (UNFCCC, 1998). The agreement recognised the main responsibilities of developed countries on higher CO_2 concentrations in the atmosphere and adopted the principle of 'common but differentiated responsibilities' (UNFCCC, 1998). In order to assist developed nations to achieve their reduction targets the Kyoto Protocol adopted Flexibility Mechanisms (also known as Flexible Mechanisms or Kyoto Mechanisms) in which developing countries could participate by providing ways to reduce global emissions by means of additional and certified operations which were part of a global market scheme known as the Clean Development Mechanism (CDM).

Developing countries had no reduction commitments[4] for the first and second period[5] of the Kyoto Protocol (respectively, 2008-2012 and 2013-2020) and could

[2] There is no convention by the UN system that defines a developing country (except Least Developed Countries – LDC). However, commonly, a developing country is defined as a nation with a lower living standard, underdeveloped industrial base and low Human Development Index (HDI) relative to other countries.

[3] Parties to the UNFCCC are classified as:

- Annex I: there are 43 countries to the UNFCCC listed in Annex I of the Convention, including the European Union. These countries are classified as industrialised (developed) countries and "economies in transition" (EITs). The 14 EITs are the former centrally-planned (Soviet) economies of Russia and Eastern Europe;
- Annex II: consist of the Organization for Economic Cooperation and Development (OECD) members of Annex I, but not the EIT countries. Annex II Parties are required to provide financial and technical support to the EITs and developing countries to assist them in reducing their GHG emissions (climate change mitigation) and manage the impacts of climate change (climate change adaptation);
- Annex B: while Annex I refers to the countries included in the UNFCCC, Annex B is an adjusted list of the countries identified under Kyoto Protocol. Annex B countries have their reduction targets formally stated;
- Least Developed Countries (LDCs): 49 Parties are LDCs, and are given special status under the treaty in view of their limited capacity to adapt to the effects of climate change;
- Non-Annex I: Parties to the UNFCCC not listed in Annex I of the Convention are mostly low-income, "developing countries". Developing countries may volunteer to become Annex I countries when they are sufficiently developed.

[4] Brazil as well as China and India were considered into the category of a developing country and, therefore, they had no mandatory GHG reduction targets under the Kyoto Protocol approach.

develop and host governmentally approved CDM projects. Carbon credits (CER) from a CDM project could be generated not only from emissions reduction, but also from initiatives that led to carbon sequestration from the atmosphere. However, the agreement excluded the possibility of development of forest conservation and/or prevention of deforestation projects, mainly because of concerns about technical difficulties in accurately measuring GHG emissions/reductions from such actions (Streck and Scholz, 2006). This fact rendered little relevance for the conservation of native forests like the Amazon within the Kyoto Protocol scope, creating no benefit from this type of activity using market mechanisms. What remained on forestry was "Afforestation and Reforestation" (CDM A/R) sectoral scope 14 of the CDM scheme. This means, only reforestation projects (planting forest in areas that were deforested before 1990) and afforestation actions (planting forest in areas where there was previously no forest vegetation for at least 50 years) aimed at sequestering carbon from the atmosphere were eligible under the KP scope.

Nevertheless, the preservation of remaining natural forested areas constitutes a key-issue in combating climate change; if forests store large amounts of carbon – directly contributing to micro-climate regulation – on the other hand, deforestation releases GHG and aggravates global warming (Gil, 2010). Within this scenario, Brazil must be highlighted, since the country has almost 456 million hectares of natural forests (54% of its territory), or in other words, about one-third of the world's remaining rainforests (SFB, 2013). In this context, Reducing Emissions from Deforestation and Forest Degradation (REDD/REDD+) has emerged as a prominent strategy, because it opens up the possibility to maintain standing native forests while reducing GHG emissions. In addition, it is expected that the REDD+ mechanism could encourage reforestation activities, preserve wild fauna and flora and promote the improvement of livelihoods that depends on natural resources as well as protecting the rights of indigenous people (IPAM, 2011). REDD/REDD+ refers to reducing emissions by preserving existing threatened forests, avoiding their deforestation and degradation (see further details in Chapter four). However, the issue of REDD/REDD+ was not addressed in the Kyoto Protocol framework and consequently REDD/REDD+ initiatives were not eligible under the CDM scope.

[5] In 2012 an amendment to the Kyoto Protocol was agreed, the Doha Amendment, establishing a second commitment period from 2013 to 2020. However, until currently it has not entered into force (see further details item 4.2.1.3).

The reduction of deforestation in tropical countries leads to a discussion about the economic value of forests and their inclusion in a market mechanism for the carbon storage provided by them (Carvalho, 2010). This brings into discussion, a currently highly commented topic, the term “Environmental Services” (ES), which means a series of services provided by nature, arising from the vigorous functioning of ecosystems, which may be the result of human actions or simply a balanced state of nature (Constanza et al., 1997). These services are the result of ecological processes and functions that keep the equilibrium of ecosystems and contribute directly to the survival and well-being of the whole society (Myers, 1996). On the other hand, some authors like Chomitz et al. (1999) have adopted the concept of ES only as a human activity that contributes to the maintenance of or increases the provision of environmental benefits.

Manfrinato[6] (2014, personal communication) follows the same concept declaring that: *“Environmental Services are not provided by nature but by those protecting the nature. In economics you have products and services, and services are an anthropogenic thing. A tree does not provide an environmental service; it is part of an ecosystem”.* Differently from benefits of material goods (that accrue to individuals, e.g. producers and consumers), the value of ES pertain to the society remaining mostly unmarketed because it is still complex to demonstrate the precise nature of these ES and even more convoluted in economic sense (Myers, 1996). But there are some attempts as the study from Tsonkova et al. (2014). They analysed five regulating ES using a developed assessment tool in order to facilitate comparison of ES provision with respect to different land use practices. They state that quantifying ES is expected to enhance the implementation of sustainable land use systems, concluding that the developed tool can be considered a flourishing first assessment step toward valuation of non-market environmental services (Tsonkova et al., 2014). The environmental service concept was popularised by the Millennium Ecosystem Assessment, a multi-stakeholder study carried out under the direction of the UN from 2001 to 2005. This same study grouped ES into four broad categories: i) provisioning, such as the production of food and water; ii) regulating, such as the control of climate and disease; iii) supporting, such as nutrient cycles and crop pollination and iv) cultural, such as spiritual and recreational benefits (Millennium Ecosystem Assessment, 2005).

Many ecosystems and their services, however, are currently under increasing pressure; explicitly, more than 60% of the world’s ecosystems are not being used in a

[6] Warwick Manfrinato – Personal communication

sustainable way (Cenamo et al., 2009; Lima, 2014; Millennium Ecosystem Assessment, 2005). The Earth Summit promoted the “triple bottom line” concept of sustainable development that included ecological, social and economic sustainability (Roe and Elliot, 2005). Therefore, development organisations have been increasingly using schemes as Payment for Environmental Services (PES) as a tool to promote both goals of conservation and social development. The concept of PES assumes that in cooperation with existing resource management institutions, it could foster both better resource management and livelihood benefits. However, a critical debate is addressed on whether PES schemes really improve the livelihood of local stakeholders, a debate which is also critical to current discussions on REDD+ (Lima, 2014). Some authors argue about the ability of PES schemes to promote equitable outcomes (Corbera et al., 2007; Proctor et al., 2008).

According to Wunder (2005), PES is a voluntary transaction where a well-defined ES is being bought by a minimum one buyer from a minimum one ES provider but only if the ES provider secures ES provision addressing conditionality. This definition has been widely accepted by the academic community although those who have analysed PES interventions in a practical way have found that most PES schemes implemented do not accomplish all of these criteria (Sommerville et al., 2009). Following Bond et al. (2009), REDD+ can be regarded as a multi-level PES scheme; in other words, a special modality of PES as it also aims to preserve environmental services, while offering a financial compensation to those avoiding deforestation. The transaction of allowances at the international level rewards the country ensuring the provision of the environmental service (e.g. carbon storage). On the other hand, at the national level, the transaction rewards may be granted according to pre-defined rules (Gil, 2010; Lima 2014).

In Brazil, however, PES is repeatedly referred to as a smaller component of REDD+ projects, specifically as the share of resources given to land owners and/or users as direct payments for the benefit provided. This notion is based on the understanding that REDD+ generates broader benefits (such as social improvements or governance enhancement) and PES is the financial compensation for strictly well-defined ES (Gil, 2010). But for Valberg (2011) nevertheless, there is no clear definition of what should be accepted as “ecosystem services” in Brazil, indicating that Brazil may not have a full overview over opportunities for reducing deforestation, in turn making it difficult to determine whether goals are actually reached by the planned/implemented environmental policies. For instance, there is no regulation at federal level establishing

PES frameworks in Brazil, even though the new Forest Code allows the implementation of such schemes as a financial instrument. With that in mind and for the purpose of this study, both concepts may be merged, which means that REDD+ might be generally understood as a multi-level PES scheme, but differentiation will be made when necessary.

In developing countries, increasing populations, income levels and energy use are leading to a rapid increase in GHG emissions (Miller, 2012). Therefore, the pressure on these countries increased to adopt some kind of GHG emissions reduction targets. Developed nations argue that conditions have changed as developing countries have begun to industrialise and pollute more rapidly in recent years (IEA, 2015). For example, developing countries will be responsible for almost 90% of the projected world increases in carbon emissions for the period from 2013 to 2035 (Miller, 2012). In Brazil the main source of emissions since the 1990's is the burning and decay of biomass resulting from deforestation (see further details in item 5.4.2) followed by emissions from the agricultural sector, especially the methane emitted by cattle (MCTI et al., 2013). Although Brazil is not one of the biggest emitters of GHG by fuel use, the country is among the top world emitters due to land use change (GHG Protocol, 2014).

Although estimative of deforestation contribution to global emissions have been reduced from 20% in 2006 to around 11% in 2014 (IPCC, 2014), this is still a considerable amount of global emissions. Efforts towards enhancing carbon stocks and conserving and managing tropical forests sustainably will, therefore, be decisive in the next years in the fight to diminish the impacts of climate change. In this sense, since 2005 it was expected that REDD would be a part of the COP (Conference of Parties) agenda. This in fact officially happened in 2009 when REDD was adopted by the Copenhagen Accord. A year later, the REDD scope was extended to REDD+ in order to include the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. In the same year, 2010, a group of emerging economies, the "BASIC countries" (Brazil, South Africa, India and China), have joined together in order to become a major force in the negotiation of a climate change agreement (Dagicour, 2010). Therefore, they have released a statement about their position on their voluntary emissions reductions targets in virtue of the Copenhagen Accord. Thenceforth, designated authorities have been working on the definition of rules for REDD+ actions for standardisation and integration into a Brazilian national strategy (see further details in

Chapter six). At the international level, the ultimate step in direction of REDD+ establishment was its adoption in the new international climate agreement in 2015.

1.1.1 Paris Agreement

The Paris Agreement[7] has been agreed to by representatives of 195 nations at the COP21 to the UNFCCC in Paris on 12 December 2015 and will start in the year 2020 onwards. The Paris Agreement aims to keep the global average temperature rise to "well below" 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. Although the target of 1.5°C is not binding, reference to it in the text of the agreement was considered a breakthrough as well as the acceptance of the demands of the least developed countries (LDCs) and small island states (SIS), highly vulnerable to negative impacts of climate change (Wąsiński, 2015). Regardless of this fact, some specialists argue that the Paris Agreement exposed these countries even more to the threat posed by ever-increasing GHG emissions for which they are not entirely responsible (Cleménçon, 2016). The agreement contains two modalities for trying to achieve the targets. First, it declares that the peak of global GHG emissions should be reached as soon as possible, thereafter envisioning reductions to achieve zero net emissions by 2050. The second is a so-called (Intended) Nationally Determined Contribution (INDC/NDC),[8] which all the Parties (developing and developed nations) publicly outlined what post-2020 climate actions they would develop under the Paris Agreement. Parties can meet their NDC targets by transferring "mitigation outcomes" internationally, likewise, in the context of emission trading, or to allow results-based payments (Climate Focus, 2015). Moreover, Parties to the new agreement will be obliged every two years to submit a report on progress, which will be subject to technical expert review (Wąsiński, 2015).

The Paris Agreement is a treaty under international law, which must be approved under Parties' respective domestic ratification processes, including approval by executive and in some cases parliamentary processes (CDKN Global, 2016). However, although the Paris Agreement has many provisions that impose legally binding obligations, what "legally binding" means in this context is controversial as each country may use a different interpretation. For example, although the agreement requires

[7] Full version online available at: https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf
[8] To make a differentiation between INDC and NDC, the INDC will become the NCD when a country ratifies the Paris Agreement, unless they decide to submit a new INDC at the same time.

countries to submit new commitments every five years, with each successive NDC needing to have more pushy reduction targets, the overall goal of the agreement is not broken down into specific reduction obligations. Thus, a country can sign the Paris Agreement and present a climate plan that envisages no remarkable changes in its GHG emissions, thereby justifying this action by asserting that its national circumstances do not allow it to have more ambitious reduction targets. On the other hand, as long as that country fulfils all the reporting and administration requirements, it will still be in compliance with the Paris Agreement, as also there are no implemented sanctions for governments that do not comply with their obligations. Therefore, one of the major challenges in this context will be enforceability. Thus, making the Paris Agreement legally binding is presumably not enough to guarantee that its core goals will be achieved (Harvey, 2016).

Many provisions establish common commitments while allowing flexibility to accommodate different national capacities and circumstances (C2ES, 2015). For example, the Paris Agreement will be implemented further in accordance with the 'principle of common but differentiated responsibilities and respective capabilities' (article 2 §2). Also, the article 4 §4 states that 'Developing country Parties **should** continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances' (UNFCCC, 2015). Moreover, the issue of which provisions to make binding (expressed as "shall," as opposed to "should") was a central concern for many countries, in particular the USA, which wanted an agreement the president could accept without seeking congressional approval (C2ES, 2015). For instance, the USA could agree to certain "procedural requirements" (e.g., reporting and measurement) that would be legally binding under the 1992 UNFCCC, to which USA was already bound legally (Busby, 2016). In other words, this action would not require the Senate's consent. However, new legally binding commitments to GHG emissions reductions would require Senate approval, for example.

The Paris Agreement was opened for signature on 22 April 2016 (and would remain open for signature for one year) and would enter into force if at least 55 countries that account for at least 55% of global GHG emissions ratify it. This happened on 5 October 2016, when the threshold for entry into force of the Paris Agreement was achieved. The Paris Agreement entered into force on 4 November 2016. The first session of the COP serving as the Meeting of the Parties to the Paris Agreement

(CMA1) had taken place in Marrakech in conjunction with COP 22/CMP12. Until the conclusion of this dissertation 156 countries of 197 Parties to the Convention have ratified the agreement (UNFCCC, 2017). Brazil has ratified the agreement on 12 September 2016. On the one hand, the low emissions threshold means that, theoretically, the Paris Agreement could have entered into force even if China and the USA have not ratified it (Wąsiński, 2015). On the other hand, this did not happen since the USA joined China to formally ratify the agreement on 3 September 2016. However, this scenario may change due to the election of Donald Trump in November 2016 (as the new president of USA), because Donald Trump vowed to the "American withdrawal from the Paris Agreement". Unequivocally this withdrawal would have serious consequences for the Paris Agreement. However, this is still an opened chapter in the climate change arena.

Nevertheless, as a matter of domestic law, in the USA, the Paris Agreement is an executive agreement, binding only on (ex) President Barack Obama's administration (Slaughter, 2015). However, although an executive agreement made by one administration is not necessarily binding on its successor, it would have to be explicitly repudiated. Thus, differently from the Kyoto Protocol (which was recognised by the US Senate as a treaty), the INDC was accepted as a voluntary action, which has allowed the Obama's administration to effectively argue that the Paris Agreement is not a "treaty" under article 2 of the US Constitution, even if it is a legally binding agreement or treaty within the definition of the Vienna Convention on the Law of Treaties (Busby, 2016). In this sense, the Paris Agreement is a legal obligation that the USA has assumed and its non-compliance means that the USA will be breaking an international law. Moreover, the USA can not formally withdraw for three years after the Paris Agreement has gone into force. This happens on account of article 28 of the Paris Agreement, which allows for any Party to voluntarily withdraw from the agreement, and this withdrawal becomes effective one year later (CRS, 2016). However, this instrument is not available until 4 November 2019. As an alternative, USA could withdraw from the UNFCCC (which would take one year) since the article 28 also establishes that any Party that withdraws from the UNFCCC shall be considered to have also withdrawn from the Paris Agreement (and since the UNFCCC entered into force in 1994, the three-year withdrawal prohibition expired in 1997). On the other hand, since the UNFCCC was approved by the US Senate, the withdrawal procedure under domestic law would be less straightforward (CRS, 2016).

Although the agreement was lauded by many, including the then UN Secretary-General Ban Ki-moon, criticism has also been declared. While this “bottom-up” approach – with countries undertaking national pledges for 2020 – has attracted much wider participation (C2ES, 2015), estimates based on the submitted INDCs show if fully implemented by 2030, GHG emissions will be reduced by about 9%, which would translate into an increase in the average global temperature at the end of this century of between 2.7°C and 3°C (Wąsiński, 2015). Moreover, in order to have a 50% of chance of reaching this 1.5°C target, global GHG emissions would have to fall from an expected 56 billion tonnes of CO_2 emissions in 2020 to just eight by 2050 (Chivers and Worth, 2015). Hence, limiting expected warming to no more than 2°C requires deeper, steeper, and earlier reductions in global GHG emissions than the current INDCs would achieve (Sterman et al., 2015). Furthermore, in order to reach 1.5°C it will be necessary to put much more effort into reducing dependence on fossil fuels and other GHGs such as methane, by tackling major drivers as the expansion of unsustainable practices of cattle ranching, for example. Although the lifetime of methane in the atmosphere is much shorter than carbon dioxide, methane is more efficient at trapping radiation than CO_2. The comparative impact of methane on climate change is more than 25 times greater than carbon dioxide over a 100-year period (EPA, 2017). However, the Paris Agreement contains no mention of the word “fossil fuel” (Chivers and Worth, 2015). This implies no clear timescale of when fossil fuels must be phased out. Nevertheless, in Paris it was recognised that private sector, philanthropy, civil society, academia, and the society in general all have a role to play in addressing a major global challenge (Slaughter, 2015).

Finance was a contentious issue in Paris with developed countries pushing for wealthier developing countries to contribute financially and poorer developing countries seeking stronger assurances that financial support would be scaled up (C2ES, 2015). The agreement commits developed countries to provide finance for mitigation and adaptation measures in developing countries, in continuation of their existing obligations under the UNFCCC, a specification desired by the USA so the agreement would not create new binding financial commitments requiring congressional approval (C2ES, 2015). Other major issues included whether to set a new finance mobilisation goal beyond the US$100 billion a year in public and private resources already promised by developed countries, and whether to establish a process to revisit the question every five years. The COP decision extends the US$100 billion-a-year goal through 2025, and beyond that, says only that by 2025 the COP will set a ‘new collective quantified goal

from a floor of US$100 billion a year' (C2ES, 2015). Meanwhile, the world still spends close to US$500 billion in fossil fuel subsidies each year but only about US$70 billion a year for helping developing countries lower their GHG emissions (Clémençon, 2015). For Clémençon (2016), much of the claimed climate financing mobilisation is relabeling or redirection of existing official development flows, which means that financing issues will remain the most important dilemma influencing how rapidly developing countries will move on implementing their INDCs.

1.2 Statement of problem and justification

Similar to other strategies also aimed at tackling an issue as multi-dimensional and convoluted as deforestation, the REDD+ approach raises equally complex questions related to effectiveness (whether it really can achieve GHG emission reductions and decrease of deforestation rates), efficiency (whether these reductions are obtained at the lowest cost possible) and equity (whether benefits are fairly distributed). In this context, REDD+ issues involve stakeholders from the local, national and international levels and requires a combination of political, institutional, technical and economical conditions to succeed.

Unsurprisingly, a deeper understanding about the risks and the opportunities involved are required due to the fact that some critical operational issues remain unclear for the development of a national REDD+ strategy. Regarding the establishment of a REDD+ system, some of the main concerns still are, for instance, related to which rules and targets should be addressed for emission reduction; how to design an adequate financing scheme and how to set a comprehensive accounting system. Since the adoption of REDD+ actions will affect the livelihood of forest-dependent groups, social aspects must also be observed, ensuring public participation as well as the interests and rights of indigenous people and traditional communities (Bonfante et al., 2010; Gebara, 2013; Lima, 2014). Such involvement is a key issue for environmental policies to enhance the reduction of deforestation rates and the sustainable use of natural resources.

Although negotiations on REDD+ advanced as the mechanism was included into the Paris Agreement (see further details in Chapter four), there is still a long way to go and many countries are still skeptical about relying on mechanisms that involve forest protection for different reasons. At the moment it should be the beginning of an important

legislative[9] process to enforce institutional design of REDD+ frameworks in countries establishing such mechanism. This means, the main priority should be the preparation of countries from an institutional point of view, so that they could have the conditions to implement REDD+ policies at national level in an effective and efficient way. Thus, a coherent domestic legal framework is needed for countries preparing to implement REDD+ to ensure that national systems not only deliver permanent GHG emission reductions, but also prevent social and environmental constraints while also delivering non-carbon benefits (Denier et al., 2014). In this context, the legal framework will be the instrument through which many of the international requirements for REDD+ will be translated by countries into concrete and specific national requirements, according to their singular circumstances (Denier et al., 2014). Also, the voluntary market for REDD+ credits has been evolving more rapidly than regulations and this may have left room for projects of equivocal merit (Gil, 2010). It is important to keep in mind, therefore, that the design of a national strategy is needed prior to the establishment of an operational system, meaning that the REDD+ should be in accordance with national development interests. That requires, in the first place, the identification of measures that countries should take in order to lay down the conditions for benefiting from REDD+ initiatives.

At present, the question in Brazil still is how to design a legal framework that ensures the success of such strategy, albeit the country has released its REDD+ national strategy through Decree 8.576/2015[10] (see further detail in Chapter six). The regulation of REDD+ in the context of forest management and land use in Brazil is still under progress and, therefore generates many questions regarding its form of implementation. For example, Brazil faces several challenges especially regarding institutional weakness as lack of governance, weak property rights, land use conflicts

[9] The definition and differentiation of some concepts are needed here:

- Following Denier et al. (2014) a domestic legal framework comprises a country's strategies, policies, plans, programmes, laws and regulations;
- Strategy aims to achieve a long-term goal related to one or more policy areas. It will identify the challenges facing one or more sectors enabling the government to define a position. A strategy describes how the ends (goals) will be achieved by the means (resources);
- Following the FAO definition, policy is a set of decisions which are oriented towards a long-term purpose or to a particular problem. It is more specific than a strategy and provides political direction for the adoption, implementation and interpretation of laws. However, policies do not ensure that the same will be successfully followed reaching that long-term goal;
- Legislations are actual laws that are enforceable, which means they must happen and should be followed. Legislations also require a voting to ensure that they are passed, while policies can be decided by the government. Legislation can also mean the process of making the law;
- Plans generally build on policies and provide more detailed quantitative targets and qualitative principles. Programmes are spatially, temporally and technically explicit about the actions or activities and resources needed to achieve a plan's objectives (Denier et al., 2014).

[10] Online available at: http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2015/Decreto/D8576.htm

and negligence with the environmental legislation that hinder appropriate policies' implementation in the country (see Fatorelli et al., 2015; Gebara et al., 2014). Moreover, the country faces another clear problem: there is a high level of public sector corruption[11] and bureaucracy in the country. Such high level of bureaucracy creates a fertile environment for corruption that may contribute to the development of environmentally damaging policies and laws (Alves, 2014). Indeed, the current political system in Brazil creates difficulties in effectively exercising legislative and executive[12] powers (Valberg, 2011). In addition, although there has been progress in decreasing deforestation rates in Brazil, the country faces important development challenges in combining the benefits of agricultural growth, environmental protection and sustainable development (World Bank, 2015).

Furthermore, some federal states are taking independent and non-aligned steps towards devising and implementing their own REDD+ policies. The development of the REDD+ national strategy in Brazil is then characterised by inconsistency. This is directly related to a lack of dialogue with civil society, federal states and mainly indigenous and traditional communities (Cenamo and Lima, 2014). Moreover, it is also related to a lack of coordination among the National Policy on Climate Change (NPCC), environmental policies and development goals (Cenamo et al., 2014). Especially in the legislative branch of government, there are characteristics that indicate weakness of the Brazilian position in the international sphere, as there is no internal ballast to support it (Reis et al., 2015). While internationally the country stands as a leader on voluntary commitments and actions towards a climate-forest-related approach, internally it presents discrepancy in its conduct (the federal government does not always support such actions domestically), illustrating the challenges for the development of environmental policies in the country (Reis et al., 2015).

In a wider view, despite all progress related to the sustainable use of natural resources, however, it seems not to be enough to deal with the critical situation that the planet is facing. Deforestation shows signs of decreasing in several countries but continues at a high rate in others. In addition, the humankind is facing other challenges

[11] According to Transparency International's Corruption Perception Index, Brazil ranked 69th (43 points) among 175 countries in 2014. The Corruption Perception Index ranks countries and territories based on how corrupt their public sector is perceived to be. A country or territory's score indicates the perceived level of public sector corruption on a scale of 0 (highly corrupt) to 100 (very clean). For 2014, there was no country that got a perfect score and more than two-thirds scored below 50. For 2015 the situation has even worsened. Brazil scored only 38 points (76th).

[12] Typically the legislative power makes the laws, and the executive power executes and enforces the laws, although their exact roles can be determined according to a country's constitution.

as increasing poverty, water and energy, security, biodiversity loss, etc. Most of these problems and their solutions are inter-related and related to climate change (see IPCC, 2002, 2014; OECD et al., 2002). A much broader perspective and brand new strategies are therefore needed to tackle inequity and to truly reach a sustainable socio-ecological transformation of global economies. Thus, an understanding of how sustainable forest management policies and practices are vulnerable to climate change, as well as how to incorporate uncertainty into decision making is required in order to address the challenges and capitalise new opportunities presented by climate change (Williamson et al., 2012).

Moreover, a deeper understanding of different contexts is extremely important for such achievement. It is accurate affirm then that Brazil benefits from international discussions on REDD+ (as these discussions provide subsidies on how to apply the mechanism domestically) and, at the same time this relationship is beneficial to the design of the international REDD+ framework (because Brazil can serve as a very realistic example). Within this context, the establishment of national strategies is essential to convert international commitments based on the optimisation of collective interests and, therefore, REDD+ should be implemented within the national policy arena that promotes the sustainable forest management. However, REDD+ must go beyond tackling also the dependence on fossil fuels and market changes. For example, the indirect substitution that takes place when materials that require high volumes of fossil fuel to be produced (e.g. steel) are replaced with materials that do not, represents great potential in reducing GHG emissions (Galbert et al., 2013). Thus, REDD+ policies should create synergies that leads to fossil fuel replacement rather competition among non-fossil options (Berndes et al., 2016). Galbert et al. (2013) also defend the idea that the REDD+ scope should be widened to a more comprehensive perspective that addresses the productive use and management of forest resources, including impacts that take effect outside of the forest sector.

Hence, the goal is for the incorporation of the co-dependent relationship between good governance and forest-based emission reductions into REDD+ schemes, integrating multiple options and generating useful key-scenarios to formulating strategies for maintaining forests stand. In this sense, a more consolidated and cooperative landscape approach can better measure trade-offs[13] between conflicting issues such as

[13] The term trade-off involves losing one quality or aspect of something in return for gaining another quality or aspect. It is now more generally used for situations where a choice needs to be made between two or

food security, energy needs, and the preservation of natural resources (CGIAR, 2013). Significant opportunities exist to promote more integrated and multi-functional land uses that combine conservation and the production (e.g. timber and/or crop and livestock) and other forest products that support livelihoods and provide for both socio-economic and environmental functions (Galbert et al., 2013). Brazil could make a substantial contribution towards the mitigation of global climate change through the reduction of GHG emissions from deforestation and degradation and, simultaneously seek for progress on, or perhaps lead in establishing a model for economic development of a low carbon economy.

The results of this study identified key constraints related to the ongoing negotiations on the formulation of a national strategy on REDD+ in Brazil. The findings guided a multi-disciplinary exercise and laid forthcoming challenges for the successful establishment of REDD+ into the policy arena. The study further propounded how REDD+ could be addressed as an opportunity to provide pathways for consistent forest governance in Brazil. This means, the dissertation identified the regulatory and organisational conditions that are most likely to ensure the effective implementation of the REDD+ in Brazil. This is necessary to establish the contextual groundwork of regulatory and institutional structures, which will be imperative for REDD+ to promote better governance practices. Moreover, until currently there have been also few attempts to analyse and understand the overall framework of REDD+ (DeShazo et al., 2016). Identifying effective approaches must therefore take a multi-disciplinary perspective that sheds light on the economic, social and organisational implications of discrete policy and regulatory choices (Fosci, 2014).

1.3 Research aims

With the research background in mind, the proposed study:

- Investigates and understands the overall framework of REDD+ development as a national strategy in Brazil;
- Identifies the major challenges and policy constraints, which undermine this development design process;

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more things that cannot be had at the same time. It is also a very popular term in the ES literature, covering a broader array of occurrences, such as conflicting land-uses, ES incompatibilities, etc. Despite its popularity, the intuitive definition of “ES trade-offs” and its antonym “ES synergies” lack conceptual clarity (Turkelboom, 2016).

- Identifies tools, mechanisms and policy areas to address the constraints associated with the findings to proffer an analytical reasoning for fundamental changes in order to REDD+ to be able to improve domestic forest governance within the Brazilian context.

1.3.1 Research questions

The following research questions are designed to address and achieve the research aims:

- What is the current status of REDD+ development as a national strategy in Brazil?
- What is the Brazilian strategy on REDD+?
- What are the main challenges related to this development process?
- What are the weaknesses and strengths of this strategy?
- What are the legal and political barriers for this implementation?
- How can this strategy be used as a tool of forest governance in Brazil?
- What area(s) of domestic policy, if any, should be followed to prioritise REDD+ in Brazil?

1.4 Research approach and methodology

After setting out the context and the aims of this research, in this section the methodological approach is outlined.

1.4.1 Research strategy

The choice of research strategy should be based on the aim or research questions that are addressed in a study (Zobel, 2005). The case study is chosen as the central research strategy for this thesis. It has been largely used as research strategy in political science (Yin, 2009). Also, Yin describes the case study as the preferred research strategy when the research focus is on contemporary real-life scope and when the researcher has little control over the actual behavioural event. Answering the research questions developed in the previous section requires the exploration and description of the forest governance framework in Brazil. The focus of this work will

therefore be on exploratory and descriptive research, mapping the field and providing a structured approach to the issue. In other words, the goal of identifying how the REDD+ mechanism can be used as tool for the enhancement of governance in the Brazilian context has not been previously profoundly explored. Hence, a research that aims to cover this issue can be considered exploratory. Moreover, this research must also include a deep comprehensive description of different elements for assessing the current status of REDD+ development in Brazil. The study can therefore also be considered as descriptive in nature.

A qualitative research methodology offers the opportunity of meeting the needs of an exploratory study, because it is possible to observe a process in detail; thus, this research is based on qualitative data. The qualitative research method investigates questions about the what, how or why of a phenomenon rather than how many or how much, which are normally answered by quantitative methods (Patton and Cochran, 2002). Furthermore, it could enrich the quality and depth of the collected data. Having established the research strategy applied in the present study, it is necessary to comment on the specific research design of this dissertation.

1.4.2 Research design and methods

For this research, the respondents were selected through purposeful sampling. The objective was to compare the views and experiences of the actors. The selected respondents are actively involved in REDD+, climate change and forest initiatives at their jurisdiction. Personal dialogues (semi-structured interviews, open-ended questions) were conducted, but also some of the interviews were responded to electronically (using questionnaires). The respondents were divided in two different groups: i) governmental and ii) non-governmental stakeholders.[14] Governmental stakeholders comprise of all actors that are part of the state administration and its institution, working at different levels of administrative units (local, regional, national and international) and non-governmental stakeholders comprise of all actors that are interested in climate change and REDD+ at different levels of administrative units (non-governmental organisations (NGOs), forest based enterprises, universities and research institutions, media and consultants). In total, 58 different stakeholders have participated in this research. Among

[14] Stakeholders are considered those who have an interest and/or direct relevance in a particular decision, either as individuals or representatives of a group. This includes people who influence a decision, or can influence it, as well as thought affected by it.

governmental stakeholders, 15 different organisations (comprising federal and state level) have participated. Concerning non-governmental stakeholders, different sectors were reached as it was outlined. For example, respondents were representatives from:

- Two independent consultants;
- Six universities (four national and two international);
- Four private companies;
- 18 Civil Society Organisations, Funds, Foundations (twelve national and six international;
- 13 Institutes, NGOs, Non-Profit Organisations (ten national and three international).

The use of interview is the most suitable and coherent choice for certain evaluations due to their exploratory character, openness and flexibility, which stimulates interviewees to think freely and expose their perceptions spontaneously about controversial and often non-explicit topics (e.g. poor administration, difficulties in accessing finance and political power relationships). Interviews technique should be: i) reproducible, ii) systematic, iii) credible and iv) transparent (Patton and Cochran, 2002). This study therefore is based on primary and secondary data. Three main types of data collection methods were utilized to obtain the necessary information for answering the research questions. These included semi-structured interviews (utilizing a previously prepared interview guideline) and a questionnaire to collect primary data. Concerning secondary data, it was based on a detailed review of published works on topics such as climate change, the REDD+ mechanism, the role of tropical forests inside the climate debate, the international forest regime, forest governance and several other documents (strategic, legislative, policy studies, etc) were examined.

1.4.3 Data analysis

The research questions were addressed based on the methodology of grounded theory, often used in social science within qualitative research (Bryman, 2008). Such methodology is systematic, which involves the construction of theory through data analysis (Glaser and Strauss, 1967). Unlike positivist research, a study using grounded theory has a major focus on the evaluation of primary data, repeated ideas, elements that are tagged with codes and then grouped into concepts or categories that become

clearly apparent with analysis. The writing of the dissertation started with an empirical question (how to use REDD+ to enhance domestic forest governance in Brazil?) and, subsequently, from this theory, the data collection was outlined. After the interviews with the governmental stakeholders were conducted in Brasília, the data was categorised and the outcome of these interviews determined the next step of data collection process. Each interviewee gave a unique answer and this was the fundament to understand a more complete picture of the research context and also being part of the process of finding new questions for the non-governmental stakeholders. After the complete data analysis, in order to corroborate with the discussion presented throughout this dissertation, the analysis returned to theory.

The choice of employing grounded theory methodology is built on two major considerations as in Fosci (2014): i) theoretical reasoning on regulatory instruments and governance must be considered in context and based on evidence if it is to be of any assistance to policy-making and ii) abstract treatment of these subjects is important in academic debate and increases analytical understanding, but it is not directly applicable to particular cases. Research based on observations, experimental evidences and interpretations rather than theoretical concepts often lack the comprehensiveness necessary to inform policy making, or in other words, they are insufficiently theoretical to be applicable across contexts. Grounded theory, on the other hand, provides a synthesis between these two approaches which makes the research also relevant for decision making.

A qualitative content analysis (using the software MAXQDA© version 12) was then carried out, which involves the use of derivatives, analytical codes, theories/existing and relevant explanations for the research focus (Hsieh and Shannon, 2005). Qualitative content analysis goes beyond purely counting words to examining language deeply for the purpose of classifying large amounts of text into an efficient number of categories that represent similar meanings (Weber, 1990), which means focusing also on the contextual meaning of the text. In the initial phase, a first reading of the interviews was conducted to get a first impression of the texts (conventional content analysis approach)[15] and, based on previous studies and theories discussed in this dissertation (directed content analysis approach), a list of codes was created to label and classify the

[15] In a conventional content analysis, categories are derived from data during data analysis. The researcher is usually able to gain a richer understanding of a phenomenon with this approach. With a directed content analysis, the researcher uses existing theory or prior research to develop the initial coding scheme prior to beginning to analyze the data. As analysis proceeds additional codes are developed, and the initial coding system is revised and refined (Kyngas and Vanhanen, 1999).

material from the interviews. The data were then coded according to the topics relevant to the research questions:

- Governance constraints;
- Institutional weaknesses;
- Cross-sector interaction;
- Distribution of benefits;
- Rights of indigenous communities, forest dwelling and forest dependent communities
- Policy linkages;
- Participation on decision-making process;
- Transparent safeguard system;
- Finance structure;
- Monitoring system;
- Technical requirements (scope, leakage, permanence, baseline).

Furthermore, new codes were added based on the most common problems presented in the data (e.g, social inequality, land tenure conflict, corruption and bureaucracy, low institutional capacity, political will, conflict of interests, etc). At this stage, each encoded piece of text was assigned to a specific topic. Sometimes two or more subjects were coded to a text excerpt because of its relevance to both. This coding aimed to summarise, condense and organise text snippets of different interviews, in accordance with the main topic of this dissertation. All approaches to qualitative content analysis require a similar analytical process of seven regular steps, including: i) formulating the research questions to be answered; ii) selecting the sample to be analysed; iii) defining the categories to be applied; iv) outlining the coding process; v) implementing the coding process; vi) determining trustworthiness and vii) analysing the results of the coding process (Hsieh and Shannon, 2005; Kaid, 1989).

1.5 Trustworthiness and limitations of the research

William Bruce Cameron wrote: '*not everything that can be counted counts and, not everything that counts can be counted*' (Cameron, 1963). Although Flick et al. (2000) declares that qualitative research has become firmly established, concerns and criticism remain. Critiques towards qualitative research are mostly centered on the validity and

reliability of findings (Yin, 2009). While interpretations are an essential element of qualitative research, results achieved via inductive reasoning[16] can not be proved beyond doubt and, therefore they need to be well founded using reasoned arguments (Mayiring, 2002). Thus, this dissertation is based on communicative validation, which means, the discussion of the results is used to validate the findings (Mayiring, 2002). At this level of discussion empirical primary-data gathered first-hand is treated no differently from evidence derived from the literature. In order to complement and address concerns regarding the internal validity of the results, different methods of data collection were used to answer the research questions, as an instrument to ensure the quality of the gathered data. Although some specialists argue that the production of similar findings from different methods merely provides corroboration (Barbour, 2001), for Mays and Pope (2000), patterns of convergence can be seen as a way of ensuring comprehensiveness and encouraging a more reflexive analysis of the data. On the other hand, the exploration of elements in the data that contradict, or seem to contradict the emerging explanation of the phenomena under study, may also improve the quality of explanations in qualitative research (Mays and Pope, 2000). Reliability of this present research is ensured through the provision of the references utilized, description of stakeholders interviewed as well as explanation of research design and methodology. Also, the semi-structured guideline and questionnaire are presented in Annex I and II.

In this research, as previously mentioned, face-to-face interviews and questionnaires are used for data collection. Both methods have strengths as well as weaknesses. Personal interviews are often conducted in an agile way, and researchers are able to gather data rapidly (Patton and Cochran, 2002). Also, face-to-face interviews enable the respondent to elaborate better on difficult questions (Jäckle et al., 2006). On the other hand, some criticisms are associated with the uncertainty that the researcher must deal, because it is controversial if the interviewee is constantly telling the truth or not. In other words, some interviewees could be willing to please the researcher. In order to not influence the interviewees' answers, they were left uninformed about the theoretical ideas which led to the construction of the interview guidelines. Moreover, interviews are challenging to conduct. However, these arguments simply illustrate the limits to what could be inferred from such data. Questionnaires have the benefit of being the same for all respondents in the research. On the one hand, questionnaires do not

[16] Inductive reasoning is the reasoning in which the premises are viewed as supplying strong evidence for the truth of the conclusion. While the conclusion of a deductive argument is certain, the truth of the conclusion of an inductive argument is probable, based upon the evidence given.

vary from respondent to respondent, during the data collection. On the other hand, questionnaires require that each respondent has a fairly good understanding of the research being conducted (Ackroyd and Hughes, 1992). That is the main reason why the respondents were selected through purposeful sampling.

1.6 Structure of dissertation

This document is divided into seven independent chapters followed by the references and annexes. Chapter one introduces the research background and provides the information needed to understand the research context. Also, the research problems, the research objectives, the methodological approach and the research limitations are introduced. The next chapter, Chapter two, explores the sustainable forest landscape governance approach as the overarching concept for the effective implementation of REDD+ in Brazil. Chapter three focuses on the role of forest issues in international politics. It examines the forest development context in international agreements centering the focal point on the relationship between forest and climate change. In Chapter four, the REDD+ mechanism is introduced. The chapter explores several aspects of the mechanism in order to provide a substantial understanding of its role in the climate agreement umbrella. It also examines the high complexity of technical requirements, as well as social, political, economic and institutional issues related to the REDD+ framework. Chapter five focuses on the Brazilian context in the climate debate. It starts with an overview of Brazil. It describes the context of forest conservation in the country and explores the evolution of the Brazilian position concerning climate change and forest-related issues as well as the development of domestic forest-climate-related measures. It ends discussing and introducing the context of REDD+ in Brazil. Chapter six presents the findings related to the research questions that guide the study, meaning that, in this chapter, the findings of the research are presented, discussed and interpreted. Finally, Chapter seven concludes the thesis and exposes lessons learned. The references and annexes are presented at the end of this dissertation.

CHAPTER 2 Building a Conceptual Framework

Chapter two explores the sustainable forest landscape governance approach as the overarching concept for the effective implementation of REDD+ in Brazil, introducing conceptualisation and ideas for further discussion on how Brazil could use REDD+ to enhance domestic forest governance. The main conception related to the development of the thesis is to identify policies' areas, measures and tools to approach forest governance at landscape level as the groundwork approach to be adopted in the formulation of the Braziian REDD+ strategy. The chapter starts defining the concept of governance.

2.1 Defining governance

The complexity of governance (as a theoretical concept) is difficult to capture in a simple definition. Rhodes (1996) states, for example, that the term governance is popular but imprecise. Literature shows several different conceptions about what is defined as governance. Interestingly, Graham et al. (2003) begin their paper defining what governance is not. They argue that governance is "not" synonymous with government. But governance is related to how governments and other social organisations interact, how they relate to people, and how decisions are taken among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions (Graham et al., 2003). Differently, Cabello and Gilbertsson (2012) state that governance seems to remove the ideas of direct authority and power from the government while altering it as an apolitical "practice". For Bevir (2013), governance refers to all of processes of governing, whether undertaken by a government, market or network, whether over a community, family, tribe, formal or informal organisation or territory and whether through the laws, norms, power or language. For Pierre (2000), governance refers to sustaining coordination and coherence among a wide variety of actors with different purposes and objectives. In this context, governance does not need to be conceptualised in the meaning of "authorities having power over", but rather, can be realised in the form of "government exercising power with", as the involved actors strive together to solve common problems or accomplish shared goals (Foucault, 1991). While this definition gives credence that governance is broader than government, Pierre and Peters (2000) perceives

governance as a more State-centric concept. They define governance as processes in which the State plays a leading role, making priorities and defining goals.

Hirst (2000) offers a more general definition of the concept, considering governance as the means by which an activity is controlled or directed in a way that it delivers an acceptable range of outcomes according to some established principles. The World Bank (1993) defines governance as the method through which power is exercised in the management of a country's political, economic and social resources for development. The World Bank focus on governance reflects the worldwide thrust toward political and economic liberalisation. The UNDP in its policy paper from 1997 defined governance as the exercise of economic, political and administrative authority to manage a country's affairs at all levels, comprising the mechanisms, processes and institutions through which the population articulate their interests, exercise their legal rights, meet their obligations and mediate their differences. In other words, the term governance enlarges and better illustrates what governments should be focusing on. This dissertation combines such definitions and fundaments itself on the conceptual framework of governance that leaders through a participatory process may be able to reconcile different political, social and economic perspectives with regard to the sustainable use of natural resources as a basis for sustainable development. Furthermore, some defend the idea that most of the crises in developing countries are of a governance nature. Thus, the contemporary adjustment package emphasises governance issues such as transparency, accountability[17] and judicial reform. In this context, a new way of looking at governance (more as a policy concept) was introduced; which defines the term "good governance". This concept often emerges as a model to compare ineffective economies with viable economies.

Defining the principles of good governance is difficult and controversial. According to the World Bank, good governance entails robust public sector management (efficiency, effectiveness and economy), accountability, exchange and free flow of information (transparency), and a legal framework for development (justice, respect for human rights and liberties). A more succinct definition of good governance is offered by Hirst (2000) who proposes that good governance means creating an effective political framework conducive to private economic action: i) stable regimes; ii) the rule of law; iii) efficient State administration adapted to the roles that governments can actually perform

[17] Accountability is related to notions of responsibility, referring to the willingness to accept responsibility (Biermann and Gupta, 2011).

and iv) a strong civil society independent of the State. On the other hand, the UNDP (1997) enunciated a set of principles that have a claim to universal recognition (table 1), grouping those under five broad themes. However, it is recognised that these principles are complex and conflicting at some point, playing out in practice according to the actual social context (Graham et al., 2003). In the context of REDD+, the five good governance principles may be use to prepare an effective institutional framework integrating governance and regulatory systems to ensure the implementation of national strategies on REDD+.

Table 1 The five good governance principles

The Five Good Governance Principles	Related UNDP text on which they are based
1. Legitimacy and Voice	**Participation:** anyone affected by or interested in a decision should have the opportunity to participate in the process for making that decision. This can happen in several ways such as, community members may be provided with information, asked for their opinion, given the opportunity to make recommendations or be part of the actual decision-making process. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively **Consensus orientation:** good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures
2. Direction	**Strategic vision:** leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded
3. Performance	**Responsiveness:** local government should always try to serve the needs of the entire community while balancing competing interests in a timely, appropriate and responsive manner **Effectiveness and Efficiency:** local government should implement decisions and follow processes that make the best use of the available people, resources and time to ensure the best possible results for their community
4. Accountability	**Accountability:** accountability is a fundamental requirement of good governance. Local government has an obligation to report, explain and be answerable for the consequences of decisions it has made on behalf of the community it represents. This accountability differs depending on the organizsations and whether the decision is internal or external **Transparency:** transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them

5. Fairness	**Equity:** a community's wellbeing results from all of its members feeling their interests have been considered by council in the decision-making process. This means that all groups, particularly the most vulnerable, should have opportunities to participate in the process **Rule of Law:** legal frameworks should be fair and enforced impartially, particularly the laws on human rights. This means that decisions are consistent with relevant legislation or common law and are within the powers of council

Source: Adapted from Graham et al., 2003

The concept of governance has over the years gained momentum and a wider meaning. Apart from being an instrument of public affairs management, or a gauge of political development, governance has become a useful instrument to enhance the legitimacy of the public domain. It has also become an analytical framework or approach to comparative politics. But the actual meaning of the concept depends on the level of governance (global, international, national, sub-national, organisational, local) as well as it depends on the goals to be achieved and the approach being followed. Under the term governance, to a certain extent, the field of environmental policy has been paradigmatic of the search towards new manners of political guide (Görg, 2007).

2.2 Sustainable forest landscape approach

On account of the complexity of sustainable forest management and the ineffectiveness of many sector-based activities that neglect the cross-sector linkages between forestry, agriculture, nature conservation and economic development, there is increased recognition of the importance of landscape approaches (van Oosten, 2013). Today, maintenance of ecosystem services, conservation of biodiversity, rural development and human well-being are new additional objectives to the previously goals of sustaining the yields of wood, food and energy (Axelsson et al., 2012). At the same time there are new risks and uncertainties linked to climate change, economic globalisation, energy security and water supply which should also be addressed. Consequently, adaptive governance and management are needed (Axelsson et al., 2012).

In response to this, the concept of forest landscape governance is currently being developed to stimulate such integration, aiming to preserve and restore degraded forests in human landscapes (van Oosten, 2013). Land-use planning efforts are embracing the

more integrated, holistic approach of a landscape as a series of inter-dependent natural and human systems (CI, 2011). With the increasing importance of the concept of forest landscape governance, the topic becomes also relevant to the Brazilian context. Conflicting sectoral policies that prioritise agribusiness and decentralisation without adequate training characterise the institutional governance framework applied to forest landscapes in Brazil (Gebara, 2015a). Therefore, it is even more important to understand the obstacles present in the transition to a more integrated model of governance of forest landscapes and factors that may contribute to this process in the country.

At this point, it is useful to provide a definition of the concept of a landscape. There are several definitions of what constitutes a landscape with many variants of the definition depending on the research or management context. From an ecological perspective, a landscape can be defined as mosaic of interacting ecosystems (at any scale), spatially heterogeneous in at least one factor of interest (Forman and Godron, 1986; Turner et al., 2001). On the other hand, landscapes can also be seen as stages of processes, resulting from socio-economic, cultural, institutional or natural factors and influences (Brascamp, 2013). Guilmour (2008) defines landscape as a unique mosaic (because of the structure and the arrangement of its different components) of different biophysical and social components, such as different land uses, land owners, vegetation, human areas, etc. The inter-related land-use mosaic explains the many different functions that a landscape can have, being called services, when these functions or benefits are valued by people (van den Dries, 2013). Moreover, landscape is a result from practices of society and nature relations, which is shaped by customs, rights and duties (Penker, 2009). In this dissertation as adopted in Brascamp (2013), the landscape is defined as an area in which humans interact with the environment for social, economic, cultural, and natural purposes, being seen as a continuous process of changes over time.

The disparity in definitions makes it difficult to establish consistent management policies. The essential beginning in any landscape-level management endeavour, nevertheless, is to define the landscape, which is not necessarily defined by its size, but rather it is defined by an interacting mosaic of patches relevant to the phenomenon under consideration (McGarigal, 2016). However, the landscape scale for governance processes is significant since it links multi-level politics to natural-spatial conditions (van den Dries, 2013). In this sense, landscape governance is regarded as a way of bringing

spatial decision-making closer to those directly affected by spatial decisions; it considers landscapes as the ideal space for multiple stakeholders to negotiate and dialogue on their needs and options on collective decisions about the organisation of their space (van Oosten, 2013). Landscape at the meso-level is increasingly seen as valuable to facilitate governance processes since it combines societal factors with natural factors and is able to connect different scales for finding solutions (Görg, 2007). However, frequently landscapes are not represented in planning and decision-making processes of governmental actions (Rietbergen-McCracken et al., 2007).

The term landscape approach to support sustainable development as a societal process in order to achieve sustainability on the ground is originated from the conservation discourse (Angelstam et al., 2013). It promoted as an understanding that sustainable responses to conservation often required the involvement of local people living in the area, describing this way the social learning process where stakeholders concrete participate in the development and implementation of sustainable management solutions (Angelstam et al., 2013). This understanding has grown to a paradigm shift in conservation realm (Singer, 2007). Sustainability of landscapes is often related to their multi-functionality, an important paradigm within sustainable development thinking (Selman, 2008; Southern et al., 2010). However, distinguishing between sustainable development and sustainability is relevant because in many cases the close association between the two concepts has caused “sustainable development” to be isolated as simply environmental, although the concept is intended to facilitate coordination between social, environmental and economic aspects.

Sustainability is the ability of a human system, natural or mixed, to resist or adapt to endogenous or exogenous change indefinitely (Dovers and Handmer, 1992). In contrast, sustainable development is a way of intentional change and improvement that keeps or increases this attribute of the system meeting the needs of the population (Sartori et al., 2014). Sustainable development can therefore be considered the path to achieving sustainability, that is, sustainability is the ultimate long-term goal. Apart from the ecological and physical appraisal of urban/rural/natural environments, the multi-functionality of the landscape (its structure and functions) have been inserted within the context of the entire natural and cultural dynamics of any region to emphasise a consistent “asset-based local development” (Kaplan, 2014). It is precisely this hybrid character of landscape concept, which intrinsically links societal and natural services provision to one another that ensure that cultural, aesthetic, economic and social

dimensions are as much involved as ecological functioning (Janssen and Knippenberg, 2012). The landscape approach is at the centre of sustainability and sustainable development rhetoric as a domain of this hybrid human-environmental interaction, inducing a shift in land use.

The global concern about biodiversity loss and climate change effects has been supporting the concept of sustainable forest landscape governance. This debate has stimulated policy makers to restore ecological connectivity by scaling up scattered local conservation initiatives to larger spatial units, strengthening their resilience and increasing carbon stocks (van Oosten, 2013). The global agenda on food security, social resilience and sustainable land use has been a second driver, highlighting the complexity of forests as elements of anthropogenic landscapes. It has also highlighted that productive land-use systems do not necessarily reduce the biodiversity of natural ecosystems, but rather increase the bio-cultural diversity of landscapes (Wiersum, 2003). However, within the policy arena, use and management of landscapes are often unsustainable (Butchart et al., 2010), and multiple stakeholders act independently of each other (Young, 2013).

There are several gaps between policies for natural resource governance and what is practiced on the ground (Angelstam et al., 2013). Building multi-sector governance for sustainable development of landscapes is indeed not an easy task for authorities and institutions. This means that the participation of non-state stakeholders in decision-processes on the different levels of governance as well a stronger decentralisation in policy implementation is advocated (Newig and Fritsch, 2009). Although it is assumed that the nature of participation (or even its absence) in governance decisions affects outcomes, little is known about this relationship and how participation concrete influences over governance effectiveness (Newig and Fritsch, 2009).

As such, multi-level governance[18] raised new and important questions about the role, power and authority of governments, evolving over time and addressing a more network-like structure of policy-making (Conzelmann, 2008). A network can be seen as

[18] Originally, multi-level governance (MLG) is an approach in political science and public administration theory that originated from studies on European integration, which discovered that authority was shifting not only from central states up to Europe, but also down to sub-national authorities (Hooghes and Marks, 1996). Within the European context, MLG emphasized both the increasingly frequent and complex interactions between governmental actors and the increasingly important dimension of non-state actors that are mobilised in cohesion policy-making and in the EU policy more generally (Hooghes and Marks, 2003). The concept was developed as a tool of pure research, but recently motivates policy makers as well.

the links between the public and private sector in the implementation of policies, dealing with problems or situations that occur on a regional level (van Waarden, 1992). Stakeholders involved in these network structures are state (policy makers) and private actors and interest groups, which are inter-dependent in terms of problem solving (Spaargaren, 1997). Through these networks, interaction processes between stakeholders emerge to delineate problems and to achieve consent (Spaargaren, 1997). The stand of stakeholders and political decision-making processes play a relevant role in how governance works (Görg, 2007). In this sense, governments should guide stakeholders and policy development into the direction that is desired at that moment, and should give the involved actors sufficient favourable circumstances to be involved in the policy-making process and implementation of activities (Brascamp, 2013). Therefore, form this perspective it has become increasingly evident that regional and local decisions are essential in the design of environmental strategies to respond.

Landscape governance will require a high degree of collaboration to connect contrasting sectors, to integrate complex institutional layers, and to engage multiple stakeholders in the sustainable development of cultural landscapes (Görg, 2007). Since multi-level cooperation and multi-sectoral coordination are essential to an inclusive and participatory approach to landscape conservation, the goal is to stimulate and integrate a mutual win-win scenario between sectoral interests by a “conservation through development” approach (Janssen and Knippenberg, 2012). However, considerable challenges, conflicts and opposition could emerge. First, there are complex trade-offs among goals, which does not guarantee that this win-win situation will be created.

Also, multiple sectors with management responsibility at different societal levels of governance are challenged with sharing power and improving collaboration among stakeholders in social-ecological systems (Adger and Jordan, 2009). Also, to consider risks and uncertainties related to continually evolving expectations from society is needed as well as from variable market demands and economic crises (Barnes, 2006) and, to climate change (Johnston and Williamson, 2007). Dealing with all of this complexity is the predominant challenge for civil, private, and public sectors (Komiyama et al., 2011). For Janssen and Knippenberg (2012), resistance lies mostly in the manner of consulting and involving local interests, rather than possible economic losses to local livelihoods arising from acceptance. By working cooperatively with local stakeholders, local, regional and national levels of government should aim to increase regional resources creation. This will give greater importance to rural areas, and conceive more

acceptances for landscape conservation among the local population and increasing awareness among people about forests and the natural environment.

2.3 Governance in the REDD+ context

It is well recognised that the consequences of the pressure on the environment are becoming increasingly inter-linked and globalised, requiring a higher level of adaptive capacity of governance regimes in order to deal with such challenges. On the one hand, although it has been many years since the pressure had risen for a more authoritative response to global forest loss – even though the international community has failed to reach a commitment in a global forest convention – the REDD+ discourse is the most recent chapter in several decades of developments in international forest law and governance (Asselt and McDermott, 2016). On the other hand, given the global nature of the problems associated with climate change and its relationship with forests, an international response to this concern has been required. Within this context, REDD+ has become likewise a critical focus of global climate change efforts. The REDD+ structure will affect or be affected by forest governance, it can influence forest governance or be undermined by its failures even though it is not primarily focused to be a governance reform. Therefore, the REDD+ framework will depend on good forest governance to become an efficient, effective and equitable regime.

The broadened definition of REDD+ has incited the creation of new bi- and multi-lateral agreements, prompting a shift in which sustainable measures (e.g. agriculture) and low-emissions development are prioritised alongside forest conservation, affecting domestic structures of governance in tropical countries (CI, 2011). In this sense, it is because of its multi-faceted nature that REDD+ offers the opportunity to deal with deforestation drivers, emissions reduction, actors and different sources of complexity concomitantly, in a more integrated manner. On the other hand, the multi-dimensional indirect and unintended effects originated from such schemes should explicitly be addressed in policy design and implementation to deal with possible trade-offs between different aspects of such scope, for example, the bias favouring certain ecosystem services (Makkonen et al., 2015).

In order to establish REDD+, nevertheless, boosting accountability, capacity building, participation of all stakeholders and improved coordination and transparency are needed (Ozinga, 2012). However, most countries developing a REDD+ framework

have vulnerable governance structures, constituting one of the main challenges for its implementation (Fosci, 2013). Regardless of the constitutional form of government, environmental governance calls for a narrowing of the policy "gaps" among levels of government via the adoption of tools for vertical and horizontal cooperation. The vertical dimension recognises that national governments cannot effectively implement policies and strategies without working closely with regional and local governments as agents of change. Here, local capacity building and incentives for effectiveness of sub-national levels of government are crucial issues for improving the quality and coherence of public policy. On the other hand, to take action, federal states and municipalities cannot be effective and do not operate in isolation from other parts of government, this means the horizontal dimension of governance refers to co-operation arrangements between regions or between municipalities (Corfee-Morlot et al., 2009).

The opportunity presented by REDD+ is unprecedented but there are also risks which should be considered within this context (Cadman and Maraseni, 2011). Failing to tackle problems of deficient institutional capacity and coordination as those aforementioned obstacles may intensify current conflicts over the use of natural resources and risk creating perverse outcomes for forest-dependent people, forest ecosystems and the global climate (Vatn and Angelsen, 2009). Looking at several national REDD+ plans, however, it is noticed that mostly countries focus on measurement, reporting and verification (MRV) on carbon emissions, rather than on MRV on governance and safeguards, making it complicated to lead to better governance. Monitoring social and environmental impacts is needed to truly promote co-benefits. According to Vatn and Angelsen (2009), tasks to be performed by national REDD+ architectures should mainly be related to coordination, channeling international funding, monitoring, safeguards and governance. This means that governance structures should also focus on how suitable the actions are for national authorities, civil society, local communities, donors and other international organisations engaged in REDD+ activities.

Rather than solely to constrain or modify the behaviour of countries in order to address global dilemmas, the ultimate goal of many international and transnational endeavours is to influence domestic policymaking processes (Eba'a Atyi et al., 2010). This is reflected in the context of forest governance because, while forest resources lie within state borders, the consequences of their misuses or conservation may have global implications (Eba'a Atyi et al., 2010). The success of REDD+ as an international mechanism will therefore further depend on the existence of governance arrangements

that are also able to deliver both GHG emission reductions at significant scale (i.e. solve the problem), as well as being transparent and involving the participation of multiple stakeholders (Cadman and Maraseni, 2011).

While forest governance arrangements determine how the main questions regarding forests, livelihoods and sustainability will be answered under REDD+ schemes (Larson and Petkova, 2011), the climate governance discourse reflects the growing preference for social-political forms of multi-stakeholder interaction, functioning at multi-levels and including NGOs and the private sector with decentralised networks (Haas, 2002; Juhola and Westerhoff, 2011). Many decades of international environmental conservation efforts have shown that usually governments alone cannot ensure forest conservation even if they were indeed committed to it (Kashwan and Holahan, 2014; Ostrom, 2010). Thus, in order to establish REDD+ frameworks to include methods that engage representatives of a range of non-state interests, including forest dependent, civil society organisations, and the private sector will be demanded. However, often the final decision continues to be in the hands of the government (Peterson, 2003). That said, forest governance in context of REDD+ is a complex and fragmented issue as it also holds diversified interests of individuals and communities, which are now taking part in formulating, negotiating and implementing policies across different scales and productive sectors (Sharma and Kohli, 2012). Nonetheless, Cabello and Gilbertson (2012) argue that governance results in a political process which determines whose authority and power establishes and plays with the “rules of the game” and, as a consequence, who will gain and lose.

Although nationally-owned policy frameworks usually follow international directives and benefit from international guidance, it is clear that the success of REDD+ will depend on effective implementation at domestic level. The national REDD+ architecture should target on decisions about what are legitimate [19] governance principles (including functioning legal enforcement) and distribution of responsibilities, and how the trade-offs involved should be dealt with (Ozinga, 2012). For example, an institutional structure delivering cost-efficient results in terms of GHG emissions reductions may not deliver satisfactorily on other important goals, such as poverty reduction. The way the system is set up will strongly influence the handling of such

[19] Legitimacy is a core analytical issue for governance, and commonly describes the state or quality of being legitimate, this means, to be in accord with established legal norms or requirements or; principles, accepted rules and standards of behaviour (Biermann and Gupta, 2011).

trade-offs, the costs of coordination (transaction costs),[20] the motivations of those involved and hence the overall outcomes. Upfront transaction costs may be raised in nested and less centralised approaches for REDD+ institutional frameworks. Although in this case the federal government may bare the largest share of costs, to be efficient, the government should be protective in defending the maintenance of natural resources for present and future generations from rash and reckless spoliation (Micheletti et al., 2015; Pigou, 1932).

In this sense, tropical countries that clarify tenure arrangements (improving land-use planning and zoning) and address illegality are expected to benefit more from REDD+ investments than those that do not address such difficulties (Saunders et al., 2008). This means, certainly without such fundamental changes, REDD+ may not be able to improve forest governance in REDD+ countries. However, there is still little evidence showing that existing REDD+ schemes are improving forest governance and strengthening local peoples' tenure rights (Ozinga, 2012). Past efforts have failed to achieve transformational[21] change, often because they did not adequately take into account the inherent complexity and inter-connected nature of the diverse actors, rules and practices that comprise governance of landscapes (Vatn and Angelsen, 2009). Therefore, it is required for countries to establish a proper understanding of how existing regimes interact with REDD+ in addition to how new rules or mechanisms will operate.

[20]Transaction cost includes learning costs, legal costs, bargaining costs, and other costs incurred when two parties trade with each other (game rules and refereeing). For example, these are costs related to the monitoring of carbon benefits and benefit-sharing agreements.

[21] High ambition is needed to combat climate change and its effects. This conviction drove the decision to implement the Green Climate Fund (GCF) of the UNFCCC and other climate finance instruments. Despite the increasing use of the term in the climate context, there is no generally acknowledged definition of transformational change. The GCF has to date not defined what a paradigm shift might mean in concrete terms. Likewise, the NAMA Facility another promoter of the transformational change concept, currently foregoes an explicit definition of what is meant by transformational change in its funding context (Mersmann et al., 2014). However, initiatives submitted to the NAMA Facility do have to argue how they will contribute to a transformation within a sector or on a national level. For Mersmann et al. (2014), given the complexity of the topic, it is understandable that such institutions choose to describe aspects that might contribute to "transformational change" instead of a definition that may raise a political debate. Although the definition used is not precise enough to clearly determine whether a specific process can be considered transformational or not, there is a shared belief that an elemental change is demanded to prevent climate change dangerous effects and to ensure a globally sustainable development. Such a change cannot merely arise from changing technologies or simple structures. It must entail a holistic approach as an integrated system (Mersmann et al., 2014).

CHAPTER 3 Forests and International Relations

In order to understand what caused the climate regime to become the main locus of political discussions on forests, first we need to understand the international context on this topic. Therefore, chapter three begins with one question: Is there an international forest regime? Further, the chapter discusses the role of forests in the climate change framework. It also examines how this topic evolved from the policy domain to the development of a market mechanism under the climate agreement umbrella.

3.1 International forest policies: institutional context

Although, it is recognised worldwide that forestlands should be conserved and protected, no single international regime (or convention) exists for the political issue primarily focused on forests in which the entire socio-economic and environmental aspects of forest ecosystems are included (Carvalho, 2010). The substantive focus of forest-related instruments ranges from the protection of biodiversity, to climate change mitigation, to the expansion of global trade (McDermott et al., 2007). However, the current literature provides several answers as to whether a forest regime exists, ranging from no regime (see Rayner et al. 2010) to the existence of a non-regime (see Dimitrov, 2005) to a forest regime (see Tarasofsky, 1999; Humphreys, 2006) to an international forest regime-complex (see Howlett and Rayner, 2010). The basic advancement of the interpretation of a non-regime, however, lies in its ability to grasp a particular stage of international cooperation between cooperation within a regime and no international cooperation at all (Giessen, 2013).

But first, as far back as 1983 Krasner developed his still valid definition of international regimes as the sum of explicit and implicit ‘norms, rules, principles and decision-making procedures around which actors’ expectations converge in a given issue area of international relations’ (Krasner, 1983). ‘Principles are beliefs of fact, causation, and rectitude; norms are standards of behavior defined in terms of rights and obligations; rules are specific prescriptions or proscriptions for action and decision-making procedures are prevailing practices for making and implementing collective action’ (Krasner, 1983). In addition, this dissertation proposes as in Carvalho (2010) that beyond what Krasner defines, following Dimitrov (2005) as well as Sprinz (2005) and Young (2001) an essential characteristic that defines a regime is its effectiveness.

But Humphreys (2006) suggests the existence of a forest regime based on Krasner's regime definition, even though he characterises the current situation related to the forest regime as disconnected, fragmented and multi-centric in order to set up management regimes for ensuring their protection and sustainable use, since forests are true commons natural resources. Moreover, Humphreys identifies key elements in an evolving international forest regime (Giessen, 2013):

- Hard laws (binding legal instruments), for example, the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the General Agreement on Tariffs and Trade (GATT) and the Convention on International Trade in Endangered Species (CITES);
- Soft laws (non-legally binding instruments), for example, UNCED Forest Principles, Agenda 21 Chapter 11, the Intergovernmental Panel on Forests and the Intergovernmental Forum on Forests Proposals for Action, and the United Nations Forum on Forests (UNFF) and also resolutions such as the 2007 "Non-legally binding instrument on all types of forests". Although soft law instruments are non-legally binding instruments, they are often negotiated in good faith by the negotiating parties who expect that the non-binding commitments will be performed and achieved (Egute, 2011);
- Private international law (deals with cases having a foreign element), such as the legal chain of custody of the Forest Stewardship Council (FSC) and the FSC forest management principles.

On the other hand, for Carvalho (2010) all these instruments are at a lower stage of existence of an international regime. It seems clear that these several institutional arrangements are insufficient to efficiently deal with a complicated issue as natural resources use and degradation added the complex economic aspect that should also be addressed in these instruments, which brings a bias to the point in question (Carvalho, 2010). Surely, such "failure" has many causes; however, the political and economic importance of forest exploitation was certainly decisive (Fosci, 2014).

3.1.1 International forest-related policy initiatives

Forests can be said to have become a global political concern since the establishment of the Food and Agriculture Organisation of the United Nations (FAO) and

its forestry department in 1945 (SIFI, 2010). Likewise, the Educational, Scientific and Cultural Organization (UNESCO) included environmental issues into their original mandates (McDermott, et al., 2007). However, it was not until the 1980s, when tropical deforestation became a widely recognised problem, that forests became a global politically controversial issue (SIFI, 2010). The first Global Agreement on Tariffs and Trade (GATT) was ratified in 1948 promoting the elimination of national import and export restrictions in favour of expanded global trade in goods and services (McDermott, 2007), but environmental issues received relatively little attention in these early multi-lateral processes.

Nevertheless, in 1972 the United Nations organised the UN Conference on the Human Environment in Stockholm. Moreover, the United Nations Environment Programme (UNEP) was established that same year, as a UN programme primarily focused on environmental protection (McDermott et al., 2007). The conference in 1972 resulted in a non-binding instrument, commonly known as the Stockholm Declaration. The Stockholm Declaration established 26 principles to inspire the global community in the preservation and enhancement of the human environment (Egute, 2011). The Stockholm Conference was characterised by ideological controversy between developed and developing countries. The developed countries held the position that the biggest threat facing the planet is environmental degradation, while poorer developing countries articulated that poverty and consequently greater development would be the main reasons for pollution and biodegradation (Nukpezah, 2010). Moreover, the Stockholm Declaration formed the basis for environmental reforms and implementation at the national level of most developing countries which had no concrete environmental policy (Nukpezah, 2010).

During the 1970's other key agreements have been ratified including: i) the RAMSAR Convention on Wetlands of International Importance – adopted in 1971 and entered in to force in 1975; ii) the World Heritage Convention (WHC) – adopted in 1972 and entered into force in 1975; iii) the Convention on Migratory Species (CMS) – adopted in 1979 and iv) the Convention on International Trade in Endangered Species (CITES) – adopted in 1973 and entered into force in 1975, which focused on governing international trade in endangered species or their specimen, whether alive or dead, by creating a system of import and export permits (Egute, 2011).

The World Bank between the years from 1980 and 1995 carried out a review and reformed its forest and environmental policy. They have recognised the need to invest in

biodiversity conservation and the integration of environmental protection into the goals of poverty reduction and economic growth (Egute, 2011). In 1985, the FAO in cooperation with the UNEP, the World Bank and the World Resources Institute (WRI), launched the Tropical Forestry Action Plan (TFAP). In 1986, the first International Tropical Timber Agreement was adopted, along with the establishment of the International Tropical Timber Organisation (ITTO). The Brundtland Commission's report "Our Common Future" from 1987 – which came to have a major impact on the agenda of the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 (also known as the Rio Conference, Rio Summit or Earth Summit) – also established a link between economic growth and sustainable development, emphasising the need to curtail the destructive impact of development on the environment (Egute, 2011).

It was at the Rio Conference that a globally coordinated strategy for forests first emerged. A number of governmental and non-governmental participants at the UNCED pushed for the creation of a legally-binding convention on forests. However, such an agreement was not reached (McDermott et al, 2007). Instead, five instruments that addressed forest management were produced, including: i) the Chapter 11 (*Combating Deforestation*) of Agenda 21[22] focused on human impacts on the environment; ii) the Chapter 15 of Agenda 21 focused on the conservation of biological diversity and iii) the Forest Principles (formally named as *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests*), a weakened document that makes several recommendations for conservation and sustainable development. On the other hand, it was the first global agreement concerning sustainability of forest management (Kubiszewski and Cleveland, 2012).

Three major global environmental conventions, known as the "Rio Conventions", were also created as a result from the UNCED. All of these conventions contained mandates of direct relevance to forests (McDermott et al., 2007). These agreements, which are all housed within the UN, are: i) the Convention on Biological Diversity (CBD) – adopted in 1992 and entered in force in 1993; ii) the Framework Convention on Climate Change (UNFCCC) – adopted in 1992 and entered into force in 1994 and iii) the

[22] The Agenda 21 is the international plan of action to sustainable development, outlines key policies for achieving sustainable development that meets the needs of the poor and recognises the limits of development to meet global needs. Agenda 21 has become the blueprint for sustainability and forms the basis for sustainable development strategies (adapted from Kubiszewski and Cleveland, 2012).

Convention to Combat Desertification (UNCCD) – adopted in 1994 and entered into force in 1996.

The CBD is concerned with forests as habitat for a large number of the world's plant and animal species (McDermott et al., 2007). Moreover, the CBD is based on three pillars, which are: i) conservation of biological diversity, ii) sustainable use of its components and iii) fair and equitable sharing of benefits arising from genetic resources. In other words, its objective is to promote the development of national strategies for the conservation and sustainable use of biological diversity, including appropriate financing (Carvalho, 2010). In Brazil, based on the CBD principles, the Decree 4.339/2002 defines the rules for the implementation of the national biodiversity policies. Nevertheless, Gulbrandsen (2004) and Carvalho (2010) state that the CDB – regarding forest issues – promotes much more research and exchange of information than the cooperation for the development of political agreement and commitments.

The UNFCCC recognises forests as carbon "sinks" capable of mitigating the effects of the human pollutants contributing to climate change. As it is the focus of this dissertation, the UNFCCC area issue is further discussed throughout the subsequent chapters. Finally, the UNCCD recognises the role of forests in preventing desertification and drought. The UNCCD is worthy of special note as the first multi-lateral environmental agreement primarily driven by developing countries (McDermott et al., 2007).

Three years after the Rio Summit, in 1995, governments decided to establish the Intergovernmental Panel on Forests (IPF) and subsequently succeeded in 1997 by way of the Intergovernmental Forum on Forests (IFF) – in order to implement the Forest Principles and Chapter 11 of Agenda 21 – as subsidiary bodies of the UN Commission on Sustainable Development (UNCSD) under the Economic and Social Council (ECOSOC) of the UN (Schneider, 2006). The IPF/IFF processes examined a wide range of forest-related topics, such issues as the underlying causes of deforestation, traditional forest-related knowledge, international co-operation in financial assistance and technology transfer, the development of criteria and indicators for sustainable forest management, and trade and environment, etc. It has presented its outcome in the form of more than 270 proposals for action towards sustainable forest management and which are considered collectively as the IPF/IFF Proposals for Action (PfA). Although the IPF/IFF PfAs are not legally binding, participants of these processes are under a political obligation to implement the agreed proposals for action (Schneider, 2006).

In October 2000, ECOSOC created the United Nations Forum on Forests (UNFF), thereby providing a more permanent home for the international dialogue on forests with a substantially higher level of political authority, which had as its main objective to promote 'the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end' (UN ECOSOC, 2000).[23] Also, it aimed to facilitate the implementation of forest-related agreements, and to foster a common understanding regarding sustainable forest management (McDermott et al., 2007). Through this process, the Collaborative Partnership on Forests (CPF) was established to support the work of the UNFF and to foster increased cooperation and coordination on forests. Since the UNCED, intergovernmental deliberations (IPF, IFF and UNFF) have made evident progress towards international forest policy development and policy coordination at the international level (Schneider, 2006). However, despite the achievements, deforestation and forest degradation continue at threatening rates worldwide.

The currents of global governance have been shifting again since the UNCED. Considering the World Summit on Sustainable Development (WSSD), held in 2002 in Johannesburg, until the Rio+20[24] (a 20-year follow-up to the 1992 Earth Summit that also took place in Rio de Janeiro on 20-22 June 2012) an increased emphasis is given on the social issue of global poverty reduction (McDermott et al., 2007). An environmental action may solve an environmental problem, but in the process it may simultaneously create a social or economic problem (Hobbs, 2004). Furthermore, it is not simply necessary to understand the interplay between environment and poverty but to be aware that environmental degradation contributes to poverty and to understand that a cause of environmental problems is not only poverty (Hobbs, 2004). Although

[23] More detail at: http://www.un.org/documents/ecosoc/dec/2000/edec2000-inf2-add2.pdf

[24] The Rio+20 resulted in over 700 voluntary commitments:

- Member States decided to launch a process to develop a set of Sustainable Development Goals (SDGs), which will build upon the Millennium Development Goals and converge with the post 2015 development agenda;
- The Conference also adopted ground-breaking guidelines on green economy policies;
- Governments also decided to establish an intergovernmental process under the General Assembly to prepare options on a strategy for sustainable development financing;
- Governments also agreed to strengthen the UNEP on several fronts with action to be taken during the 67th session of the General Assembly;
- They also agreed to establish a high-level political forum for sustainable development;t
- Governments also requested the United Nations Statistical Commission, in consultation with relevant United Nations system entities and other relevant organizations, to launch a programme of work in the area of measures of progress to complement gross domestic product in order to better inform policy decisions, etc.

changes in environmental protection policies framework are required in order to deal with global pressures which the world is facing, changes in the nature of environmental governance may affect the welfare of households, mainly in those cases where natural resources (e.g. forests) play an important role for survival. Therefore, the necessity of multi-level, multi-stakeholder governance models, linking the aims of creating a green economy and effective global environmental governance is increasing (EEA, 2011).

3.2 Forests and climate change

Forests have the potential to absorb nearly one-tenth of global carbon emissions projected for the next 50 years storing this carbon into their biomass, soils and products (FAO, 2012). Forests contain approximately 60% of all the carbon stored in terrestrial ecosystems (IPCC, 2000). The world's forest ecosystems are estimated to store around 638 billion tonnes of carbon (Green Facts, 2015). Due to large data gaps for soil carbon in major boreal forests, this figure probably underestimates the total amount of carbon stored in forest ecosystems (Green Facts, 2015).

Unless disturbances occur, forests over time accumulate carbon through the growth of trees and the increase of soil organic carbon (Zhou et al., 2006). It is widely recognised that juvenile forests sequester carbon at high rates, while in mature forests the ecosystem reaches a stable state since carbon sequestration is eventually equals to decomposition (Luyssaert et al., 2008). However, Stephenson et al. (2014) argue that most of the studies – that support the idea that very old trees absorb less carbon as they age – are not based on measurements of individual tree mass growth. They reviewed records from forest studies on six continents, involving 673,046 individual trees belonging to 403 tropical, sub-tropical and temperate tree species, going back as far as 80 years ago. They found out that for most species mass growth rate increases continuously with tree size (Stephenson et al., 2014). Hence, large old trees do not act simply as senescent carbon reservoirs but actively sequester large amounts of carbon compared to smaller trees. Nevertheless, it should also be considered that on a forest by forest as opposed to tree by tree basis, still, younger stands of trees sequester more carbon overall than very old ones (Walsh, 2014). Thus, whether forests act as reservoirs, carbon sinks or sources of GHG depends on some factors such as the age of the forest, the management regime and human-induced deforestation (Streck and

Scholz, 2006). For policymaking, such implications confirm that all kind of natural resources should be conserved, protected or at least sustainable managed.

Deforestation – mainly for the establishment of pasture and agricultural crop or other land uses – has the largest land-use change impact on the carbon cycle, both through the loss of photosynthetic capacity in forest vegetation and the simultaneous release of large carbon stocks[25] accumulated in forest ecosystems over long periods of time (Apps, 2003). Thus, forests play a vital role in the global carbon cycle, for example, forests release carbon through processes of respiration and through the decay of organic matter or burning of biomass. Also, forests affect rainfall interception, evapotranspiration (ET), water infiltration, and groundwater recharge (Pramova et al., 2012). Moreover, forests also stabilise soil and prevent erosion and landslides, reducing further negative impacts of these hazards (partially climate-related) on infrastructure, settlements, and water users (Pramova et al., 2012).

Although forests typically recover from natural disturbance, continued disturbance can keep forests from recovering, which means that it is not necessary to increase the ability of existing sinks, but it is essential to prevent forests from continuing to be massive sources of GHG emissions (Junior et al., 2008). Aside from the key role that forests play in the carbon cycle, they also provide many goods and services that humanity values highly (Streck and Scholz, 2006). Societies in general rely on these services and goods, for raw material inputs, production processes, and climate stability. Moreover, another important aspect is related to those livelihoods (principally poorer) that depend on natural resources for their subsistence. As a consequence of the human-induced action, climate change effects will affect most of these goods and services, thus causing significant impacts on socio-economic systems and livelihood flows (IPCC, 2014). Tropical forests are then an important component of mitigation[26] measures, however, their role in adaptation is rapidly gaining significance, since forests are vulnerable to climate change, those managing or conserving them will have to adapt

[25] Carbon stock refers to the amount of carbon stored in the world's forest ecosystem, mainly in living biomass (44%) and soil (46%), but to a lesser extent also in dead wood (6%) and litter (4%) (Green Facts, 2015).

[26] Mitigation and adaptation are the two main responses to climate change, mitigation seeking to address its causes and adaptation aiming to reduce its impacts. In the forest sector:

- mitigation strategies comprise reducing emissions from deforestation; reducing emissions from forest degradation; increasing the role of forests as carbon sinks; and product substitution, such as using wood instead of fossil fuels for energy and forest products in place of materials whose manufacture involves high GHG emissions;
- adaptation encompasses interventions to decrease the vulnerability of forests and forest-dependent people to climate change (FAO, 2015).

their management to future conditions (Locatelli et al., 2008). Future actions must focus on the sustainable use of natural resources likewise on the contribution of forests on the development of livelihood strategies to ensure the continuous provision of these goods and services (van Bodegom et al., 2009). In this sense, coping with altered ecological conditions while eliminating uncertainties and gaps in knowledge and likewise strengthening the international and human dimensions of sustainable forest management and conservation constitute realms for major changes (Schoene and Bernier, 2011).

As mentioned, forests and trees can also support climate adaptation strategies, for example, family farming and agriculture are threatened by rainfall and temperature variability. Hence, the presence of trees in agricultural lands can help maintain production under a variable climate and also protect crops against climate extreme occurrences (Pramova et al., 2012). The agroforestry system – which combines trees and shrubs with crops and/or livestock – is therefore, being increasingly recognised as an effective approach for minimising production risks under climate variability and change (Verchot et al., 2008). With their deep root systems, trees are able to explore deeper soil depths for water and nutrients, which will be advantageous to crops in times of drought. Their contribution to increased soil porosity, reduced runoff, and increased soil cover leads to increased water infiltration and retention, and reduction of moisture-stress during low rainfall. On the other hand, excess water is pumped out of the soil more rapidly in agroforestry plots due to their higher evapotranspiration rates (Pramova et al., 2012; Verchot et al., 2008).

For instance, in the temperate regions, a sustainable land use option receiving an increasing amount of interest is an agroforestry model called alley cropping, in which woody biomass is produced by integrating parallel strips of fast growing trees into conventional agricultural sites, thus simultaneously yielding conventional agricultural crops and woody biomass (Grünewald et al., 2007; Tsonkova et al., 2014). In Brazil, agroforestry systems such as the integrated crop-livestock-forest system (iCLF) are still not broadly adopted, mainly because of their level of complexity compared with traditional systems. Also, because the lack of understanding by farmers regarding their benefits (de Almeida et al., 2013). Although the government has allocated financial resources in terms of credit for development and for technology transfer addressing iCLF systems (de Almeida et al, 2013), farmers continue to have difficulties mainly related to rural extension contacts, technical assistance and access to financial credit.

Furthermore, coastal forests such as mangroves can protect coastal zones from tropical storms, sea-level rise, floods, and erosion due to their ability to absorb and dissipate wave energy and stabilise coastal land (Pramova et al., 2012). However, controversies exist with regards to the protective role of mangroves during extreme storms. Nevertheless, mangrove forests can be very effective in buffering coastal settlements from the impacts of lower-grade cyclones, typhoons, coastal flooding, erosion, and sea-level rise (Pramova et al., 2012). Uncertainties remain about the characteristics of ecosystems in determining their protective role from different types of hazards.

Urban forests and trees can provide shading, evaporative cooling, and rainwater interception, storage, and infiltration services in cities. They can play a notable role in urban adaptation to climate variability and change (Pramova et al., 2012). Trees are generally a better option than grasslands for cooling and reducing runoff because they are less sensitive to drought. Urban development significantly increases the amount of storm water. The increased runoff causes more intense local flooding, while droughts during dry weather are deeper and longer (EPA, 2015). Precipitation flows over impervious surfaces transporting pollutants, such as oil, heavy metals, and fine particulates. This has altered hydrology[27] in urban areas and can generate five times as much surface runoff as an equivalent area in a forested condition (EPA, 2015). However, trees cannot act as a stand-alone solution against flood impacts, and other measures might be needed such as green roofs (Gill et al., 2007). The green roofs are based on the concept of conversion of impervious surfaces in urban areas into a multi-functional land cover that serves both human demands, such as transportation and housing, as well as ecological functions, such as storm water retention, energy conversion resulting in primary production and habitat creation (Carter and Butler, 2008).

On the other hand, not only forests can affect climate change, but the global changing of climate also does affect the vegetation, significantly impacting ecosystems in different latitudinal zones. For example, such impacts could result in changes of tree species dominance and diversity, the seasonality of biotic and abiotic processes and

[27] Combined effects of urbanisation, industrialisation, and population growth greatly modify landscapes and thus the hydrological cycle. Removing vegetation and soil, grading the land surface, and constructing drainage networks increase runoff to streams from rainfall and snowmelt. As a result, the peak discharge, volume, and frequency of floods increase in nearby streams. Changes to stream channels during urban development can limit their capacity to convey floodwaters. Roads and buildings constructed in flood-prone areas are exposed to increased flood hazards, including inundation and erosion, as new development continues (Konrad, 2003).

events, the structure of plant communities, net primary (NPP) and net ecosystem productivities (NEP), carbon and nutrient cycling, evapotranspiration and water-use efficiency (Olchev et al., 2009). Also, it is likely that changing temperature and precipitation patterns will produce a strong direct impact on both natural and planted forests (Kirilenko and Sedjo, 2007). Warmer and wetter climates will enhance forest growth, while warmer and drier climates will likely be detrimental to growth. Grasses will often replace forests in a dry natural system, which means a limitation on moisture availability (Bowes and Sedjo, 1993). In addition, mortality may increase in older forests stressed by low soil moisture, and regeneration may decrease for species affected by low soil moisture and competition with other species during the seedling stage (Vose et al., 2012).

In general, climate change is likely to shift natural forests toward the poles (Sedjo, 2010). Rising temperatures drive many living organisms to migrate to cooler areas. Such movements involve all species, including plants. Some species will seek higher altitudes, others will move further polewards. Most climate models indicate that temperature changes will be least at the Equator and increase as the poles are approached (Sedjo, 2010). For forests, therefore, the changes should be immense in the boreal and temperate countries as boreal forests migrate into areas formerly absent of trees, such as parts of the tundra, and temperate forests move into former boreal forest areas where soils, photoperiod, and other growing conditions are appropriate (Sedjo, 2010). Tropical forests may be affected differently, since the anticipated amount of temperature warming is lower at those latitudes, even though this issue is not often discussed. On the other hand, these same forests may have less tolerance for adaptation (Sedjo, 2010).

Interacting disturbances (such as fire, drought, landslides, species invasions, insect and disease outbreaks, hurricanes, windstorms and ice storms) will have the biggest effects on ecosystem responses, simultaneously altering species composition, structure, and function (Dale et al., 2001; Moore and Allard, 2008; Vose et al., 2012). Climate change is expected to impact the susceptibility of forests to disturbances and also affect the frequency, intensity, duration, and timing of such disturbances (Moore and Allard, 2008). The type and magnitude of disturbances will differ regionally and will pose significant challenges for resource managers to mitigate and reduce damage to resource values (Vose et al., 2012). For example, increased drought will exacerbate stress complexes that include insects, fire, and invasive species, leading to higher tree

mortality, slow regeneration in some species, and altered species agglomeration. In this sense, as a consequence of a changing climate the disturbance dynamics of native forest insect pests and pathogens should be altered (Moore and Allard, 2008; Mortsch, 2006). Moreover, invasive species will likely become more widespread, especially in areas subject to increased disturbance and in dry forest ecosystems (Vose et al., 2012).

The change in frequency of extreme events can result in substantial economic damage to forest sector (Kirilenko and Sedjo, 2007). These effects of climate extremes on commercial forestry are region-specific and include reduced access to forestland, increased costs for roads and facility maintenance, direct damage to trees by wind, snow, frosts, or ice, effects of wetter winters and early thaws on logging, etc. High wind events can damage trees through branch breaking, crown loss, trunk breakage, or complete stand destruction, especially caused by faster build-up of growing stocks in a warmer climate (Kirilenko and Sedjo, 2007). Production patterns and trade in forestry commodities will be also altered as species are grown more competitively in higher latitudes and altitudes. On the contrary, markets may be saturated due to increased mortality of trees following pest infestations (Moore and Allard, 2008). Furthermore, forests with low productivity due to drought will likely face further decreases in productivity, while areas where temperature limits productivity may benefit from rising temperatures (Moore and Allard, 2008).

Decreased environmental services will be experienced due to climate change effects in forests (e.g. timber production, water supply, recreational uses). On the other hand, according to Vose et al. (2012), a changing climate may improve and expand ecosystem services in others (e.g. increased growth of high-elevation trees, longer duration of trail access in high-snow regions). Some areas may be particularly vulnerable because current infrastructure and resource production are based on past climate and the assumption of steady-state natural resource conditions. Therefore, climate change implies increased social and environmental vulnerability, because both the supply and demand for forests products will be affected by climate change related events (Vose et al., 2012).

3.3 Forests in the international climate regime

3.3.1 The UNFCCC background

During the First World Conference on Climate in February 1979 held in Geneva, Switzerland, climate change was recognised as a serious problem to be faced by the international community. During the conference the conclusion that anthropogenic CO_2 emissions can cause long-term effects on the climate balance came up. The World Climate Programme (WCP) was established in the following year, providing a framework for international cooperation in research and the basis for the identification of important climate issues such as the destruction of the ozone layer and global warming (Gebara, 2005). In this sense, recognising the need for reliable and updated scientific information especially for policy makers, the IPCC was established in 1988. That same year, following a proposal by the Maltese government, the UN General Assembly addressed the issue of climate change for the first time and adopted resolution 43/53 on the 'protection of global climate for present and future generations of mankind'. In 1990, the IPCC released its First Assessment Report, confirming that climate change is indeed a threat and urging the negotiation of a global agreement to address the problem (Gebara, 2005).

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the Earth Summit in Rio de Janeiro and was adopted on 9 May 1992, opened for signature on 4 June 1992 and entered into force on 21 March 1994; 90 days after the 50th country's ratification had been received. The climate convention enjoys broad legitimacy, largely due to its near-universal membership. Currently, there are 197 Parties, including all United Nations member states, United Nations General Assembly Observer State of Palestine, UN non-member states Niue and the Cook Islands and the Supranational Union European Union. As a framework agreement, the UNFCCC has only limited specific obligations to reduce GHG emissions, but it formulates principles, general goals, and general actions that countries are supposed to take (Metz, 2009). Also, it outlines how specific international treaties (e.g. protocols) should be negotiated to set binding limits. It has also established institutions and a reporting mechanism, as well as a system for review of the need for further action (Metz, 2009). Table 2 summarises some key elements of the UNFCCC:

Table 2 UNFCCC's key elements

Principles (article 3)	• 'Common but differentiated responsibility' (article 3.1)・ • special consideration for vulnerable developing countries (article 3.2) • 'Precautionary principle' (article 3.3) • Promote sustainable development (article 3.4) • Measures taken to combat climate change should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade (article 3.5)
Goals (article 2)	'Stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. 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'
Actions Required	• Minimise emissions and protect and enhance biological carbon reservoirs, so-called 'sinks' (all countries); take action with the aim to stop growth of emissions before 2000 (Annex I countries)・ • Promote development, application, and transfer of low carbon technologies; Annex I countries to assist developing countries • cooperate in preparing for adaptation • Promote and cooperate in R&D • Report on emissions and other actions (so-called 'national communications', annually for Annex I countries and less frequently for others) • Assist developing countries financially in their actions (Annex II countries)
Compliance	Review of reports by the secretariat and by visiting expert review teams
Institutions	• Conference of the Parties (COP), the supreme decision making body; voting rules for decisions never agreed so de facto decisions only by consensus・ • Bureau (officials, elected by the COP, responsible for overall management of the process)・ • Two Subsidiary Bodies (for implementation and for scientific and Technological Advice) to prepare decisions by the COP • Financial mechanism, operated by the Global Environment Facility of World Bank, UNDP and UNEP, filled by Annex II countries on voluntary basis; two special funds: a Least Developed Country Fund and Special Climate Change Fund, mainly to finance adaptation plans and capacity building, but also technology transfer and economic diversification • Expert groups on Technology Transfer, Developing Country National Communications, Least Developed Country National Adaptation Plans・ • Secretariat (located in Bonn, Germany)

Source: Adapted from Metz, 2009

3.3.2 Kyoto Protocol

After the signing of the UNFCCC treaty, Parties to the UNFCCC meet at conferences (Conferences of the Parties or COP)[28] to discuss how to achieve the treaty's goals. At the COP1 Parties had decided that the aim of Annex I Parties stabilising their emissions at 1990 levels by the year 2000 was "not adequate" and, further discussions at later conferences led to the Kyoto Protocol[29] (Gebara, 2005). The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP7 in Marrakesh and are referred to as the "Marrakesh Accords". Its first commitment period started in 2008 and ended at the end of 2012. The Kyoto Protocol obliged Annex B Parties to cut their emissions of GHG to levels ranging from 4.6% to 5.5% below the levels observed in 1990. However, under the terms agreed in Kyoto, the agreement would only enter into force following ratification by 55 Parties to the UNFCCC, and if these 55 countries included a sufficient number of Annex I Parties that at least 55% of that group's total CO_2 emissions for 1990 were represented (IISD, 2015).

Although the USA did not ratify the Kyoto Protocol, the majority of other Annex I Parties, including Canada, Japan, and the EU ratified it. Nevertheless, in November 2004, the Russian Federation also ratified the Kyoto Protocol, thus overcoming the 55% threshold reaching more than 60% (IISD, 2015). On 16 March 1998, in New York, the Kyoto Protocol was opened for signature and in November the same year the COP4 was held in Buenos Aires, Argentina. In order to regulate certain aspects of the Kyoto Protocol and establish priorities for action was approved the Buenos Aires Action Plan.[30] The Buenos Aires Action Plan discussed about funding mechanisms, development and technology transfer, the implementation of articles 4 §8 and 4 §9[31] of the Convention and activities implemented jointly under the pilot phase (Gebara, 2005). Continuing the work, the COP5 was held a year later in Bonn, Germany. In 2000, the COP6 was held in The

[28] The COP serves as the meeting of the Parties to the Kyoto Protocol (MOP). However, the first formal MOP just happened in 2005, after the Kyoto Protocol entered into force.
[29] The full version of the Kyoto Protocol can be found at: http://unfccc.int/resource/docs/convkp/kpeng.pdf
[30] The full version of the Buenos Aires Action Plan can be found at: http://unfccc.int/resource/docs/cop4/16a01.pdf
[31] Article 4.8 of the Convention calls on Parties to consider actions to meet the specific needs and concerns of developing countries in this regard, listing categories of countries (e.g. small island countries and countries whose economies are highly dependent on fossil fuel) that may be particularly affected.
Article 4.9 refers specifically to the needs and special situation of the least developed countries (LDCs) concerning funding and the transfer of technology.
Online available at: http://unfccc.int/cop7/issues/art4849.html

Hague, Netherlands. At that COP the discussions were suspended because the negotiations between the EU and the USA in relation to sinks[32] and activities regarding Land Use, Land Use Change and Forestry (LULUCF)[33] were not successful (Gebara, 2005). Negotiations were then reconvened on 27 June 2001, again in Bonn. This conference is known as COP6 BIS and after further talks, Parties adopted during the conference the Bonn Agreement,[34] a decision that provided high-level political direction on the implementation of the Kyoto Protocol (IISD, 2015) and also made some concessions to satisfy countries in conflict. These concessions were accepted in particular to ensure the permanence of countries such as Japan and the Russian Federation; considering the interests of the EU and the developing countries (Gebara, 2005).

3.3.3 Marrakesh Accords – the regulation of the flexible mechanisms

It was in Marrakech, during the COP7 in 2001, where the Bonn Agreement translated into formal decisions, setting off operational rules for the Kyoto Protocol. The Marrakesh Accords[35] consisted of a package of draft decisions on many of the details of the KP, including the flexible mechanisms, reporting and methodologies, LULUCF and compliance. The Marrakesh Accords also addressed issues such as capacity building, technology transfer, responding to the adverse effects of climate change, and the establishment of three funds: the Least Developed Countries (LDC) Fund, Special Climate Change Fund (SCCF), and Adaptation Fund (IISD, 2015). Regarding LULUCF (Decision 11/CP7), the principles in the Marrakesh Accords responded to concerns that the use of LULUCF activities should not undermine the environmental integrity of the Kyoto Protocol. These principles emphasised, for instance, the need for consistent methodologies, as well as the importance of conserving biodiversity. They also specified that naturally-occurring removals, including removals as a consequence of indirect anthropogenic effects, should be excluded from the system and that any re-release of

[32] A carbon sink is anything that absorbs more carbon that it releases, whilst a carbon source is anything that releases more carbon than is absorbed. Forests, soils, oceans and the atmosphere all store carbon and this carbon moves between them in a continuous cycle.
[33] Article 3 §3 of the Kyoto Protocol describes the "Land Use, Land Use Change and Forestry" sector that can provide a relatively cost-effective way of offsetting emissions, either by increasing the removals of GHG from the atmosphere (e.g. by planting trees or managing forests), or by reducing emissions (e.g. by curbing deforestation). The matter had already been discussed in Buenos Aires, but had not reached any conclusion.
[34] The full version of the Bonn Agreement can be found at:
http://unfccc.int/resource/docs/cop6secpart/05.pdf
[35] The full version of the Marrakesh Accords can be found at: http://unfccc.int/resource/docs/cop7/13a01.pdf

GHG (e.g. through forest fires) must be instantly accounted for (UNFCCC, 2002). Also, a common proposition to define the term "forest"[36] (in order to ensure firmness and comparability among Parties) was agreed. Some flexibility, however, was allowed to take account of national circumstances, so that a country could choose, for instance, to select a minimum tree height of between 2 to 5 meters for its definition of a forest. Once the values were chosen, they would remain fixed. This flexibility approach was adopted because when designing a monitoring plan, the analysis of remote sensing data could adapt to different minimum tree crown cover and minimum forest area thresholds, for example (GOFC-GOLD, 2009).

Delegates built on the Marrakesh Accords also at COP8 and COP9, elaborating on various technical rules and procedures (IISD, 2015). During COP8 topics such as forests, permanence, additionality, baseline, leakage, crediting period, etc., were discussed. However, no substantial results were obtained and it was then agreed that such issues would be discussed during COP9. On the other hand, during COP8 the efforts of the private sector and non-governmental organisations to ratify the KP and the adoption of the flexibility mechanisms were noteworthy (Gebara, 2005). During COP9 some of the main issues that had been previously discussed, were then standardised. Also, this COP was mostly focused on discussions about potential buyers and sellers of carbon credits. On the one hand, the buyers, including EU, Norway and Switzerland were concerned about the “quality” of these carbon credits and they attempted to establish conditions in order to protect their investments and preserve credibility with NGOs (Carvalho, 2010). On the other hand, the sellers defended better market conditions, in order to minimise the transaction costs of such measures (Carvalho, 2010). In 2005 the COP 11 took place in Montreal. Since the Kyoto Protocol entered into force in February this COP was also the 1st Meeting of the Parties to the Kyoto Protocol (COP11/MOP1). Parties to the Convention that are not Parties to the Kyoto Protocol are

[36] By the Decision 11/CP.7 of the Marrakesh Accords the definitions of forests, afforestation and reforestation were adopted. “Forest” is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30% with trees with the potential to reach a minimum height of 2-5 meters at maturity *in situ*. A forest may consist either of closed forest formations where trees cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30% or tree height of 2-5 m are included under forest, as are areas normally forming part of the forest area which are temporarily un-stocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest. This forest definition is very similar to the definition adopted by FAO. The difference is, however, that the FAO definition is essentially a land-use based definition while the UNFCCC did not consider land use in this usage. But the definition of forest also varies country to country. How a country defines “forest” can have a significant impact on how carbon emissions from deforestation and degradation are measured and reported, and how the drivers of deforestation are assessed (further discussion in Chapter four).

able to participate in the MOP as observers, but without the right to take decisions. At this meeting the Marrakesh Accords was formally adopted. The COP11/MOP1 through Decision 1/CMP.1 also established the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). The AWG-KP would work in parallel focusing on negotiations under the Kyoto Protocol and should complete their work and present the outcome in Copenhagen (but the draft conclusions presented in 2009 contained many unresolved issues). In 2012 it was decided that the AWG-KP had fulfilled the mandate set out in decision 1/CMP.1 and that its work was concluded (UNFCCC, 2017a).

3.3.4 Flexible mechanisms

These mechanisms (Emissions Trading, Joint Implementation and the Clean Development Mechanism) are defined under the Kyoto Protocol and enable Parties to achieve emission reductions or to remove carbon from the atmosphere cost-effectively in other countries. Under carbon emissions trading (ET), a country having more emissions of carbon is able to purchase the right to emit more and the country having less emission trades the right to emit carbon to other countries. Usually, the carbon market trades emissions under cap-and-trade schemes or with credits that pay for or offset GHG reductions (Dowdey, 2015). In a cap-and-trade scheme, the government determines which emissions are covered by the system and sets an overall emission target, or "cap," for covered entities (C2ES, 2011). This cap is the sum of all allowed emissions from all included facilities. Once the cap has been set and covered entities specified, tradable emissions allowances (rights to emit) are distributed (either auctioned or freely allocated, or some combination of these). Each allowance authorises the release of a specific amount of GHG emissions. The total number of allowances is equivalent to the overall emissions cap. For example, if a cap of one million tons of emissions is set, one million one-tonne allowances will be issued. Covered entities must submit allowances equivalent to the level of emissions for which they are responsible at the end of each of the programme's compliance periods (C2ES, 2011). Market-based schemes will be further detailed in the next topic discussed in this chapter.

The mechanism Joint Implementation (JI), defined in article 6 of the KP allows an Annex B Party with an emission reduction or limitation commitment under the protocol to earn emission reduction units (ERU) from an emission-reduction or emission removal

project in another Annex B Party. A JI intervention must provide a reduction in emissions by sources, or an enhancement of removals by sinks that is additional to what would otherwise have occurred. For example, a JI project might involve replacing a coal-fired power plant with a more efficient combined heat and power plant. Projects must have approval of the host Party and participants have to be authorised to participate by a Party involved in the project. The Clean Development Mechanism (CDM), defined in article 12 of the Kyoto Protocol, allows an Annex B country to implement an emission-reduction project in a non-annex B country. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO_2, which can be counted towards meeting the Kyoto Protocol. The CDM issue area will be further explored in the subsequent section due to its importance in the context of developing countries.

3.3.5 Clean Development Mechanism

The CDM is one of the Protocol's 'project-based' mechanisms, in that it is designed to promote projects that reduce GHG emissions. The purpose of the CDM is to promote clean development in developing countries, in account of for example, that in developing countries, enforcement and execution of environmental regulation are generally weaker than it is in developed nations (Sathaye et al., 2001). For instance, capacity building and changes in policy thinking resulting from CDM-implemented interventions has led to the introduction of domestic emission reduction policies in some developing countries (Scotney et al., 2012). Moreover, the economic basis for including developing countries in efforts to reduce GHG emissions is that emission diminutions are thought to be more inexpensive in developing countries than in developed nations (Goldemberg et al., 1996).

Although forestry may be considered unproductive under the CDM umbrella, the CDM scope provided valuable lessons for REDD+ as a policy instrument which proposed new solutions of some functional, regulatory and technological (e.g. forest monitoring and baseline establishment) aspects of environmental governance at global scale (Lederer, 2011). Within this context, this is the reason why the CDM has been detailed at this part of the dissertation. Under the CDM umbrella few forestry projects were approved by 2014, only 55 CDM A/R projects out of more than 7,665 projects have been registered by the Executive Board (UNFCCC, 2017b). Forestry projects commonly

are challenging to implement, thus, some factors that could explain the low number of registered projects could be related to the reduced international demand for forest credits and the high complexity of technical requirements. For instance, because of permanence, carbon credits from forestry projects were not accepted in the EU-ETS (Carbon Market Watch, 2015). In addition, there are high transaction costs with low profits, among others issues. The CDM allows Annex B countries to partially[37] meet their emission reduction commitments under the KP by buying CER units from CDM projects in developing countries (e.g. countries like Brazil, which in turn do not have reduction commitments). The projects and the issue of CERs are subject to approval to ensure that these emission reductions are real and “additional”. The CDM is supervised by the CDM Executive Board (CDM EB) and is under the guidance of the COP/MOP of UNFCCC. In general, CDM projects can be divided into two categories: i) "emission reduction projects," primarily associated with emissions displacement resulting from the burning of fossil fuels and/or capture and burning of methane and ii) "carbon sequestration projects" related to carbon capture and storage in forests.

The CDM project will be represented by the Project Design Document (PDD). In preparing the PDD, one of the first steps is the assessment of eligibility. The project is considered eligible when it fully complies with the propositions of each criterion. An unanswered criterion is enough to make it ineligible. Moreover, a local stakeholder consultation as well as an environmental risk assessment should be included in the PDD development. In order to calculate the amount of CERs that will be generated by such initiatives, it is necessary to compare emissions with those in a baseline scenario representing the situation that would have occurred in absence of the project activity. The CERs would then be calculated as the difference in emissions between the baseline and the project outcomes. The baseline may be estimated through reference to emissions from similar activities and technologies in the same country or other countries, or to actual emissions prior to project implementation. Any proposed CDM project has to use an approved baseline and monitoring methodologies.[38] It must also to be validated, approved and registered. Baseline methodology will set steps to determine the baseline within certain applicability conditions whilst monitoring methodology will set specific steps to determine monitoring parameters, quality assurance and equipment to be used,

[37] To prevent industrialised countries from making unlimited use of CDM, the framework requires that the use of CDM must be “supplemental” to domestic actions to reduce GHG emissions.
[38] A project developer can also propose a new methodology; however, the PDD approval is conditional to the approval of the proposed methodology.

in order to obtain data to calculate the emission reductions. The first methodology for Afforestation/Reforestation (CDM A/R) [39] projects was approved in December 2005. Under CDM A/R, the approved methodologies give project developers options to manage and harvest forests for agro-forestry, bio-energy, timber production or urban forestry (FAO, 2006a).

The criteria of additionality must also be accomplished in every CDM project. Additionality requires 'that the activity goes beyond institutional and regulatory requirements in the region'. It corresponds also to the change in the reference scenario, which occurs as a result of the modifying action. Moreover, a forestry project becomes eligible when the reforestation of cleared areas before 1990 was made after 2000. Thus the projects implemented after the year 2000 (e.g. 2011) are eligible if these areas have been cleared until 31 December 1989. This measure was adopted to prevent eventual perverse actions of deliberate deforestation and subsequent reforestation that had been implemented and could be benefited (or encouraged) by the CDM mechanism. The crediting period for CDM A/R projects may be fixed for 30 years or 20 years renewable twice (for 60 years total). Despite the similarity in many aspects, key differences exist among CDM modalities which, in practice, have much importance. One of the main differences between CDM A/R modality to the others is the temporality of the CER system (Gebara, 2005). An alternative way proposed by Colombia of accounting for credits was established: temporary CERs (tCER) and long-term CERs (lCER). The first model expires at the end of the subsequent commitment period to that in which it was issued. The second expires at the end of the crediting period of the CDM A/R project activity for which it was issued. In addition, standards have been established for the accreditation of operational entities in relation to CDM A/R projects, as well as standards for the PDD preparation for such activities and additional requirements for the CDM Registry (Gebara, 2005).

3.3.5.1 CDM process

In order to be considered for registration, a project must first be approved by the Designated National Authorities (DNA). In Brazil, the DNA is the Inter-ministerial Commission on Global Climate Change (CIMGC), established by Presidential Decree of

[39] Afforestation means planting of new forests on lands that historically have not contained forests, and Reforestation means planting of forests on lands that have previously contained forests but that have been converted to some other use.

7 July 1999. The main function of the DNA is to elaborate a LoA (Letter of Approval) designed to enable the implementation of the CDM project in the designated country. The case is then validated by a third party agency (e.g. independent private organisations accredited to act as external controllers), called a Designated Operational Entity (DOE) to ensure that the project results are real, measurable, and contains long-term GHG emission reductions. The CDM Executive Board (CDM EB) then decides on the approval of the project. If a project is registered and implemented, the CDM EB issues CER credits to project proponents based on the monitored[40] difference between the baseline and the actual emissions, verified by the DOE. Figure 1 shows a schematic of the CDM project process:

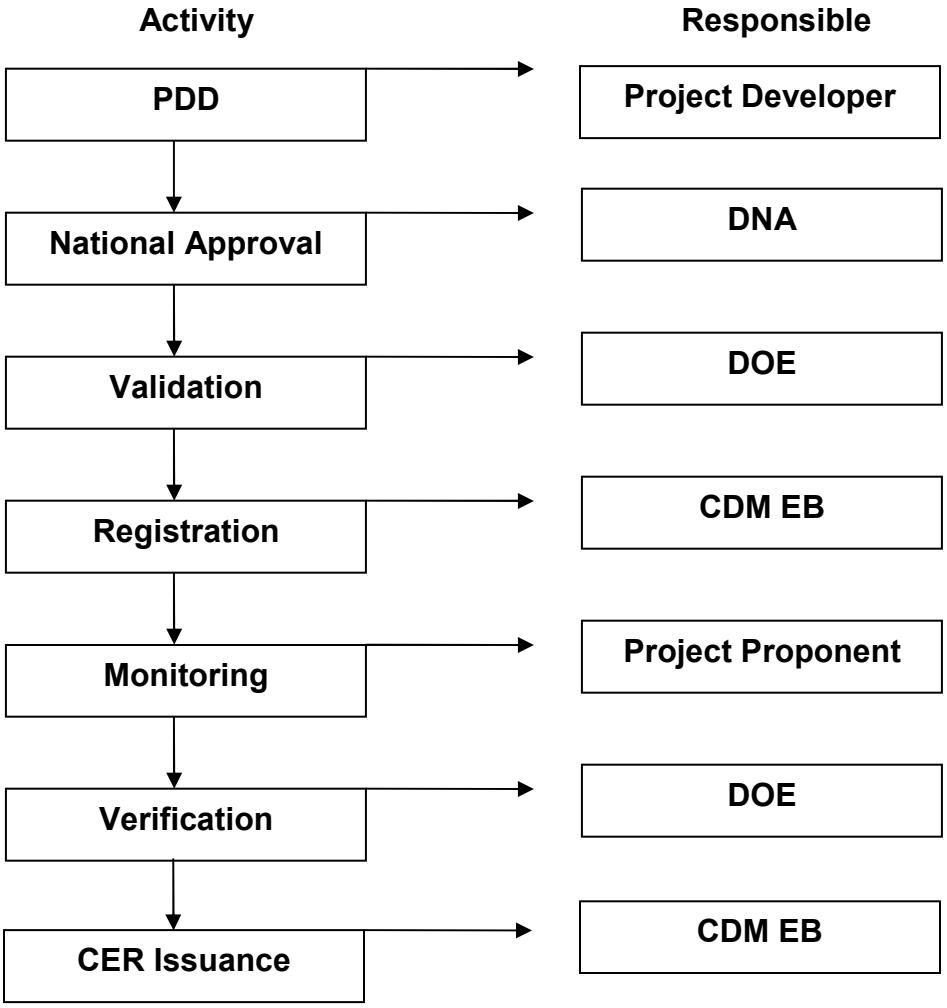

Figure 1. Clean Development Mechanism project process scheme (Source: Own creation)

[40] The monitoring report must be in accordance with the parameters and procedures laid out in the original PDD that was validated by the DOE and registered by the CDM EB.

After the issuance of CERs, the project proponent sells the generated carbon credits from the project to a buyer. The CERs can either be sold directly to a company that uses them to meet its legally binding or voluntary emission reduction obligations, or they can be sold to a trading company that facilitates the transaction between the seller and the end user of the carbon credits (Carbon Market Watch, 2015).

3.3.6 CDM and Brazil

Brazil played an influential role in the development of the CDM schemes. In previous discussions before the COP3 the Brazilian government proposed that, if a developed country exceeded its GHG emissions targets, an economic punishment would be assessed, and this capital would be collected in a Clean Development Fund. The financial assets from this fund would be directed to developing countries, which then, would use these funds for developing GHG mitigation projects designed to prevent or mitigate global climate change. The COP3 discussions about this proposal evolved into the CDM scheme (UNIDO, 2003).

Although the CDM context is controversial in Brazil, the country hosted 4.4% of total CDM projects between 2004 and 2015, only behind China with 49% and India with 20.6% (Climate Policy Observer, 2015). Various reasons could be identified for the Chinese dominance of CDM market, including for example its favourable political and economic environment for foreign investment (Jung, 2006; Shen, 2011). As of 1 March 2015, Brazil was host to a total of 455 CDM projects in a wide range of sectors (EDF, 2015). The majority of projects address methane avoidance (27%), hydroelectric projects (25%), and landfill gas (13%). Regarding CDM A/R activities, Brazil has registered only three projects up to date under the CDM umbrella (UNFCCC, 2017b). They are: i) Reforestation as Renewable Source of Wood Supplies for Industrial Use in Brazil (registered on 21 July 2010); ii) AES Tietê Afforestation/Reforestation Project in the State of São Paulo, Brazil (registered on 7 January 2011) and iii) Vale Florestar – Reforestation of Degraded Tropical Land in Brazilian Amazon (registered on 12 September 2012). In March 2015, Brazil was issued a share of 6.5% the total number of CERs issued (EDF, 2015). To date, the CDM is the main component of Brazil's activity in the carbon market.

3.4 International economy on forest carbon

The carbon market is still an area in expansion. Aside from the environmental benefits, this market flow promotes a quite lucrative commercial asset. The creation of this new financial asset leads to the establishment of a new commercial market in which interested institutions have built an organised structure for carbon credits transactions. In 2015 in Paris, 65 governments stated in their INDCs that they will make use of international market-based systems (and another 24 will consider using them in the future) to implement anti-climate change actions. Moreover, several groups such as the Carbon Pricing Leadership Coalition (CPLC) claimed for support for the use of market mechanisms and a Ministerial Declaration on Carbon Markets [41] issued by 18 governments at the close of the conference in Paris was designed to send 'a clear signal to enhance the importance of the global carbon market' (Mansell, 2016). The Paris Agreement includes provisions that can advance carbon markets in two ways for the post-2020 period: i) by ensuring there is no double counting when countries engage in emissions trading, and ii) by establishing a new mechanism to facilitate trading (Mansell, 2016). In both areas, however, important details remain to be decided.

Concerning trading of carbon credits, the two main groups are the legally binding carbon market (which involves mandatory emission reduction targets placed on countries under international agreements and/or policies) and the voluntary markets (which operate independently). The establishment of the Kyoto Protocol and the cap-and-trade system represented the outset of carbon markets; since then, they have grown considerably and become more organised, as financial and regulatory instruments were implemented. In fact, most of these instruments are expected to serve also the REDD+ system (Gil, 2010).

The main binding markets (or compliance markets) under operation include the one created with the establishment of the Kyoto Protocol and regional initiatives such as the European Union Emissions Trading Scheme (EU ETS), the New South Wales Greenhouse Gas Reduction Scheme (GGAS) in Australia and the US Regional Greenhouse Gas Initiative (RGGI). Voluntary transactions involving trading "over-the-counter" (OTC), on the other hand, occur either directly or indirectly (between credit buyers and sellers or through organised markets as the Chicago Climate Exchange – CCX).

[41] Online available at: http://www.mfe.govt.nz/sites/default/files/media/Ministerial-Declaration-on-Carbon-Markets.pdf

Like other cap-and-trade programmes, the CCX sets a limit on total allowable emissions and issues allowances that equal the cap (Dowdey, 2015). Member firms then trade the allowances – carbon financial instruments (CFIs) – amongst themselves. Each CFI equals 100 metric tonnes of CO_2eq. Members that meet their targets can sell or bank their allowances. Firms can also generate CFIs, specifically exchange offsets, by funding approved GHG reduction projects outside of the KP umbrella (Dowdey, 2015). It is worth mentioning that projects that fall outside the KP framework, or are ineligible, but are additional or are developed in non-signatory countries of the KP could be inserted into other types of market mechanisms, or even in governance actions, which may attract multi-directional interests of different economic groups. The organisation of the carbon market as a whole can be summarised as follows (figure 2):

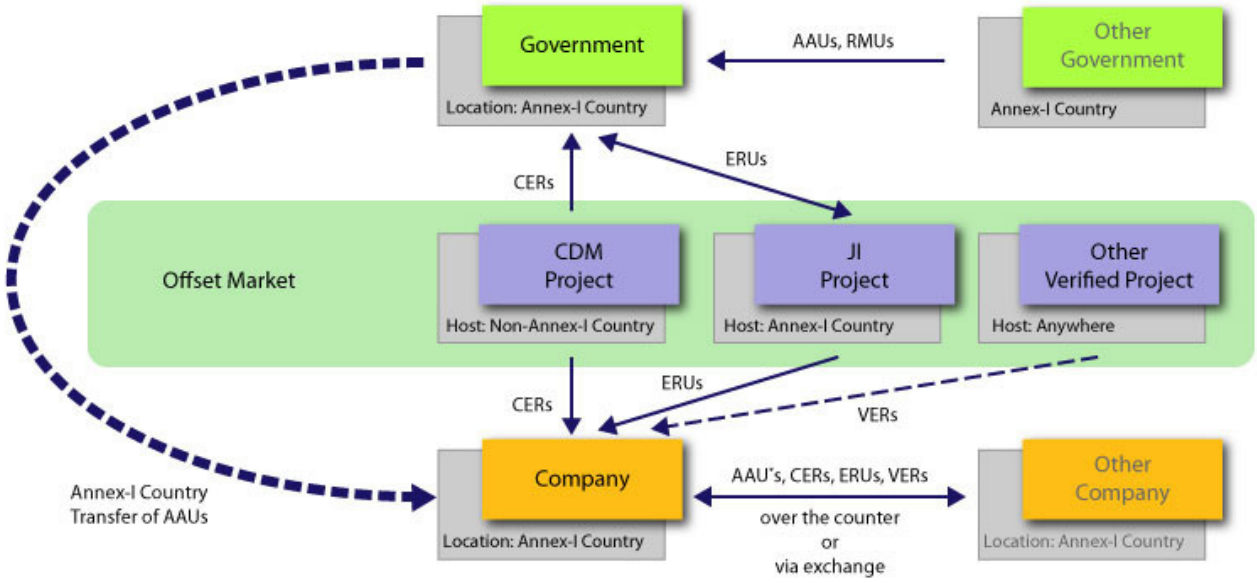

Figure 2. Organisation of the carbon market (Source: Green Rhino Energy, 2015)[42]

Depending on the origin of the emission reduction, there are a number of different emission certificates (AAU,[43] CER, ERU, VER[44]), as previously described. Standards are usually more flexible for VERs than for CERs and ERUs, since the last two can be used by developed countries to achieve their emission reduction targets but the first one is restricted to organisations voluntarily interested in offsetting their carbon emissions (Gil, 2010). Several standards and certificates have been created in order to

[42] Online available at: http://www.greenrhinoenergy.com/climatechange/carbon_markets/
[43] The Assigned Amount Unit (AAU) is the allowance (set out in Annex-B) a country is permitted to emit.
[44] VER means Verified Emissions Reduction.

differentiate credits and many have become important tools for assuring quality and transparency. These set out rules defining how emission reductions are measured. Standards provide assurance for buyers of VERs. At a minimum, all VERs should be verified by an independent third party. Besides the Voluntary Carbon Standard (VCS), other important certificates include the Voluntary Gold Standard (VGS), Climate Action Registry (CAR), Climate Community and Biodiversity Standard (CCBS), Plan Vivo, Carbon Fix Standard (CFS) and CCX. The third one (CCBS) deserves to be highlighted as a stringent standard, customised for forestry projects and focused on the contribution to local economies and integration with local communities (Gil, 2010). The first certified REDD project in Brazil (in 2008), the Juma Sustainable Development Reserve Project has the CCBS standard.

3.4.1 Current developments

Globally, 39 national and 23 sub-national jurisdictions have implemented or are scheduled to implement carbon pricing instruments (figure 3), including emissions trading systems and taxes (The World Bank, 2014). From 2016, China should house the largest carbon market in the world. China is already experimenting with seven regional carbon market pilots (The Climate Group, 2014). Each pilot covers a large city – Beijing, Tianjin, Shanghai and Shenzhen – or a province – Chongqing, Guangdong, and Hubei. However, the system can also present some critical issues. For example, as the central one, should authority overestimate the emission cap, then the market price of the carbon credits becomes too low (The Climate Group, 2014). Hope (2014) affirms that many politicians and policy analysts consider carbon pricing as a core part of global efforts to reduce GHG emissions. However, Hope argues that existing markets have structural frailties and these difficulties often maintain prices low and limit their ability to reduce GHG emissions (Hope, 2014).

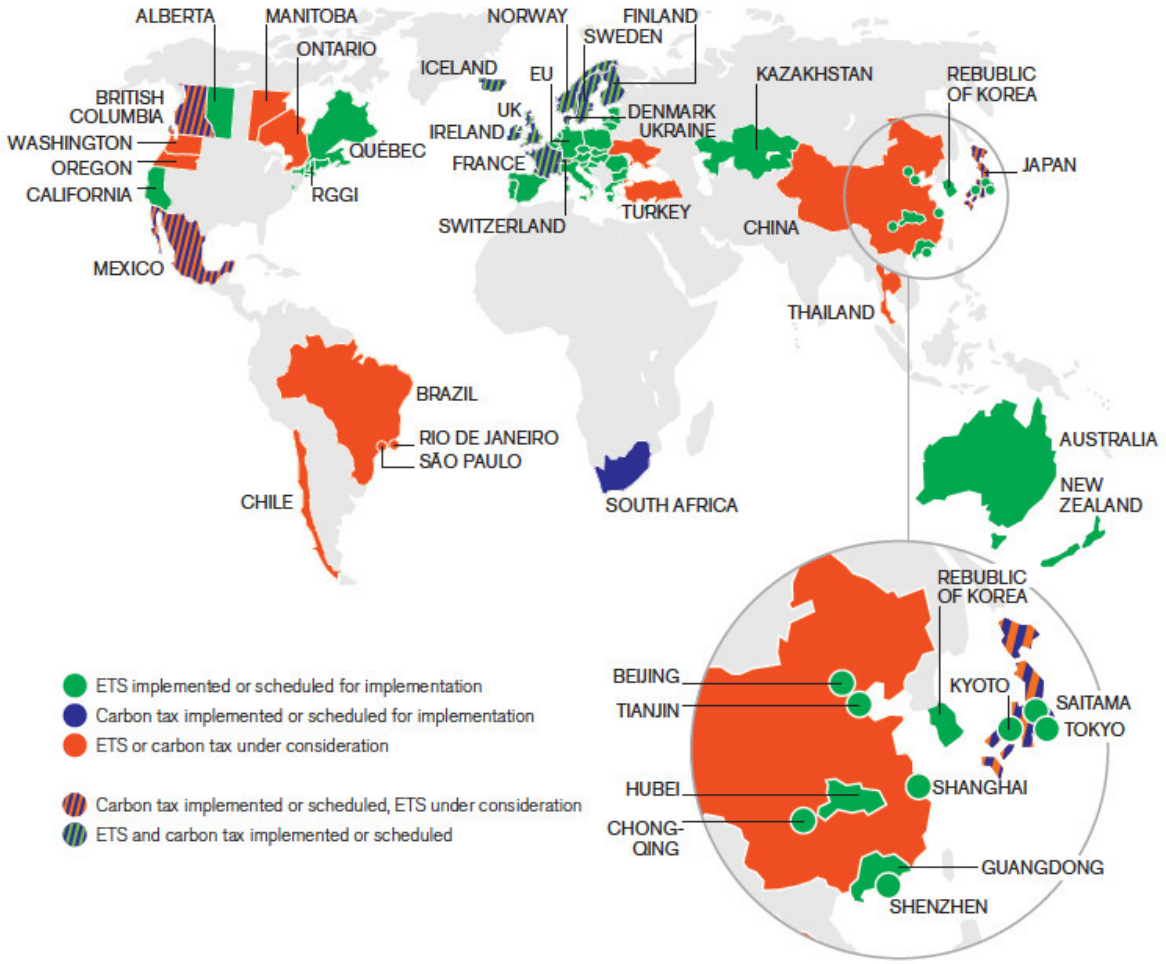

Figure 3. Summary of existing, emerging and potential national and sub-national ETS and Tax instruments (Source: The World Bank, 2014)

Carbon taxation is also gaining ground. New carbon taxes were introduced in Mexico and France in 2013. Sweden also has its own carbon tax. In the USA, the states of Oregon and Washington are exploring carbon pricing options to join California, Québec, and British Columbia in concerted efforts to tackle climate change (The World Bank, 2014). The Portugal carbon tax entered into force on January 2015, covering all energy products used in non-EU ETS sectors.

Initiated in 2012 and tasked by the Executive Group of the Inter-ministerial Commission on Global Climate Change (CIMGC), the Ministry of Finance (MF) started a multi-institutional working group to assess the convenience and feasibility of carbon pricing instruments and to determine the impact of an ETS on the Brazilian economy. Article 6, Section XI of NPCC (Brazil's National Policy on Climate Change) explicitly mentions 'financial and economic mechanisms that are national in scope and referring to

mitigation and adaptation to climate change' as instruments to achieve the country's GHG mitigation targets. This article then outlines regulatory elements that could support Brazilian ETS activity, and authorises the creation of a Brazilian Carbon Market (MBRE) – Mercado Brasileiro de Redução de Emissões (EDF, 2015).

While the MBRE, as defined by the NPCC, has yet to be implemented, the development of such a market is contemplated in the law. In the meantime, an exchange for environmental assets in Brazil, through BM&F/Bovespa operates as a stock exchange for voluntary reduction permits, and it holds auctions for CERs and for voluntary carbon units (EDF, 2015). The major Brazilian environmental assets exchanges are Bolsa Verde do Rio de Janeiro (BVRio) and the BM&F/Bovespa environmental assets exchange. This market operation resulted from a joint initiative by the Ministry of Development, Industry and Foreign Trade (MDIC), and the BM&F. The market was launched in São Paulo in December 2004, and it was the first market of its kind in a developing country. It became operational in September 2005 with the Project Bank, which aimed to improve visibility and facilitate the commercialisation of CDM projects (EDF, 2015).

3.5 Discussion: from the legal to economic sphere

In this chapter the scene of forest subject in the context of international relations was studied. In summary, the international politics over forests issues is complex mainly due to the existence of distinct perceptions and the difficulty of achieving a minimum consensus on controversial issues, often related to the sovereignty of a country over its natural resources and their right to use these resources to their development goals (Carvalho, 2010). In this sense, no single international regime exists for the political issue primarily focused on forests. However, forest global governance has been shifting since the UNCED, giving more emphasis to the connection between poverty, wealth and environmental devastation. Nevertheless, the tendency of a global convention on forests seems remote; therefore, attention is focused on existing global conventions to find synergies among them that could be applied to the forestry scope (Ruis, 2001).

Following the IPCC and its analyses, in virtue of climate change, several damages affecting environmental, social and economic aspects will happen on a global scale. In consequence, the international community has signed the Kyoto Protocol to develop actions to mitigate impacts of changes in the global environment. As carbon

emissions have traditionally been a fairly good benchmark of economic development, few countries were/are willing to take unilateral restrictive actions that could hamper their future economic competitiveness (Stuart and Costa, 1998). Thus, in order to assist developed nations to achieve their reduction targets, the Kyoto Protocol adopted Flexible Mechanisms. As a cap-and-trade system, the Kyoto Protocol established a cap and the Parties had specific emission reductions targets to achieve through a mix of alternatives, including trading or investing in projects in developing countries, which means that the protocol framework created a carbon market with a supplementary role to domestic measures (Carvalho, 2012).

Developing countries could then participate by providing ways to reduce GHG global emissions by means of additional and certified operations which were part of a global market scheme known as CDM. In the intergovernmental context of UNFCCC, forest issues were primarily negotiated under the headings of LULUCF developing A/R CDM projects, targeting developed (more industrialised) nations; and currently under REDD+, targeting developing countries (Holmgren, 2015). Therefore, the international discussion on forests have shifted; from a legal perspective, connected with territorial and sovereignty issues, to an economic perspective, related to the environmental service of carbon sequestration provided by forests (Carvalho, 2012). In the climate regime *per se* this change can also be observed. After the Kyoto Protocol adoption issues as economic measures, new technologies and financial instruments were more dominant on negotiations than previous discussions on *per capita* emissions, historical responsibility for climate change and the need of transferring substantial funds from developed to developing countries (Brunnengräber, 2006).

Looking onwards the relationship between forests and the carbon market, the complex relationship between forests and markets is surely growing (Carvalho, 2010). On the one hand, for instance, tropical timber is an internationally demanded product. Moreover, the growing demands for forest products, added the demands for food – due to human population growth and consumption – contribute to the increased pressure on forest ecosystems for more available arable land. Certainly, it is not a coincidence that the main cause of tropical deforestation is the expansion of agricultural activities, while (illegal) logging is the biggest single driver of forest degradation (Kissinger et al., 2012). A tangled challenge concerning forests and climate change mitigation agenda is to strike an effective and workable balance between forest carbon conservation and the production of forest products (Galbert et al., 2013). Although REDD+ should address the

role of production forests, because forests can play a significant role as an economic asset if they are managed sustainably, a major problem that will limit the success of the REDD+ domain (and which has not been discussed as it should) is the overall increase of goods consumption and the global demand for forest products. Current policies are designed with little attention to the residuals of production and consumption. Among the most evident unintended byproducts of the ongoing economic system are environmental problems like air and water pollution and landscape degradation. Moreover, it should also never be forgotten that a situation has two different sides. For example, the decision to shut down all nuclear energy plants by 2022 in Germany is accelerating coal and oil price increases, indirectly helping to drive up the demand for wood energy (UNECE, 2011).

On the other hand, the concern that forest goods and services be produced and managed sustainably exists. However, such conception is more based on sustainable production measures than on sustainable consumption pattern. This means, if the levels of consumption that the society craves nowadays were replicated across of the roughly nine billion people projected to be on the planet in 2050, the impact on water supply, air quality, forests resources, climate, biological diversity, and human health would be extremely severe. Nevertheless, these concerns have begun to be internalised in markets through voluntary forest management and chain of custody certification[45] for forest products such as the Forest Stewardship Council – FSC (one of the earliest and largest forest certification schemes). Forest certification is widely seen as one of the most important initiatives to promote better forest management. Challenges faced by the Brazilian forest industry dealing with the natural forests and plantations have provided favourable ground for the establishment of forest certification (Araújo, 2008). However, efforts focused on the timber supply chain, including certification and legal verification of traded timber, have been limited in Brazil, especially in the fragmented nature of Amazonian wood production (McDermott et al., 2015).

Although it is argued that forest certification provides forest owners – families, communities and companies – with access to the global marketplace for certified products, a study from McDermott et al. (2015) suggest the opposite. They assert that in Brazil, both activities (certification and legality verification) favour large producers as well as concentrated supply chains destined for international markets (e.g. pulp and paper

[45] Forest certification is a non-state, voluntary market-based instrument with the purpose of incentivising change in the forest sector (Pinto and MacDermott, 2013).

and high-value tropical sawnwood), while extensive legal requirements inhibit local benefit capture. On the other hand, since most of the pressure on forests that leads to deforestation in Brazil is due to clearing of land for agriculture or cattle ranching expansion – and not due to logging activities – certification is not necessarily an instrument that will highly contribute to decrease deforestation rates, especially in the Amazonian scenario. On the other hand, it can positively affect against forest degradation. Thus, it is noteworthy that although the forest issue has acquired an economic perspective in global governance, the achievement of establishing viable and sustainable economic instruments for the conservation of forests it is not currently entirely successful (particularly in the Amazonian scenario). For authors as Fosci (2014) this happens because in his view, environmental disturbance is much a failure of the market as it is a failure of the State, on account of forest loss being driven by market demand and the contextual failure of recognising the value of environmental services. Notwithstanding, usually in developing countries, poor public sector governance has led to an inefficient and disorderly management of economic activities and increased environmental damage. Nevertheless, the failures to achieve prescriptive regulations in international forestry left space for the emergence of alternative approaches (Fosci, 2014).

These developments are part of the shift of forest policy away from prescriptive regulations and towards a neoliberal[46] model of environmental governance. This means that payment for ecosystem services (PES) as a way to conserve natural resources is becoming more commonplace, using the market demand, rather than the government force to drive this change (DeShazo et al., 2016). However, it should be not forgotten that economic incentives (so called indirect means) also need quite often regulations to be established. Consequently, this shift is also noticeable in the Brazilian context. Since the years 2000's, deforestation in the Amazon forestlands began to be recognised also as an economic (rather than merely legal) problem, which induced the advocacy of economic incentives for the preservation of forests (van der Hoff et al., 2015). It was within this broader context that the REDD+ mechanism started to be viewed by different actors in Brazil as a way to channel financial resources and provide economic benefits for the conservation of the Amazon rainforest (van der Hoff et al., 2015).

[46] Neoliberalism applied to international environmental law has three fundamental principles: i) voluntary compliance as opposed to binding obligations, ii) property rights over nature as opposed to public goods, and ii) the use of market incentives as opposed to top-down regulation (Humphreys, 2009).

CHAPTER 4 REDD+ and the Climate Change Negotiations

In Chapter four the REDD+ mechanism is presented. The chapter explores several aspects of the mechanism in order to provide a substantial understanding of its context into the climate agreement umbrella. It examines the high complexity of technical requirements, as well as social, political, economic and institutional issues related to the REDD+ framework. The chapter starts defining what REDD is and ends with a discussion on the decisive role of the REDD+ mechanism within the UNFCCC framework.

4.1 The Mechanism

Precisely, the acronym REDD stands for Reducing Emissions from Deforestation and Forest Degradation and refers to reduced GHG emissions by preserving existing threatened forests (avoiding their deforestation and degradation). On the other hand, this mechanism can be a valuable action to curb deforestation in tropical forested lands, because it opens up the possibility to maintain standing forests, while recognising the real value of the natural capital of forests. While deforestation refers to long-term human-induced conversion of forested areas to other forms of land use, degradation refers to gradual, human-induced loss of forest carbon stocks, for instance caused by logging, grazing, fire or fuel wood collection (Forest Trends et al., 2008).

The concept behind REDD is simple: ‘an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development’ (UN-REDD, 2016). In other words, it involves payments to developing countries in pursuance of establishing strategies that will prevent deforestation and/or degradation that would otherwise have taken place in forested areas, enabling these countries to conserve and use their natural resources sustainably.

The REDD concept also evolved over time. First, RED (Reducing Emissions from Deforestation) was introduced as a proposal to compensate emission reductions from avoided deforestation. Afterwards, considering that degraded forests have their ability to store carbon compromised, it was decided that compensations should also be incorporated to avoided degradation. Thus, RED became REDD. In association with the Principles of the Bali Action Plan, as a way of comprising also sustainable forest management that could lead to the enhancement of carbon stocks the REDD+

mechanism has been established (Gil, 2010). Today, aside from some level of confusion of the above described evolution, the REDD/REDD+ concept became a general way of discussing activities that result in avoiding deforestation and the reversal of forest degradation processes. In this context many types of strategies may be proposed such as full protection, management, restoration and enrichment of forest areas, including deforested areas that should function as forests and need such anthropogenic action in restoring an area into a functional forest.

Once the principle of "carbon storage" was introduced by REDD, it was also argued that the REDD concept could be extended to every form of land use. This scheme would be called REDD++, with the second plus signaling the inclusion of agriculture. However, the term REDD++ was not adopted, but it is also sometimes referred to as Reducing Emissions from All Land Uses (REALU). On the other hand, two previously distinct sectors, the LULUCF (Land Use, Land Use Change and Forestry) and Agriculture, were both recently integrated in the IPCC Guidelines into one sector called Agriculture Forestry and Other Land Use (AFOLU) – which in the context of climate policy refers to all forms of "terrestrial carbon" – in order to improve the general consistency and completeness of national GHG inventories. Also, it is important to clarify that the term REDD+ is used throughout this dissertation to denote all categories, and differentiations is specified whenever needed. Moreover, it is interesting to state that the land-use sector is peculiar in climate debate as it is the only sector where both emissions and removals of GHG occur (including depletion of carbon sinks).

4.2 The politics of REDD+

4.2.1 Background

The concept of a simple performance-based compensation mechanism for developing countries based on the discourse on environmental services for the human well-being and on economic approaches to overcome unsustainable exploitation of natural resources rapidly gained momentum when was first presented at a scientific side event at COP9 in 2003 (Pistorius and Kiff, 2014). Thenceforth, since 2005 several countries had been willing to include REDD in the official COP agenda through a proposal led by Papua New Guinea and Costa Rica and on behalf of the Coalition for

Rainforest Nations[47] (when they submitted the document "Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action"). However, REDD became an integral part of the so-called Bali Action Plan in 2007 during COP13. The idea was that the countries should submit their initial visions about REDD and the Convention would technically deepen its knowledge to address political and technical implications that originated from this mechanism (Pavan, 2014).

While the Bali Action Plan did not specifically mention that REDD would be a part of a future global emissions trading scheme, it happened in 2009, when REDD was adopted by the Copenhagen Accord. In order to prevent performance-based payments from creating perverse incentives, at COP16 in Cancun in 2010, the Parties agreed on rather unspecific social and environmental safeguards.[48] Also, the REDD scope was extended to REDD+ in order to include the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. One year later, at COP17 in Durban the Safeguard Information System (SIS) was officially adopted. Developing countries should provide information regarding how they would address and respect these safeguards in order to receive performance-based payments (Pistorius and Kiff, 2014).

At the following rounds of negotiations, several elements regarding for example, reference levels, monitoring and other significant aspects related to REDD+ were decided and therefore, with the adoption of the Warsaw Framework for REDD+ at COP19 in 2013, the REDD+ mechanism was supposed to be ready for its implementation (Pistorius and Kiff, 2014). This framework is composed of seven decisions[49] concerning the financial, methodological and institutional aspects of REDD+ under the terms of the UNFCCC at the international level.

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[47] The Rainforest Coalition provides Diplomatic Leadership through efforts across government, academia and industry to address the complex issues surrounding environmental sustainability specific to tropical rainforests. Currently, participating countries in the activities of the Rainforest Coalition include: Argentina, Bangladesh, Belize, Central African Republic, Cameroon, Chile, Congo, Costa Rica, DR Congo, Dominica, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Fiji, Gabon, Ghana, Guatemala, Guyana, Honduras, Indonesia, Kenya, Lesotho, Liberia, Madagascar, Malaysia, Nicaragua, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Samoa, Sierra Leone, Solomon Islands, Suriname, Thailand, Uruguay, Uganda, Vanuatu and Vietnam.
More details online available at: http://www.rainforestcoalition.org/

[48] Safeguards encompass environmental standards (e.g., improved ecosystem services and biodiversity conservation), social standards (e.g., opportunities for wealth creation and well-being), governance-related standards (e.g., increased levels of local participation and transparency in environmental policies that affect the management of forest resources) – also referred as non-carbon benefits – and carbon standards to be applied as the core minimum performance requirements for REDD+ initiatives.

[49] The seven decisions are:

i) Decision 9/CP.19: Work programme on results-based finance to progress the full implementation of the activities referred to in decision 1/CP.16, paragraph 70;

4.2.1.1 Bali Action Plan

In 2007 during the COP13 held in Indonesia, the Parties adopted the Bali Road Map by which a binding international agreement could eventually be adopted at the Copenhagen Summit in December 2009 (Dagicour, 2010). The Bali Road Map included the Bali Action Plan[50] that was adopted by Decision 1/CP13. It also included the launch of the Adaptation Fund, the scope and content of the article 9 review of the Kyoto Protocol, as well as decisions on technology transfer and on REDD issues. The COP decided to establish a subsidiary body under the UNFCCC to conduct the process, the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA). The Bali Action Plan was divided into five main categories: i) shared vision, ii) mitigation, iii) adaptation, iv) technology and v) financing. The shared vision referred to a long-term vision for action on climate change, including a long-term goal for emission reductions. The AWG-LCA subsequently divided the work streams into components under those five parts (UNFCCC, 2017c).

There are significant achievements that have resulted from the work of the AWG-LCA, which include for example: i) Decision 1/CP.16 (Cancun Agreements), ii) Decision 2/CP.17 (outcome of the AWG-LCA) and subsequent implementing decisions related to the many institutional arrangements created – including the Cancun Adaptation Framework, the Technology Mechanism, Institutions on Finance, iii) Forum on Response Measures and the Durban Forum on Capacity-Building, etc (UNFCCC, 2017d). The AWG-LCA, however, was replaced by the Ad Hoc Working Group on the Durban Platform with Enhanced Action (ADP) due to Decision 1/CP17 in 2011. The ADP was a subsidiary body established 'to develop a protocol, another legal instrument or an agreed outcome with legal force applicable to all Parties'. The ADP was aimed to conclude its work prior to 2015 for the new instrument to be adopted in the same year and implemented from 2020.

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ii) Decision 10/CP.19: Coordination of support for the implementation of activities in relation to mitigation actions in the forest sector by developing countries, including institutional arrangements;
iii) Decision 11/CP.19: Modalities for national forest monitoring systems;
iv) Decision 12/CP.19: The timing and the frequency of presentations of the summary of information on how all the safeguards referred to in decision 1/CP.16, appendix I, are being addressed and respected;
v) Decision 13/CP.19: Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels;
vi) Decision 14/CP.19: Modalities for measuring, reporting and verifying;
vii) Decision 15/CP.19: Addressing the drivers of deforestation and forest degradation.

More details at: http://unfccc.int/land_use_and_climate_change/redd/items/8180.php

[50] The full version of the Bali Action Plan can be found at: http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf

4.2.1.2 Copenhagen Accord

The Copenhagen Accord[51] adopted at the COP 15 in 2009 does not commit countries to agree on a binding successor to the Kyoto Protocol. Nevertheless, certain specific elements contained in the agreement could have helped to pave a path for the new climate agreement. For example, the Copenhagen Accord set the target for a maximum of a 2°C limit on temperature increases. It also included a reference to consider limiting the temperature increase to below 1.5°C (a key demand made by vulnerable developing countries). On the other hand, there was no agreement on how to do this in practical terms. The Copenhagen Accord also established the Copenhagen Green Climate Fund (GCF),[52] as part of a joint effort to mobilise US$100 billion per year by 2020 in public and private investments to address the adaptation and mitigation needs of developing countries (Dagicour, 2010). Other central elements included (UNFCCC, 2017e):

- Developed countries promised to fund actions to reduce GHG emissions and to adapt to the inevitable effects of climate change in developing countries;
- Developed countries promised to provide US$30 billion for the period 2010 to 2012, and to mobilise long-term financing of a further US$100 billion a year by 2020 from a variety of sources;
- Agreement on the measurement, reporting and verification of developing country actions, including a reference to "international consultation and analysis".

Also, for the first time in an international agreement, the Copenhagen Accord established a new body on reducing emissions from deforestation and forest degradation (REDD). Also, the concept of Nationally Appropriate Mitigation Actions (NAMAs) was formally adopted whereby developed countries would inscribe emissions targets for 2020, and developing countries would inscribe NAMAs, recognising that different countries may take different nationally appropriate action on the basis of equity

[51] The full version of the Copenhagen Accord can be found at: http://unfccc.int/resource/docs/2009/cop15/eng/l07.pdf

[52] The Green Climate Fund was designated as an operating entity of the financial mechanism of the UNFCCC, in accordance with Article 11 of the Convention. The GCF is based in the new Songdo district of Incheon, South Korea. The Green Climate Fund is intended to be the centerpiece of Long Term Financing under the UNFCCC. Uncertainty over where this money would come from led to the creation of a High Level Advisory Group on Climate Change Financing (AGF) which was founded by UN Secretary-General Ban Ki-Moon in 2010. There is no formal connection between this Panel and the GCF, although its report is one source for debates on "resource mobilisation" for the GCF. The lack of pledged funds and potential reliance on the private sector is controversial and has been criticized by developing countries. Pledges to the fund reached US$10.2 billion on 28th May 2015 (Green Climate Fund, 2015). More details online available at: http://news.gcfund.org/wp-content/uploads/2015/04/GCF_contributions_2015_may_28.pdf

and in accordance with common but differentiated responsibilities and respective capabilities (Dagicour, 2010; Gil, 2010). A year later, in 2010 at COP16, REDD formed part of the Cancun Agreements, described in paragraph 70 of the AWG-LCA outcome:

> *"Encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances:*
>
> - *Reducing emissions from deforestation;*
> - *Reducing emissions from forest degradation*
> - *Conservation of forest carbon stocks;*
> - *Sustainable management of forest;*
> - *Enhancement of forest carbon stocks"*

The text defines the REDD+ mechanism, although it is not referred to as such in the AWG-LCA text. Moreover, the term "forest carbon stocks" were added to the Cancun Agreements, in account of the concern that forests could be viewed simply as stores of carbon rather than ecosystems (Lang, 2011).

4.2.1.3 Doha Climate Gateway

Negotiations in Doha focused on ensuring the implementation of agreements reached at previous conferences. The package of Doha Climate Gateway decisions adopted amendments to move towards a new global agreement that applies to all Parties by 2020. Key elements of the outcome also included agreement to consider loss and damage, which means, compensations would be provided to vulnerable communities for the loss and damage caused by climate change. However, an international mechanism on loss and damage in Doha was not adopted (IISD, 2012). Furthermore, the Parties re-affirmed continued efforts to scale up climate finance (GCF) to help developing countries to respond to climate change and consequently to enforce the establishment of the REDD+ mechanism. The Conference in Doha was notably about the cost of addressing climate change and, in particular, making progress on long-term funding to support action in developing countries. In Copenhagen it was agreed

that US$100 billion annually from 2020 would be provided to developing countries, but nothing in between (IISD, 2012). However, only few countries, like the UK and the EU, stepped forward with some numbers (Fuhr and Schalatek, 2012).

Also in Doha, a second commitment period of the Kyoto Protocol was decided, which would start on 1 January 2013 lasting until 2020, encompassing commitments for a total of 14% in emissions reductions compared to 1990 levels. Specifically (UNFCCC, 2017f):

- The legal requirements that would allow a smooth continuation of the Kyoto Protocol were agreed, and the valuable accounting rules of the agreement were preserved;
- Countries that are taking on further commitments under the Kyoto Protocol agreed to review their emission reduction commitments at the latest by 2014, with a view to increasing their respective levels of ambition;
- The Kyoto Protocol's Market Mechanisms – the CDM, JI and ET – would continue; access to the mechanisms remains uninterrupted for all developed countries that have accepted targets for the second commitment period;
- A key element was added to the monitoring framework for developed countries with the adoption of the tables for the biennial reports known as common tabular format, thereby strengthening transparency and the accountability regime;
- Surplus assigned amount units can be carried over without limit from the first to the second commitment period of the Kyoto Protocol by Parties included in Annex I that have a target for the second commitment period, but with restrictions on the use of these carried-over AAUs[53] for the second commitment period and quantitative limits on how many of these units may be acquired from other Parties.

Nevertheless, only the EU, Australia, Norway, Switzerland, Iceland, Monaco, Liechtenstein, Belarus, Ukraine and Kazakhstan would have targets. The USA, Canada, Russia and Japan[54] would not take part in the second period. They would also no longer have access to the CDM mechanism (Fuhr and Schalatek, 2012). As of 29 December

[53] AAUs are units of GHG emissions as defined by the Kyoto Protocol. An AAU is equivalent to one metric tonne of carbon dioxide equivalence.
[54] Canada withdrew from the Kyoto Protocol in 2011, while Japan and Russia declared they would not join a second commitment period.

2016, 75 countries had ratified the amendment, which will enter into force once 144 parties have ratified it (UNFCCC, 2017g).

4.2.2 REDD+ Developments

Given the considerations that the capacities of countries vary greatly, the Cancun decision established that countries would proceed in their efforts to get ready for REDD+ at different paces (Pistorius and Kiff, 2014). It was agreed that REDD+ implementation in each country should follow three consecutive phases (figure 4): i) readiness and capacity building, ii) implementation of national strategies, and when all requirements are fulfilled the transition to iii) performance-based payments.

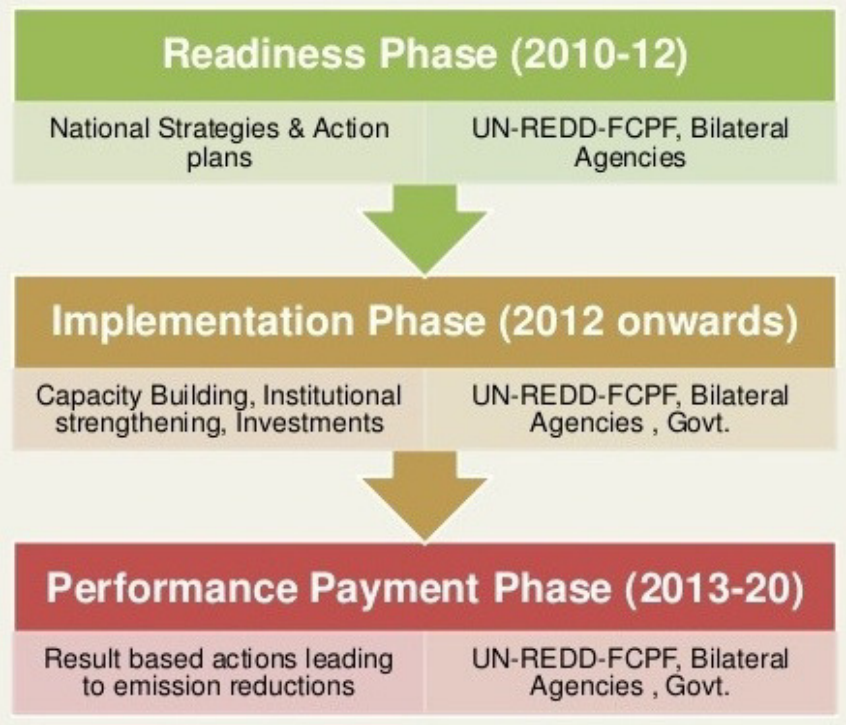

Figure 4. REDD+ implementation phased-approach (Source: WWF, 2017)[55]

REDD+ has been fully recognised in many sub-national levels of dialogue and official engagements, such as State to State negotiations. An example of that is the dialogue started by California State in the USA, enrolling many other states in different countries (as Acre in Brazil). This type of agreement has been useful in strengthening

[55] Online available at: https://www.slideshare.net/samyakjainshah/redd-feasibility-report-updated-march-05

non-compliance markets at a voluntary level, which significantly helps to indicate the way to some diplomatic negotiations. Another via of funding concerns countries being financially supported by grants. This REDD-Readiness funding is administered through both the United Nations Collaborative Programme on Reducing Emission from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme, a partnership of UNDP, UNEP, and FAO) and the World Bank, with their Forest Carbon Partnership Facility (FCPF) and the Forest Investment Programme (FIP).

In the Phase 1, governments receive funding basically to build capacity, creating or strengthening the institutions, policies, and legal frameworks. Phase 2 consists of initiating pilot/demonstration projects, along with further financing for capacity-building activities. Phase 3 will be the mature state of REDD+, with formal payments transferred in exchange for verified emissions reductions (Angelsen, et al., 2009).

4.2.2.1 UN-REDD Programme

The UN-REDD Programme was launched in 2008 and is a collaborative initiative between FAO, UNEP and UN Development Programme (UNDP). These agencies are combining forces to support developing countries in their efforts to mitigate climate change through the implementation of REDD+ activities agreed under the UNFCCC umbrella (UN-REDD, 2015). The overall development goal of the UN-REDD Programme is to reduce forest emissions and enhance carbon stocks in forests while contributing to national sustainable development in developing countries (UN-REDD, 2015).

The programme has also a role to play in both, supporting the incorporation of an effective REDD+ mechanism under the climate agreement, as well as supporting the emerging arrangements for REDD+ financing and coordination. During its first phase (2008-2015), in 23 countries full-scale national programmes designed for REDD+ readiness have been funded. Smaller targeted support and policy/technical advice has been provided to over 35 countries and a global programme has allowed the UN-REDD Programme to move the REDD+ discussion forward through the development of guidance, tools and briefs. Moreover, the Programme has operated in tandem with the Readiness Fund of the FCPF (UN-REDD, 2015).

An external evaluation made in 2014 resulted in a series of recommendations that have shaped the design of the new phase of the programme strategy, which will last from 2016 to 2020. One of the envisaged goals is to strengthen the collaboration with

the FCPF as well as closer collaboration between the UN agencies and both the established GCF and the Global Environment Facility (GEF) [56] will be explored. Interaction with these strategic partners at global level, as well as with the FIP will be complemented with enhanced dialogue on cooperation at country level (UN-REDD, 2015).

4.2.2.2 Forest Carbon Partnership Facility

The Forest Carbon Partnership Facility (FCPF) was launched in 2008 as a global partnership that complements the UNFCCC negotiations on REDD+ initiatives. The FCPF has created a framework and processes for REDD+ readiness, which demonstrates how REDD+ could be applied at the country level. The FCPF has two separate but complementary funding mechanisms, the Readiness Fund and the Carbon Fund in order to achieve its strategic objectives (FCPF, 2014):

- FCPF Readiness Fund supports participating countries in the development of REDD+ strategies and policies, reference emission levels; measurement, reporting, and verification systems; an institutional capacity to a manage REDD+, including environmental and social safeguards;
- FCPF Carbon Fund is designed to pilot performance-based payments for emission reductions from REDD+ programmes in FCPF countries. Countries that have made significant progress in their REDD+ readiness endeavors may be selected to participate in the Carbon Fund, through which the FCPF will pilot incentive payments for REDD+ policies and measures in approximately five developing countries. The Carbon Fund will remunerate the selected countries in

[56] The Global Environment Facility was established in 1991 as a $1 billion pilot program in the World Bank to assist in the protection of the global environment and to promote environmental sustainable development. Since then, the GEF has provided over $14 billion in grants and mobilized in excess of $70 billion in additional financing for more than 4,000 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and private sector to address global environmental issues. The GEF serves as financial mechanism for the following conventions:

- Convention on Biological Diversity (CBD);
- United Nations Framework Convention on Climate Change (UNFCCC);
- Stockholm Convention on Persistent Organic Pollutants (POPs);
- UN Convention to Combat Desertification (UNCCD) ;
- Minamata Convention on Mercury;
- The GEF, although not linked formally to the Montreal Protocol on substances that deplete the ozone layer (MP), supports implementation of the Protocol in countries with economies in transition. More details online available at: https://www.thegef.org/gef/whatisgef

accordance with negotiated contracts for verifiably reducing emissions more than in the reference scenario.

The FCPF offers financial support to 36 forest developing countries (13 in Africa, 15 in Latin America and the Caribbean, and eight in the Asia-pacific region). From these countries, 33 have prepared Readiness Preparation Proposals (R-PPs), nine have signed Readiness Preparation Grant Agreements, and one – the Democratic Republic of Congo – has advanced to the mid-point of their readiness preparations (FCPF, 2014). In June 2013, the Facility Management Team prepared the Monitoring and Evaluation framework. It builds on country level monitoring and evaluation efforts to be developed as part of readiness implementation. It includes the two following main constituents (FCPF, 2014):

- Result Chain and Logical Framework, which together provide a strategic overview of the FCPF and support decision-making by illustrating the main results to be achieved by the Facility at various levels, and their associated performance indicators. They provide a frame to focus both the monitoring and evaluation efforts at the Facility level.
- Performance Measurement Framework (PMF), which is based on the Logical Framework, is the key internal management tool to be used by the Facility Management Team (FMT) to manage the collection, analysis and reporting on the performance data that must nourish the monitoring and evaluation functions. It captures key elements of expected results of the FCPF at the Facility level, by outlining proposed programme indicators for each result level, targets, baselines, frequency of data collection, data sources and methods, as well as responsibilities for this data collection and consolidation.

4.2.2.3 Forest Investment Programme

Approved in 2009 the US$785 million Forest Investment Programme (FIP) is a funding window within the framework of the Climate Investment Funds (CIF). The FIP supports developing countries to reduce GHG emissions and deforestation leading to protection of carbon reservoirs. In practice, the goal of FIP is to support the establishment of REDD+ strategies by developing countries, and consequently to identify opportunities to help these countries to adapt to the impacts of climate change

and to contribute to several others benefits such as biodiversity conservation and rural livelihood improvement. FIP primarily focuses on REDD+ implementation activities (Phase 2), providing a crucial pull to incentivise REDD+ readiness activities (Phase 1) and exerting a push to develop needed capacity and experience for countries to progress to results-based payments (Phase 3). The FIP is active in eight pilot countries, including Brazil (FIP, 2014). For a better understanding, the REDD+ financing packages are divided into (FIP, 2014): i) FIP US$501 million is allocated to 38 projects and programmes, expecting co-financing of US$1 billion from other sources, ii) FIP US$208 million (42% of the FIP allocations) is approved and under implementation for twelve projects with expected co-financing of US$742 million, iii) FIP US$50 million is the Dedicated Grant Mechanism for Indigenous Peoples and Local Communities (DGM).

4.3 The economics of REDD+

Several works in economic domain have attempted to estimate the needs of REDD+ finance, showing that one of the least expensive GHG abatement strategies would be the preservation of rainforests (Anderson, 2009; Boucher, 2008). Thus, carbon sequestration may effectively compete with other climate investments as part of a cost-effective climate policy (Bluffstone et al., 2012; Kindermann et al., 2008). According to the UN-REDD (2015), the REDD+ mechanism could yield meaningful sustainable development benefits and may generate a financing stream for sustainable forest management in developing countries, assuring the necessary time for countries to seek for paths to reach an economic model based on low GHG emissions.

For example, the Eliasch Review (Eliasch, 2008) suggested that around US$17 to US$33 billion per year should be invested to halve GHG emissions from the forest sector by 2030 considering the scenario of inclusion of a global carbon trading. Moreover, Kindermann et al. (2008) and Strassburg et al. (2009) use simulations techniques and estimate that 80% of avoided deforestation costs less than US$5 per tonne of CO_2 (Bluffstone, 2013). Zarin et al. (2009) estimates that REDD readiness and implementation costs for a 50% global reduction in forest emissions would range from US$15 to US$35 billion per year. The Stern Review (Stern, 2007) estimates even less, ranging from US$5 to 15 billion per year. Some specialists, however, argue that such studies underestimate the costs of REDD+ mechanism (Fosci, 2013; Lohmann, 2011). For example, Persson and Azar, (2010) suggest that a climate policy framework will

raise the value of land by increasing the demand for bioenergy (making deforestation for biomass cultivation increasingly profitable) and, therefore, this could imply that REDD+ activities would not offer enough economic incentive to preserve tropical forests. For Sunderlin et al. (2013), in order to be a cost-effective measure, the REDD+ financial flow should provide a large stream of benefits, however, recent developments in Brazil and Indonesia have shown that funding stream must be substantially raised to assure that forests are not converted to other land uses.

Reports such as the Stern Review (Stern, 2007) focused on opportunity costs,[57] and the importance of creating financial incentives to encourage governments and landowners to keep forests standing instead of cutting them down for alternative land uses. On the other hand controversy remains, nevertheless, regarding whether all local opportunity costs of carbon sequestration have been effectively included in such studies (Dyer and Counsel 2010; Gregersen et al., 2010). Also in Brazil, the majority of the most relevant studies (se for example, Börner et al., 2010 and Strassburg et al., 2009) about REDD+ costs focused primarily on opportunity costs in the Amazon region (Cunha et al., 2016). Moreover, there also is the question of how opportunity costs are estimated because opportunity cost estimates vary widely, depending on which method is used. Furthermore, it changes as market forces change, as technology improves, and as new technologies emerge (Gregersen et al., 2010). It may also be difficult to estimate opportunity costs correctly because sometimes the “perceived” opportunity cost by the targeted recipients may differ from a calculated one. For example, Börner et al. (2013) estimate that the opportunity cost for the participants of a PES programme (in this case the Bolsa Floresta Programme (BFP) in the Uatumã Sustainable Reserve, Brazil) to comply with the land use related rules tend to be null – the communities carry out rustic activities, they do not use fertilizers (or other chemicals) and to plant they use part of the cassava plant, thus this cost tends to zero (Lima, 2014).

On the other hand, Lima (2014) indicates in her research that under the same conditions (this means observing the same scheme at the same reserve) the “perceived” opportunity cost of participation is not fully compensated by the provided direct payment. This may happen according to Agustsson et al. (2010) for the reason that when a monetary incentive is given to beneficiaries, they assume the payment as their

[57] Opportunity costs are equivalent to benefits foregone by government, farmers and local communities in conserving forests, rather than adopting potentially more profitable alternative land uses, such as agriculture, or harvesting for timber and charcoal. REDD+ opportunity costs are the difference in net earnings from conserving or enhancing forests versus earnings from converting them to alternative land uses.

motivation even though non-carbon benefits are also outlined, as the case of the BFP (complementing a higher value of total benefits added to the direct payment). In addition, even in scenarios where opportunity costs are relevant, the costs of establishing, implementing, and monitoring may make an important contribution to total costs, thus influencing the likely success of the REDD+ intervention and its ability to invest significantly in biodiversity and social co-benefits (Thompson et al., 2011). For Fosci (2014), for the positive incentive approach to work under REDD+ according to opportunity cost logics, the same incentives must make activities driving deforestation "uneconomic". However, this prospect is highly unlikely as countries are already struggling to meet their modest financial commitments (Fosci, 2014).

Ultimately, there are more prospective issues that need to be addressed in developing realistic estimates payments and costs required for a successful REDD+ implementation (Gregersen et al., 2010). For instance, further with Gregersen et al. (2010), in a situation where perverse incentives that encourage deforestation exist, the same must be considered into the costs that need to be covered. For example, Binswanger (1991) firmly argued that some tax incentives, rules of land allocation and an agricultural credit system have accelerated deforestation in the Amazon. Hence, while the country has addressed many of these distorting policies, some remain until nowadays and need to be factored into calculations of what the realistic cost of reducing deforestation will be in Brazil (Gregersen et al., 2010).

Furthermore, developing countries will need to build measuring, monitoring, reporting and verification systems and create new agencies and institutions for the management of REDD+ in order to be prepared for the later phases of REDD+ mechanism implementation and to have access to longer-term financing based on results (Norman and Nakhooda, 2014). In this sense, global cost estimates for reducing deforestation do not often factor in these costs (Morris and Stevenson, 2011). Hence, the sum of opportunity costs, implementation costs (except those directly compensating opportunity costs), and transaction costs are therefore an estimate of the total costs of REDD+ actions (Angelsen, 2011). Merger et al. (2012) go even further. They propose that in order to estimate the full range of REDD+ costs, apart from opportunity costs, implementation costs, transaction and institutional costs, development and estimation of potential revenues (based on regional variations) to assess the potential effectiveness of REDD+ investments should be included. They argue that this bottom-up approach would

provide data for the design of marginal abatement cost curves as a vigorous economic decision-making instrument (Merger et al., 2012).

Numbers concerning the amount of resources that may be supplied or needed by REDD+ mechanism are still uncertain on account of several aspects. It may vary according to the stringency of the emissions reduction targets, the actual emissions, the percentage of emissions reductions that can be achieved through the mechanism and the price of carbon in offset markets, for example (Gil, 2010). Moreover, the amount of resources may also vary considerably among regions, mainly as a function of alternative land-use opportunities (Gil, 2010) and the ability of developing countries to implement required safeguards (Morris and Stevenson, 2011). However, since fairness and poverty alleviation also are at stake in REDD+, it appears that the debate on cost estimates to is not only a technical economic one, but also about how the international community and national governments will commit to reduce deforestation and to improve livelihoods. Although the overall expected costs of REDD+ would most likely increase (beyond initial opportunity cost estimates) with efforts to integrate equity and poverty concerns, these increased costs need to be met in order to ensure the delivery of outlined REDD+ outputs, which means favouring the “lowest cost” efficient carbon sequestration option or the one that also considers poverty reduction (Gregersen et al., 2010).

In order to understand the size and composition of finances for REDD+ initiatives, over 23,000 pledges (or individual projects) of support of REDD+ activities between 2006 and 2014 were reviewed by Norman and Nakhooda (2014) in a joint paper. They state that aggregate pledges of both public and private finance are significant, at more than US$9.8 billion for the period between 2006 and December 2014, but the pace of new pledges slowed after 2010. Since 2010, global pledges for dedicated REDD+ initiatives average US$796 million per year, partially because of the global economic crisis (Norman and Nakhooda 2014). In addition, the lack of a global compliance market for carbon offsets from REDD+ has depressed price expectations in the voluntary market (Peters-Stanley et al., 2013; Sunderlin et al., 2014). Although there are more than 20 REDD+ donors and 80 recipient countries, activity is relatively concentrated. Norway, USA, Germany, Japan and the UK provide approximately 77% of identified funding with ten countries receiving the majority of this resource. Indonesia and Brazil collectively receive 35% of allocated funding, 20% of funding is directed to global programmes or international research and just 17% of allocated funding is

supporting REDD+ activities and programmes across the remaining 75 recipient countries (Norman and Nakhooda 2014).

4.4 The challenges of REDD+

After its adoption and much debate among scientists, technical experts and policymakers many aspects inherent to the REDD+ mechanism and/or related to its operationalisation still remain unsettled. This part of the dissertation explores most of the usual challenges related to the REDD+ concept discussed in the literature. Although it focuses on issues such as leakage, reference level and permanence, some fundamental concerns with respect to the establishment of REDD+ are: how to link the REDD+ framework with existing national development strategies; how to improve institutional capacity and enhance local governance; how forest communities and indigenous peoples will participate in the design, implementation, monitoring and evaluation of national REDD+ programmes and how the amounts of reduced emissions and enhanced removals as a result of REDD+ will be monitored, etc (which will be assessed in the subsequent chapters).

4.4.1 Definition of forest

One of the most important aspects concerning REDD+ but not so discussed as it should be is the definition of what is considered to be a forest. Why is it so important to have a coherent definition of what a forest is? Research shows that the choice of a forest definition can have a considerable impact on estimates of deforestation and forest degradation areas, on assessment of drivers of deforestation as well as on the development of a reference level (Romijin et al., 2015). There are hundreds of definitions of forest that are used throughout the world, incorporating factors such as tree density, tree height, land use, legal standing and ecological function (Schuck et al., 2002).

Differences in definitions among countries are questionable when determining the extent of leakage internationally and measuring whether global emissions reductions are being achieved or not (DeShazo et al., 2016). However, the definition of a forest becomes an issue within a country when one seeks to determine the drivers of deforestation and measure future deforestation and forest degradation (DeShazo et al.,

2016). Should the definition leave out a significant portion of deforestation, policies to curb deforestation may be ineffective in reaching relevant results.

According to Sasaki and Putz (2009) should global policies intended to promote forest conservation continue to use the definition of forest adopted by the UNFCCC great quantities of carbon and other environmental values would be lost when natural forests are severely degraded or replaced by plantations but technically remain "forests." Although forest plantations do store carbon, they contribute to emission reductions only when planted on degraded land with initially lower carbon densities (Moss, 2013). It is important therefore for the integrity of REDD+ framework to differentiate between natural forests and forest plantations. The definition of "forest" as an area of 0.05-1 hectares in size with 10 to 30% covered by a canopy consisting of trees that reach a height of at least 2 to 5 meters at maturity was adopted in the Marrakesh Accords through Decision 11/CP.7. However, this definition also implies that an old-growth rainforest can be heavily logged, with substantial amounts of timber (biomass) removed, without recognition of the loss of carbon (Butler, 2009).

Sasaki and Putz (2009) recommend that natural forest be differentiated from plantations and that for defining "forest" the lower height limit defining "trees" be set at more than five meters tall with the minimum cover of trees be set at more than 40%. These changes, they argue, would help to reduce GHG emissions from what is now termed forest "degradation" without increasing monitoring costs. Furthermore, these changes in the definition of forest would promote the switch from degradation to more reliable forest management, fostering mitigation actions while protecting biodiversity and contributing to sustainable development.

Although the IPCC recommends that countries report forest cover loss and GHG emissions using an internationally recognised definition, international definitions do not include national circumstances and can leave out a significant amount of deforestation. For example, Romijin et al. (2015) found that between 2000 and 2009, the total cumulative deforestation rates in Indonesia were 49.000 km^2 when using the FAO definition,[58] 58.000 km^2 when using a "natural forest" definition (18% higher) and 68.000 km^2 when using a national definition (28% higher). Moreover, the stricter definition from Sasaki and Putz (2009) could reduce incentives to conserve habitats with sparse

[58] FAO defines forest as land of at least 0.5 ha covered by trees higher than 5 m and with a canopy cover of more than 10%, or by trees able to reach these thresholds. This definition is fairly similar to the definition adopted by the Kyoto Protocol; however, the FAO definition is essentially a land-use based definition.

vegetation or a low canopy, like the Cerrado biome in Brazil,[59] which would no longer be qualified for carbon payments.

4.4.2 Reference Level

The additionality assessment of results-based payments from REDD+ activities implies that the establishment of forest reference levels and/or forest reference emissions levels (FRL/FREL)[60] provides a hypothetical "business as usual" (BAU) scenario against which carbon stock changes can be measured (Gil, 2010). FRL/FREL set, therefore, a performance benchmark[61] – that reduce transaction costs – for mitigation activities by providing a reference point to which current and actual efforts can be compared throughout a predetermined timeframe. Consequently, FRL/FREL is strongly linked to monitoring of mitigation efforts (Chagas et al., 2013). The BAU baselines refer to the projected quantity of GHG emissions, or the net amount of emissions after subtracting removals, without any mitigation action.

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[59] The Brazilian Forest Service (SFB), when developing its actions and elaborating national and international reports on forest resources in Brazil, defines its forests types according to the Classification System (based on FAO's definitions). This classification includes forests and other wooded lands classified by the Brazilian Institute of Geography and Statistics (IBGE):

- Dense humid forest
- Open humid forest
- Mixed humid forest
- Semi-deciduous seasonal forest
- Deciduous seasonal forest
- Campinarana (forested and wooded)
- Savannah (forested and wooded), in portuguese Cerradão and Cerrado
- Steppe savannah (forested steppe and wooded steppe)
- Steppe (tree steppe)
- Forest vegetation under marine influence, forest vegetation under fluvial-marine influence (wooded)
- Transitional zones with at least one forest formation
- Secondary vegetation in forest areas and,
- Reforestation.

The estimate of forest areas is calculated by the SFB based on maps of remnant vegetation in the Brazilian biomes, produced by the Ministry of Environment (MMA) from Landsat images.

[60] The UNFCCC does not explicitly specify the difference between a FREL and a FRL, the most common understanding is that a FREL commonly refers to emissions from gross deforestation and forest degradation (REDD) in a given time period while FRL refers to net emissions and removals, in the case that the other REDD+ activities (comprising the "+") have also been included in the scope. Also, the terms reference level and baseline are often used interchangeably when additionality is discussed. From a strict conceptual perspective though, Angelsen (2008a) differentiates between historical baseline (the rate of deforestation and degradation and the resulting CO_2 emissions over the years); business as usual baseline (how emissions would evolve without the REDD activity); and finally crediting baseline (the benchmark for rewarding the country/project, such as an emissions quota). Here, reference level refers to the crediting baseline and other concepts are specified, whenever they are utilized.

[61] Such as carbon stocks determined in a fixed year or range of years.

There are several key technical elements, decision points or design features that need to be considered when establishing a FREL/FRL for REDD+. These are: i) forest definition; ii) scale (national or sub-national); iii) scope of activities; iv) carbon pools included;[62] v) data and methodologies used;[63] vi) time period[64] and vii) use of adjustments.[65] The scale of REDD+ initiatives determines whether FRL/FREL is set for the territory of a jurisdiction (country, federal, state or administrative region), or whether it applies to an area defined by the boundaries of a particular intervention, such as a project or a programme (Chagas et al., 2013). Project-scale standards differ in their objectives and concerns from jurisdictional and/or national efforts, resulting in divergent approaches to each FRL/FREL. Project-scale standards as the CDM are mostly concerned with the creation of tradable offsets. On the other hand, incentives at larger scales (jurisdictional or national) are created through government initiatives and/or bilateral and multilateral negotiations and tend to involve a more convoluted set of objectives including those set under the UNFCCC (Chagas et al., 2013).

The scope refers to the activities that are covered in the FRL/FREL such as avoided deforestation, forest management, afforestation or conservation, for example. Most project-scale standards outline specific methodologies on how to establish baselines for each activity. The scope of jurisdictional REDD+ consists of various activities, adding significant complexity to developing FRL/FREL. Hence, the responsible entities in developing jurisdictional REDD+ FRL/FREL usually have flexibility to start accounting for avoided deforestation, and afterwards as capacities, systems and

[62] There are 5 IPCC forest C pools: aboveground biomass, belowground biomass, deadwood, litter and soil. According to the UNFCCC Durban decision on FREL/FRL, significant pools and gases should not be excluded from the construction of a FRL and parties should give reasons for omitting any pool or gas.

[63] The Durban guidelines for REDD+ FREL/FRL submissions make it clear that the data, methodologies and procedures used in the construction of the FREL/FRL should be guided by the most recent IPCC guidance and guidelines, as adopted or encouraged by the COP. Given IPCC methods, both activity data as well as emission factors will be needed to estimate the forest-related emissions by sources and/or removals by sinks. All data and information used to estimate CO_2 equivalents per year over the selected time period will need to be consistent with that used to estimate the forest-related emissions by sources and removals by sinks, for the purpose of MRV.

[64] A historical reference period will need to be chosen. This is the span of time during which emissions taking place in the past will be estimated. This time period will likely be based on a combination of factors including data availability and the relevance of the past as a predictor of the future.

[65] While for some national contexts, it may be most appropriate to set the FRL/FREL based on historic deforestation rate, for other REDD+ countries it may likely require an adjustment from the historic rate to more accurately reflect the BAU case. The scope of eligible adjustments is not defined in the UNFCCC decisions. There are no specific guidelines for countries to follow in order to account for national circumstances, if they opt to do so. Generally, the UNFCCC guidance only makes it clear that adjustments should be justifiable and transparent. Though the definition or types of sufficient justification are not specified, it can be assumed that this will require reasonable proof, particularly third party assessment of likely forest impacts.

available data improve, they can incorporate additional activities or categories (Chagas, et al., 2013).

The discussion on how to determine a FRL/FREL has been focused on two approaches: the past approach – according to which it would be calculated as an average of past deforestation rates and the future approach – which it would be calculated as a function of estimated future deforestation rates based, for example, on population density and growth, forest area, economic growth, commodity prices, governance variables, future disturbance of forests due to infrastructure investments (Gil, 2010). Standards focused on offset credits frequently define as BAU baselines that take into account historic data and extrapolate these into the future. Wherever necessary and justified, these extrapolations may be adjusted for projected events that, at the jurisdictional level, are often referred to as "national circumstances"[66] (Chagas et al., 2013).

Approaches based on historical deforestation rates have been criticised by specialists, although both approaches have some limitations (Köthke et al., 2014). It is argued that countries with high forest cover and low historical deforestation rates could be underprivileged, because the past approach does not reflect national circumstances and it is not a precise predictor of future deforestation either (Gil, 2010; Köthke et al., 2014). On the other hand, countries with high deforestation rates in the past could be advantaged by less demanding reference levels, which may induce countries to inflate their crediting baselines in order to maximise REDD+ transfers (the so-called "hot air")[67] because it allows high deforestation rates even in the future (Köthke et al., 2014). Also, the past approach depends on reliable deforestation data, which most developing countries lack (Gil, 2010).

The future approach is very uncertain because deforestation is a complex phenomenon and can be highly variable from year to year. However, at the same time, 'it shows systematic trends over longer periods (5-10 years) which depart from past deforestation rates' (Angelsen et al., 2008). A systematic bias of the forest cover development by simple linear extrapolation is expected and must be avoided; becoming evident when simple historical reference levels are related to the forest transition

[66] National circumstances is recognised in Decision 4/CP.15, which states that the establishment of FRL/FREL should be transparent taking into account historic data, and adjusting for national circumstances. On the other hand, despite the lack of specific guidance, countries can look to the scope of national circumstances considered in National Communications reporting as one input into determination of which circumstances maybe relevant in the context of setting a REDD+ FREL/FRL.

[67] REDD+ credits that do not reflect any additional efforts being put on the market.

hypothesis (Köthke et al., 2014). This hypothesis will be further explored in item 6.9.4.4. Brazil has in theory adopted a sub-national framework by biome, transitioning afterwards to the national scale using the historic approach; agreeing that projections tend to work better for countries with low historic rates of deforestation and degradation (MCTI, 2014, personal communication).[68]

4.4.3 Permanence

Permanence is frequently mentioned as a risk for REDD+ implementation, which refers to whether the net benefit of an action, such as carbon removed from the atmosphere, will remain fixed for a long period or whether the process may soon be reversed. In other words, in the case of REDD+, it is questionable its inefficacy to confirm how long the reduced (or zero) rate of deforestation can be ensured (McFarland, 2010). Moreover, in the circumstance of GHG standards for land use, permanence refers to the longevity of a carbon pool and the stability of its stocks, given the management and disturbance of the environment in which it occurs. The risk of non-permanence (also referred to as “reversals”) describes the possibility of reversing climate benefits through the loss of forest carbon biomass, for example through a fire or pest outbreak that releases carbon back into the atmosphere. Reversals are sometimes categorised as “intentional vs. unintentional” referring to whether it was anthropogenic (i.e. induced by human activity, such as harvesting) or a natural disturbance (e.g. a hurricane).

The risk of reversals should be addressed through two groups of risk management measures: the first refers to the possibility of GHGs re-emissions; and the second refers to the need to establish a liability system in case REDD+ is to be credited and traded in carbon markets. If the forest underlying the offset is destroyed, the offset will also be compromised unless the loss of forest is taken into account (Dutschke and Angelsen, 2008). The table 3 below explains the first group in detail and summarises strategies to deal with it:

[68] MCTI – Ministry of Technology, Science and Innovation – Personal communication

Table 3 Re-emissions risks and coping measures

Specifics Risks	Coping Measures
Natural/Ecological Risks: Storms, pests, fire, droughts	Traditional forest insurance. Contracts are usually renewed on an annual basis, in order to reflect the actual risk profile
Climate Change-related Risks: Although is related to natural risks (above), climate change may lead to carbon losses in certain regions	Projects should attempt to factor out human intervention, so that eventual carbon variations are not attributed to individual actions
Demand-side Risk: When the demand for particular crops is the one of the main driver of deforestation and their prices ascend, forest conversion might become profitable	Changes in commodity prices can be divided between funding agency and landowner by including an indexing clause in the contract that foresees additional payments when prices differ from what had been agreed on
Failure of Project Partners: Ineffective project management, insecure land tenure or bankruptcy of project partners	When project proponents fail to comply with contractual commitments, the ultimate liability falls back to the selling country's government. The national REDD+ focal point should ask for an in-kind risk premium before approving a sub-national activity
Political Risk: Political changes may modify prior approvals/commitments and impacts projects, programmes or policies	It can be minimized by broad participation in the climate regime and by international cooperation

Source: Adapted from Dutschke and Angelsen, 2008 and Gil, 2010

Security measures against commercial risks must also be adopted (Gil, 2010). The issue of permanence can be addressed primarily by the proper design of REDD+ measures (GTZ, 2009) and likewise through a range of alternative approaches. For example, under the tonne year accounting credits are issued for the increments of carbon sequestered corresponding to a defined permanence period and their quantity depends on the carbon stored in biomass each year of the permanence period. On the other hand, this approach has not been implemented by any standard. The buffer approach, setting aside credits to cover reversals has been adopted in compliance and voluntary carbon markets and in the CDM for carbon capture and storage (CCS) projects along with host country guarantees. Commercial insurance could serve in place of or as a supplement to other approaches such as buffers, but is not extensively available. Under country guarantees, countries can take responsibility for addressing reversal risk through policy, legal, and financial measures (BioCarbon Fund, 2013). These approaches are not mutually limited but could be used in tandem with each other. To date the CDM framework has addressed reversal risks in A/R CDM projects adopting temporary crediting (tCERs or lCERs), which must be replaced upon expiration. This has

resulted in lowering the value of such credits in comparison to permanent CER from other sectors.

Under a national approach, the concern is no longer the permanence of particular forest areas, but whether the country as a whole continues to maintain reductions below those established by the FREL/FRL regardless of where the singular reductions are coming from (Dutschke and Angelsen, 2008). A crucial question then emerges: What happens if the country exceeds its reference level? In the case of Brazil for example, the Amazon Fund (further details in Chapter five) states that if GHG emissions exceed the reference level, no payments would be made in that year and equivalent emissions would be deducted from positive results in subsequent years.

Much of the focus of the discussion about forest carbon has been about ensuring and insuring permanence, which are usually mistaken, as they are different concepts (Skutsch and Trines, 2010). Ensuring permanence relates to creating conditions under which forest remains forest, for instance by accurate enforcement of forest protection law, or by continued payment of incentives to the local communities to not deforest, or by diminishing conditions, such as land tenure insecurity, that are regularly related to deforestation actions (Palmer et al., 2009; Skutsch and Trines, 2010). On the other hand, insuring permanence relates to the guarantee that any carbon lost is not credited, or that the credits are replaced by others when any loss occurs. Often this involves consideration of who is liable, morally and financially, for replacing the losses (Skutsch and Trines, 2010).

4.4.4 Leakage

Within the REDD+ context, leakage refers to changes in removals of GHGs outside the accounting system that result from activities that cause changes within the boundary of the accounting system. If a conservation activity is implemented in a given area, how could it be assured that unanticipated emissions would not occur outside this protected area? (McFarland, 2010). In other words, leakage is in some ways just another kind of non-additionality. For example, if interventions do not reduce GHG global emissions because deforestation moves elsewhere (even though they protect a threatened forest), then they make no additional contribution to diminish global warming. This is why the international REDD+ architecture has argued for national rather than project-level accounting and compensation. This means that leakage would not be

considered or would be assumed to be captured in the national monitoring and accounting system, even if a risk of international leakage would still remain (Wunder, 2008; Angelsen et al., 2008; Eliasch, 2008).

Although Appendix I of Decision 1/CP.16 states that when undertaking REDD+ activities, actions to reduce displacement of emissions should be promoted and supported, there is no international leakage requirement. But instead the use of national reference levels captures in-country leakage. This is exactly what happens in Brazil, under the REDD+ national strategy approaching the Amazon Fund, the issue of leakage is not addressed, using on the other hand, a national baseline rather than sub-national or project baselines to calculate the emissions reductions achieved. For DeShazo et al. (2016), there is still no realistic way to address leakage.

Leakage can be further categorised as “market leakage”, in which alterations to the supply, demand or equilibrium of a forest product may lead to an increase in its value and subsequent pressure to convert less well protected forests elsewhere and “activity shifting”, in which destructive activities are displaced from inside to outside a REDD+ design’s boundaries (Meyfroidt and Lambin, 2009). Market leakage simply refers to changes in market, for instance, if the supply of timber in one region decreases, it could be expected that markets would act to make up the shortfalls in others regions (DeShazo et al., 2016). An example of activity-shifting leakage occurred in Ecuador. The President Rafael Correa drew international attention when he offered to call off oil drilling projects in the Yasuni National Park if international organisations would compensate Ecuador US$3.6 billion (DeShazo et al., 2016). Many people argued then that protecting the park (through a REDD+ project) would only cause oil drilling to be moved to another part of Ecuador – on account of its inelastic demand the oil would be extracted either within or outside the park – even though this action would mitigate around 410 millions tonnes of carbon emissions (DeShazo et al., 2016).

Concerns have also been voiced over the possibility of temporal leakage from one period to another, negating this way past climate change mitigation efforts. The question lies on whether and how the mechanism can adequately ensure that reduced deforestation at one point in time does not simply mean delayed deforestation to another point in time. All REDD+ design has to consider and manage the risk that deforestation pressures will happen again due to policy shifts or market feedbacks, or that avoided deforestation is offset by natural disasters, such as pests or forest fires (Dutschke and Angelsen, 2008b; Angelsen et al., 2008; Eliasch, 2008).

4.4.5 Measurement, Reporting, Verification (MRV)

MRV raises two main questions: How do we measure, report and verify emission reductions from forests? and What mechanisms are needed – and who will operate them – to measure changes in rates of deforestation, leakage, permanence, the implementation of safeguards and the impacts on governance?

Therefore, MRV for REDD+ specifically refers to the measurement, reporting and verification of a country's forest, and associated GHG emissions and removals, including their changes over time (Hewson et al., 2014). A REDD+ design of any scale depends on the establishment of criteria defining which activities are eligible under REDD+, as well as on robust methodologies for the measurement of carbon pools (i.e. aboveground biomass, belowground biomass, litter, dead wood and soil organic carbon) and flows (variations in the carbon content of each pool) (Gil, 2010). The reliability of the generated information depends on whether data comply with defined quality criteria: transparency, comparability, consistency, completeness, and accuracy.

According to the UN-REDD Programme:

- Measurement refers to the direct or indirect measurement of emissions or removals per unit activity (emission factors – EF) from forest areas (activity data – AD) as a result of human activities. For REDD+ this translates into measurements of forest area and area change (AD) and forest carbon stock and carbon stock changes (EF). Direct measurement can include both field measurements and remote sensing, and can be supplemented with modeling. Indirect measurement involves estimation of emissions reductions using equations based on data on land areas and specific emission factors or the use of complex models that take into account a number of different parameters that affect the release or sequestration of carbon and other GHGs (Hewson et al., 2014).
- Reporting refers to the presentation of measured information in a transparent and (often) standardised manner. Reported information encompasses forest-related data and estimates of GHGs and the methodologies used to derive them, as well as other related issues, such as quality assurance and quality control (QA/QC) activities and uncertainty estimation, among others. Reporting requirements to the UNFCCC (National Communications) may cover issues other than just

those subject to measurement. For example, under the UNFCCC reporting agreements, developing countries can report their GHG inventory data as part of their national communication to the UNFCCC and in the context of biennial update reports.

- Verification refers to the assessment (through internal and external checks) of the completeness, consistency, and reliability of the reported information through an independent process. Verification provides inputs to improve data (including GHG emissions and removals as well as all measured data or derived parameters) and helps to build confidence in, and improve scientific understanding of, estimates and trends. The UNFCCC Secretariat through its experts will verify the data reported. The verification of countries' actions depends on three factors: i) the degree to which reported data is capable of being verified; ii) the actors conducting the verification; and iii) the way in which verification is performed.

In REDD+ framework there are five components which may be compensated for at the national level, and whose performance would need to be measured for this level: i) reducing emissions from deforestation; ii) reducing emissions from degradation; iii) conservation for forest carbon stocks; iv) enhanced forest carbon stocks; and, v) sustainable management of forests (McCall et al., 2016). At the national level, measurement of change in forest area (to detect changing rates of deforestation) can be carried out reasonably efficiently and inexpensively through remote sensing, but this will not be sufficient for REDD+ (Knowles et al., 2010). Quantifying the density of biomass (i.e. the level of the carbon stock) in different categories of forests is much more complex. On the other hand, it is essential firstly for estimating the stock in the forests, both remaining and lost, and secondly, also for claiming reduced degradation, forest enhancement and sustainable forest management, for which the changes in biomass density must be precisely measured (Knowles et al., 2010).

The MRV system should therefore be integrated with a country's overall goals for sustainable development. It should be designed to capture sufficient detail for an assessment of the GHG impacts of policies and measures that are planned or implemented, added the impacts on other interventions. Monitoring systems – another activity of particular importance for REDD+ activities – must include all lands that are impacted by human activity and are defined as managed lands (Hewson et al., 2014).

While developing a MRV system for REDD+, a country has the opportunity to identify its national and regional development objectives and actions associated with its REDD+ strategy (Hewson et al., 2014). Without a clear linkage between MRV and policy development from the beginning, results-based compensation for REDD+ actions will be ineffective.

In countries with "nested-based" REDD+ programmes under development, where REDD+ activities exist at multiple levels, MRV must be coordinated to ensure that sub-national systems do not discord with the national system. In addition, a MRV system should be linked to a decision-making process and enforcement for better adaptive management and policy implementation at the national level. For example, for Pratihast et al. (2014), ongoing nested MRV structures are expected to narrow the gaps of different levels (local, sub-national and national) monitoring data. During UNFCCC negotiations, Parties ultimately agreed that local communities should be involved in the MRV development (Hewson et al., 2014). But although this issue was addressed in the Cancun Agreement, there is no specific formal guidance on how this local engagement should be achieved and countries have the flexibility to decide the extent and modalities of such involvement (Hewson et al., 2014). Nevertheless, several authors suggest that such participatory MRV promotes several benefits such as empowerment of local people (Constantino et al., 2012), conservation of biodiversity (Porter-Bolland et al., 2012), reduction of forest degradation (Lawrence et al., 2006) and consequently promotes monitoring at lower costs.

During the COP19 the Warsaw Framework on REDD+ was adopted and among other things, these decisions provide guidance to countries on MRV-related matters, including:

- Coordination of support for the implementation of activities in relation to mitigation actions in the forest sector by developing countries, including institutional arrangements;
- Modalities for national forest monitoring systems;
- The timing and the frequency of presentations of the summary of information on how all the safeguards are being addressed and respected;
- Guidelines and procedures for the technical assessment of submissions from Parties on proposed FREL/FRLs;
- Modalities for measuring, reporting and verifying.

4.4.6 Additionality and the 3E's

REDD+ must promote additional improvements beyond a reference scenario, in terms of reduced deforestation and degradation. Thus, the underlying rationale is to distinguish activities which further contribute to mitigation measures from those which, although they may be associated with carbon savings, offer no benefits above those expected anyway (Valatin, 2011). Distinguishing activities which are additional implies the establishment of a reference level that provides a hypothetical business as usual scenario against which carbon stock changes can be measured. This requires determining a counterfactual scenario for what would have happened if the project or activity had not gone ahead, and identifying the carbon pools and other GHG emissions sources and savings covered by the assessment (Valatin, 2011). One way to avoid additionality problems regarding REDD+ initiatives would be to target areas – usually those adjacent to land that had recently been deforested – for protection that are most likely to be deforested, because REDD+ should not pay for protection of a forest that would be protected anyway (DeShazo et al., 2016).

Wunder et al. (2008) also argue that potential areas for REDD+ schemes can be those areas where the ecosystem services are threatened by deforestation or already deforested land (in which services could be generated with additional environmental positive externalities) under the control of potential providers, and not only the areas which show a high level of carbon stocks, biodiversity indicators, or areas with potential for carbon capture. This can be observed in Africa, where several REDD+ initiatives are placed where pressure on forests is high, people are most receptive, and where there are fewer political obstacles (Rayden et al., 2010; van Oosterzee et al., 2012). On the other hand, targeting high risk forests could create perverse incentives (DeShazo et al., 2016). Risk may introduce uncertainty that also may reduce the attractiveness of the investment, demand, and hence the price of carbon, implying that the opportunity cost of not harvesting a forest increases, thus perversely incentivising accelerated deforestation (van Oosterzee et al., 2012).

Additionality is also very controversial in Brazil. Some critics claim that since deforestation rates have been decreasing prior to the establishment of a national REDD+ framework, such actions should not be recognised under the climate convention umbrella. Moreover, in Brazil the suppression of forests by users is already restricted by the current legislation (Forest Code). Therefore, it is argued that establishing REDD+ interventions in these areas and paying beneficiaries for preserving forests would be the

same as rewarding them for complying with their legal obligations (Gil, 2010). However, it also argued that the level of law compliance is unquestionably low in Brazil and that deforestation will continue to increase unless a financing scheme such as REDD+ is adopted. For example, estimates from Soares-Filho et al. (2006) determine that between 2007 and 2050, an area of approximately 1.5 million km^2 across the Amazon (more than 60% of that in the states of Amazonas and Pará) will be cleared. Under this scenario, deforestation would be extended to other regions than those around recently deforested areas. It is then discussed by Gil (2010), that the selection of sites for the implementation of REDD+ initiatives should not be based on the additionality *de jure* (i.e. defined by legal parameters) but rather on the additionality *de facto* (i.e. defined by what happens in practice, which not necessarily is authorised by the law).

In parallel with the development of different formal criteria for assessing REDD+ performance, there are also the development of informal criteria for assessing the wider success of REDD+ frameworks. The criteria that has achieved the most resonance is the '3E' criteria first proposed by Stern (2007) and promoted through a set of Centre for International Forestry Research (CIFOR) publications (Angelsen, 2008b; Angelsen et al., 2009; McDermott, 2013). The objective is to support informed decision-making that will help deliver REDD+ initiatives that are effective, efficient and equitable (Babon et al., 2012). These are known as the '3E criteria' (Angelsen et al., 2009; McDermott et al., 2013):

- Effectiveness: refers to the extent of carbon and non-carbon benefits achieved by REDD+ (i.e. can the mechanism bring significant emission reductions?);
- Efficiency: refers to the costs of these emissions reductions or removal increases (i.e. are these reductions achieved at the minimum cost?);
- Equity: refers to the distributional aspects of the associated costs and benefits, but also to procedural aspects of participatory decision-making and the specific contexts that shape stakeholders' perceptions of equity (i.e. are benefits and costs distributed fairly among and within countries/stakeholders?).

These criteria have been widely adopted in the literature as the key determinants for assessing REDD+ frameworks. They provide the key indicators in order to develop recommendations on how REDD+ should be designed, providing also a framework for assessment of REDD+ policy. Early assessments of REDD+ policy using such criteria are essential as the full emission impacts of REDD+ policy may not be known for years

after initial policy interventions due to lags in data availability, and slow changes in behavioural patterns. Providing initial assessments of the impact of REDD+ policy on proxies for deforestation can help to provide early lessons for the wider implementation of REDD+ interventions (Laing, 2014).

4.5 Discussion: the role of REDD+ in the new climate agreement

The relatively high opportunity costs of conservation compared to more profitable land-use options and the lack of viable alternatives to generate income in forested areas mostly result in high deforestation rates. A key question is to find avenues for extracting value from forests other than from timber. Moreover, even though extensive monitoring and strict legislation are the fundamental basis to any policy that seeks to extinguish deforestation, they have not been sufficient to reach this goal, as observed in the Amazon region (IPAM, 2011). Thus, by attributing a financial value to the carbon stored in forests and offering tropical countries economic incentives to fight deforestation, REDD+ started gaining support as an adequate alternative tool to halt forest destruction while reducing GHG emissions. In this sense, although the value of forests can be hardly calculated, REDD+ payments may outline the economic balance away from loss of forests and in favour of sustainable forest management (Bluffstone et al., 2012).

The real challenge, however, is the implementation of such idea, considering methodological constraints and complex relationship observed between deforestation drivers in different regions as previously presented. REDD+ is strongly linked to issues of human rights and participatory governance and, therefore, it is expected that the REDD+ initiatives could also contribute to the promotion of non-carbon advantages, benefiting local stakeholders. On the other hand, questions of whether and how social co-benefits should be included into REDD+ design are raised. For specialists as DeShazo et al. (2016), if REDD+ programmes are not cautiously institutionalised and designed, those livelihoods with informal land use-rights could be marginalised (also into the decision-making processes, which are usually driven by the elites).

The role of forests to mitigate climate change has been also recognised in the Paris Agreement, with a specific article devoted to REDD+, but what does such item state?

4.5.1 REDD+ in the Paris Agreement

The article 5 specifically devoted to REDD+ outlines:

> *"1. Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gas as referred to in Article 4, paragraph 1(d), of the Convention (Article 5.1)*
> *2. Parties are encouraged to take action to implement and support, including through results-based payments, the existing framework as set out in related guidance and decisions already agreed under the Convention for: policy approaches and positive incentives for activities relating to reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries; and alternative policy approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests, while reaffirming the importance of incentivizing, as appropriate, non-carbon benefits associated with such approaches (Article 5.2)"*

This provision also calls on Parties to adhere to previous REDD+ related COP decisions, which includes the Warsaw Framework for REDD+. The article 5 §1 clearly references the 1992 UN Convention. On the other hand, the Paris Agreement uses the word "should", whereas the Convention text from 1992 used "shall" – in UN-speak, shall means must and should means encouraged to. While in the text from 1992 Parties had to 'promote and cooperate in the conservation and enhancement' of sinks and reservoirs, under the new Paris Agreement, Parties 'should take action to conserve and enhance' sinks and reservoirs. Article 5 §2 provides international support of both REDD+ and of a joint mitigation and adaptation approach to the sustainable management of forests. It also reaffirms the significance of non-carbon benefits (NCBs) and, in doing so endorses the broader scope of REDD+ to be a market- and a non-market-based

mechanism that is as much applicable to adaptation actions as it is to mitigation (Leonard, 2015). As a result, the Paris Agreement operationalises the REDD+ framework and sets the stage for forests to play a major role in the fight against climate change. The paragraph 55 of the text is about financing REDD+:

> *"Recognizes the importance of adequate and predictable financial resources, including for results-based payments, as appropriate, for the implementation of policy approaches and positive incentives for reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks; as well as alternative policy approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests; while reaffirming the importance of non-carbon benefits associated with such approaches; encouraging the coordination of support from, inter alia, public and private, bilateral and multilateral sources, such as the Green Climate Fund, and alternative sources in accordance with relevant decisions by the Conference of the Parties (Paragraph 55)"*

Nevertheless, Parties 'recognise the importance of adequate and predictable financial resources' for REDD+ initiatives. The financial support may come from public, private, bilateral, or multilateral sources. However, the text does not involve anyone making any commitments to finance REDD+ developments (Lang, 2015). For Fosci (2014), REDD+ does qualify for a share of the US$100 billion. On the other hand, even assuming that developed countries will be able to reach their reduction targets, this sum will cover several activities such as mitigation from all sectors, adaptation, technology development and transfer, capacity building, measurement and reporting obligations, etc. Thus, despite the important contribution of forests to climate change (although moderated when compared to fossil fuels), the rapid increase in industrial emissions in

developing countries, and the increased needs for adaptation in a warming planet, REDD+ would only be entitled to receive a small fraction of that amount (Fosci, 2014). Nevertheless, specifically for REDD+, Germany, Norway and the United Kingdom announced a collective aim of providing US$1 billion/year from 2015 and beyond 2020 in order to support countries that are involved in REDD+ initiatives.

Eventually, the text implies REDD and the “plus” part of REDD (the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries). This is claimed to be a clear call to action for countries to endorse policies that conserve standing forests. Indeed, the Paris Agreement indicates that tropical and sub-tropical countries can receive both public and private funding if they succeed in reducing their GHG emissions from deforestation and forest degradation. On the other hand, how exactly REDD+ is to be inserted into national development and climate strategies remains as the major questions (Angelsen and Verchot, 2015).

CHAPTER 5 Brazil and Forest-Climate Debate

Chapter five focuses on the Brazilian context in the climate debate. It starts with an overview of Brazil. It reveals natural characteristics as well as history, politic and economy background, focusing on enumerating aspects relevant to this study. Exposing pressing environmental problems, the big picture is built in order to provide a comprehensive understanding into the contemporary forest conservation and management context and models adopted in Brazil. Furthermore, it presents a description of the context of forest conservation in the country. It explores the evolution of the Brazilian position concerning climate change and forest-related issues as well as the development of domestic forest-climate-related measures to diminish GHG emissions in the country. It ends discussing and introducing the context of REDD+ in Brazil.

5.1 Location, geographic regions and demography

Brazil with 8,547,403.5 km^2 is a country of continental dimensions (the largest in South America; occupying 66% of the South-American territorial area (Carvalho, 2006)). The land area corresponds to 8,491,194 km and internal waters 55,547 km. Among all countries of continental dimensions, it is the only one whose territory is completely habitable. This does not occur, for example, in the cold areas of Canada, in the desert regions of China and Australia, the regions of the Rocky Mountains and in the deserts of the USA (Schneeberger and Farago, 2003). The country is located in the Western hemisphere, between the meridians 34º47'30" and 73º59'32" to West of Greenwich. Located between the parallel of 5º16'20" of North latitude and 33º44'42" of South, it is cut to the North by the Equator and, to the Southeast, by the Tropic of Capricorn; therefore, with 93% of its territory in the Southern hemisphere (Carvalho, 2006). With exception of Ecuador and Chile, Brazil has a border with all other countries that compose the South-American continent (figure 5). Its perimeter embraces 23,086 km, being bounded over 7,367 km by the Atlantic Ocean, that is to say 31.9% of its borders.

Figure 5. Brazil's location and its political borders (Source: National Geographic, 2017)[69]

Brazil has 26 federal states aside from Brasília (called Federal District) and is divided into five regions: North, Northeast, Southeast, South and Center-West (figure 6). Although the administrative boundaries do not necessarily coincide with ecological boundaries, each of the five regions predominantly has a distinct ecosystem.

[69] Online available at: http://kids.nationalgeographic.com/explore/countries/brazil/#brazil-soccer.jpg

Figure 6. The regions of Brazil (Source: GCR, 2013)

5.2 History, politics and economy

For a better understanding about the institutional and political system adopted in Brazil, it is necessary to have a peprspective about its historical development. Thus, Brazil was discovered in 1500 by the Portuguese navigator Pedro Álvares Cabral and was a Portuguese colony until 1822, when it became independent. When gold was found in Brazil in the 1690's, the country was recognised for its mineral and trading potential. Approximately one century later though, it was understandable that the gold sources were limited and that the agricultural value of Brazil would remain its main asset. In 1807, during the invasion of Portugal, the Portuguese royal family fled to Brazil, establishing Rio de Janeiro as the *de facto* (by the facts) capital of Portugal. After Napoleon's army was finally defeated in 1815, in order to maintain the capital in Brazil and alleviate Brazilian fears of being returned to colonial status, the King Dom João VI of Portugal raised the *de jure* (of the law) status of Brazil to an equal, integral part of a

United Kingdom of Portugal, Brazil, and the Algarves. In 1820 the Constitutionalist Revolution started in Portugal. The movement demanded the return of King Dom João VI, who had been living in Brazil since 1808. When returned to Portugal in 1821, he left Brazil in the hands of his son, Prince Dom Pedro. However, Dom Pedro rebelled, declaring Brazil independent from Portugal in 7 September 1822. The prince was acclaimed Emperor Dom Pedro I on his birthday (12 October), which coincided with the inauguration of the Empire of Brazil. Nevertheless, formal recognition came with a treaty signed by both Brazil and Portugal in late 1825. Dom Pedro II was the second and last ruler of the Empire of Brazil, reigning for over 58 years (from 1831 to 1889). Abolition of slavery came in 1888, and the first Republic was established two years later (1890).

Coffee and sugar became major products of Brazil, giving the locals work and establishing the country within the world's economy. The 19 century coffee magnates cooperated with a military coup, removing imperialism from Brazil, and making these coffee planters the major Brazilian powers of the time. The economic abundance stopped, however, when the world experienced a major depression in 1929. In 1930, this existing political era came to a grinding halt when a new military coup placed Getúlio Vargas in the presidency. Although a civilian, Vargas was the dictator, elected president, dictator again, senator and then democratically elected president. He governed from 1930-1945, then he resigned in 1945 and returned as elected president in 1950 until he took his own life in 1954. A democratic government prevailed from 1945 to 1964. In the late 1950s after Vargas' second period the country experienced an economic boom (using export goods regardless of what they had to charge for those goods to do so) during Juscelino Kubitschek's mandate, period in which the capital was moved from Rio de Janeiro to Brasília.

In Brazil, the military government began with the 1964 coup led by the Armed Forces against the administration of the President João Goulart. The military dictatorship lasted 25 years, from 1964 to 1989 (when the country returned to a democratic model of government). The military government adopted nationalism, economic development, and anti-communism as its guidelines. Nowadays, Brazil has three levels of government: a federal government, 26 states and a federal district (Brasilia), and approximately 5,570 municipalities (Nogueira et al., 2016). Brazil may be considered as one of the most decentralised federations in the world (Afonso, 2004; Gupta et al., 1994). After the totalitarian regime, decentralisation to the local level was argued for in the name of democracy as much as in the name of governmental efficiency and efficacy (Almeida,

2006). There are two main reasons for Brazil's level of decentralisation: i) the response by the military government to domestic and international politics (as a means to maintain its support, the government devolved powers to locally-elected municipalities), and ii) the transition to democracy and its subsequent constitution.

The 1988 constitution enshrined decentralisation into its charter. For example, the constitution mandates that a percentage of the revenue collected at the national and state level be redistributed downwards to the municipalities and delegates administrative authority to the states. However, this has not been enough to address Brazil's many problems. In fact, decentralisation exacerbated the financial and economic problems in the country. Inflation and debt increased after the implementation of decentralisation in Brazil in the late 1980. Re-centralisation was considered the solution to that problem then. On the other hand, there are not enough evidences to merit the claim that a re-centralisation process is in course in Brazil (Almeida, 2006). But tensions over re-centralisation has resulted in deficits at the national and state level and little improvement in conditions at the municipal and local level, producing different results (e.g. lack of control over resources) according to the specific issues that are at stake (Almeida, 2006).

From 2000 up to 2012, Brazil was one of the fastest-growing major economies in the world, with an average annual GDP growth rate of over 5%, with its economy in 2012 surpassing that of the United Kingdom, making Brazil the world's sixth largest economy (Soto, 2015). However, Brazil's economic growth has decelerated in 2013 and it had almost no liquid growth during 2014 and 2015 (Soto, 2015). Brazil's medium-term prospect will strongly depend on the success of the current adjustment and the adoption of further growth-enhancing reforms. To achieve higher growth in the medium-term, raising productivity and competitiveness is the crucial challenge for the country (World Bank, 2015). Nevertheless, the country experiences extreme regional differences, especially in social indicators such as health, infant mortality and nutrition; for example, the South and Southeast regions experience much better results than the North and Northeast (World Bank, 2015). Moreover, despite the achievements in poverty reduction over the last decade, inequality remains at relatively high levels for a middle income country (World Bank, 2015). For example, in 2014 Brazil ranked 51.5 in the Gini

coefficient index,[70] with the richest 10% of Brazilians receiving 42.7% of the nation's income, while the poorest 10% received less than 1.2%.

5.3 Biomes and biological diversity

Brazil is the country with the greatest biodiversity, where between 15 to 20% of the total number of species of the Earth is found. Also, the country is home to at least 103,870 animal species and between 43,000 and 49,000 plant species as well as microorganisms, algae and several biological groups never before studied (SECOM, 2012). Brazil also ranks third on the list of countries with the most number of bird species and second with the most reptile species (Palmerlee, 2007). Approximately 700 new animal species are discovered each year in Brazil (SECOM, 2012).

Brazil has its territory divided into six natural biomes (figure 7): the Amazon (rainforest), Cerrado (savannah), Caatinga (semi-arid), Atlantic Forest, Pantanal (wetlands) and Pampa (lowlands). Around 54.4% of Brazilian territory is still covered by forests (table 4), representing the second biggest forested area on the planet only behind Russia (SFB, 2013). The remaining lands are used for agriculture, cattle, urbanism and infrastructure. Brazil possesses 12% of the world‘s reserve of available freshwater (USAID, 2011). However, geographically, these resources are extremely unevenly distributed. Nearly 73% of Brazil‘s freshwater is concentrated in the sparsely populated Amazon River Basin. The Pantanal is under pressure from expansion of large soy and sugar plantations. Water pollution and availability issues exist in the industrialised South and Southeast, which is home to the majority of the population.

[70] See at: http://data.worldbank.org/indicator/SI.POV.GINI?locations=BR

Figure 7. Biomes of Brazil (Source: ABAG, 2017)

Table 4 Estimated forest areas in Brazil

Type of Forest	Total Area (ha)	% of Forests	% of Brazilian Territory
Natural	456,083,955	98.45	53.56
Plantation	7,185,943	1.55	0.84
Total	463,269,898	100	**54.40**

Source: Adapted from SFB; GEIF; ABRAF, 2013

Nevertheless, there still are difficulties in calculating the area of natural forests within the different biomes in Brazil. This happens on account of the absence of a proper systematic mapping of vegetation in each region and the continuous improvement of image interpretation methodology, for example, when there are changes in the mapping.

Different sources diverge about forest ownership estimations in Brazil: between 68% (FAO, 2015)[71] and 81% (TFT, 2013)[72] of the forest area is supposed to be "publicly owned". Public ownership is merely public administration, the other part is owned by communities. Also indigenous lands in Brazil are considered of public ownership. Between 19 and 23% is supposed to be in private ownership. But such proportion of private forest ownership affects implementation of forest policy at the national level (due to lack of enforcement) in the country, even though this number is relatively not too high. In their country report Brazil, FAO (2015) states that in 8% of the forest area, ownership is unknown and there is a great lack of information on the ownership of forests in Brazil, probably also caused by differences in the interpretation of "public ownership".

Public lands with natural forests can be managed by private companies of by traditional communities. There is no plantation management on public lands. The management of natural forests may also occur on private land. "Permanent Forest Estate" (PFE) is defined as: land, whether public or private, secured by law and kept under permanent forest cover (TFT, 2013). This includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfill a combination of these functions. Forest area that is not classified as PFE is open for conversion to other land uses. Brazil is one of the countries with the largest public forest area under community management. For example, in 2010, 152 million hectares were under community-based management in Brazil (FAO, 2015). Brazil also recognises a number of tenure regimes for local and indigenous communities, each subject to specific conservation requirements such as: i) extractive reserves, ii) sustainable development reserves, iii) national forests, iv) agro-extractive settlement projects, v) forest settlement projects, vi) sustainable development projects, vii) "Quilombos", [73] indigenous lands, etc.

5.3.1 Amazon

The Amazon biome represents about 8% of all the world's remaining forests (SBF, 2013). Originally, the Brazilian Amazon had about 4 million km² of forests. In this region, plants alone can hold up to 76 billion tonnes of water in their living tissues (carbon composes approximately 45% of dried biomass while water composes about

[71] See FAO (2015) Global Forest Resources Assessment 2015.
[72] See TFT Country guide to timber legality - Brazil
[73] Quilombos are the communities' descendants of Afro-Brazilian slaves who escaped from slave plantations.

40% of fresh biomass (Baker et al., 2004)). These forests function as an efficient soil-atmosphere water pump. For example, on an average day, about 20 billion tonnes of water is transpired by plants in the Amazon basin (Manfrinato et al., 2007). The Brazilian Amazon overlaps with two other geographic areas: the Amazon Basin and the Legal Amazon. Through nine countries (Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil, French Guyana, Guyana, and Suriname), the Amazon Basin extends over 6.8 million km^2 (Goulding et al. 2003). Concerning the Legal Amazon, it is an area that encompasses nine Federal states in Brazil (Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins and part of Maranhão). This governmental action aims at bringing together the regions of similar economic, political and social problems, in order to better plan for the development of the Amazon region.

5.3.2 Cerrado

The Cerrado biome is formed by a complex set of habitat mosaics and plant varieties that occupy all of central Brazil and encompasses an area of 2.04 million km², (SECOM, 2012). It is characterised by a gradient of grassland, savannah and forest formations (Ribeiro, 2013). The savannah formation mostly constitutes this biome which is, after the Amazon, the second largest biome of Brazil (Klink and Machado; 2005, Ribeiro, 2013). Also, it is considered one of the world's richest savannahs, representing an estimated 5% of all global biodiversity, with 11,627 catalogued native plant species (SFB, 2013; SECOM, 2012).

5.3.3 Caatinga

The Caatinga biome covers an area of approximately 844,455 km² equivalent to 10% of the national territory and is the only exclusively Brazilian biome. Its vegetation is a mosaic of thorny shrubs and seasonally dry forests and, despite occupying a semi-arid region, its biodiversity is extremely heterogeneous, sustaining various economic activities aimed at agro-silvopastoris and industrial purposes (SFB, 2013).

5.3.4 Atlantic Forest

The Atlantic Forest biome encompasses an area of 1.1 million km² or 13% of the Brazilian territory and extends along the entire coast from the Northeast to the South. However, the forest area in this biome was drastically reduced and currently is extremely fragmented. Nevertheless, the Atlantic Forest still hosts a significant portion of Brazil's biological diversity (SFB, 2013).

5.3.5 Pantanal

The Pantanal biome is considered one of the largest continuous wetlands of the planet. It has an approximate area of 150,355 km² representing 1.8% of the total Brazilian territory. This biome is under direct influence of three major biomes: Amazon, Cerrado and Atlantic Forest. In addition, it is also influenced by the Chaco biome – name given to the Pantanal located in Northern Paraguay and Eastern Bolivia (SFB, 2013).

5.3.6 Pampa

The Pampas are fertile lowland plains of the far South part in Brazil. It occurs in the state of Rio Grande do Sul (encompassing an area of 176,496 km^2) and extends across Uruguay and Argentina. The dominant vegetation consists of pampa grass interspersed with semi-deciduous forests, subtropical forests (mainly Araucaria forests) and seasonal forests (SFB, 2013).

5.4 Environmental problems

Brazil faces its own set of environmental issues, for instance, illegal wildlife trade, loss of biodiversity, air and water pollution, land degradation and severe oil spills, among others. In areas where agriculture is more intense and developed, there are serious problems of soil erosion; siltation and sedimentation of streams and rivers, and pollution with pesticides (see Blaikie, 1985; Pimentel et al., 1987). Moreover, desertification, another important environmental problem in Brazil (see Cavalcanti and Countinho, 2005; Vieira, 2007), only received international attention following the outputs from the Earth Summit. However, the environmental problem that attracted most international attention

in Brazil since the 1980's[74] was undoubtedly the deforestation rate in Amazonian forestlands, even though deforestation was and still is a significant problem in all other biomes. The Brazilian Amazon accounts for 48% of the country's total area, covering an area of approximately 419 million hectares and is often used as a proxy for Brazil's tropical forests (SFB, 2013).

For many years Brazil has shown the highest deforestation rates worldwide. Therefore, for a meaningful study concerning the Brazilian formulation of a national REDD+ strategy, deforestation issues must be addressed. Addressing only the promotion of sustainable use of forest resources would neglect the most important forces behind forest clearance in Brazil. For a better understanding of how to develop such strategies, it is imperative to address these issues in an integrated way. Thus, the discussion of their roles is required for the design of a realistic set of effective policies to curb deforestation and benefit traditional and indigenous communities who depend on natural resources for their subsistence. Considering then that deforestation releases GHG and aggravates global warming, the next two topics present an overview of the state of deforestation underway until nowadays in Brazil likewise the Brazilian GHG emissions estimates.

5.4.1 Deforestation process in Brazil

The Amazon rainforest had remained almost intact until the beginning of the "modern" era. Since colonial times, settlement of the Brazilian Amazon has been marked by violent confrontation and deforestation actions in the competition over natural resources and access to land (Hall, 2013). Brazil showed for many years the highest deforestation rate globally, which mainly occurred in the Amazon region. For example, according to FAO (2006b) from the year 2000 to 2005 Brazil accounted for about 42% of total global net forest loss. During this period, the mean annual deforestation rate was 22,392 km^2, representing 18% more than in the previous five years (19,018 km^2). About 17% of the region has now been cleared mainly as a result of cattle ranching, timber

[74] While at that time some concepts such as the Gaia Hypothesis and Silent Spring were emerging and taking place worldwide, Brazil was beginning to unfold economic megaprojects and launch public infrastructure, settlement and fiscal incentive policies that eventually proved to be not merely controversial, but often disastrous. In reaction to those projects, which were largely unleashed during the period of military dictatorship (1964-1989), social movements expanded and converged in the region, fighting for the rights of the peoples of the forest. Their most expressive moment was to take place much later in 1988, in the state of Acre, with the murder of the rubber tappers' leader Chico Mendes; an event that had international repercussions (WWF, 2015).

extraction and agricultural crops (Hall, 2013). The total deforested area in the Amazon increased 51% over the past 20 years (IBGE, 2012).

5.4.1.1 The main drivers

Agricultural expansion (mainly soya and beef for export markets), infrastructural development and selective or illegal logging – loggers in the Brazilian Amazon exploits weaknesses in the country's regulatory system to launder illegally logged timber for the global market (Greenpeace, 2015) – are amongst the most frequently cited drivers of Amazon clearance in Brazilian territory, while public policies, institutional weakness (lack of governance, weak property rights and negligence with the environmental legislation) and international market demand are considered as important underlying causes (Wertz-Kanounnikof et al., 2008). Whereas industrial activities are the principal driver of deforestation and degradation worldwide, in Asia, the main contributors to deforestation are the combination of subsistence agriculture and large-scale farmers and in Africa the small-scale subsistence agriculture and fuelwood consumption (Kissinger et al., 2012). Within this context, it is important to notice that this support to poor livelihoods through the use of natural resources only responds to a minor part of the complex process of deforestation in Brazil (Verchot and Petkova, 2009). Small-scale farmers are estimated to account for only about one-fifth of the deforestation rate in Amazonian lands (Chomitz, 2007).

Concerning infrastructural development, there is a particular case written in the Amazonian history, the construction of the Trans-Amazonian Highway[75] in 1972 (official designation BR-230). The construction of the highway has contributed to a large deal of deforestation in the Amazon (Skole et al., 1994). Access roads branch perpendicularly off BR-230 allowing deeper penetration into the surrounding forested areas. Originally these roads were to open up land for agriculture by settlers; however, loggers have used these roadways to further deforest the surrounding forested lands (Skole et al., 1994). Moreover, the serious debt crisis of the 1980s in Brazil led to large scale-deforestation due to massive development projects, for servicing foreign debt (DeShazo et al., 2016).

[75] Official named in Portuguese as "Rodovia Transamazônica" is 4,000 km long, making it the third longest highway in Brazil. It runs through the Brazilian states of Paraíba, Ceará, Piaui, Maranhão, Tocantins, Pará and Amazonas.

The region known as “Arc of Deforestation”[76] (figure 8) has been the world’s most active deforestation frontier in recent decades (Macedo et al., 2011). Beef production in Amazonian lands tends to be extensive, with low levels of meat production per unit area (Boucher et al., 2011). More than two-thirds of the deforested area in this part of the Amazon is used for extensive cattle ranching. For example, the states of Mato Grosso, Rondônia, and Pará have converted from 1996 to 2005 an average of 16,600 km^2 per year of forests (Macedo et al., 2011).

Figure 8. Arc of deforestation in the Legal Amazon (Source: Forest Trends, 2015)[77]

Domestic beef consumption was used to drive the expansion of Brazil’s cattle ranching activities, but international drivers gained greater importance since the year 2000 (Wertz-Kanounnikof et al., 2008). Brazil has emerged as the largest beef exporter (growing by 140% from 1990 to 2003) in the world, surpassing the USA in 2003 and Australia in 2004 (Wertz-Kanounnikof et al. 2008). This happened on account of mainly

[76] Arc of Deforestation is the region where the agricultural frontier advances towards the native forest (having the highest rates of deforestation in the Amazon). It encompasses an area of almost 500,000 km² that goes from the East and South of Pará state towards the West, passing through the states of Mato Grosso, Rondônia and Acre.

[77] Online available at: http://www.ecosystemmarketplace.com/articles/indigenous-people-explore-many-shades-redd/

two reasons: the first change was the improvement of livestock production system, which increased the number of animals produced per area. The second and most significant reason was the eradication of major diseases (such as bovine spongiform encephalopathy), allowing the states of Mato Grosso, Acre, and the Southern half of Pará to export beef to Europe (Wertz-Kanounnikof et al., 2008). Both facts have enabled substantial increase in profit in the Amazon by farmers, stimulating huge investments in, and an expansion of the occupied area.

The development of new temperature-tolerant varieties of soya enabled the expansion of soya production in the late 1990's into the Amazon region (Fearnside, 2001). Additionally, the decrease in world supply of animal protein feed production caused an increase in soya bean price (Brookes et al., 2005; Hard, 2002). Over the past decades, Brazil's soya bean production has expanded rapidly (TNC, 2010). For instance, in 1969 Brazil produced only 1 million tonnes of soya beans. On the other hand, by 1975 Brazil already produced 11.6 million tonnes and surpassed China to become the world's second largest soya producer. Moreover, by 1989 production rose to 20 million tonnes and in 2009 it reached 63 million tonnes. Every year soya production plays a greater role in Brazilian exports and is currently the most important commodity in Brazilian agribusiness (TNC, 2010). According to TNC (2010), in the 2009 export market, Brazil was the world's second largest exporter of whole soya beans (behind only the USA) and of soya meal and soya oil (behind only Argentina). The 2014/15 soya bean production in Brazil was forecasted to increase by 8% (reaching 97 million tones), making Brazil the world's largest soya bean exporter, based on augmented available supplies and strengthened export capacity (USDA, 2014a).

A relationship can be observed between deforestation and soya bean and cattle prices in the international market. This means, it can be observed that as the commodities prices increase, the deforestation rates increase as well. Thus, the global fluctuations of market prices highly influence the production level and the consequent pressure on forest resources in Brazil. Figure 9[78] shows the relation between beef and soya production with deforestation:

[78] The dotted line presented in the graphic represents the threshold level established in the National Policy on Climate Change as the deforestation baseline scenario.

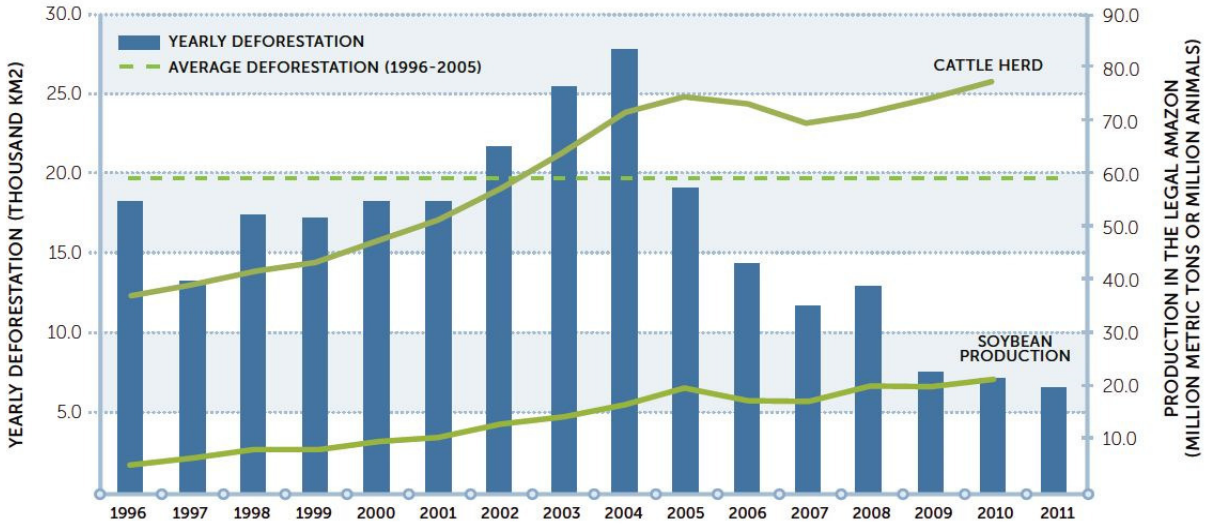

Figure 9. Relation between deforestation and beef and soya production in Brazil (Source: IPAM, 2012)

The share of Amazon clearing for soya bean crops (at least in Brazilian territory) is considered low relative to clearings for new pastureland – soya bean farmers usually use degraded pasture[79] lands (Brandão et al., 2005; Chomitz and Tomas, 2001). However, the soya bean production can be seen as a main indirect driver of deforestation, as it induces land sellers (e.g., cattle ranchers and smallholders) to further advance into the Amazon to open up new lands (Barona et al., 2010; Wertz-Kanounnikof et al. 2008). This happens on account of the increased value of the land because of the production of soya bean and this is an incentive for the ranchers to sell their land to the soya bean producers and search for new land further into the Amazon (Dalene, 2011). Soya bean farming also provides the economic and political basis for new infrastructure projects, which accelerate deforestation by other actors (Wertz-Kanounnikof et al. 2008).

Looking onwards the Amazon region, the Northeast, South and Southeast regions concentrate 85% of the Brazilian population (IBGE, 2014). These regions underwent the most intense deforestation rates in Brazil, due to urbanisation and economic growth. Although the remaining natural vegetation in these regions is protected by law, deforestation is still ongoing (Watson, 2005; WWF, 2011) and management activities are restricted only to planted forests. Amongst these biomes, the most endangered are the Atlantic Forest, whose actual coverage corresponds only to

[79] Pasture degradation is defined as the progressive loss of natural vigor, productivity and recovering capacity demanded by the animals, according to Assad et al. (2013).

7.9% of its original vegetation (SBF, 2013) and the Pampas, which maintains only 10% of its original coverage (SBS, 2006). In the Northeast, the Caatinga is continuously endangered; in spite of legal restrictions, a large quantity of wood is used as firewood, which is the main basis of energy generation in the region, owing to poverty and the scarcity of other fuel sources (MMA, 2011). From the 1980's cattle, agriculture and forestry expanded rapidly in the Center-West region. Intensive production expanded when new technologies (intense mechanisation, adapted seeds, access to macronutrients) made soya bean production viable in lands with low fertility, using a land-use model based on large properties, at least 1,200 hectares were considered necessary for soya bean production to be economically viable areas (Bessa et al., 2005). The low price of land combined with official incentives and the favourable conditions of the market rapidly made soya bean the most profitable crop in the Cerrado region areas (Bessa et al., 2005). This expansion is heavily changing the landscapes of this biome. By 2002, 890,636 km² had been deforested; between 2002 and 2008, this amount was increased by 85,074 km², totaling 47.84% of the Cerrado's original forest area (MMA, 2011a). This means that the Cerrado has lost around half of its original forested cover, with only 66.3 million hectares remaining (MMA, 2011a).

5.4.2 Brazil and GHG emissions

Rapid economic growth and industrialisation over several decades has brought increasing reliance on fossil fuels and increasing GHG emissions in Brazil (Chandler et al., 2002). However, the country ranks relatively low in energy-related carbon emissions, even though the energy sector now emits more than twice as much as it did back in 1990 (MCTI et al., 2013). On the other hand, the largest share of Brazil's GHG emissions derives from non-energy sources such as agriculture and livestock, land use change and forestry. During 1990 and 2005 a total of 55.8 million hectares of forest from the entire Amazon Basin were cleared, which corresponds to a release of approximately 4.8 million tonnes of carbon (FAO, 2010). Brazil is among the top six GHG emitters due to deforestation (Marcovitch, 2006). For instance, in 1995, deforestation accounted for 1,950,084 $GtCO_2eq$ (see figure 10) representing almost 80% of total net CO_2 emissions in the country (MCTI et al., 2013). In 2004 deforestation of Amazonian areas in Brazil accounted for almost 5% of global GHG emissions (Boucher et al., 2013).

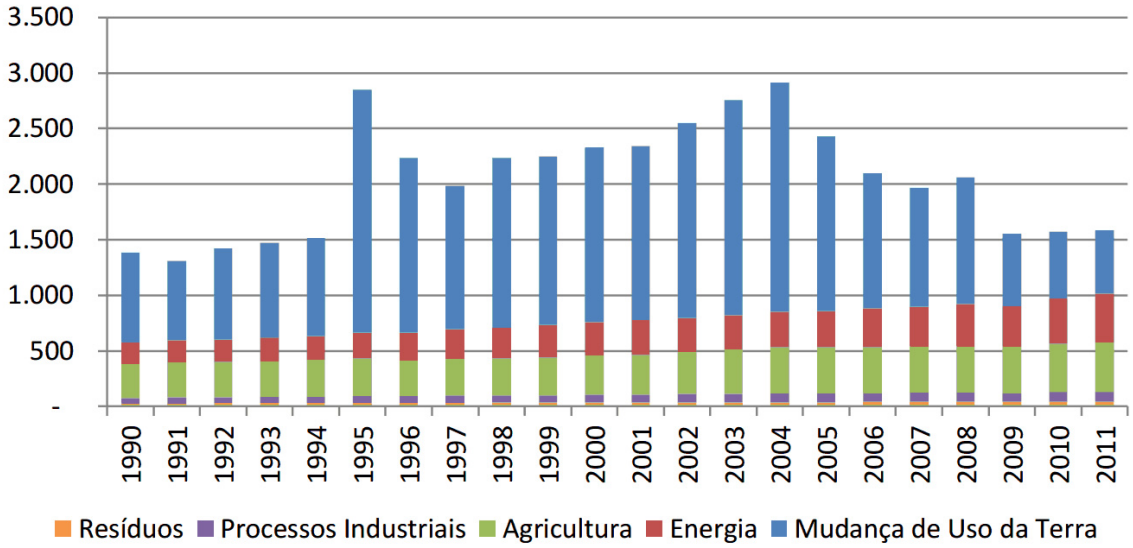

Figure 10. Brazilian GHG emissions per sector (1990-2011)[80] (Source: MCTI et al., 2013)

Over the past decades, Brazil has drastically cut its carbon footprint for the reason that the deforestation rate has fallen considerably since 2005. The forestry sector decreased in 76.1% (table 5) its total CO_2 emissions during the period from 2005 to 2010 in Brazil (MCTI et al., 2013).

[80] Translation: The colours refer to: orange – waste treatment, red – energy, lila – industrial processes, green – agriculture and blue – forestry and land use change.

Table 5 Brazilian total CO_2 emissions per sector (1995-2010)

Sector/Year	1995	2000	2005	2010	Variation
	Gt CO_2eq				2005-2011
Energy	232,340	301,096	382,808	399,302	+21.4%
Industrial	63,065	71,673	77,943	82,048	+5.3%
Agriculture	335,375	347,878	415,713	437,226	+5.2%
Forests	1,950,084	1,324,371	1,167,917	279,163	- 76.1%
Waste	33,808	38,550	41,880	48,737	+16.4%
Total	2,615,162	2,083,570	2,032,260	1,246,477	**- 38.7%**

Adapted from: MCTI, 2013

On the other hand, in 2013 all five sectors have increased their emission rates, releasing in total about 1.5 million tonnes of CO_2eq, representing an increase of 7.8% compared to 2012 and the highest value recorded since 2008 (SEEG, 2015). In spite of this increase, Brazil is still on track to meet climate goals announced in Copenhagen in 2009. Brazil could increase its emissions by nearly 66% from 2010 levels and still achieve its 2020 targets (Tollefson, 2013). This is exactly a point of disagreement; some specialists criticise the country position, declaring that its targets should be more audacious and realistic. The overall targets established by the National Policy on Climate Change (NPCC) are not divided by sectors, although each sector has it own mitigation plans, which means that one sector must compensate the other (SAE, 2014, personal communication).[81] According to Fraundorfer and Rabitz (2015), it was unlikely that Brazil would take more aggressive measures in areas other than forestry, although an ambitious contribution to global post-2020 mitigation would require more stringent action in all other sectors.

[81] SAE – Secretariat of Strategic Affairs of the Brazilian Presidency – Personal Communication

5.5 GHG mitigation measures non-forest related

Recent reductions on deforestation rates have helped to reduce CO_2 emissions in Brazil. However, the forestry issue area is not discussed in detail here as this section focuses on non-forest-related mitigation measures. Although Brazil has also been active in advancing policies to address emissions from energy use, GHG emissions from the energy sector increased 21.4% between 2005 and 2010 (MCTI et al., 2013). The country is motivated in part by the desire to address social issues and increase economic development, as several GHG mitigation options – both within the country and globally – could have strong overlap with these concerns. For example, distributed renewable electricity generation can help bring electricity to the rural area, and GHG mitigation strategies that rely on Brazil's growing biofuels business could support economic development (Erickson et al., 2009). Brazil's sectoral mitigation plans are in different stages of development and implementation (Gebara and Thuault, 2013). Existing national programmes in Brazil focus mainly on efforts to curb deforestation and on expanding the use of renewable energy. More than 40% of Brazil's energy comes from renewable sources compared to an average of less than 20% for the rest of the world (figure 11 and 12). The figure 13 shows the Brazilian electricity supply in the year 2014.

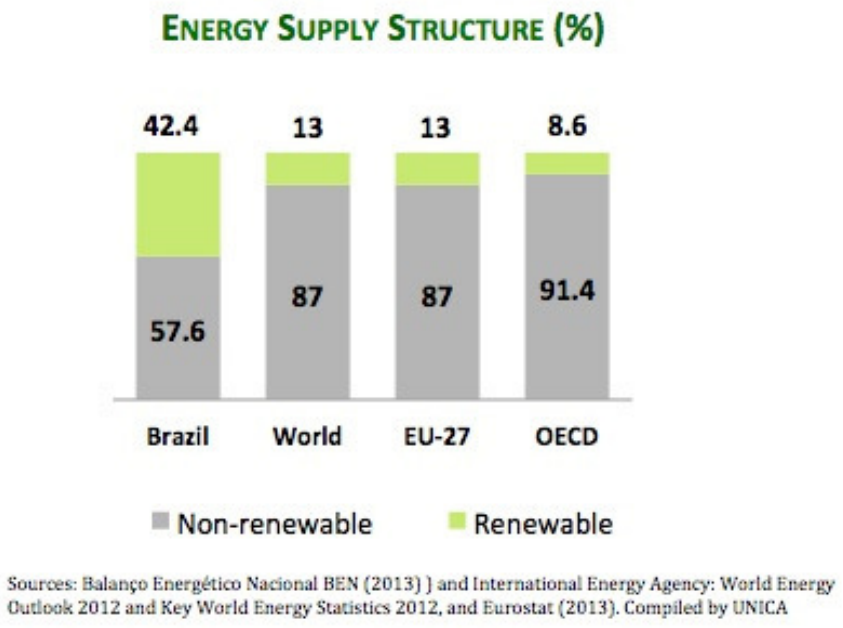

Figure 11. Energy supply structure in percentage (comparision between Brazil worldwide) (Source: Surgacane.org, 2013)[82]

[82] Online available at: http://sugarcane.org/the-brazilian-experience/brazils-diverse-energy-matrix

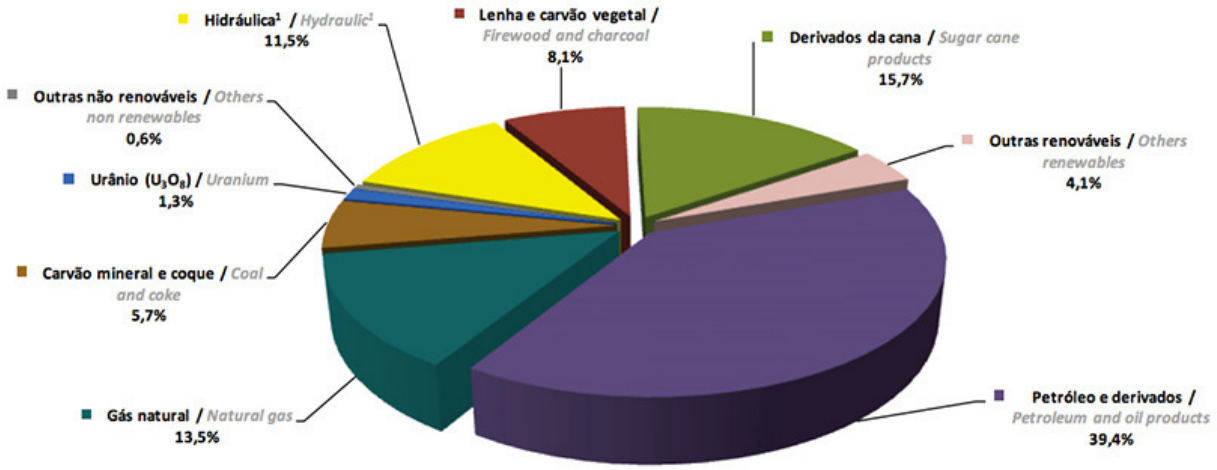

Figure 12. Brazilian energy matrix in 2014 (Source: Brazilian Energy Balance, 2015)

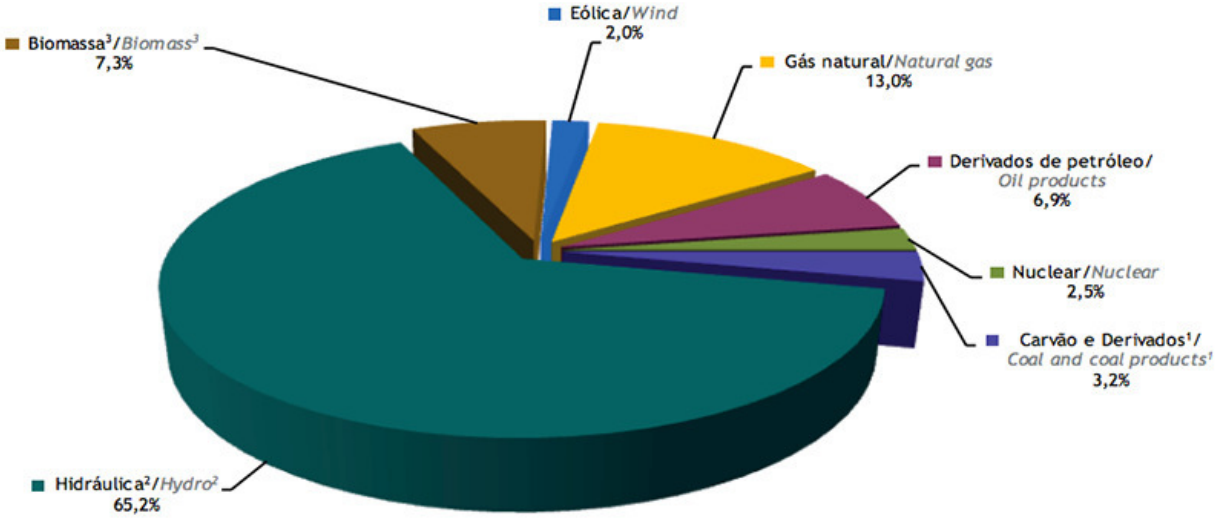

Figure 13. Brazilian electricity supply in the year 2014 (Source: Brazilian Energy Balance, 2015)

Brazil has also used its NDC[83] to state what its energy and electricity mixes will look like by 2030. Renewables will make up a 45% share of its energy mix by 2030, with renewable sources, excluding hydropower, to occupy between 28% and 33% of the total. This commitment, however, does not indeed represent progress considering that renewable sources already make up more than 40% of primary energy production in

[83] Online available at: http://www4.unfccc.int/ndcregistry/PublishedDocuments/Brazil%20First/BRAZIL%20iNDC%20english%20FINAL.pdf

Brazil (almost 43% in 2013, for example). Meanwhile, the share of renewable (other than hydropower) will constitute at least a 23% share in Brazil's power supply by 2030. This will be achieved by raising the share of wind, biomass and solar and achieving efficiency gains of at least 10% in the electricity sector, as stated in the NDC. Moreover, the share of sustainable biofuels in the Brazilian energy mix should be increased to approximately 18% by 2030, by expanding biofuel consumption, increasing ethanol supply, including by increasing the share of advanced biofuels and increasing the share of biodiesel in the diesel mix.

Nevertheless, Brazil has been also introducing policies focused on reducing energy-related GHG emissions. In the energy sector, examples of national programmes include: i) the National Ethanol Programme (ProAlcool); ii) the National Programme for Production and Use of Biodiesel (PNPB) and iii) the Programme of Incentive to Alternative Sources of Electric Energy (PROINFA).

The ProAlcool is one of the oldest national initiatives aimed to promote ethanol use as an alternative fuel in transportation (Erickson et al., 2009). Brazil first launched the ProAlcool in 1975 trough the Decree 76.595/1975 to promote ethanol production (from biomass, e.g. sugar cane, cassava and sorghum) as a substitute for gasoline (Chandler et al., 2002), when energy supply became a main priority due to the oil crisis and the low price of sugar (Soccol et al., 2005). At that time, sugar cane was chosen due to its great adaptation to the Brazilian weather and soil type (Soccol et al., 2005). Between 1975 and 2006, Brazil's sugar cane production increased by 412%, from 88.9 million to 456 million tonnes (Moraes, 2008). Currently the production may reach 590 million tonnes (UNICA, 2015). According to Voegele (2015), for the 2015/16 season, the UNICA[84] predicts that ethanol production would reach 27.28 billion litres, up 4.33% from the 26.15 billion litres produced during the 2014/15 season.

The main objective was to slow down energy consumption while maintaining economic growth, which means to diminish environmental impacts of energy use, and to create domestic jobs and income (Chandler et al., 2002). The government offered a variety of incentives including low-interest loans to build distilleries, ethanol purchase guarantees, favourable pricing relative to gasoline and sales tax reductions (Chandler et al., 2002). However, global oil prices had fallen since 1986; also domestic oil production had decreased dependence on foreign oil import. On the demand side, rising sugar prices led to two ethanol shortages (in 1989 and 1990) and price hikes, dropping the

[84] UNICA means Sugar Cane Industrial Union.

consumer confidence in alcohol-fuelled cars (Chandler et al., 2002). That trend was only reversed with the introduction of dual-fuel or flex-fuel vehicles in 2003 (Moraes, 2008). Today, ethanol is used in Brazil mainly as a gasoline additive. Alcohol fuel in the year 2000 still avoided 5.4 million tonnes of carbon emissions (Chandler et al., 2002).

The international market for ethanol could be a positive opportunity for Brazil. Ever since signatures were gathered on Kyoto Protocol, a number of developed nations have been seeking alternatives to petroleum in order to reduce their GHG emissions, which could mean opportunities for ethanol. However, the international ethanol market must be looked upon as a medium to a long-term undertaking. There are barriers to be overcome from issues concerning market protectionism in some developed countries, down to cultural differences (Moraes, 2008). Although some countries have shown a real interest in pure ethanol for blending with gasoline (such as Japan), very few countries have actual experience with fuel ethanol on any large-scaled (Moraes, 2008). Moreover, the countries must have source of supply they can rely on – at prices they can work with. No country will be willing to risk prices that would result if there were only a single supplier – in this case, Brazil. There are also logistical problems to be worked out, if exports are to increase.

In addition to ethanol, the government has introduced the PNPB (biodiesel[85] programme, see page 121) – launched on 6 December 2004 – from raw materials such as palm, castor bean and soya bean. The goal of this programme is to introduce a new fuel in the national energy mix from self sustained projects that combine fair price, high fuel quality, security of supply and social development policies (Erickson et al., 2009).

Brazilian biodiesel is derived from biomass and is used to power compression-ignition internal combustion engines. Regulations provide for other types of power conversion in which it can partially or entirely replace fossil fuels (Rodrigues and Accarini, 2009). Hence, there is no shortage of possible applications of biodiesel fuel in urban and highway transportation, as well as passenger and cargo shipping, railways, generators and stationary engines (Rodrigues and Accarini, 2009). The programme was designed to gradually converge on markets mechanisms by means of incentives which provide for the inclusion of producers in the poorest regions into the supply chain for this fuel, through incentives based on supply and demand (Rodrigues and Accarini, 2009). It is based upon laws, executive orders and other legal and normative documents.

[85] The biodiesel industry remains regulated by the government which increased biodiesel blend requirements to 6% effective (July, 2014) and 7% effective (November, 2014). As a consequence, biodiesel production for 2015 was projected at 4.4 billion liters, up 900 million liters from 2014 (USDA, 2014b).

Within this context, Brazil should concern to the fact that biofuel production typically takes place on cropland which was previously used, for instance, for growing food or feed. Since this agricultural production is still necessary, it may be partly displaced to previously non-cropland such as forests areas (being this process known as indirect land use change – ILUC). It took a long time for this discussion to be part of the EU Renewable Energy Directive (EU-RED) framework, for example. The EU-RED has been addressing deforestation due to direct land use change but in 2011, the European Commission delayed a decision on whether or not to address iLUC factors (Johnson et al., 2012). However, in 2015 new rules[86] came into force which amended the current legislation on biofuels – specifically the Renewable Energy Directive and the Fuel Quality Directive – to reduce the risk of indirect land use change (EU, 2016). Using this as a background, economic opportunities for developing countries to export biofuel to the EU could appear. The high productivity of biomass in tropical and subtropical regions could result in lower land use impacts and lower GHG emissions than result from biofuels produced in the EU (Johnson et al., 2012). These incentives could be linked to REDD+, stabilising the agricultural frontier, while reducing land use change and GHG emissions (Killeen et al., 2011). On the other hand, REDD+ countries my face higher costs in meeting the sustainability criteria, due to the lack of technical, financial and human resources to support certification (Johnson et al. 2012).

Access to electricity is considered essential to social and economic development in Brazil. Despite the fact that almost 70% of all energy generated in the Brazilian electric sector comes from hydroelectric power plants, in 2002, PROINFA was launched (Erickson et al., 2009). On the other hand, the hydropower sector in Brazil is unsustainable (Gebara, 2015b). For example, Brazil has never seen such a massive displacement of financial and natural resources (the dam prevents migration of the fish) and people (mainly indigenous) as in the construction of the Belo Monte hydropower

[86] The amendment:

- Limits the share of biofuels from crops grown on agricultural land that can be counted towards the 2020 renewable energy targets to 7%;
- Sets an indicative 0.5% target for advanced biofuels as a reference for national targets which will be set by EU countries in 2017;
- Harmonises the list of feedstocks for biofuels across the EU whose contribution would count double towards the 2020 target of 10% for renewable energy in transport;
- Requires that biofuels produced in new installations emit at least 60% fewer greenhouse gas than fossil fuels;
- Introduces stronger incentives for the use of renewable electricity in transport (by counting it more towards the 2020 target of 10% for renewable energy use in transport);
- Includes a number of additional reporting obligations for the fuel providers, EU countries and the European Commission.

dam. In some cases, dams can even produce more GHGs (which should be carefully measured and estimated) than power plants running on fossil fuels (even though carbon emissions vary from dam to dam), representing a significant additional impact of many dams, especially in the tropics (Valberg, 2011).

The PROINFA sets an overall goal for the production of 10% of the total electricity from non-hydroelectric renewable sources by 2022, divided into two phases. The first phase is to achieve 3,300 MW of renewable energy, divided equally among biomass, small hydro and wind. This would be achieved through long-term power purchasing agreements between Eletrobrás[87] and independent power producers, as well as fiscal incentives for each type of renewable energy (Erickson et al., 2009). The incentives of the programme are oriented to promote small producers, income distribution, the generation of local employment, a correct use of regional potential and the development of factories of materials and equipment, and the public partnership (Requejo, 2009).

Conflictingly, the idea to “decarbonise” the Brazilian power sector remains in absolute contradiction with current policy developments in the country. For example, in November 2014, the Federal Government opened power auctions to coal- and gas-fired power plants. The goal of this strategy was to expand the options of the power sector in case hydropower plants would not be able to provide enough electricity to reach the promptly increasing demand in the country (Climate Action Tracker, 2015). Severe occurrences of droughts are having a disruptive influence on hydropower production, which down 13% in 2014 compared to 2011 levels (Spencer, 2015). However, the success of such power plants in the government’s plans to increase power production from gas-fired power plants by 66% until 2023 compared to 2014 (MME, 2014) may restrict the options for profound decarbonisation[88] in the forthcoming future of the Brazilian economy. Moreover, while the NDC identified a 10% efficiency gain in the electricity sector as a key action, it might have also been crucial to have some focus on the transport sector and energy efficiency more broadly. For instance, the efficiency of transport per passenger kilometre would need to be reduced by 40% by 2050 for a relevant decarbonisation scenario in Brazil (Spencer, 2015). The energy intensity of the

[87] Centrais Elétricas Brasileiras S.A. (Eletrobrás) is a major Brazilian electric utilities company.
[88] In August 2015, Brazilian ex-President Dilma Rousseff issued a joint statement with Angela Merkel calling for the "decarbonisation of the global economy in the course of the century".

Brazilian transport sector is about 60% higher than the other BRICS[89] countries, for example (Spencer, 2015).

Furthermore, the extraction of the pre-salt layer has been a topic of strong discussions in Brazil. The pre-salt oil is of good quality, although it is found in reserves that are in deep-sea areas and under thick layers of salt, requiring large-scale investment to extract it. It is estimated that it can be explored from this area in Brazil between 70 and 100 billion barrels of oil and mineral natural gas (Petrobrás, 2016). The government argues that Brazil could become an oil exporter with this amount. In this way, the country would acquire greater power of political decision and generate more jobs and wealth. However, many environmentalists oppose Brazil's way of thinking about investing in oil exploration. They believe that this can make Brazil a global warming villain. Efforts on modifying the ways of obtaining energy by means less aggressive to the environment such as wind and solar energy have been disseminated. Deciding itself contrary to this thought, the Brazilian government is establishing an activity that produces great pollution through its many derivatives (e.g., sulfur, carbon dioxide and other gases that pollute the atmosphere).

According to specialists, a domestic climate policy that mainly focuses on anti-deforestation measures will not be able to sufficiently limit emissions in the post-2020 period in Brazil (Fraundorfer and Rabitz, 2015; La Rovere et al., 2013). At the same time there are several options to boost Brazil’s energy security such as increasing energy efficiency or introducing incentives for demand management. More effective utilisation of flexible renewable sources, such as biomass, wind and especially solar (for example, while Brazil has a considerable solar incidence, ranging from 4.25 to 6.5 sun hours/day (Martins et al., 2017), solar power in Brazil generates less than 0.01% of the country's electricity demand) as well as development of power grid to take advantage of the different sources of energy could also be used to reduce Brazil’s CO_2 emissions. This has also been emphasised by the International Energy Agency (IEA) in its World Energy Outlook 2013, according to which there are numerous measures that can increase energy efficiency in Brazil, which are not mentioned in Brazil’s National Energy Efficiency Plan – PNE 2030 (Climate Action Tracker, 2015). The PNE 2030 is designed to meet energy demand projected for 2030 considering the current standard of economic development, consequently (indirectly) considering also, an increase in both, energy consumption and supply due to the annual GDP growth rate (Neves, 2012). Further with

[89] BRICS refers to Brazil, Russia, India, China and South Africa.

Neves (2012), it is then (actually) projected an increase in GHG emissions in the energy sector, from 383 million tonnes of CO_2 in 2005 to 771 million tonnes of CO_2 in 2030.

5.6 Brazil and forest conservation context

Getúlio Vargas during his mandate in 1934 created the first edition of the Brazilian Forest Code[90] (Decree 23.793/1934), along with the Water Code (Decree 24.643/1934) and measures of protection and defense of wildlife (Decree 24.645/1934), as a governmental attempt to standardise the use of natural resources in the country. However, the 1934 Forest Code never became operational due to the inertia and the inattention of state and local authorities, as well as passive and deliberate resistance areas (Bessa et al., 2005). Afterwards in 1962, the Minister of Agriculture at that time, Armando Monteiro Filho, claimed for the reformulation of the forest legislation noting that the indiscriminate use and deforestation actions had a direct impact on agriculture. The reformulation took three years of debate among dozens of experts, and in September 1965, the then President Humberto de Allencar Castello Branco signed the Federal Law 4.771. This new Forest Code stated that 50% of the vegetation of each private property in the Amazon region should be preserved (these areas were named as Legal Reserves (RL)).[91] In other regions of the country, the required portion was 20%. The owners who eventually had already harvested beyond this percentage would have to be responsible for reforesting the area. For Bessa et al. (2005), the establishment of the 1965 Forest Code, the tax incentives for deforestation in 1966 and the creation of the Brazilian Institute for Forestry (IBDF) in 1967 marked the definition of a new forest policy, which initiated large-scale deforestation in Brazil.

Some experts say that the new law also defined the permanent preservation areas (APPs)[92] that should be mandatorily kept in the countryside or in the cities. These areas were intended to preserve the regime of water, prevent erosion, to protect fauna and flora, for example. However, Borges et al. (2011) cite that those areas were already prescribed in article 4 of the 1934 Forest Code, which referred to the protective forests.

[90] The Forest Code governs forest management and outlines the procedures for forest conservation as well as the conservation of natural resources in national forested areas, including both private and public lands.
[91] The native vegetation must be maintained in these areas, whether forests or other vegetation, in order to ensure the protection of native flora and fauna, biodiversity conservation and rehabilitation of ecological processes.
[92] The APPs are designed to protect soils and especially riparian forests. Generally riparian forests are relatively narrow on both riversides, rarely exceeding 100 meters wide in each side. This type of vegetation has the function of protecting rivers, ensuring the supply of groundwater and the preservation of aquatic life.

Nevertheless, the 1965 Forest Code brought limitations to private property, because until that time there was little or no standard that patronised environmental resources in rural properties (Borges et al., 2011). Also, on account of the used words "goods of common interest," the 1965 Forest Code can be considered the forerunner of the Federal Constitution of 1988, by conceptualising environment as a common good of the Brazilian people (Machado, 2004).

During the 1970s, the environmental movements began to influence environmental policies. A year after the Stockholm Conference, in 1973, the military government responded to these movements and created the Special Secretariat of the Environment (SEMA), responsible for creating the new protected areas (Bessa et al., 2005). However, the contradictions in governmental forest policy also became clear at this time. The government demonstrated concern for the environmental conflict; on the other hand it promoted the expansion of the agricultural frontier and the occupation of the Amazon region regardless of control (Bessa et al., 2005).

From the 1980's there is a clear evolution of Brazilian environmental policies and specific legislation for environmental protection, especially in its legal and institutional aspects, within a tendency towards decentralisation not only through the creation of government environmental agencies such as the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) in 1989 and the Ministry of Environment in 1993, but also through distribution of responsibilities. Moreover, aiming to enforce the Forest Code it was established by the National Environmental Policy (PNMA Law 6.938/ 1981), the National Environmental Council (CONAMA) and the National Environmental System (SISNAMA). In addition, table 6 presents below further examples. However, these advances were not enough to consolidate a democratic policy arena in Brazil to make feasible the right of public participation in political decisions on the environmental heritage of the country (Neves, 2012; Lima, 2011).

Table 6 Brazilian environmental laws

Legal Instrument	Topic
Law 4.771/1965	Forest Code
Law 5.197/1967	Protection to Wildlife
Law 6.938/1981	Environmental National Policy
Law 7.347/1985	Civil Public Responsibility for Environmental Damages
Federal Constitution/1988	Protection to the Environment article 225, Chapter VI
Decree 750/1993	Harvest, Use and Suppression of Primary Vegetation or Advanced Stages of Regeneration of the Atlantic Forest
Decree 1.922/1996	Private Natural Heritage Reserve (RPPN)[93]
Law 9.605/1998	Environmental Crimes Act
Law 9.985/2000	Conservation Units National System (SNUC)[94]
Decree 5.758/2006	Protected Area's Strategic National Plan
Law 11.428/2006	Use and Protection of Native Vegetation
Law 12.651 /2012	New Forest Code

Source: Adapted from WWF, 2008

In 1995, Brazil recorded the highest deforestation rate in Amazonian forests (29,059 km^2). Concerned about the rampant devastation, the then President Fernando Henrique Cardoso issued the Provisional Measure (MP) 1.511 in 1996, which increased the legal reserve in Amazonian forestlands to a percentage of 80% and reduced from 50 to 35% the legal reserves in the Cerrado areas within the Legal Amazon region. Despite being an important law, there has constantly been an immense pressure on from the agricultural sector for its modification (SOS Florestas, 2011). In 1998, the Law of Environmental Crimes brought tougher penalties for those who disobeyed environmental

[93] The Private Natural Heritage Reserve is a category of Conservation Unit created in particular private area for voluntary owner act, in perpetuity, established by the government.

[94] The SNUC brought a number of directives and regulations aimed at modernizing the management of protected areas in Brazil. This law suggests that states and municipalities also create their conservation unit systems to contribute in achieving the goals related to the biological diversity protection at national and international levels. Because of the great diversity in Brazil, the Conservation Units are divided into two major groups:

i) Protection of Permanent Conservation Units: aimed to preserve the nature in areas with little or no human action, which does not allow the direct use of natural resources. They are divided into five categories: Ecological Station, Biological Reserve, National Park, Natural Heritage and Natural Wildlife Refuge;

ii) Protected Areas for Sustainable Use: allow the sustainable use of natural resources. They are divided into seven categories: Environmental Protection Area, Area of Relevant Ecological Interest, National Forest, Extractive Reserve, Fauna Reserve, Sustainable Development Reserve and Private Natural Heritage Reserve.

legislation. This law reaffirmed most of the activities defined as illegal by the 1965 Forest Code as crimes while including a list of other activities that would also be criminalised areas (Bessa et al., 2005). Likewise, it contained a set of restrictive measures including bank financing restrictions for producers that had not regularised their environmental liabilities. Some representatives of agribusinesses then began to feel pressured. The agricultural sector lobby started to build a strategy, related to the substantial decrease in deforestation rates in the Brazilian Amazon, to propose the creation of a new Forest Code (Soares-Filho et al., 2014). By the beginning of ex-President Dilma Rousseff's administration in 2010, anew a narrative of growth-seeking as the overriding purpose of economic policy has justified reducing the territory of Conservation Units, and licensing activities, with a high negative environmental impact on indigenous lands (Abranches, 2014). New axes have become the structuring forces of the social and economic dynamics such as the construction of large hydropower plants, road-building, oil and gas exploitation and mining.

Until 2012, there were a total of 36 bills that have tried to overthrow the Forest Code (SOS Florestas, 2011). A new version – after twelve vetoed points and other 32 amendments determined by the then President Dilma Rousseff – was approved in May 2012 into law. The New Forest Code (Law 12.651/2012) involves at least three controversial points stressed by the conflict between large landowners and environmentalists' interests. Substantial efforts were allocated to the reduction of the percentage of land area that composes the legal reserve zones in private lands. These efforts were not effected. However, in the 1965 Forest Code, the APP areas must have been computed separately from the legal reserve, while in the 2012 Forest Code, the APP areas can be computed inside the legal reserve area. Consequently, this alteration indirectly promotes the reduction of these areas and losses of biodiversity (Borges et al., 2011). Likewise, the permission to perform crops on top of hills (in areas with higher altitude than 1,800 m) was obtained, which was earlier not allowed. Finally, the Amnesty for loggers – which no longer pay fines related to deforestation made before July 2008 (after the enactment of the Environmental Crimes Act) – is highly questioned. Specialists argue that the instruments that reduce restoration requirements are applicable only for areas converted previous to that date (Lima et al., 2011). However, this action will reduce the area to be reforested from 500,000 km^2 to 210,000 km^2 (Soares-Filho et al., 2014). Moreover, these changes in the Forest Code will affect conservation in all

Brazilian biomes and estimates show that the new law allows legal deforestation of an additional 400,000 km^2 of the Cerrado biome (Soares-Filho et al., 2014).

Nevertheless, the 2012 Forest Code introduces new mechanisms to address fire management, forest carbon and PES, which could assist in reducing deforestation actions and bring environmental benefits even though the 2012 Forest Code reduces restoration requirements. According to Soares-Filho et al. (2014) the most important mechanism might be the Environmental Reserve Quota (CRA), a tradable legal title to areas with intact or regenerating native vegetation exceeding the Forest Code requirements. The CRA (surplus) on one property may be used to offset a legal reserve debt on another property within the same biome and, preferably, the same federal state. They also affirm that implementing the CRA could create a trading market for forested lands, adding monetary value to native vegetation, abating potentially 56% of the legal reserve debt. Therefore, given the high costs of forest restoration, the exchange of CRAs could become a cost-effective way to facilitate compliance, meanwhile protecting forest surpluses that might otherwise be legally deforested (Soares-Filho et al., 2014). However, depending on regulatory choices, this offset market could also be flooded with low-cost titles from private lands inside areas already protected by the Forest Code, meaning that no additional forests would be saved (Rajão and Soares-Filho, 2015). This would allow landowners with forest debt to purchase inexpensive offsets while others could legally clear their own land (Gebara, 2015a).

The 2012 Forest Code made it mandatory to map all rural properties in the Rural Environmental Registry (CAR). With compulsory registration of all landowners, the CAR is a strategic electronic database for controlling and monitoring rural properties (through satellite images). Landowners must register their properties defining the area and identifying the geographic coordinates, as well as all protected areas within the property, especially APPs and legal reserves. It is aimed at integrating environmental information regarding the status of forests and remnants of native vegetation, the natural areas of restricted use and consolidated areas of private rural properties and state rural possessions. However, the registration does not guarantee property rights. While each state should decide through their environmental agencies how to establish the CAR system, the Decree 7.830/2012 created the Rural Environmental Registry System (SICAR), which will integrate the information of all federative units, besides regulating the CAR system. Thus, the state environmental agencies should make the information available on the internet, which will also serve for consultation and monitoring (by the

landowners) of the situation of their rural properties concerning environmental regularisation.

From the proposed approach, the CAR system could be the one of the most important tools lacking by the federal government to improve its cross-coordination governance on environmental issues. On the other hand, there is no other measure to support environmental regularisation beyond the CAR (Gebara, 2015a). The simple registration of rural properties in the CAR is not enough for the landowners to start implementing its environmental adjustment programmes (PRAs). According to Pires and Ortega (2013), the instrument is losing significance due to several problems such as: i) the lack of strategy and coordination of the instrument with other policies and measures; ii) the excessive focus on the application and not in the whole process; iii) the lack of priority of the federal government with environmental management, since the regulation of CAR took two years to be published, and also is not comprehensive enough; iv) the lack of strategic aspects such as level of public transparency. With transparency, the society could exercise social control over deforestation. But for that to happen, it is necessary to reformulate the MMA Normative Instruction 3/2014, eliminating articles 4 and 11 that limit access to essential information, which is even in contradiction with the Federal Law on Access to Information (Law 1.227/2011). In addition, it is also urgent to promote the analysis and validation of the records already made in the CAR to guarantee its accuracy, respectability and its use in combating deforestation.

5.7 Brazilian position on climate change and forests

Until recently, Brazil maintained that yearly GHG emissions should not be seen as a proxy for a country's responsibility for climate change. This responsibility, it argues, is more closely related to the contribution to global temperature increase. Since CO_2, the most important GHG, remains in the atmosphere for more than one century on average, past emissions need to be taken into account (La Rovere and Pereira, 2007). Brazil also argued that yearly emissions data generally overestimate developing countries' contributions to climate change, and underestimate that of developed countries. As a result, in international negotiations, Brazil has refused to accept emission targets before the middle of this century. Brazil affirmed that at that time the burden of responsibility for the total GHG emissions present in the atmosphere would be the same for developing and developed countries (Nielson, 2009).

This stance may have changed due to Brazil experiencing a series of natural disasters, starting with an Atlantic hurricane crossing the Brazilian coast for the first time documented in weather records in 2004 (Nielson, 2009). Since 2008, Brazil was hit by a series of accidents related to landslides, most of them being associated with hydrological processes such as rain storms and floods. For example, the torrential rains which affected the state of Rio de Janeiro in 2010 and 2011, resulting in about US$13 billion in damage (Romm, 2011). Also, the severe drought in Southeastern Brazil in 2014, when even after tapping two emergency reserves containing a combined 287 billion liters of water, the Cantareira reservoir system – which is intended to supply nine million people in São Paulo capital – sat at just 7.2% of capacity at the end of the same year (Dolce, 2015).

Until recently, the most well-known disasters in the country were severe droughts, but in the last few years the increasing frequency of floods, high winds and storms has become part of this new scenario in Brazil (Kahn, 2011). For the Amazon region, studies like Marengo (1992, 2004), Marengo et al. (2008), Ronchail et al. (2002), Ropelewski and Halpert (1987, 1989), among others have found that negative rainfall anomalies in the Center, North and East part of the Amazon are generally associated with El Niño-related events. Several of these studies have also pointed out that some of the strongest droughts (e.g. the severe drought in 2005) in the Amazon were on account of: i) the occurrence of intense El Niño events, ii) strong heating of surface waters of the tropical North Atlantic during the summer to October in the Northern Hemisphere, or iii) both as in Marengo et al. (2008).

On the other hand, Kasa (2013) argues that economic issues were also decisive in motivating this acknowledgment from Brazil. For example, the US Waxman-Markey Act on border taxes in 2009 (even though later failing in the Senate) and the biofuels industry in Brazil – willing for a strong global climate agreement to boost international biofuels markets – made the industrial sector in Brazil to adopt a preference for a more flexible Brazilian position in order to get rid of international market barriers linked to Brazil's negative reputation for deforestation, thereby resulting in high GHG emission rates (Kasa, 2013). As mentioned, Brazil has played an important role in the evolution within the international negotiations on climate change. Relevant facts that shall be cited, for instance, Brazil's hosting of the UNCED in 1992, its participation in the previous discussions to the Kyoto Protocol and the suggestion for the adoption of a fund for clean development actions, are solid examples of how the country has been involved in this

topic. However, after the push to approve the Kyoto Protocol, climate politics took a back seat again in Brazil (Hochstetler and Viola, 2012). The political debate focused on economic growth domestically and reassertion of Brazil's claims to sovereignty and global leadership abroad, especially in the South (Burges, 2009).

Concerning the second commitment period of the Kyoto Protocol, Brazil asked Annex I Parties for more ambitious actions and targets. On the AWG-LCA, Brazil asked for a balanced result, although the main issue to solve would be finance (ensuring implementation of the financing commitments by developed countries), in order to also negotiate on technology, adaptation and mitigation (Azpíroz, 2016). On the Green Climate Fund, Brazil (together with the others countries from the BASIC group) stated that a pre-condition was that public resources should be the largest share to support it. The AWG-LCA should be closed in a satisfactory manner for all, and the pending issues should be solved. For example, Brazil accused developed countries of not wanting to deal with issues such as unilateral trade measures (Azpíroz, 2016).

For the analysis of the Brazilian position on forests in the climate change regime, Carrvalho (2012) concludes that in the big picture of climate change negotiations, Brazil has been considered a leader of the G-77 and China[95] – the coalition of developing countries. This is due to its strong position of fighting for the adoption of quantified GHG emission reduction obligations by developed countries and the attribution of appropriate commitments for developing countries (based on the principle of common but differentiated responsibilities), which would not be a barrier to their right to development. However, on the specific issue of forests, Brazil has strongly resisted discussing mitigation measures related to emissions from tropical deforestation and degradation, using the argument of sovereignty over natural resources as a shelter. That positioned Brazil as a veto state, opposed to the USA and even countries in the G-77 and China, such as Costa Rica and Colombia (Carvalho, 2012).

Repeatedly, Brazil has opposed the position of several countries of Latin America. For example, Brazil was firmly against the inclusion of natural forests and small-scales A/R initiatives into CDM framework (anew claiming serious technical difficulties), clearly supported by Mexico, Bolivia, Nicaragua, Costa Rica, Colombia and Uruguay. Notwithstanding, Viola (2002) argues that this defensive posture was certainly

[95] The G-77 at the UN is a loose coalition of developing nations, designed to promote its members' collective economic interests and create an enhanced joint negotiating capacity in the UN. China has never officially joined the G-77, but provides consistent political support (usually in the name of "the Group of 77 and/plus China") and financial donation (since 1994) to the G-77.

a concern about the incapability of curbing deforestation rates in the Amazon region which were extremely high at that time. Brazil was perturbed by the fact that should mandatory GHG reduction emission targets have been established for developing nations, the country would have faced a colossal environmental liability. At that time, this position was strongly supported by rural agricultural and timber elites, dominant in state-level politics in the Amazon and with a strong faction in the National Congress (Viola, 2004).

5.7.1 National Policy on Climate Change (NPCC)

In 2007, nevertheless, Brazil began to reformulate its response to climate change. The Brazilian Federal Government announced its National Plan on Climate Change in 2008 at COP 14, where it outlined a voluntary deforestation reduction target by 71% below the average deforestation rate (19,625 km^2) between 1996 to 2005 by 2017 (The REDD Desk, 2011). A year later in Copenhagen (COP 15), Brazil announced its National Policy on Climate Change (NPCC), pledging to voluntarily reduce GHG emissions by 36.1% to 38.9% in relation to 2020 projections (SECOM, 2011). Subsequently, the NPCC was voted into law (Law 12.187/2009) in the National Congress; in December 2010, the Brazilian Government approved Decree 7.390/2010 regulating the NPCC (Gebara and Thuault, 2013).

Although voluntary at the international level, this commitment is nationally compulsory and mostly relies on GHG emissions reduction in the Amazon, including an 80% decrease in forest loss in this region, or approximately 55% of the total GHG emissions reduction announced (Cenamo et al., 2014). According to Decree 7.390, the GHG baseline emission for 2020 was estimated at 3,236 $GtCO_2eq$ and thus, the corresponding absolute reduction was established between 1,168 $GtCO_2eq$ and 1,259 $GtCO_2eq$ (MMA, 2008). The Inter-ministerial Committee on Climate Change (CIM) and its Executive Group (Gex) are responsible for the NPCC governance, established by Presidential Decree 6.263/2007. The NPCC is supported amongst several instruments such as: the National Plan on Climate Change, the National Fund on Climate Change and the Secretariat of Communication of UNFCCC.

The Plan is divided into four main areas: i) mitigation opportunities, impacts, vulnerability and adaptation; ii) research and development; iii) education and training and iv) communication. Additional highlights include initiatives to conserve and support the

recovery of national biomes, consolidate and expand legally protected areas, enhance energy efficiency and create incentives for the adoption of low-carbon fuel and green technologies (SECOM, 2011). Furthermore, some other goals are presented:

- Increase over the next ten years the domestic consumption of ethanol by 11% per year;
- Double the area of planted forests, to eleven million hectares in 2020, with two million hectares planting native species;
- Exchange in of one million old refrigerators per year within ten years;
- Increase by 2015 the recycling of municipal solid waste by 20%;
- Increase the supply of electricity from cogeneration in 2030, by 11.4% of the total electricity supply in the country;
- Reduce the non-technical losses in the distribution of electricity at the rate of 1,000 GWh annually in the next ten years.

5.8 Domestic forest-climate related developments

After reaching over 27,000 km^2 in 2004, deforestation rates in the Amazon decreased almost continuously. The lowest rate since 1988 was registered in 2012, when 4,571 km^2 were cleared between August 2011 and July 2012 (PRODES, 2012). However, in 2013, deforestation rates increased once again by 28.8%, reaching 5,891 km^2 (PRODES, 2013). Currently, deforestation rates reached 7,989 km^2 (PRODES, 2016). This is the highest value since 2008, when deforestation reached 12,911 km^2 (figure 14). This increase could be stimulated by the new Brazilian's Forest Code which includes an amnesty for individuals who cleared rainforest illegally before 2008 and it may gives a 'perverse message that if you violate the law and cut down the forest without a permit, you will occasionally be pardoned' (Schiffman, 2015). It could also be related to unsustainable rural settlement policies and lobby of agribusiness at the National Congress (Alencar et al., 2015; Crisostomo et al., 2015; Moutinho et al., 2016). The fact is, when Brazil announced that it would reduce deforestation in the Amazon region by 80% by 2020, the rate for that year should be around 3,925 km^2. However, with the recent increase in the rate, the effort to reach such a goal will be much greater. This means, Brazil will need to reduce the deforestation rate by 50% until 2020 (Azevedo et al., 2016).

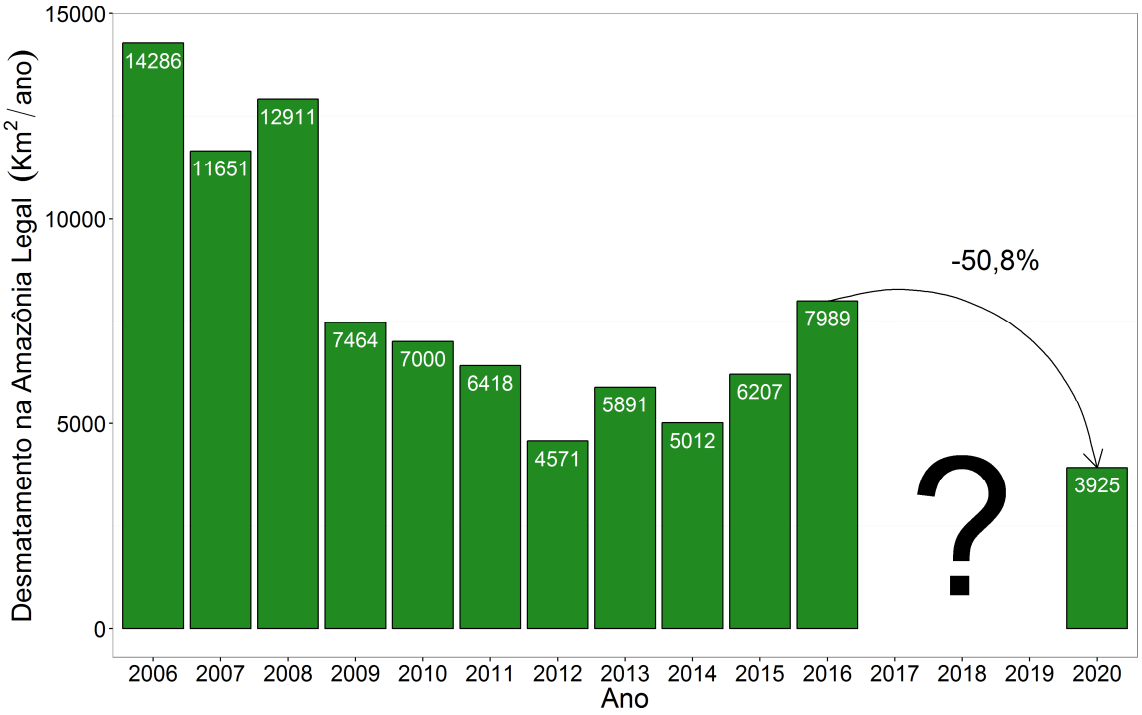

Figure 14. Deforestation rates from 2006 to 2020 in Brazil (Source: IPAM, 2016)

Although several reasons may have contributed to the overall decrease of deforestation rates in the Amazon, mixed evidence exists concerning the effectiveness of different anti-deforestation mechanisms implemented in Brazil in the recent past. Different authors as Assunção et al. (2012) and Viola (2010) agree that the implementation of command-and-control policies and voluntary mechanisms constitute an important factor to halt deforestation. Viola (2010) suggests five main reasons that contributed to the fight against deforestation: i) better law enforcement by the federal government; ii) the establishment of several protected areas and reserves from 2002 to 2007; iii) more concrete and intense actions from international and national environmental NGOs in the Amazon; iv) higher public awareness regarding environmental problems and v) higher level of cooperative actions between federal states and the federal government in order to curb deforestation activities.

Assunção et al. (2012) suggest that these governmental initiatives were responsible for the prevention of almost 62,100 km^2 of forest loss, or the avoidance of 621 million tonnes of CO_2. However, it is still unclear to which extent such decrease is a concrete outcome of the implementation of these policies or whether it results from factors like market fluctuations and lower prices of agricultural commodities. Nepstad et al. (2014) and Gibbs et al. (2015) have revealed that macroeconomic forces and

measures such as the soya *moratorium*[96] deserve credit for the initial decline in deforestation rates in the Amazon (Tollefson, 2015), but also point out that command-and-control policies adopted in Brazil may not sustain the low deforestation rate in the long-term. The achievement of "zero deforestation" has been challenging under this model of economic-environmental governance established in Brazil (Marcovitch, 2011; Stokes et al., 2014), marked by a historical negligence regarding environmental legislation compliance.

According to Assunção et al. (2012), two relevant turning points marked the conservation policies aimed at controlling and preventing deforestation in the Amazon. The first point was the launch of the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) in 2004, which integrated actions across different government institutions and introduced innovative procedures for monitoring, environmental control and territorial management. The second was the disclosure of an official list in 2008 of municipalities with the highest deforestation rates in Brazil as well as the conditionality of credit on environmental regulation compliance (Assunção et al., 2012). Together, these municipalities accounted for about half of the country's total deforestation in 2007. To get off the blacklist, they had to register at least 80% of their private properties under the rural environmental registry (CAR) system and ensure that the area deforested every year would fall below pre-determined thresholds (Wunder and Duchelle, 2014). With such measures, the government also intended to collect geo-referenced data and information for the regularisation of land tenure in order to enforce the Forest Code and promote the engagement of states and municipalities governments in conservation measures (Gil, 2010). Figure 15 shows that these two turning points of adoption of conservation policies coincide with decreases in the rate of deforestation:

[96] Actions that were taken in 2006 from different actors as Greenpeace, WWF, other NGOs, soya producers as well as the Federal Government to disincentive soya production in the Amazon forests region at the same time being effective at curbing deforestation rates.

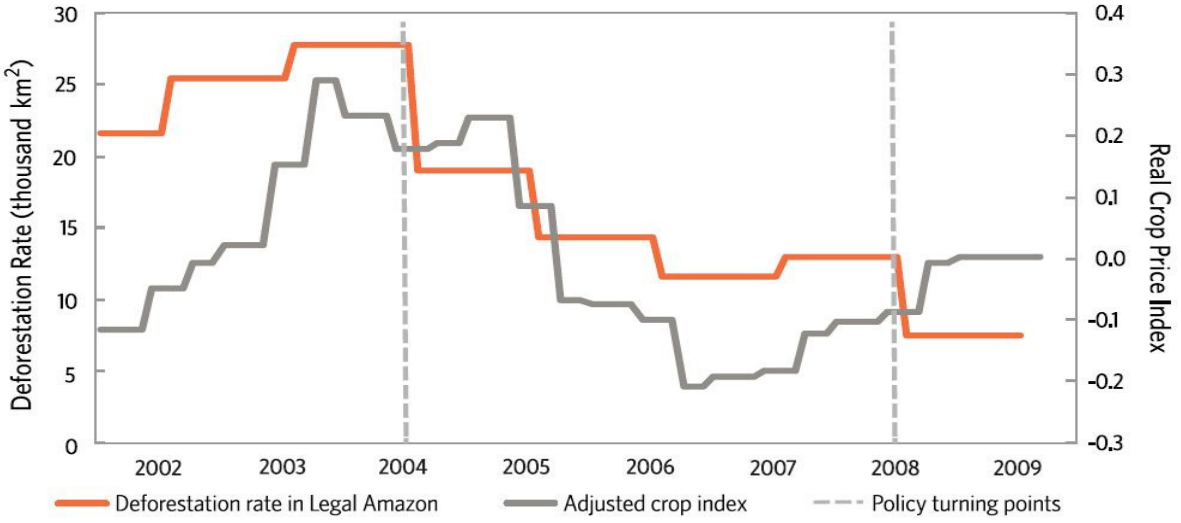

Figure 15. Turning points of adoption of conservation policies vs. rate of deforestation in Brazil (Source CPI, 2012)

The Decree 7.390/2010, which regulates articles 6, 11 and 12 of the National Policy on Climate Change (NPCC) establishes that the National Plan on Climate Change will be composed of plans for mitigation and adaptation measures, amongst them, the already mentioned National Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), the National Action Plan for Prevention and Control of Deforestation and Forest Fire in the Cerrado (PPCerrado) and the Low Carbon Agriculture Plan (ABC Plan). In the case of land use change, such programmes are not sector-specific but rather regional-set based on a range of different policy orientations. However, it refers to the targets established by the NPCC to each sector. Since sectoral plans must be integrated with measures for forest conservation and increased carbon storage (following the Forest Code), these programmes are the basis for the articulation and establishment of REDD+ in Brazil. For example, the development of certain activities within the framework of theses programmes – such as the mentioned CAR (registry system), the approved Forest Inventory in the Cerrado and the National Forest Information System (SNIF) – are partly financed through the Forest Investment Programme – FIP (Ministry of Finance, 2011 personal communication; SFB, 2014).[97]

[97] MF – Ministry of Finance - Personal Communication

5.8.1 PPCDAm

The National Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) was launched in 2004, initially comprising of 13 ministries under the coordination of the Presidency‘s Civil House. Currently, due to Decree 7.957/2013, the PPCDAm is coordinated by the Ministry of Environment (MMA) and includes 17 governmental institutions (MMA, 2013). Its main objective is to promote the reduction of deforestation rates through a set of integrated actions, divided into three main areas: i) territorial and tenure planning, ii) monitoring and environmental control, and iii) incentives for sustainable production activities.

Combined with these measures, the PPCDAm emphasised the need to enhance institutional integration between government departments, including federal institutions, state governments, municipalities, as well as civil society organisations and the private sector. The first two areas aimed to clarify land tenure through registers, cartographic data, and zoning plans, as well as to strengthen the control of deforestation, monitoring and enforcement of capacities. The third, on the other hand, sought to incentivise sustainable practices, support sustainable forest management and extractive activities, enhance agricultural productivity, and also restore degraded areas (Gebara and Thuault, 2013). During PPCDAm’s first and second phases (from 2004 to 2007 and 2008 to 2011, respectively), the largest decline in deforestation was accomplished through monitoring and control. For instance, 649 operational oversights in priority areas were carried out (MMA, 2013). The development of the Deforestation Detection in Almost Real Time Project system (DETER) and the integrated planning supervision also contributed to that achievement (MMA, 2013). For example, it is estimated that this monitoring system prevented the clearing of 59,500 km^2 of Amazonian forests between 2007 and 2011 (Assunção et al., 2013). In its third phase (2012-2015), the PPCDAm was supposed to focus on areas with less than 25 hectares by strengthening actions of planning and territorial development and agrarian sustainable productive activities (Gebara and Thuault, 2013).

The plan is targeting an 80% reduction in deforestation in the Amazon by 2020 (relative to baseline 1996-2005). Further important achievements included the creation of 25 million hectares of Federal Conservation Units (CUs), 25 million hectares of State Conservation Units and 10 million hectares recognised by the federal government as indigenous lands (MMA, 2013; SECOM, 2011). On the other hand, by 2013 the Dilma Rousseff’s administration (2010-2016) had created only three new protected areas

(MMA, 2014, personal communication). [98] Comparing, according to the Socio-Environmental Institute (ISA) and the Chico Mendes Institute for Biodiversity Conservation (ICMBio), under the MMA, the Fernando Henrique Cardoso mandate (1995-2002) has created 81 protected areas (totaling 21.5 million hectares of preserved area). In two mandates (2003-2010), Lula government made effective protection of 77 conservation units, totaling 26.7 million hectares.

Furthermore, the first and the third pillars, respectively related to tenure regularisation and territorial management and incentives for sustainable production have not been entirely and successfully implemented (Gebara et al., 2012). Maia et al. (2011) made an evaluation of PPCDAm and identified the following barriers to the implementation of sustainable production practices: i) problems in planning; ii) difficulties of coordination between institutions; iii) lack of budgetary resources and personnel and, iv) failure in the use of credit lines created for sustainable production. In fact, the rural credit for the forestry sector (management of native forests and reforestation) remained negligible due to various policy barriers (Gebara, 2015a).

5.8.2 PPCerrado

The PPCerrado (National Action Plan for the Prevention and Control of Deforestation and Forest Fire in the Cerrado) was launched in 2010 as an attempt to halt deforestation. The plan, a strategic action from the government, combined with other public policies such as the National Biodiversity Policy, the National Policy on Water Resources was integrated into the PNMC; the federal government targets 40% in reduction of deforestation rates (baseline 2002-2008 – 15,700 km^2) by 2020 (MMA, 2014). The PPCerrado lists 151 actions – divided into four main areas: i) monitoring and control; ii) protected areas and territorial planning, iii) sustainable activities and iv) environmental education – that are managed by an executive commission comprising of representatives from 17 ministries and coordinated by the Civil House (Gebara and Thuault, 2013).

According to Azevedo (2012), considering the lack of financing for the other areas, the most intensively implemented actions derive from the third topic (sustainable activities). Six years after the publication of PPCerrado, little has been done. The first monitoring report, prepared in 2012 showed that only 30% of the actions planned for that

[98] MMA – Ministry of Environment – Personal Communication

year had been executed (Greenpeace, 2013). The monitoring had been promised for 2011, but the needed resource has not been allocated in the budget for the development of the systems. The forecast is that the systematic monitoring of the Cerrado (equal to the Amazonian system) starts in 2017 (Greenpeace, 2013).

5.8.3 ABC Plan

The Brazilian Low Carbon Agriculture Plan (ABC Plan) was launched in 2010 with the primary objective of reducing GHG emissions directly or indirectly related to the Brazilian agricultural sector. Specifically, the plan aims to reduce annual CO_2, CH_4 and N_2O sources by 133.9-162.9 million tonnes of CO_2eq by the year 2020 (MAPA, 2012), through the promotion of seven different programmes (of which six concern mitigation technologies and one concerns adaptation to climate change). However, the potential from this sector may be much more considerable as the proposed goals. For instance, Assad et al. (2015) found that the actual GHG emissions mitigation potential of Brazilian agriculture sector is more than ten times larger than the proposed targets.

The programmes and their goals include: i) the recovery of 15 million hectares of degraded pastures (representing 63% of GHG mitigation targeted); ii) the adoption of integrated crop-livestock-forest and agroforestry systems in four million hectares; iii) the adoption of eight million hectares of no-tillage systems; iv) the expansion of biological nitrogen fixation in 5.5 million hectares of cultivation areas, replacing the use of nitrogen fertilizers; v) the expansion of commercial forest plantations currently used to produce fibers, wood and cellulose from six million to nine million hectares; and finally vi) the adoption of technologies for the treatment of 4.4 million m^3 of animal waste aiming at power generation and production of organic compost (MAPA, 2012).

Although the main focus of the ABC Plan is not related to forest protection, some of its practices are expected to contribute directly and/or indirectly to deforestation decline in the Amazon and in the Cerrado, particularly the recovery of degraded pastures and adoption of systems that decrease the pressure for forest clearance. After all, the idea behind the ABC Plan is to improve efficiency in the use of natural resources, increase the resilience of production systems and rural communities and allow the adaptation of the agricultural sector to climate change. This combination is supposed to deliver 22.5% of the GHG emission reduction targets established in the NPCC (article 6 §1 Decree 7.390). According to governmental estimates, restoring grazing land, could

achieve an annual emission reduction of 83 to 104 $MtCO_2eq$ (MAPA, 2012). However, according to International Institute for Applied Systems Analysis (IIASA) calculations, a reduction of this size would require about twice the pasture area targeted by the ABC Plan, implying that there are uncertainties regarding the average sequestration potential and the implementation of the programme (Elzen et al., 2015).

The scope of the ABC Plan is national throughout 2010 to 2020. To achieve the goals set by the ABC Plan, between 2011 and 2020, it is estimated that the necessary resources will be around US$ 55 billion financed with governmental budget or through lines of credit (Gebara, 2015a). The ABC Plan has a line of credit (the ABC Programme) approved by the Central Bank (BACEN Resolution 3.896/2010). According to a recent report from the ABC Observatory (2015), there was an advancement of the ABC Programme disbursement, but the programme has not achieved the expected yet. For instance, only 61% of resources were invested at the end of the harvest between 2013 and 2015. The regional and state distribution of the ABC Programme shows that priority areas for receiving the resource (those with a high rate of degraded pasture), as the North and Northeast regions have a stake lower than the expected. Likewise, although the Legal Amazon had an increase of contracted activities for 2013/2014 the amount still falls far short of the number observed in the Southeast and Midwest regions of the country.

The bureaucracy for access to credit and the difficulty of measuring the return on these investments are some of the problems for taking the loan, recognised by both the government and the producers. The report makes clear that it is necessary to increase efforts for better spatial distribution of credit, strengthening the training process of technical assistance, producers and financial analysts to stimulate demand and emphasise the systemic aspects linked to the projects. The study concludes by indicating the need to monitor carbon mitigation balance linked to the total amount already paid since the beginning of the programme in order to evaluate its effectiveness related to its main objective – to contribute to GHG emission reduction (ABC Observatory, 2015).

5.9 Discussion: REDD+ context in Brazil

Brazil has been intrinsically involved in global negotiations on REDD since the beginning and was in fact one of the first countries to advocate a financial compensation for avoided deforestation. In 2003, a group of researchers from the Amazon Environmental Research Institute (IPAM) presented in a parallel event at COP9 a proposal (‘*Redução Compensada do Desmatamento’* (Santili et al., 2005)) that would reward developing countries which managed to reduce their GHG emissions trough avoided deforestation (the amount to be received would be referenced by the price in the carbon market). The Brazilian Federal Government revealed hesitation about this proposal especially because the scheme would mostly rely on a carbon market-based system. Within the federal governmental sphere, the most relevant institutional actors influencing the Brazilian position concerning climate change and forests scope since 1997 are the Ministry of Foreign Affairs, the Ministry of Science, Technology and Innovation and the Ministry of Environment (Carvalho, 2010). Amongst them, the first two have been “traditionally” conservative with regard to climate-forest-related measures and offsetting issues. The Ministry of Environment (MMA) held the position as vice-chair of the Inter-ministerial Commission for Climate Change but problems with funding, staff quality and high personnel turnover provided the MMA with little capacity to use this commission as a platform for influencing Brazil’s position in this topic (Kasa, 2013). However, as international negotiations started to focus on curbing emissions from deforestation opened a policy window – with its strong competencies on deforestation – to involve itself in governmental discussions over the position (Kasa, 2013).

Afterwards, in a workshop organised by the UNFCCC Secretariat in Rome in 2006, Brazilian authorities suggested an updated version of the previous proposition (a document built by the MMA), outlining a mechanism that would also reward developing countries that managed to reduce their deforestation rates below a certain threshold for a defined period of time (UNFCCC, 2006). This proposal was the turning point for Brazil to become more influential into the climate negotiations (Carvalho, 2010). However, the resources for such rewards would come from a fund comprising of voluntary contributions from developed countries instead a market-based mechanism. This was the starting point from the Amazon Fund[99] (Moutinho, 2012). This proposal would not

[99] The Amazon Fund is a private fund created by the federal government in 2008 (Decree 6.527/2008) aimed at raising donations for non-reimbursable investments in efforts to prevent, monitor and combat deforestation, as well as to promote the preservation and sustainable use of forests in the Amazon Biome and others tropical biomes (up to 20% of the Amazon Fund‘s disbursements may support the development

involve a “mandatory regime” that could include future obligations, which means that the achieved GHG emission reductions would be considered as a voluntary additional effort to emission reduction by Annex I countries (May et al., 2011). Nevertheless, other countries came up with some additional adjustments to this proposal which led to the REDD concept.

The Federal Government has also frequently questioned how effective and able a mechanism like REDD/REDD+ would be to address critical issues such as land tenure and market pressure (Gil, 2010). The government has remained reluctant about the establishment of a national strategy on REDD+, as well as the use of carbon credits obtained through REDD+ projects to achieve emissions reduction targets (MMA, 2014, personal communication). [100] Fairness and sovereignty have been on top of governmental concerns. The government has argued that REDD+ could be an undue intervention of foreign interests in domestic policy (Abranches, 2014). But Angelsen et al. (2012) propose to interpret this from another perspective. They state that REDD+ could be seen as a mechanism for turning tables, where forest-rich developing countries would support developed nations in providing a global public good (climate mitigation). Notwithstanding, Fearnside (2008) asserts that this skepticism from the government side came from the fear to commit itself and eventually not being able to accomplish deforestation reduction targets.

Brazil’s official position was (and still is) that the mechanism should not allow developed countries to offset their own emissions (MMA, 2014, personal communication). [101] Nevertheless, should the option of the compensatory market be adopted, developed countries should likewise only be able to offset their emissions if

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of systems to monitor and control deforestation in other tropical biomes rather than the Amazon rainforest) (NORAD, 2011). The Fund is managed by the National Bank for Economic and Social Development (BNDES) and should help the targets set by the NPCC for GHG emissions reduction to be reached. BNDES holds a bank account in Brazil to collect donations from foreign countries and net return from cash investments and is also in charge of raising funds, facilitating contracts and monitoring, supporting projects and other initiatives. On March 2009, the Amazon Fund received the first grant of US$ 110 million from the Government of Norway (in total, the government of Norway donated US$ 1 billion by 2015), exclusively to support REDD/REDD+ projects in the Amazon region. The Amazon Fund comprises two committees: the guidance committee, responsible for setting guidelines and following up on the results obtained (including the endeavour for the adequacy of projects supported by the Fund); and a Technical Committee, appointed by the MMA, responsible for verifying and certifying the calculation of deforestation emissions. The first one acts as an advisory committee and is composed of representatives of federal and state officials, NGOs, social movements, indigenous people, scientists and private investors. Based on data about emissions reduction, BNDES is authorised to raise donations for the Amazon Fund, issuing diplomas equivalent to the tons of carbon that correspond to the amount of the financial contribution to the Fund. This means that funds raised by the Amazon Fund are based on effective reduction of GHG emissions and that new fundraising will only be authorised once it has been proven that deforestation emissions have fallen.

[100] MMA – Ministry of Environment – Personal Communication

[101] MMA – Ministry of Environment – Personal Communication

they comply with their domestic mitigation goals in other sectors (Viana et al., 2010). On the one hand, the government stated that by allowing developed countries to offset their emissions through reduced deforestation, the system would not be encouraging the development of a low carbon economy and changes in current patterns of fossil fuels. On the other hand, the Brazilian Government sees market-based mechanisms as a tool to be domestically used (Zwick, 2015; Lang, 2015), which means to offset its own emissions from the growing demand for energy (especially fossil fuels) and the heavy emphasis on expansion of oil production.

Within this context, in Brazil REDD+ has previously been positively recognised in sub-national levels and therefore, since 2008 there are several ongoing state-led activities in the country as projects and programmes (Cenamo et al., 2009; Stecher, 2011). For instance, the state of Pará launched its Plan for Deforestation Prevention, Control and Alternatives (PPCAD/PA) in 2009 as well as the Green Municipalities Programme in 2011 (Cenamo et al., 2014). In 2013, Mato Grosso created its own REDD+ system through the Law 9878/2013. Despite some differences between each state's initiatives, they all express the need to carry out territorial zoning, promote the registration of rural properties and give incentives to the rural productive chains as a way of supporting income sources that do not put pressure on forests (Gil, 2010). It was argued that the absence of the national legislation has led some states of the Amazon region to develop their own state REDD+ policies and frameworks (Cenamo et al., 2014). Nassar (2015) affirms, however, that as the federal government's position has become more positive, some institutions (including states and civil society organisations) decided to put more effort into supporting the implementation of sub-national REDD+ initiatives. In this context, nevertheless, a major challenge for the REDD+ framework in Brazil is exactly to avoid a mismatch between such implemented REDD+ actions under the national strategy umbrella. For example, to incorporate different safeguards standards, reference levels calculation, monitoring systems from previous experiences will be one of the biggest obstacles for the ENREDD+.

Sassi et al. (2014) evaluated 23 different REDD+ programmes in six countries: Brazil, Peru, Cameroon, Tanzania, Indonesia and Vietnam. They state, nevertheless, that most of the REDD+ pilot initiatives implemented in these countries are struggling to make the transition from pilot projects to sustained REDD+ interventions, mostly on account of multiple challenges related to both REDD+ specifically monitoring and to forest conservation in general. However, sub-national REDD+ interventions require the

same design processes and mechanisms, and faces the same implementation challenges, as REDD+ implemented at national level (Kempinski, 2015). Moreover, the evolution of these pilot-projects/programmes and empirical studies have deepened the general understanding of REDD+ and its implications, allowing for the amendment of this first piece of legislation towards an effective, efficient and equitable REDD+ approach (Gil, 2010).

Abranches (2014) argues that REDD+ was admitted as the least costly and most desirable solution to reduce GHG emissions only after Brazil faced the political and moral obligation to address such emissions. The government thought that reducing deforestation would be domestically sufficient as a goal for reduction of total GHG emissions, therefore justifying avoiding resolute targets to reduce carbon emissions from other sources, such as energy, transport and agriculture (Abranches, 2014). Assuming that reducing deforestation would contribute to reduce total GHG emissions increased government support to these policies particularly when the then President Luiz Inácio "Lula" da Silva started to realise the role that Brazil could play on global climate change politics, after the New York Climate Summit in 2009 (Abranches, 2014). The conservative position of the Brazilian Government not only in considering the reduction of GHG emissions caused by deforestation but also in developing a REDD+ national strategy has thus markedly changed after good results in combating deforestation were achieved. This means that Brazil's willingness to firmly adopt a GHG reduction emissions framework became concrete, especially due to good results achieved in the decrease of deforestation rates in the Amazon. Brazil wanted to say publicly to an international audience what it had already achieved in addressing climate change (Hochstetler and Viola, 2012).

While some authors as Moutinho (2012) argue that this change of attitude was influenced mostly by substantial decrease of deforestation rates during 2005 to 2010 in the Amazon region, other critics argue that this happened also on account of the Decision 1/CP.16 §71, in consequence of the Brazilian acceptance of results-based finance for reduction of deforestation (Abranches, 2014). The Decision 1/CP.16 §71 states that in order to have access to payments by the results of their national efforts, developing countries should implement a national strategy or plan on REDD+ actions. This process of REDD+ development in Brazil, illustrate well the argument from Bernstein and Cashore (2010) that say: 'several pathways for influences from the international to the domestic level can act in a synergic manner'. That is to say that the

establishment of national strategies is therefore crucial to convert international commitments based on the optimisation of collective interests.

But furthermore, the media, civil society and social movements have also demanded reducing the high rates of deforestation, pressing the government to take a more proactive action to curb deforestation also as a valid response to mitigate climate change effects. On the other hand, in interview with Carvalho (2010), Thelma Krug (a senior researcher from the National Institute for Space Research – INPE) declares that this positive posture from Brazil was not a shift of paradigm but its position has only become more malleable, whose principles remained intact. This aspect can be noticed when analysing the issued Decree that establishes the Brazilian REDD+ national strategy. For example, article 6 states that the use payments or originated carbon credits from REDD+ initiatives for offsetting of developed nations under the UNFCCC umbrella is not allowed.

In 2010, therefore, the Federal Government created Working Groups (WG) to start a debate at different levels of government, private sector, social movements and NGOs with respect to a national strategy on REDD+ in Brazil. These groups were divided into three different categories: i) WG1: Coordination, Institutional Arrangements and Participation, ii) WG2: Distribution of Benefits, Dominion and Safeguards and iii) WG3: Funding Sources and Financing Mechanisms. They were composed by different sectors (120 participants from 58 different federal institutions and civil organisations) to discuss the basis for a national REDD+ strategy (MMA, 2011b). Moreover, each of the Working Groups submitted a report with conclusions of their dialogues and proposals for the national strategy on REDD+ to the MMA in December of the same year (2010).

CHAPTER 6 Answering the Research Questions

This chapter will present the findings related to the research questions that guided the study, meaning that, in this chapter, the findings of the research are presented, discussed and interpreted. In also seeking to investigate and analyse the overall framework of REDD+ development as a national strategy in Brazil, this first section will address the two first research questions: What is the current status of REDD+ development as a national strategy in Brazil? and; What is the Brazilian strategy on REDD+?, looking in detail at the policy design process.

6.1 Development of the REDD+ National Strategy

6.1.1 The governance structure

The development of the national strategy on REDD+ (entitled ENREDD+) is systemised and coordinated by the Ministry of the Environment (MMA) and the work is based on the discussions from the Inter-ministerial Committee on Climate Change (CIM), the Executive Panel on Climate Change (GEx) and the Working Group of Technical Experts on REDD+ (GTT REDD+). The GTT REDD+ includes the Secretariat of Strategic Affairs of the Brazilian Presidency (SAE), Ministry of Agriculture Livestock and Supply (MAPA), Ministry of Science Technology and Innovation (MCTI), Ministry of Finance (MF), Indigenous National Foundation (FUNAI), the Brazilian Forest Service (SFB), Ministry of Foreign Affairs (MRE), Ministry of Agrarian Development (MDA) and the Ministry of Planning, Budget and Management (MOP).

During 2011 and 2012 eleven meetings were held, which resulted in a draft text introducing several technical and key aspects of the national strategy. In August 2012 the MMA carried out technical bilateral meetings with representatives of all cited ministries. From that stage, contributions were synthesised as notes to the step of high-level meetings. In parallel to this process, a Task Force on REDD+ with Amazonian states was conducted. This bilateral effort was coordinated by the Civil House together with the MMA, MF, MCTI, MRE and MOP, mostly focusing on issues related to the development and improvement of the Amazon Fund. Also in 2012, the Secretary of Climate Change and Environmental Quality received representatives of civil society, in order for them to contribute to discussions concerning the ENREDD+ (MMA, 2014,

personal communication).[102] In 2013, the document was revised to incorporate changes introduced by the Warsaw Framework for REDD+.

A draft of the national strategy on REDD+ was consolidated by the MMA in 2014, taking into consideration the input produced since 2010. According to the MMA, they have intensified dialogue with civil society, state governments and indigenous representatives in a series of meetings for alignment on REDD+ under the UNFCCC and the ENREDD+ (MMA, 2014, personal communication).[103] However, the GTT REDD+ had only three registered meeting in 2014 and one in 2015 (MMA, 2016). Moreover, federal states and actors (as NGOs) performing in the Amazon region declared the opposite during the interviews. It is clear that interviewees have different opinions regarding the same topic, but they have argued that the federal government has not taken into account their needs, experiences and opinions in the development of this final version of the ENREDD+.

On 27 November 2015, the Decree[104] 85.767/2015 which established the National Commission on REDD+ (CONAREDD+) was issued. The Decree assigned to the MMA the task of establishing the ENREDD+, which was concluded with MMA's Ordinance 370/2015. The CONAREDD+ shall be composed of representatives from the MMA, who will be in authority and coordinate the commission, all ministries from the GTT REDD+ as well as the Civil House of the Presidency. It will be also invited to compose the commission: two representatives of the federal states, indicated by the Brazilian Association of State Environmental Entities (ABEMA), a representative of the municipalities appointed by the National Association of Municipal Environmental Agencies (ANAMMA) and two representatives of civil society organisations, totaling 13 seats. The CONAREDD+ will be responsible for coordinating and providing guidelines for the implementation of the ENREDD+. The Ministry of the Environment (MMA) will also perform the Executive Secretariat functions for the CONAREDD+, being responsible for:

- Preparing, based on inputs produced by the GTT REDD+,[105] the technical documents to access REDD+ results-based payments;

[102] MMA – Ministry of Environment – Personal Communication
[103] MMA – Ministry of Environment – Personal Communication
[104] A Decree is a secondary legislation and following Denier et al. (2014), it is limited in that it can create institutions, but cannot guarantee to those institutions any powers of enforcement. Primary legislation would therefore be recommended in cases where law enforcement will be critical, as observed in Brazil.
[105]The GTT REDD+ is responsible for:

- Developing and implementing the REDD+ Safeguards Information System;
- Preparing, based on inputs from the relevant Thematic Advisory Board (TAB), the summary of information on the implementation of the REDD+ safeguards;
- Proposing, based on the results of REDD+ actions, the annual fundraising limits and the minimum price per tonne of CO_2eq for results-based payments;
- Issuing certificates in recognition of results-based payments received;
- Presenting, at the international level, information to publicise the achieved REDD+ results and related payments on the Lima REDD+ Information Hub.

The Thematic Advisory Boards (TAB) will be formed by stakeholders and experts from civil society, public and private entities invited by the CONAREDD+. The ad hoc TABs will operate for one year (throughout 2017) with the possibility to receive a time extension to be granted by the CONAREDD+. There are three different components:

- Thematic Advisory Board on Fundraising and Distribution of Non-Reimbursable Resources (related to fundraising of REDD+ results-based payments and distribution of benefits). This Advisory Board will focus on supporting the definition of criteria, rules and guidelines related to: i) eligibility to access REDD+ results-based payments for results recognised under the UNFCCC achieved by Brazil; ii) fundraising for REDD+ results-based payments; and iii) use of REDD+ results-based payments resources;
- Thematic Advisory Board on Federative Relations will work to support the CONAREDD+ in promoting convergence among climate change and forests related public policies at the federal, state and municipal level. This Advisory Board will focus on: i) developing a capacity building plan on REDD+ under the UNFCCC to state and municipal public servants; ii) developing a survey to identify REDD+ related initiatives being implemented by the states; iii) defining guidelines to promote coherence between jurisdictional REDD+ programmes and the ENREDD+ and iv) preparing progress reports on REDD+ related strategic initiatives at the federal, state, and municipal levels and proposing measures to promote integration among the relevant public policies;

- Collecting information about results, methodologies to reduce emissions from the land use, land use change and forest sector in Brazil;
- Reviewing the technical content to be used as the basis for Brazil's REDD+ related submissions to the UNFCCC; and
- Interacting with international experts and providing inputs throughout the evaluation process of Brazilian submissions.

- Thematic Advisory Board on the Safeguards will work to develop inputs to support the CONAREDD+ in overseeing if the REDD+ safeguards are being addressed and respected throughout the implementation of REDD+ by Brazil. This Advisory Board will focus on i) the conceptualisation of the REDD+ safeguards in the Brazilian context; ii) the development of the Safeguards Information System (SIS); iii) reviewing the summary of information on the safeguards; iv) defining a procedure to allow reporting of safeguards violations and v) developing a safeguards related capacity building plan.

The CONAREDD+ has started its work 7 April 2016, when it was approved its internal regulation, published by MMA Ordinance 143/2016. The CONAREDD+ will hold two ordinary meetings a year. The chair of the Committee may also convene extraordinary meetings. All the meetings are open to citizens willing to attend as observers (MMA, 2016a).

6.1.2 The Brazilian REDD+ National Strategy

6.1.2.1 Objectives

The general objective that guides the REDD+ national strategy is '*to contribute to mitigate GHG emissions defeating illegal deforestation, conserving and restoring ecosystems as well as fostering a sustainable forest economy based on low carbon, promoting economic, social and environmental benefits*'. By 2020 it is expected that the national strategy on REDD+ will have contributed to the achievement of targets established in the National Policy on Climate Change (NPCC). In order to achieve the proposed objectives, the strategy is based on three lines of action, namely: i) coordination of public policy on climate change, forests and biodiversity ii) measurement, reporting and verification of results (MRV) and iii) financing, collection and distribution of payments for REDD+ results.

Respecting the contemplation of these overall goals, the following specific objectives should be established and by 2020 they will be revised (MMA, 2016b):

- Improvement of the monitoring and impact analysis (Impact Matrix) of public policies towards REDD+ in order to maximise their contribution to the GHG

mitigation as well as to the socio-economic and environmental safeguards agreed under the UNFCCC. The results generated by this tool will facilitate the identification of potential complementarities between existing policies and initiatives, as well as provide valuable information to support the decision-making regarding the investments that will be made coming from result-based REDD+ payments;

- Integrating the management structures of the NPCC and Action Plans in the biomes, seeking convergence and complementarities among climate change, biodiversity and forests related-policies at the federal, state and municipal levels;
- Contributing to the mobilisation of international resources on a compatible scale with the national commitment to mitigate GHG emissions in the Brazilian biomes as established into the NPCC.

6.1.2.2 Safeguards

With regard to safeguards, the national strategy considers as a reference the Decision 1/CP.16 and guidelines of Decision 12/CP.17 as well as the principles and environmental criteria for REDD+ developed by civil society organisations.[106] The Ministry of Environment (MMA) and the Indigenous National Foundation (FUNAI) have developed additional premises and criteria concerning indigenous issues which will constitute the basis for the implementation of the ENREDD+. Brazil already has information systems related to the implementation of REDD+ Safeguards such as the National Register of Protected Areas (CNUC), the National Forest Information System (SNIF), the National Rural and Environmental Registry System (SICAR) and the Biodiversity Portal. The safeguards information system (SISREDD+) will be coordinated by the MMA in conjunction with existing information systems and in partnership with national and state boards towards climate change. Potential users of the SISREDD+ will be the participants and beneficiaries of REDD+ programmes and initiatives as well as stakeholders involved in the implementation of such actions (e.g. non-governmental organisations, investors, donors, international community, etc). This information system

[106] "Developing Social and Environmental Safeguards for REDD+: a guide for a bottom-up approach" presents a proposed step-by-step development of environmental safeguards processes for REDD+. The guide was prepared by a multi-sectoral group of organizations and Brazilian companies including environmental NGOs, private sector, research institutions and social movements. The publication was launched officially during the COP16. Online available at::
http://www.icv.org.br/site/wp-content/uploads/2013/08/24202guiaredd_ingles_digital21.pdf

should have been designed and implemented in subsequent phases from 2015, willing to be a transparent tool and of easy access to the entire society. However, after questions about the progress of the methodological aspects, MMA has chosen not to move in this component until the TBA (advisory board) on safeguards has been created, which would provide the necessary inputs for the further development of methodological aspects. This happened in December 2016, when it was decided that the implementation of the safeguards should be concluded until the end of 2017 (MMA, 2016b).

Moreover, one of the requirements in receiving payments for REDD+ results is an information summary respecting how the Cancun Safeguards have been addressed by the country while REDD+ actions are being implemented. Brazil has already prepared its first summary [107] and in this first moment these information reflected the implementation of safeguards in the Amazon region, involving the PPCDAm actions during 2006 to 2010 and projects financed by the Amazon Fund. Finally, it is important to note that the safeguards information summary and SISREDD+ are distinct instruments. While the former serves as a communication of the Brazilian State to the UNFCCC on how safeguards are addressed and respected during the development of activities that generate REDD+ results, the second compiles over time, the necessary information to ensure compliance with the safeguards in Brazil.

6.1.2.3 Reference Levels and Measurement, Reporting and Verification (MRV)

The definition of reference levels to ground the payments by result of REDD+ actions was adopted by Decision 12/CP.17 and the Warsaw Framework for REDD+. Developing countries may annually submit their reference levels[108] to the UNFCCC for evaluation and, Brazil presented its reference level to the UNFCCC in June 2014. Brazil has chosen to set their reference levels by biome, using at first historical data monitored in the Amazon. The year of 1996 was adopted as the starting point of the reference period in order to exclude the deforestation peak occurred in 1995 and to maintain consistency with other initiatives in Brazil, such as the Amazon Fund and the National Policy on Climate Change (NPCC). The measurement and verification of deforestation

[107] Online available at: http://reddplussafeguards.com/reddplus_safeguards/wpcontent/uploads/2015/01/sumario_salvaguardas_final.pdf

[108] More detailed information at: http://redd.unfccc.int/submissions.html?country=bra

initially focused on clear cutting[109] on the Amazon biome carried out by INPE, the IBAMA and the Brazilian Agricultural Research Corporation (EMBRAPA), called the "Monitoring Group". Information is assessed annually trough PRODES and other five programmes (see table 7 below).

Table 7 The Brazilian forest monitoring MRV system

MRV Tool	Description
PRODES (Amazon Deforestation Monitoring Project)	Launched in 1988 to monitor the forest trough LANDSAT satellite images. It captures deforested areas larger than 6.25 hectares
DETER (Real Time Deforestation Detection System)	It guides environmental enforcement efforts, tracking deforestation polygons on a daily basis. Its time series started in 2004. It has a lower resolution (only areas larger than 25 hectares are detected)
DEGRAD (Mapping of Degradation in the Brazilian Amazon)	Monitors forest degradation in the Brazilian Amazon. Its time series started in 2007
DETEX (Monitoring System for Selective Timber Exploitation)	It generates information on public forests (particularly located closed to roads) and forest concessions. It was developed by INPE and SBF (Brazilian Forest Service) in 2007
TERRACLASS (Land Use Classification Programme)	Provides data on land use in the deforested areas identified by PRODES. It has provided until the moment information concerning the period between 2008 to 2012
INPE/QUEIMADAS (Fire Outbreak Control)	Monitors daily fire outbreaks using satellite images (Reference Satellite Aqua_M-T)

Source: Own Data

The ENREDD+ does not define very clearly how MRV activities will be adopted, improved, financed and extended to all biomes. However, the MMA released in November 2015 through Ordinance 365/2015 its Environmental Monitoring Strategy for All Biomes (but this strategy is not consolidated within ENREDD+ yet). The Environmental Monitoring Programme of All Brazilian Biomes will generate every two years, the matrices with the areas used to estimate LULUCF contributions in the GHG National Inventory. Apart from deforestation rates, mappings and recovery monitoring

[109] Other activities encompassed within the REDD+ scope such as forest degradation and enhancement of carbon stocks, were not included, justified by the lack of consistent data.

will be developed for the Amazon, the Atlantic Forest and Cerrado, which include areas in regeneration or planting of native species, woody and perennial or long cycles. These data will be instrumental in monitoring the areas recovering at farm level and will be an indicator of the efficiency of the Forest Code's implementation. The crossing of data on native vegetation recovery, spatially explicit, with the data of the CAR (rural registry) in a Geographic Information System (GIS), will generate essential data for the estimation of CO_2 removal, in order to corroborate Brazil's GHG reduction targets for 2025 and 2030. The programme is structured to be implemented in three different phases: i) Amazon and Cerrado Biomes (2016); ii) Atlantic Forest (2016-2017) and iii) Caatinga, Pampa and Pantanal Biomes (2017-2018).

On the other hand, Valberg (2011) argues that although Brazil is considered to have a satisfactory system for forest monitoring, there are also problems because the monitoring system does not distinguish between legal and illegal logging. This fact might slow down the process of reducing deforestation, as legal logging is far easier to stop (Valberg, 2011). Furthermore, since the adoption of the DETER system in 2007, which improved the monitoring and control over deforestation measures, the dynamic of deforestation activities have changed in the Brazilian scenario. This means that a behavioural change can be observed from deforestation actors, which became aware that they were being monitored and have began deforesting areas smaller than 25 hectares (ha), logically because only deforested areas larger than 25 ha are detected by the system. Thus, this fact must be considered in the development of the MRV system to be applied to the REDD+ framework.

The government is also developing its Modular System for Monitoring GHG Emissions Reductions (SMMARE), which is being designed as a tool to provide information, in particular in relation to the mitigation actions implemented in each Mitigation Plan and its associated methodologies and assumptions, the progress made in their implementation and information on domestic measurement, reporting and verification. The SMMARE can also be used for the purposes of performance-based payments, once the GHG emissions reduction results can be made available through the system. Several institutions are being invited to participate in the SMMARE design and implementation and the final list will depend on the results of on-going negotiations.

An interesting aspect is pointed out by Salvini et al. (2014), however. They assessed 98 documents produced by 43 REDD+ countries (including Brazil) to compare how countries link REDD+ interventions to forest deforestation and degradation drivers

in their readiness plans, implicating this way monitoring systems. They state that current REDD+ monitoring efforts are largely focused to meet international reporting needs and thus are concentrated on the assessment of change in forest area (deforestation) and related carbon emissions. On the other hand, in only a few cases (explicitly not the case of Brazil) is the forest area change analysed by linking it to specific driver activities and follow-up land use.

6.1.2.4 Financing

The collection of resources will be based on achieved and measured results, whereas the distribution of resources will take place in a decentralised manner – guided by the CONAREDD+. The fundraising actions will seek bilateral partnerships or international financial institutions willing to offer payments by results, through the Amazon Fund, using the REDD+ portal updated by the UNFCCC Secretariat as the basis for fundraising. Also, there are other national financing instruments supporting the implementation of actions towards REDD+, such as the National Environmental Fund (Law 7.797/1989), the National Forest Development Fund (Law 11.284/2006) and the Protected Areas Fund part of the Amazon Protected Areas Programme (FAP/ARPA). However, since the REDD+ framework has broadened its targets, it opened possibilities for other sources of financing. However, the main question is to know if whether the ENREDD+ will accept these others sources as official funding (Alves-Pinto et al., 2016).

The Brazilian entities interested to be fundraisers must meet minimum eligibility criteria to be defined by the CONAREDD+. These criteria will be reviewed periodically and will comply with current legislation and with the Cancun Safeguards. Should the minimum eligibility criteria be met, these entities will then be acknowledged by the CONAREDD+ in the UNFCCC REDD+ portal. Once confirmed as fundraisers, these entities may start their efforts, according to the guidelines, rules and criteria established by CONAREDD+. After signing the contract between the authorised entity and the donor, the CONAREDD+ should be informed in order to request the Executive Secretary to issue the non-transferable diploma, with the corresponding amount. These diplomas and the payments can not be used, directly or indirectly, for offsetting mitigation commitments from other countries under the UNFCCC. The chair of the CONAREDD+ should then inform the UNFCCC Secretariat about this payment received by these results so this information can be available at the UNFCCC REDD+ portal.

6.1.2.5 Implementation

The national strategy on REDD+ should be implemented in two phases. This division into stages aims to allow its implementation to begin continuously in line with the National Policy on Climate Change (NPCC), PPCDAm, PPCerrado, Forest Code and the Amazon Region Protected Areas Programme (ARPA). In Phase I (2014-2016),[110] investments would have been primarily focused on indigenous lands, settlements and public and private protected areas. In Phase II (2017-2020), actions aimed at private lands would be intensified in line with the deadlines set in the 2012 Forest Code for implementation of the rural registry, the Environmental Adjustment Programme (PRA), and forest legislation by biome. It is noteworthy that the indigenous lands-targeted incentives should be implemented through an indigenous component, created under the REDD+ rules and based on the current indigenous legislation, especially through the National Land and Environmental Management and Indigenous Lands Policy – Decree 7.747/2012 (CIM et al., 2013). The implementation model it seems adequate, however, it remains unanswered how the distribution of resources between these involved entities will be established.

By contrasting different experts' opinions, the next section presents major associated challenges related to the REDD+ framework in Brazil.

6.2 REDD+ Challenges (respondent's perspective)

In a common sense the challenges to implement the REDD+ framework are twofold. There are major challenges in the internal order such as what a country desires when implementing REDD+? What is understood as REDD+? Also, it is difficult to get a shared position among different actors, to know who the potential beneficiaries would be, to define what the benefits are, and what the investment in each sector would be, to clarify misinformation that builds a great expectation in receiving rewards from REDD+ and to bring together the federal government and federal states which have not always uniform positions. There are also challenges of international order. Although a higher level of transparency may be reached within the Paris Agreement approach (see article 13 of Paris Agreement), there are still several uncertainties about the REDD+

[110] Some actions have been already delayed.

mechanism. This higher level of clarity may increase the willingness of donor countries and the credibility of the recipient countries. On the other hand, REDD+ was placed as a market mechanism for a long period and the possibility of obtaining a large amount of resources has been decreasing over time.

Overall, the most significant challenges indicated by most of the interviewees with regard to the Brazilian scenario are those related to governance. It is noted that governance is considered as an umbrella context that encompasses and leads to other major conflicts (e.g social inequality, land tenure conflicts, higher level of corruption, etc). Fatorelli et al. (2015) also state that despite significant efforts towards the coordination related to REDD+, governance remains a major challenge in the country. This challenge is omnipresent whether between government levels (as evidenced in the differences in REDD+ perspectives and interests between federal and state governments), civil society or between government and the private sector. Although the most cited problems (table 8) during interviews are acknowledged as “major challenges”, the lack of coordination and conflict of interests between different governmental agencies and sectors (e.g. private sector and civil society) was the topic with the highest level of agreement among respondents (92%). This is followed by lack of participation in decision-making (90%), long-term financing (81%), land tenure conflicts (81%), 79% answered contradictions/non-aligment among forest-related policies with other sectors (e.g. agriculture), lack of coordination of actions at local and sub-national levels with the ones at the federal level (78%) and addressing causes of deforestation (73%).

Table 8 Most frequently cited challenges by the number of mentions (national REDD+ scope)

Challenges	Type of organization	Number of mentions
Lack of coordination and conflict of interests between different governmental agencies and sectors	Ministries and Coordinations	**12**
	Independent consultants	**2**
	Universities	**6**
	Private companies	**3**
	Civil Society Organisations	**18**
	Institutes, NGOs	**13**
Lack of participation in decision-making	Ministries and Coordinations	**9**
	Independent consultants	**2**
	Universities	**6**
	Private companies	**4**
	Civil Society Organisations	**18**
	Institutes, NGOs	**13**
Long-term financing	Ministries and Coordinations	**15**
	Independent consultants	**2**
	Universities	**4**
	Private companies	**4**
	Civil Society Organisations	**13**
	Institutes, NGOs	**9**
Land tenure conflicts	Ministries and Coordinations	**9**
	Independent consultants	**1**
	Universities	**6**
	Private companies	**3**
	Civil Society Organisations	**12**
	Institutes, NGOs	**16**
Contradictions/non-aligment among forest-related policies with other sectors	Ministries and Coordinations	**6**
	Independent consultants	**2**
	Universities	**6**
	Private companies	**1**
	Civil Society Organisations	**18**
	Institutes, NGOs	**13**
Lack of coordination of actions at local and sub-national levels with the ones at the federal level	Ministries and Coordinations	**9**
	Independent consultants	**1**
	Universities	**5**
	Private companies	**4**
	Civil Society Organisations	**13**
	Institutes, NGOs	**13**
Adressing causes of deforestation	Ministries and Coordinations	**6**
	Independent consultants	**1**
	Universities	**6**
	Private companies	**1**
	Civil Society Organisations	**17**
	Institutes, NGOs	**11**

Source: Own Data

In spite of the fact that the background of REDD+ in Brazil is characterised by a conflict of interests among group of actors engaged in such context, it is also observed that amongst responses there was no significant variation of answers between groups (private sector/NGOs/research institutes, etc) of non-governmental stakeholders in

relation to major challenges existent in the Brazilian scene. However, it should be acknowledged that each group has clearly their own concerns. For example, most of the interviewed national NGOs strongly advocate more than the other actors with respect to the question of adaptation and conservation of biodiversity within the REDD+ framework. Moreover, the federal governmental sphere strongly advocate for REDD+ payments based on performance. On the other hand, all groups agree that REDD+ actions should promote non-carbon benefits. Within the governmental sphere, those challenges related to policies' implementation and financing of activities are mostly recognised. Concerning the aforementioned argument about conflict of interests, Shankland and Hasenclever (2011) show in their study that positions within group of actors engaged in REDD+ in Brazil are 'heterogeneous and often highly contested, with struggles for control of the agenda driven both by competition for power and resources and by ideological differences'.

A major driver of deforestation is agricultural expansion and the political lobby behind this driver is still incredibly powerful in Brazil (see Paulino, 2014; South and Brisman, 2013). While Brazil has been successful in substantially decreasing deforestation, in the end, the "business-as-usual" actors that benefit from deforestation (e.g. agricultural sector) and forest degradation (e.g. timber sector) have so much to gain from these activities that they trump meaningful improvements in forest governance. There are *"substantial opportunities to engage the private sector, as seen from the commodity roundtables and deforestation-free supply chain commitments, but is this enough to counter the 'business-as-usual' agricultural scenario?"* (CIFOR, 2014, personal communication).[111]

An environmental consultant responded that the most controversial matters arise from the different views about how REDD+ should work between the federal government and the sub-national entities, especially federal states (scale), "*which also reflects on how the baseline is established and what are the main potential sources of funding"* (Pavan, 2014, personal communication).[112] This is also reflected on tenure and property rights conflicts, "*which is the way that the carbon rights will be distributed among those who were responsible for generating them*" (Pavan, 2014, personal communication).[113] In the Brazilian scenario therefore there is a clear demand of more secure tenure rights for the application of both regulatory and incentive-based REDD+ mechanisms. Some of

[111] CIFOR – Center for International Forestry Research – Personal Communication
[112] Mariana Pavan – independent consultant – Personal Communication
[113] Mariana Pavan – independent cosnultant – Personal Communication

the interviewees stated that clear property rights are a pre-condition for the establishment of the national REDD+ strategy. Reydon et al. (2015) concluded their paper stating that the 'current institutional framework in Brazil, which regulates land allows for a variety of land uses by landowners including speculation, production or exploitation'.

Without a bottom-up approach *"there will be no legitimisation of a national REDD+ strategy in the country"* (IPAM, 2014, personal communication).[114] Brazil has a history of imposing policy measures from the top-down, without actually considering the local populations and circumstances (UEA, 2014, personal communication).[115] In this sense, local participation in REDD+ interventions in Brazil is still often limited to passive consultation by REDD+ project proponents, which should be enhanced to develop REDD+ interventions that reflect local knowledge, land use practices and aspirations (Cromberg et al. 2014). Local participation should *"promote empowerment and be interactive – so local people feel they are part of the process and not marginalised by it"* (Gebara, 2014, personal communication).[116] The process should normally be facilitated by collective actions where people collaborate with each other and, this way contributing to the achievement of REDD+ initiatives' goals. It is also important to take into account that the *"Brazilian State tends to be lethargic and, in the case of the Amazon, institutionally weak, and thus may be unable to properly implement REDD+"* (UEA, 2014, personal communication).[117] Cited also as a challenge is the fact that currently, the Brazilian REDD+ strategy is limited to addressing deforestation, not addressing the "plus" part of the REDD+ scheme (UFMG, 2014, personal communication).[118] Thus, institutional arrangements must focus on strengthening their monitoring and enforcement capacity, since a transition to sustainable development in the Amazon region will face resistance (UFMG, 2014, personal communication).[119] In addition, criticisms concern the fact that the actions involving REDD+ are not nationwide but only focused in the Amazon region (SAE, 2014, personal communication).[120]

[114] IPAM – Amazon Environmental Research Institute – Personal Communication
[115] UEA – University of the State of Amazonas, Forestry Department – Personal Communication
[116] Maria Fernanda Gebara – independent consultant – Personal Communication
[117] UEA – University of the State of Amazonas, Forestry Department – Personal Communication
[118] UFMG – Federal University of Minas Gerais, Institute of Environmental Services – Personal Communication
[119] UFMG – Federal University of Minas Gerais, Institute of Environmental Services – Personal Communication
[120] SAE – Secretariat of Strategic Affairs of the Brazilian Presidency – Personal Communication

Another major challenge is long-term financing for REDD+, also given the absence of financial flows from carbon markets (CIFOR, 2014, personal communication).[121] Although the Green Climate Fund is a promising source of results-based payment financing for Brazil, its current level of funds could never cover the full set of planned "results" in the country, and then it comes the question *"Where will the rest of the financing come from?"* (CIFOR, 2014, personal communication).[122] Although it is clear that conditionality of payments depends on measurable decreases in forest loss, another question is whether a donor country will be willing to give money for performance that has been achieved in the past, or for actions that will mitigate in the near future (SPE, 2014, personal communication).[123] A professor from the University of Brasília declared: "*In my opinion the expectations about REDD+ are inflated because there will not be significant money (beyond Norway – Amazon Fund) for middle-income countries like Brazil"* (UNB, 2014, personal communication).[124] Finance is also a controversial topic among the private sector. There is still a strong concern in relation to financial risks in REDD+ investments, benefit-sharing systems and the unpredictability about the international demand for REDD+ credits in the near future.

Interviews revealed three predominantly emphasised opinions regarding interaction issues: i) lack of interaction among involved institutions, ii) lack of a comprehensive understanding of the Brazilian strategy on REDD+ and iii) lack of a comprehensive understanding of how the developed activities could better cooperate among them under the proposed REDD+ framework. On the other hand, the challenges that provoked the least concern among interviewees included leakage, scope of activities and monitoring (MRV) system (even though the monitoring system is still not implemented for all biomes in Brazil). The analysis also demonstrates that when compared in a range of importance, the major concerns of the respondents were: i) inter-level policy linkages, this means, to ensure that projects/programmes/policies are designed in compliance with the national guidelines; ii) cross-coordination and integration among levels and sectors; iii) adoption of participatory processes, which may have a significant influence on equity, effectiveness and efficiency aspects. The following sections provide a deeper discussion of such topics. Coincidently, the analysis of the ENREDD+ corroborates for these topics be appointed as one of the main reasons

[121] CIFOR – Center for International Forestry Research - Personal Communication
[122] CIFOR – Center for International Forestry Research - Personal Communication
[123] SPE – Secretariat of Public Policy and Economy – Personal Communication
[124] UNB – University of Brasilia UNB, Institute of International Relations – Personal Communication

for a plausible inability of the REDD+ implementation in Brazil. It should also be clarified that in the following sections Brazil's NDC was likewise analysed, which includes and confirms Brazil's formal REDD+ commitment targets to the Paris Agreement. Moreover, such discussion addresses the research questions related to the weaknesses and strengths of the national REDD+ strategy as well as constraints and barriers existent in this development design process.

6.3 The pre-existing discourses reasoning

A consistent understanding of the development of REDD+ strategies solidly depends on pre-existing discourses and the historical context involved (Brockhaus et al., 2014, Kanowski et al., 2011; van der Hoff et al., 2015). There are two distinct discourses identified by van der Hoff et al. (2015) regarding the national REDD+ context in Brazil. They have identified a carbon commodification (federal states) discourse as well as the sustainable development discourse (federal government). While the first discourse underpins the argument that market constitutes the most suitable solution for deforestation, the latter emphasises the lack of access to technology and poverty as the main drivers of deforestation, seeing REDD+ as financial support for national sustainable development policies that aim for similar goals (van der Hoff et al., 2015). They also state that given the distance between the two discourses, it is not surprising that for dominance the groups of stakeholders on the different sides of this debate have struggled between themselves. Moreover, it is difficult to judge whether this parallel development of the REDD+ national strategy is reasonable in the long term, leading to a conceptual and polarisation of REDD+ stakeholders, meaning a possible collapse of the REDD+ identity in Brazil (van der Hoff et al., 2015).

For example, representatives of the Cotriguaçu and São Félix do Xingu initiatives in Brazil declared that they no longer consider themselves REDD+ programmes (Sunderlin et al., 2014). In their opinion the acronym REDD+ is strongly associated with the carbon credits market and involves sensitive issues, such as carbon rights and extensive consultations with potential participants, including indigenous populations that have expressed an aversion towards REDD+. Also, they would potentially incorporate REDD+ into their agenda if it becomes more nationally consolidated (Sunderlin et al., 2014). In this sense, they declared to have broadened their initial project approaches to focus on jurisdictional models for green development. In this sense, if actions do not

have proper identities, the actuality necessary for such developments will presumably not be achieved (Manfrinato, 2014, personal communication).[125]

According to some interviewees, although Brazil has placed effort on issuing a Decree establishing the Brazilian REDD+ strategy, the country is far from achieving a national strategy on REDD+ (ICMBIO, 2014, personal communication).[126] Another interviewee declared, *"it seems that the government does not intend to establish a policy, but they intend to comply with an international agreement, they already have the PPCDAm to fight deforestation* (SAE, 2014, personal communication).[127] Brazil intended to approve the ENREDD+ as an umbrella to the UNFCCC guidelines, and then afterwards to regulate more specific issues, which could indeed occur at the same time. For Manfrinato (2014, personal communication)[128] related to REDD+ in Brazil, "*there is a patchwork still disassembled, which includes pieces that are extremely well elaborated but not necessarily fitting within the same quilt"*. Moreover, Manfrinato says that REDD+ was created to be related to carbon emissions but the way this matter has been discussed and implemented in Brazil does not have much to do with carbon. In this regard, some deforestation reduction policies are not necessarily linked to REDD+ even though they result in REDD+ established goals. However, for Turnhout et al. (2017) REDD+ frameworks will continue to have a strong focus on carbon since there is no strong indication that the delivery of non-carbon benefits may become included in MRV (monitoring) systems or in results-based payments.

Within this context, Vijge (2016) affirms that currently many existent REDD+ manifestations do no have climate mitigation as their prime objective and this makes highly questionable the effectiveness of REDD+ scope. The rationale in favour of a "pro-poor approach" argues that REDD+ will not succeed unless co-benefits for poor forest-dependents are delivered (DeShazo et al., 2016). Nevertheless, according to Wunder (2008), poverty alleviation should never become the primary goal of conservation initiatives; otherwise, neither environmental conservation nor improvement of livelihood goals is likely to be achieved (Lima, 2014). On the other hand, Turnhout et al. (2017) suggest that a pragmatic and heterogeneous approach to conceptualising and implementing REDD+ will prevail in this context. This means, there is a high likelihood that REDD+ will sustain its focus on different initiatives driven by distinct

[125] Warwick Manfrinato – Personal Communication
[126] ICMBio – Chico Mendes Biodiversity Conservation Institute – Personal Communication
[127] SAE – Secretariat of Strategic Affairs of the Brazilian Presidency – Personal Communication
[128] Warwick Manfrinato – Personal Communication

conceptualisations (with a focus on carbon, co-benefits or landscapes). For example, some people have been advocating the focus of REDD+ scope mainly on biodiversity conservation alongside carbon, claiming that biodiversity increases both productivity of ecosystems but also its resilience to impacts, thus conserving more carbon in the long run (Alves-Pinto et al., 2016). Others support the idea that forests can also enhance the adaptation of populations and economies dependent on climate-sensitive sectors including agriculture, fisheries, and energy (Somorin et al., 2016). However, this also implies that the paradoxes, dilemmas and trade-offs across diverse conceptualisations of REDD+ will remain. Nonetheless, as long as context-specific conditions may be adopted, this might still enable REDD+ to make a distinctive and important contribution to keeping forests and their multi-functionality (Turnhout et al., 2017).

Amongst interviewees there was no common sense about what the main focus of the REDD+ national strategy in Brazil should be. Many of them recognised that a focus on curbing tropical deforestation through REDD+ and promoting sustainable development for rural people will have the "co-benefit" of contributing to global mitigation efforts. That said, it is argued that to reduce deforestation in tropical areas influences regional/local climate change caused by forest destruction. This change is related to regional changes in rainfall patterns. Recent studies show that regardless of global climate change, in the Amazon region a change of regional climate is already happening (which is becoming drier) on account of deforestation, even at low rates (IPAM, 2014, personal communication).[129] For example, large areas in the Eastern portion of the Amazon, precisely the region most affected by deforestation and forest degradation, is already suffering from the dry period (which is becoming longer), reduction of total rainfall in the year and even diminution of rain in the dry season, which makes still preserved forested areas become more susceptible to degradation by forest fires (Nobre, 2014). Therefore, it is strongly conceivable that the REDD+ mechanism (in Brazil) should then be seen not only as actions to reduce carbon emissions, but also as a possibility to value the standing forest, attempting to reverse the logic that sustains tropical deforestation.

The development of the Brazilian national REDD+ strategy has been mostly characterised by vulnerability (particularly in the legislative branch of government) as well as divergences and disagreements. Within this scenario, a lack of coordination between the National Policy on Climate Change (NPCC), environmental policies and

[129] IPAM – Amazon Environmental Research Institute – Personal Communication

development goals is observed (Cenamo et al., 2014). Although nested under potentially connected policy arenas, such policies – including REDD+ – still tend to be conducted separately in Brazil (Gebara et al., 2014). The lack of dialogue between the civil society, federal states and particularly indigenous and traditional communities is another crucial barrier to the establishment of REDD+ in Brazil (Cenamo and Lima, 2014). For example, the Brazilian Federal Government submitted its reference level (REL) to UNFCCC in June 2014. The assessment presented by the UNFCCC in December 2014 stated that the REL was in line with COP 16 and 17 decisions and suggested only small refinements, whereas, several political questions could be raised on that submission, especially considering that the REL was not debated by civil society or state governments (Reis et al., 2015). Internationally Brazil stands as a pro-active leader on voluntary commitments and implements actions towards a conservationist approach; on the other hand, the federal government does not always support such actions domestically (Reis et al., 2015). The new 2012 Forest Code is a good example, which presented several misinterpretations that could lead to a situation of legal uncertainty and/or losses of flora and fauna (Soares-Filho et al., 2014; Sparovek et al., 2010). Moreover, another example is the recent harsh reduction of conservation units in the Amazon (Gebara, 2016), which may be related to the exploitation of over 1 million km^2 of forests for mining activities

Nevertheless, the ENREDD+ presents some key elements for building a solid REDD+ policy in Brazil. For example, the ENREDD+ establishes appropriate links among the Brazilian GHG mitigation actions in the forestry sector, the Brazilian environmental regulation and the references of the UNFCCC. Comparing the 2013 version with the final version of the ENREDD+ a betterment particularly concerning the objectives could be indicated. The final version reflects a broader set of goals that surpass the UNFCCC framework, proposing a development model independent from the UNFCCC decisions. In particular, one of the strongest aspects of the Brazilian REDD+ national strategy is the fact that REDD+ is regarded as a public policy that, amongst several objectives, seeks to identify those who legitimately act towards forest conservation and deals with deforestation drivers under the logic of integrating existing public policies, being an expansion of governmental actions (even though Brazil faces several institutional and governance challenges). However, until the moment there are few synergies for aligning the ENREDD+ and previous conservation initiatives as well as sectoral policies (e.g. agriculture/livestock, energy and mining). Moreover, although

there have been national attempts to involve sub-national actors, contexts and actions (e.g. task force of Amazonian states in relation to the national REDD+ strategy coordinated by the Casa Civil), these perspectives do not necessarily seem to be reflected in national policy formulation (e.g. challenge of how to share REDD+ benefits equitably across levels of governance).

This also increases the complication to attribute results to REDD+ interventions. This means, the reduction in deforestation in recent years in the country was most likely mainly due to a mix of several factors (for example, some public policies implemented between 2003 and 2008 and the improvement in enforcement strategies) and not just for REDD+ actions. On the other hand, this position can help countries to assess gaps of the existing legal framework guaranteeing this way enforceability, for example, of newly created entities (such as a national REDD+ management body) that need to become legally enforceable in order to be effective (Denier et al., 2014). Brazil has also adopted this position (even though Brazil mostly relies on existing institutions). In addition, such an approach could also contribute to the achievement of other relevant goals as the national sustainable development goals (Denier et al., 2014).

6.4 Political coordination and cross-interaction among levels and sectors

The risks of unintended negative effects will increase if climate change policies are designed and implemented without considering broader impacts (G7 Members, 2015). The implementation of such policies could undermine economic development, contribute to political instability, and exacerbate social insecurity. These unforeseen effects often arise due to the lack of cross-sectoral coordination[130] (G7 Members, 2015). Cross-sectoral coordination failures seem to be the predominant characteristic in present policy domains, and REDD+ has not yet been able to change this pattern (Korhonen-Kurki et al., 2015). For example, various REDD+ national strategies from countries that work under the UN-REDD and FCPF (Forest Carbon Partnership Facility) readiness scope are being criticised because the developed strategies propose many actions to reduce conversion of forests in other land uses. On the other hand, they do not suggest clear solutions to the underlying causes of deforestation and forest degradation, as for example, to involve cross-sector interactions especially concerning sustainable

[130] In a sense of the integration of diverse elements into a harmonious process, regulating this way activities, responsibilities, and command and control structures to ensure that the available resources are efficiently used in pursuit of the specified objectives.

agricultural measures (Fobissie and Kanninen, 2014, personal communication).[131] However, this may happen on account of financial constraints, for example, in some countries, expected REDD+ finance is not large enough to influence policies and reforms (Lee and Pistorius, 2015). Further with Lee and Pistorius (2015), in Vietnam, for instance, international REDD+ finance is smaller if compared with finance provided through a functional payment scheme for forest ecosystem services (PFES); the same situation is observed in Mexico.

Furthermore, cross-sectoral interaction will also be important for considering equity and the socio-economic impacts of national level REDD+ strategies (Graham and Vignola, 2011). Thus, even though Brazil is a pilot-country under FIP/World Bank, it is neither a member of the UN-REDD nor FCPF and should be analysed in a particular way. First, Brazil has already achieved a significant reduction in deforestation rates. Second, countries based on subsistence farming (not the case of Brazil) tend to be financially constrained and face greater difficulties in adopting anti-deforestation policies – instead relying on projects and short-term policies. Still, the lack of coordination among actors, sectors and government will affect REDD+ governance and outcomes in Brazil (Gebara et al., 2014), which is reflected in the country's REDD+ strategy in which objectives for coordination and governance have been set but implementation details are deficient. According to Corfee-Morlot et al. (2009) a common deficiency regarding political coordination happens because relatively few evaluation frameworks have been employed to measure the outcomes of climate policies at local scale.

As previously explored, it is consistently accepted that the agricultural expansion, the commercial exploitation of timber and the opening of roads and tracks are three of the main causes of deforestation in Latin America (Salamanca, 2013). REDD+ policies at national level will therefore need to address these drivers[132] – in case of Brazil also energy and mining – of deforestation and forest degradation that are (indirectly) outside of the forest sector in order to guarantee that local level food security is not compromised to ensure the long-term political and social sustainability of REDD+ (Graham and Vignola, 2011).

In Brazil due to significant reduction in deforestation rates, the agricultural sector represents about a third of Brazilian emissions nowadays and is expected to continue on

[131] Kalame Fobissie – REDD+ negotiatior, Government of Cameroon. Climate Change Programme Coordinator at VITRI, University of Helsinki, Finland and Prof. Markku Kanninen, VITRI, University of Helsinki, Dept. of Forest Sciences, Finland.

[132] Agriculture and energy sectors are very important to consider in Brazil because of their main role as key drivers of development in the country.

a growing trend in absolute terms (IDDRI, 2015). Therefore, considering Brazil's large land area and the extensive portion of this area occupied by pastures, there is substantial physical potential for increasing production and reducing GHG emissions by converting degraded pasturelands into crops (Assunção and Chiavari, 2015). Estimates show that improving the productivity of Brazilian pasturelands would detach enough land to meet projected demands of crops and biofuels through 2040 (Strassburg et al., 2014). Brazil has over 40 million hectares of degraded pastureland outside the Amazon suitable for the production of crops (Assunção and Chiavari, 2015). Moreover, healthy pastures provide better quality forage that can reduce CH_4 emissions from enteric fermentation (Smith et al., 2007) and absorb greater quantities of soil carbon (Assad et al., 2015). On the other hand, restoring degraded pastures involves fertilisation that increases N_2O emissions (Smith et al., 2007). Also, it involves mechanisation for soil preparation – that drives up demand for energy, notably diesel – and frequently supplementary irrigation – that drives up demand for electricity (IDDRI, 2015). But nevertheless, the REDD+ framework in Brazil should put more effort into the integration among anti-deforestation measures, agriculture and livestock production and energy generation policies (Gebara et al., 2014).

For example, to achieve the goals of its NDC[133] three conditions must be accomplished by Brazil according to IDDRI (2015). Mostly Brazil's GHG emissions come from these mentioned sectors: forestry, agriculture and energy. Therefore, considering the carbon per tonne price at an average of US$50 in the market, the energy sector could comply with the NDC, but only if Brazil also fully complies with the ABC Plan and the zero net deforestation throughout the country. This means, without the accomplishment of these three conditions in combination, not even with carbon prices above US$ 200 (what is unlikely to happen in the near future – carbon prices span a wide range from less than US$1/$tCO_2$eq to US$137/tCO_2eq during 2015/2016 (The World Bank and Ecofys, 2016)) the NDC will be accomplished by the planned policies (Angelo, 2015). The net zero deforestation is the most complicated aspect in this equation, because the Brazilian regulation allows for "legal" deforestation. Brazil has a

[133] This scenario is estimated by a computer model that takes into account the emissions and performance of the Brazilian economy in this study from IDDRI. It should be noted that GDP projections had to be adjusted to match the recent deviations from a high-growth trajectory, and the forecasts for a reduced growth rate in the short-term in Brazil. Official projections by government institutions place it above 3% on annual average between 2010 and 2050, with decadal annual growth rates as high as 4.5%. However, the average growth rate for the period 2011-2014 was just 1.5% per year. The most recent estimates indicates Brazilian GDP shrinking by 2.66% in 2015, shrinking again by 0.78% in 2016, and returning to modest growth in subsequent years (IDDRI, 2015).

favourable potential to sustainably supply a significant portion of the global demand for agricultural products, if the country adopts an enhanced policy scenario among sectors, for example adopting the intensification of agriculture and cattle farming measures (IDDRI, 2015).

In order for Brazil to realise its sustainable agricultural potential, a sustained integrated approach is needed. Integrated systems have other significant environmental advantages when compared to monoculture crops (apart from its GHG emissions reduction potential), including for example, soil, water and biodiversity conservation (Gil et al., 2015) However, Gil et al. (2016) suggest that unless training in integrated crop-livestock is targeted also at farmers in marginal lands and supported through broader investment in supply chain infrastructure, its adoption in Brazil in regions with degraded pasture will likely remain low. On the other hand, this means that a superior policy support and regulation is necessary since such actions lead to higher yields, which in turn can drive up the price of land and lead to renewed deforestation pressures (Galford et al, 2013; Sparovek et al, 2010). These policies could potentially be implemented as part of the ABC Plan. For Elzen et al. (2015), intensification of cattle farming would spare land and decrease the pressure on forests. On the other hand, currently few incentives exist in Brazil for improving productivity in management practices and incorporating best practices (Elzen et al., 2015). Moreover, usually due to bureaucratic processes and strict specifications many groups (e.g. smallholders) have been marginalised from such schemes, thereby neglecting their chance to have access to the financial resources. For Gil et al. (2015), considering environmental and economic benefits potentially generated by the adoption of integrated systems, it is interesting to develop small-scale business models. Although the challenges of continuing competition for land by the agro-industry remain in Brazil, production efficiency increased in several agricultural sub-sectors during the past decades. For example, improved production techniques triggered a 240% increase in grain and oilseed (including soya) production (GIZ, 2013).

This integration would be also essential from the financial perspective. That's because the overall financing needed to achieve these NDC's outcomes will cost some billion of dollars. For example, the World Bank suggests that restoration targets (established by the Forest Code) will require investments ranging from US$14.8 billion for 12 million hectares to US$26.2 billion for 20 million hectares over 15 years (Edwards, 2016). Therefore, it will be demanded to link restoration programmes with improved agricultural activities productivity, valuing carbon and other environmental services to

help finance these efforts, and efficient integration of investment at several scale such as public and private, international and domestic (Edwards, 2016). Ultimately, issues as climate change and deforestation have multiple determinants, affect many livelihoods and sectors, and require action by different actors. Therefore, a national strategy for REDD+ must be multi-sectoral so as to aggregate efforts and avoid duplication of activities and conflict of interests, affecting also coordination (Cenamo, 2014, personal communication).[134] Conflicting goals (e.g., agricultural policy and land reform policies) can influence and even prevent the implementation of REDD+ interventions (Brickell et al., 2012). Challenges related to sector coordination and interactions are therefore among the most addressed issues shared by countries developing REDD+ (Peskett and Brockhaus, 2009). Such multi-sectoral approach is also important from the permanence standpoint, given that actions undertaken in different sectors are equally relevant in determining how long deforestation reduction obtained through REDD+ projects can be ensured for (McFarland, 2010; Valberg, 2011).

6.5 Main rationale for local-national policy linkages

There are several reasons for national governments to better engage with local governments and stakeholders on the issue of environmental policies. Local institutions serve as a vehicle for the implementation of nationally driven policies, to ensure that the mandates outlined at national scale are actually carried out and deliver consequential results at local scale (Corfee-Morlot et al., 2009). Moreover, local actions will be important in providing means of social and technical innovation that is not possible at larger scale, eventually providing a vehicle for learning and broader dissemination where prosperous innovations occur. Local action will also provide essential insights for understanding the political economy of environmental policy complex. It will provide a vehicle to identify how incentives and interests interact at different levels of governance, to observe and understand direct local costs and benefits of action, including local co-benefits, and the local beneficiaries and losers of any particular set of policy choices.

Moreover, an important factor at national level is how the federal government handles design and implementation of environmental policies and strategies. As the national government is in charge for the diffusion of responsibility, institutions that address sectoral issues should adopt multi-level governance practices into their

[134] Mariano Cenamo – Personal Communication

mandates (Corfee-Morlot et al., 2009). There is also a need for focused attention to building capacity throughout levels of government to undertake pro-active assessment of the costs and effectiveness of policy options. This will take some training but also access to standardised tools and up to date information in each area. Within this context, national governments will need to take some responsibility for decentralising understanding and building ownership and responsibility throughout state government as well as across municipalities and local stakeholders (Corfee-Morlot et al., 2009).

6.5.1 The Brazilian context

The Brazilian environmental policy has been advancing in a fragmented way (Sano, 2011). As previously described, a peculiarity of the Brazilian federalism is that the municipalities have the status of autonomous entities within the federation concerning several legal processes (Lavalle et al., 2013). A critical element of the national development goals is supporting large-scale efforts by states and municipalities to reduce deforestation rates within their borders (TNC, 2015). The federal command-and-control structure has failed to promote conservation approaches (Boyd, 2008; Fearnside, 2006) while the state level has failed to enforce environmental laws or incentives to reduce deforestation (Boyd, 2008; Chomitz et al., 2006). If forests are not seen as a high priority in national, sub-national and local development planning, this will create little incentive to strengthen sector coordination in REDD+ implementation (Brickell et al., 2012).

This lack of priority also has implications for the available resources particularly at the local level where there are not abundant resources to execute the responsibilities in a fair decentralised manner, thereby limiting enforcement due to poor capacity of execution (Brickell et al., 2012). Likewise, Korhonen-Kurki et al. (2015) argue that there is still a gap between REDD+ policy objectives and sectoral and national development policies, leading to overlapping regulations and inappropriate resource allocation among the sectors also in Brazil. According to Sano (2011), there is an institutional weakness of many Brazilian municipalities (mainly those with a smaller population) that do not have sufficient and qualified technical labour and face financial difficulties to address environmental challenges. Moreover, the lack of a culture of horizontal and vertical articulation also creates difficulties for the development of territorial actions (Sano, 2011).

Korhonen-Kurki et al. (2015) have analysed coordination and cross-sectoral integration in REDD+ experiences from seven different countries, including Brazil. They argue that despite existing efforts, REDD+ is not yet adequately integrated into existing policies in most of the countries (also in Brazil). Clearly, an impediment to the development of the national strategy on REDD+ in Brazil is the lack of alignment between state-level policies and the federal government. Cunha and Rodrigo (2012) and Rezende (2000) agree that Brazilian states and municipalities carry out activities without coordination or integration with the federal level. Indeed, many states were/are ahead of federal legislation that often adopted what already exists to make it a national standard. The State of São Paulo is a good example, since its restrictive legislation on industrial pollution provided the basis for federal legislation (Sano, 2011). On the other hand, Nassar (2015) says that sub-national initiatives may be effective in putting pressure on, and influencing the federal government's position. In addition, actions at the local level can provide essential experience and, when successful, lead to bottom-up diffusion of approaches and indeed, influence national and even international levels of initiatives (Corfee-Morlot et al., 2009; Bulkeley and Betsill, 2005).

According to Pavan (2014), incorporating the vision and activities developed by the states is extremely important for a flourishing Brazilian national strategy on REDD+. A good example is the state of Acre. In 2010, Acre's state Assembly approved a new law (State Law 2.308/2010) called the State System of Incentives for Environmental Services (SISA). SISA is s known as the world's first jurisdictional REDD+ programme (Duchelle et al., 2014). In contrast to some other jurisdictions globally, where incipient REDD+ programmes operate in seclusion, the state of Acre developed the legal framework of its state-wide programme before encouraging the implementation of forest carbon projects (Evans, 2013). This involved setting up a range of institutions to regulate the system, trade carbon credits, give scientific advice, and negotiate with civil society. For Acre, the switch from a forest-depleting to forest-maintaining model of governance and its REDD+ incentive-based system was mostly based on improving the sustainable livelihoods of communities, increasing intact forests' economic value and enhancing forest protection as well as increasing yields from agricultural and livestock production systems in order to reduce their expansion into primary forests (Climate Focus, 2013).

Nevertheless, the action of federal states often seems to be contradictory as well. For example, the federal government has adopted licensing as a way to control environmental impacts, demanding an obligatory Environmental Impact Assessment

(EIA/RIMA)[135] for plantations greater than 1,000 hectares in size (Abranches, 2014). However, some producers virtually sub-divide their lands to avoid the expense of producing an EIA/RIMA. Thus, under a flexible interpretation of regulations, statements are often formally issued (and accepted by local authorities) saying that such plantations are harmless although there is uncertainty about their ecological impact (Abranches, 2014). Federal states, nonetheless, lack clear procedures for reporting to the federal level and the structural conditions for the implementation of natural resources protection policies appear incomplete (Valberg, 2011). On the other hand, many activities taking place on the state level are not necessarily reported back to the federal government either (Valberg, 2011). For instance, the Ministry of Environment (MMA) receives inadequate information from the states, which are the ones aware of actual forest uses (MMA, 2014, personal communication).[136]

The federal states lack the necessary institutional instruments to approve forest utilisation, making it more difficult to achieve a clear distinction in measuring legal and illegal logging (Valberg, 2011). In this sense, Brazil lacks a clear distribution of responsibilities for following up on the policies and plans established in NPCC, reflecting in this way the REDD+ implementation throughout the country. This multiplicity of institutions – including the many forest agencies – and changes in their institutional responsibilities, divides responsibility and accountability and affects the incentives for sector coordination. Also, the high costs of coordination, and the need to overcome different approaches and territories, are disincentives to strengthening cross-sectoral coordination in countries implementing REDD+ activities (Brickell et al., 2012). Ultimately, in the case of Brazil, the ENREDD+ was mostly developed based on federal-level government policies and previous national efforts (e.g. PPCDAm and PPCerrado), resulting, in few synergies and a small range of opportunities for aligning the ENREDD+ and previous sub-national REDD+ actions (Alves-Pinto et al., 2016).

6.5.2 Institutional weaknesses and conflict of interests

The Brazilian institutional design is also pointed out as a problem. According to Alves (2014), it does not respond to the need of implementing complex environmental

[135] EIA/RIMA is required to all projects aiming the change of land use in natural areas such as tourist development, infrastructure, industrial, agribusiness, dams etc. However, a controversial point is that this assessment is limited to large-scale development projects.
[136] MMA – Miinistry of Environment – Personal communication

policies, because the environmental arena affects territorial management and require contributing actions from all levels of government, making its implementation more difficult. Moreover, the actors involved in institutional structures often do not have the same power or influence, and several new actors remain outside of the official political system (Alves, 2014). Following Valberg (2011), various inter-ministerial conflicts exist due to discrepant interests and forest protection is not always a shared priority. Some specialists believe that the Ministry of Environment (MMA) has less power than the Ministry of Agriculture (MAPA) and that the Ministry of Foreign Affairs (ITAMARATY) has traditionally prioritised growth over conservation (Gebara et al., 2014; Valberg, 2011). Agriculture is considered the most dynamic sector of Brazil's economy being a constant menace to socio-environmental balance in the country areas (Bessa et al., 2005). Such discrepancy among ministries was one of the reasons for former environmental minister Marina Silva's resignation[137] from MMA in 2008 during former President Lula's mandate (Abranches, 2014).

On the other hand, MMA representatives have demonstrated their skills several times in the game of bureaucratic politics, for instance, by managing to convince ministries like the Ministry of Agriculture and the Ministry of Finance about the potential positive effects of a voluntary GHG reduction emissions target (Kasa, 2013). Also, as already mentioned, the rise of issues related to climate change and deforestation on the UNFCCC agenda made the MMA's competencies on deforestation much more relevant for national climate policy. This opened a policy window for competent bargaining by the MMA, which systematically managed to increase its influence in intra-governmental negotiations (Kasa, 2013). However Gebara et al. (2014) investigated actors' influence in REDD+ policy networks through two network dimensions: i) perceived influence, referring to the reputational power an actor has according to other actors in the network and ii) relational influence, referring to the actors' central positions in information exchanges and collaboration networks. They found out that although the MMA has assumed a leading role on the development of the national strategy on REDD+, it does

[137] The then President Lula launched the Sustainable Amazon Plan (PAS), an umbrella plan under which PPCDAM, ABC Plan and Amazon Fund would be regulated. He gave the coordination of the PAS to Roberto Mangabeira Unger (Minister-in-Chief of the Secretary for Strategic Affairs of the Presidency (SAE) at that time) and the Executive Secretary to Marina Silva. This would undermine Marina Silva's political authority over major environmental and forest policies. In addition, Roberto Mangabeira Unger defended the incorporation of the Amazon into the infrastructure and economic growth plans (Abranches, 2014). However, the fight against deforestation had gained such momentum, and its domestic and global exposure was robust at that moment. Therefore, Marina Silva team's was willing to prevent their policies from being abandoned, creating a political fact of great impact on the media, public opinion and the political elite, if Marina Silva resigned at the right moment (Abranches, 2014).

not seem to be able to coordinate state and federal actors nor to link up different sectors and levels relevant to REDD+ framework, not including in this policy network arena an important role for the private sector,[138] for example.

6.5.3 Relevance of the private sector

Although some segments of the private sector drive deforestation and forest degradation (historically both have been intrinsically linked to economic development), a key determinant of REDD+ success will be ensuring effective private sector engagement in the process. This outcome was also highlighted in some studies on REDD+ governance (see Corbera and Schroeder, 2011; Cortez et al., 2010). As funding is a major concern in the implementation of REDD+ activities (in the wake of several finance crises), capturing the private sector capital will be absolutely critical to scaling up investment in REDD+ (Bernard et al., 2012). Moreover, the engagement of the private sector promotes higher degree of information flow among stakeholders and facilitates spread of innovation and best practices (GEF, 2011).

According to European Forest Institute (EFI) the private sector can also support REDD+ in several other ways such as: i) reducing the negative impacts of production, building forest protection into their routine activities or in response to legislation, external policies or incentives; ii) innovation, developing new technologies that respond to market pressures, involving environmental, legal, regulatory and fiscal scope to stay competitive; iii) influencing consumption, as with the trade in illegal timber, companies sourcing or investing in commodities can work to exclude deforestation from their supply chain; iv) developing REDD+ projects, creating carbon credits which contribute to emission reductions and v) in implementation, innovation and investment require several forms of implementation to bring results on the ground (as the largest terrestrial land users currently, the private sector will profoundly be involved in activities on the ground).

[138] Private sector can encompass all cases of private firms, including sole proprietorships, partnerships (general, limited or limited liability), corporations (privately owned or publicly traded), cooperatives and franchises, including multinational corporations as well as local businesses, financial institutions and financial intermediaries or consultancies and project management firms. Moreover, it may or not also include private individuals and households. With respect to forests, private sector may refer to forestry companies that harvest timber, agricultural companies clearing forest for palm oil, soya, rubber, coffee, cocoa, sugarcane, cattle ranching or other products, and mining companies clearing forests as part of their extraction activities. Further along the supply chain are the traders, processors, manufacturers and retailers that buy the products and the investors that provide the finance to keep the companies operating. At every stage, these stakeholders can also range from multi-national level to small local companies, sole traders or individual farmers.

However, still, little has been achieved in order to identify who the key private sector players are, the roles they play and the sector's diversity in terms of scale, expertise, motivations and forms of involvement in this context (Bernard et al., 2012).

Several segments of the private sector could have a critical influence on the future of REDD+ such as the group which includes forestry companies and businesses across forest-product supply chains as well as agribusiness, mining, and energy companies operating in and around forests. Also, informal, small- and medium-sized producers, community-based cooperatives and ecotourism companies (which may operate in forests) make up an important segment likewise. Decisively, another important group is the financial sector (private banks, investors, and financial intermediaries) that provide loans and capital to the economic (forestry) sector (CIF, 2013).

Such interface between REDD+ and the private sector is emerging in Brazil, for example, the Sustainable Agriculture Network (SAN), which certificates cattle farmers and agricultural producers who develop good practices without deforestation under the Rainforest Alliance Standard (Alves-Pinto et al., 2016). However, in order to achieve the private sector's potential the current paradigm still needs to change. For example, a major concern from the private sector is in relation to financial and management risks (also to engage in REDD+ actions). Sanches and Bataglia (2015) indicate in their analysis that the Brazilian legal institutions lack efficient mechanisms to support economic transactions due to an ineffective judicial system as well as an unstable contractual law basis. As a result, this generates high transaction costs and stimulates the use of collective and private mechanisms of coordination to minimise risks (Sanches and Bataglia, 2015). Thus, since changes in political institutions, property rights, contract law, norms, and customs influence the reconfiguration of economic organisation (Sanches and Bataglia, 2015), ensuring that this scenario (also applied to REDD+ framework) will be efficient, equitable and effective will require modifications in the institutional environment[139] in Brazil, besides coordination and collaboration between private and public sector and civil society. Therefore, it is important broad engagement of private sector during the early development stage of national strategies and policy design, establishing the legal basis for private investment through an efficient governance framework.

[139] A country's institutional environment influences the degree of uncertainty in contractual relations, as it defines the frameworks for production, exchange, and distribution through its legal, political, and social rules, affecting the forms of governance in risk management (Sanches and Bataglia, 2015).

6.6 Participatory nature of the policy

6.6.1 Defining participation

Recent discourses on participation in forest policies infrequently reflect local forest householders' needs and expectations – as local defined as any group that depends upon the forest to generate income or to subsist (Cromberg et al., 2014). Such disassociation usually occurs because participation can have different meanings, depending on the context and levels of engagement (Cromberg et al., 2014). Also, according to Pimbert and Pretty (1994), there are different levels of participation, from passive participation that only involves informative or consultative approaches to transfer of power, as described below in table 9. Such typologies have been developed to understand the differences between these interpretations and their associated approaches and methods as well as to understand the different contexts in which they are most appropriate (Reed, 2008).

Table 9 Typology of participation

Typology of participation	Characteristics
Manipulative	Participation is simply pretence, with 'people's' representatives on official boards but who are not elected and have no power
Passive	People participate by being told what is going to happen or has already happened; unilateral announcement by administrators
Participation in information giving	People participate by answering questions for surveys or researches. However, people do not have the opportunity to influence proceedings, as the findings of such researches are neither shared nor checked for accuracy
Participation by consultation	People are consulted; analysis and decisions are made by external agents (these external professionals define both problems and solutions)
Participation for material incentives	People contribute resources (e.g., field and labour), and receive cash, food, and other material incentives. People have no stake in prolonging activities when the incentives run out
Functional participation	People's participation is an answer to predetermined objectives formulated by

	external agents. Although they may be involved in decision-making, such involvement does not tend to be at early stages of project cycles. But tend to appear only after major decisions have been made
Interactive participation	People participate in joint analysis, development of action plans, and formation or strengthening of local institutions. Participation is a right, not an obligation to achieve a goal. People take control over local decisions, and so people have a stake in maintaining structures or practices
Self-mobilisation	People participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for the resources and technical advice they need, but maintain control over how resources are used. Such self-initiated mobilisation and collective action may or may not challenge existing inequitable distribution of wealth and power

Source: Pimbert and Pretty, 1994; Gebara, 2013

6.6.2 Participation in context of REDD+

Ensuring effectiveness, equity and fairness in processes of policy implementation and decision-making require the broad participation of all involved stakeholders (Lima, 2014). Besides having public consultation, that entails granting stakeholder's access to information (Bustos, 2014; Roe et al., 2013). Specialists agree that the observance of the interests and opinions of indigenous people and traditional communities is a core part of the REDD+ framework (Bonfante et al., 2010; Gebara, 2013). Also, REDD+ initiatives may have a better chance of success in providing longer-term benefits if developers actively include local people in the design and implementation of such schemes (Cromberg et al., 2014). Local stakeholders should understand that they will be a fundamental element in this process with a stake in the outcome, and should thus participate in the discussions likewise in the decisions (Anderson, 2009). As argued by a previous study, countries with centralised and/or strong national leadership over the policy process may successfully establish the necessary foundations for REDD+ system (even though the process is not inclusive). It also states, on the other hand, that

inclusiveness may prove to be essential for the later implementation of REDD+ policies and for the sustainability and equity of their outcomes (Korhonen-Kurki et al., 2013).

Literature shows that to realise full and effective participation in conservation initiatives is highly challenging (Cromberg et al., 2014). Usually such schemes impact several actors with different opinions and expectations. But, there is consistent evidence that past activities have failed to engage local people in a legitimised way (Pimbert and Pretty, 1995; Wells and McShane, 2004). For instance, Howell (2015) suggests that the reluctance of the government in to include the different affected parties in their discussions in order to incorporate community interests in the planning of REDD+ pilot projects in Central Sulawesi can be considered one of the main reasons for the failure of such activities there. On the one hand, diverse opinions will exist, but when working with perceptions, a key challenge is the correct identification of potential distortions that may arise from unfulfilled over-expectations (Lima, 2014). On the other hand, dialogue within and between different stakeholders can help identify areas of conflict and indicate points for reconciliation (Cromberg et al., 2014). However, distortions may also occur due to lack of information. It seems often that incomplete and inadequate information about conservation measures are provided to participants of such schemes, resulting in them misunderstanding the core concepts and proposed rules (Kosoy et al., 2008). For example, Hayes (2012) examined how the implementation of a PES scheme to promote sustainable pasture management and forest conservation in the Eastern Andes (in Colombia) interacts with farmers' decision-making, concluding that only 13% of the respondents understood that part of their contractual commitment was to conserve forests (Lima, 2014).

Lawlor et al. (2013) have examined 41 REDD+ projects across 22 developing countries. They conclude that the extent of information transmitted to local stakeholders was not always well described in project documents; therefore, it is difficult to analyse how properly informed households were before they agreed to participate in the project. Details about contract structure were particularly often not included in project documents, nor were descriptions of how well participants were informed about possible ranges in future carbon payment (Lawlor et al., 2013). Uncertainty about the REDD+ carbon market is often the motivation for project developers to delay community consultations and information sharing regarding REDD+ initiatives design (Sunderlin and Sills, 2012). Allowing for critical judgment by local participants requires that access to information in the early stage in the design phase should be promoted and explanations

about REDD+, the different interests involved, and associated risks and opportunities should be included, reaching also stakeholders who may not directly participate in the project (Cromberg et al., 2014). A previous assessment before the implementation of a REDD+ intervention should be done to foresee probable problems regarding the implementation (Lima, 2014).

6.6.3 Participation in the Brazilian context

Local participation in REDD+ is made explicit in the UNFCCC Cancun Safeguards as well as in the REDD+ Social and Environmental Standards, the UN-REDD Social and Environmental Principles and Criteria and the Brazilian Social and Environmental Principles and Criteria for REDD+.[140] The safeguard principle of access to information links to the very basic right of free, prior and informed consent (FPIC) regarding interventions on indigenous lands and natural resources, which is acknowledged in international law (Cromberg et al., 2014). As interviews revealed, the involvement of stakeholders (in the broad sense as those who are affected by or can affect a decision) is considered one of the key challenges in the Brazilian context, especially assuming the low priority that the Federal Government has placed on civil society representation in the CONAREDD+ (CIFOR, 2014, personal communication).[141] It is argued that the civil society was only effectively called to participate in the development of the safeguards and nothing more. In this sense, it is also expected that on account of this low representativeness an unbalanced amount of decision-making power in favour of the federal government will be promoted.

According to Cohen and Arato (2000), ‘the political role of civil society is not directly related to the control or the conquest of power, but with the generation of influence upon the democracy and in discussions which are not restricted to the cultural public sphere’. The ability to influence political decisions, however, depends on mechanisms of mediation between civil society and the state (Losekann, 2012). Otherwise, their political role becomes "diffuse and ineffective” (Cohen and Arato, 2000). In this sense, multi-stakeholder platforms could be better supported where insights from the ground can be incorporated into high-level dialogues. Existing social movement

[140] A total of 8 Principles and 27 criteria were developed. The purpose of the Brazilian document is to define minimum criteria to be complied with in any REDD+ programmes and projects and was not intended to be the base for a new certification scheme.
[141] CIFOR – Center for International Forestry Research – Personal Communication

networks are also decisive for direct engagement with local stakeholders and promotion of active local participation in REDD+.

In order to engage stakeholders in the REDD+ national agenda, the MMA led several dialogues with civil society started in 2010 to discuss possible pathways for a Brazilian national REDD+ regime. For Nassar (2015), information and knowledge are a strategic source of power for civil society organisations in world politics. In negotiations they often use their specialised knowledge in the ambition of modifying actions taken by governmental decision makers and/or altering how they define their interests. Along with Nassar (2015), in Brazil, civil society organisations contributed to the development of REDD+ policies at the national level by adopting a cooperative strategy to deal with the federal government. They also developed proposals and studies that supported both the legislative and executive branches of federal and state governments and even acted as consultants to the Brazilian Government concerning international negotiations (Nassar, 2015).

On the other hand, interviewees declared that, since 2012 the REDD+ scenario has substantially changed at the national level. There was a reduction of participation and discussion levels within the REDD+ policy processes (IDESAM, 2014, personal communication).[142] For example, a parallel event ("Brazilian Amazon: integrating climate and forest strategies with an eye towards Paris") was held during the COP20 in Lima in 2014. The event was attended by about 90 participants, including Environment Secretaries of three states (Acre, Amazonas and Tocantins), governmental representatives of Amapá, Pará and Mato Grosso, private sector representatives, experts and indigenous leaders. However, no representative from the MMA attended the debate even though they were invited (Cenamo and Lima, 2014). Two different moments can be then recognised in this process in Brazil. Until 2012/2013 dialogue and participation opportunities have been created, but it was not clear how it would be used. The work plan described in the preliminary version of the ENREDD+ also exposed uncertainties concerning the participation process. Afterwards, there were few opportunities for interaction and it seems that the contributions had not been effectively translated into a strategy or part of the strategy (IMAZON, 2014, personal communication). [143]

[142] IDESAM – Institute of Conservation and Sustainable Development of Amazonas – Personal Communication
[143] IMAZON – Institute of Man and Environment in the Amazon – Personal Communication

Several other arguments were expressed during interviews that shed light this discussion. Some interviewees believe that the REDD+ arena is still very restricted to specialists and actors that are better positioned technically, politically and financially. The discussion does not reach adequately social organisations, workers and employers, and the society in general. Federal states argue that the federal government opens a dialogue, but the processes are always the same; ineffective. The discussion is also concentrated in few spheres of the government, more in the environmental area that does not have dialogue with other areas that also play an important role in this process. Another discussed point is that it is believed that asymmetry of information is a major obstacle because people have different ways of dealing with the information. Moreover, there are factors that hinder access to information, such as the limited capacity to process information by governmental institutions, and to put it on public display. According to Angelsen et al. (2012), enhancing and harmonising information flows between local and national levels are also essential for effective monitoring and control of emissions leakage (displaced emissions).

Furthermore, for some respondents this process is having a certain social exclusion, because some actors are invited to participate, however, they do not have the proper knowledge to reflect on the challenges associated with REDD+ or even to understand how the mechanism works. For Gebara (2009) considering that one of the contributors causes of deforestation is the lack of knowledge about sustainable forest management, education could be able to foster the process of reducing deforestation (Lima, 2014). Common approaches of learning can encourage discussions between several voices within the same community, resulting in action, reflection, shared knowledge (but also the co-production of new knowledge among players), awareness and skills that could be learned and put into practice by the several participants (Gebara, 2015a).

Some authors refer to social learning as the distinct equitable participatory form of knowledge creation (Crane, 2014; Gummert and Douthwaite, 2010). Social learning has emerged as a core concept in natural resource management and environment governance over the past decade. The need to generate shared knowledge to advance current understandings of change and to apply joint-frameworks in extending individual and societal responses was recognised. But these frameworks must account for the complexity of governance regimes (e.g., formal and informal institutions, the role of state and non-state actors, the relative importance of bureaucratic hierarchies, markets and

networks). However, Reed et al. (2010) argue that while considerable evidence suggests that participatory processes can facilitate social learning, a participatory process does not guarantee that social learning will happen. Nevertheless, adopting a shared framework can better address the dynamics and adaptive capacity of resource governance; therefore, fostering shared understandings is necessary in overcoming the single-loop learning that seems to dominate governance processes in developing countries.

Through a grounded analysis of the literature, Reed (2008) identified some key features of best participation practices. It is argued in the paper that stakeholder participation needs to be established by principles that underline empowerment, equity, trust and learning. This includes learning between participants who may have very different perspectives, and between stakeholders and specialists (Reed, 2008). Also, where pertinent, participation should be considered early in the design stage and throughout the process, representing relevant stakeholders systematically. The participation process needs to have clear goals from the outset, and the need for highly skilled facilitation should be not neglected. Local and scientific knowledge should be integrated to provide a more comprehensive understanding of complex and dynamic natural systems and processes, which may also enforce local solutions to environmental problems. Finally, it is argued that to overcome many of its limitations, participatory processes must be institutionalised, promoting institutional guarantees for its implementation (Reed, 2008).

6.7 Indigenous and traditional communities' rights, benefit-sharing system and non-carbon benefits

6.7.1 The rights of indigenous and forest-dependent communities

The matter of respect of the rights of indigenous and traditional communities had come a long way since 1997 – when the UNFCCC did not include this forum under the KP umbrella – until 2010, when at COP16 the concept of safeguards to the REDD+ framework were introduced to the discussion (Jagger, 2014), although the World Bank and other international financial institutions have been using this term since at least the 1980s (Arhin, 2014). Safeguards can be an effective risk management in the policy

arena ensuring social and environmental responsibility. Through the adoption of safeguards in conservation measures, environmental and social issues can be evaluated in decision making, helping assess and reducing the risks, as well as providing a mechanism for consultation and disclosure of information (Moss and Nussbaum, 2011).

Several social risks and negative consequences can be potentially identified in REDD+ initiatives depending on how these activities are designed and implemented (Arhin, 2014). For instance, exclusion from decision-making and participation in such schemes (Dooley et al., 2011), misperception of proposed rules (Hayes, 2012), displacement of local people (Griffiths, 2008; Hall, 2010), lack of access to benefits partly due to unclear land tenure (Larson, 2011) and elite capture (Jumbe and Angelsen, 2006). Notwithstanding, in Brazil and other developing countries, local communities and indigenous groups have been broadly excluded from the design and further implementation of REDD+ initiatives (Anderson, 2009; Crippa and Gordon, 2012). Moreover, although international as well as domestic legal frameworks[144] exist to protect indigenous peoples, historically, Brazil has struggled over who has property rights to the forestlands and this strife has led to the exclusion of indigenous peoples (Taylor, 2015). An interesting perspective is presented on a study from Shankland and Hasenclever (2011). They state that the relationships between indigenous groups and the forest are often completely different from that assumed by Brazilians REDD+ policymakers and promoters. This means, many times the "environmental services" that are defined and established in the Brazilian REDD+ framework have no equivalent category within indigenous conceptualisations of nature. As a result, often both parties are not in agreement on the object of their negotiations likewise (Shankland and Hasenclever, 2011). Moreover, indigenous leaders interviewed by them emphasised the difficulties

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- The 1988 Brazilian Constitution states that indigenous peoples have rights to their own "social organization, customs, languages, beliefs and traditions, and rights to the lands they traditionally occupy", establishing legal protection of indigenous peoples' rights, including the establishment of land rights through an official demarcation of the territories of each tribe. On the other hand, these rights are not always supported or properly executed. Article 231 of Brazil's Constitution, paragraph five, contains an exception in which the indigenous peoples can be expelled from their lands in the "interest of the sovereignty of the country," so long as it is agreed to by the National Congress (Taylor, 2015).
- In 1989, the International Labour Organization adopted Convention n.169, which requires tribal and indigenous peoples' participation in negotiations concerning any development on their lands.
- The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was adopted by the United Nations Human Rights Counsel General Assembly in 2007.
- The Organization of American States (OAS) consists of thirty-five independent states, including Brazil. Article 21 of the American Convention gives indigenous peoples the right to property and acknowledges their right to the use and enjoyment of property.

they faced in involving their grassroots constituencies in the complex, fast-moving negotiations on REDD+ regulation in Brazil, for example.

In response to such concerns, environmental and social performance of REDD+ initiatives is increasingly being demanded by international financial and technical assistance (Swan et al., 2012). For Moss and Nussbaum (2011), if appropriately implemented, safeguards would not only help minimise or manage risks, but it would also enhance benefits to local population. However, this simultaneous risk/benefit potential has a range of implications for REDD+ policy and practice and open to a variety of different interpretations (Moss and Nussbaum, 2011). Therefore, a national safeguard response must be based on the specific national context, reflecting the present capacities and resources at a country's disposal for implementing a national safeguards system (Swan et al., 2012). Nevertheless, although safeguards are a crucial beginning toward equitable and fair outcomes, it still remains to be seen if they can truly influence REDD+ design (Cromberg et al., 2014). Based on that reasoning, one of the major challenges concerning the implementation of safeguards (also faced by Brazil) is the difficulty in establishing indicators that truly demonstrate that these safeguards are being addressed under a REDD+ system.

Indigenous reserves constitute a great part of remaining forests in the world (Crippa and Gordon, 2012). Previous studies have offered evidence that indigenous reserves and protected areas improved forest conservation in Amazonian lands, acting as an effective buffer against deforestation (Anderson, 2009; Ferreira et al. 2005). According to Soares-Filho et al. (2010), indigenous reserves account for 60% of all protected areas in the Brazilian Amazon, which corresponds to about 32% of the carbon stored in the Amazonian territory (or 2.5 times the reduction of GHG commissioned in the first period of the KP). The same study estimates that, from 2008 to 2050, should these areas not be protected, the same amount of deforestation would be responsible for the release of five billion tonnes of carbon into the atmosphere by the end of that period (Soares-Filho et al., 2010). Forest management adopted by indigenous and local communities in Mexico, Central and South America, has been demonstrated to be almost twice as effective in reducing deforestation as any other means of protection (Crippa and Gordon, 2012). Moreover, studies as Börner et al. (2013) and Lima (2014) suggest that higher conservation levels could be achieved by strengthening the capacity of collaborative enforcement of local residents in the protection aspect of reserve areas against external threats.

6.7.2 Benefit-sharing systems

To deliver safeguards, greater attention must also be given to mechanisms that would distribute these benefits (Leventon et al., 2014). While safeguards intend to ensure that REDD+ initiatives does not harm people and the environment, REDD+ can also have a positive impact through social co-benefits or non-carbon benefits (Duchelle and Jagger, 2014). Therefore, benefit sharing is a central element of national REDD+ architectures, and its implementation will require attachment to safeguards to ensure that contextual, procedural and distributive equity are considered (Brockhaus et al., 2014). According to Brown (2008) and Peskett et al. (2008), benefit-sharing mechanisms can generate compensations (benefits designed to cover the foregone opportunity costs of deforestation) and/or incentives (benefits designed to encourage positive behaviours). However, for Gebara (2013) compensations can also be considered as a type of incentive as they also serve to encourage conservation behaviours. Benefits can be directly or indirectly distributed. Direct benefit-sharing involves giving benefits directly to forest users (e.g. cash payments, technical materials), whereas indirect benefit sharing encompasses benefits that aim to foster broader development and adaptation actions that enhance non-carbon benefits, e.g. access to education and health services (Gebara, 2013; Luttrell et al. 2012; Peskett et al. 2008).

The ENREDD+ still lacks important details on the incorporation and operationalisation of national mechanisms for benefit-sharing. The ENREDD+ presents neither a formal proposal for benefit-sharing nor a clear statement on what share of compensation mechanisms will be related to social aspects of REDD+ (Jagger et al., 2014). However, Brazil highlights the importance of incentivising non-carbon benefits underlying also the close relationship between co-benefits and the safeguards referred to in Decision 1/CP.16 (UNFCCC, 2014). Moreover, the ENREDD+ establishes a positive precept that could lead to a more equitable outcome at local level. The ENREDD+ establishes that in order of importance, family farmers should have priority as beneficiaries in REDD+ actions. This is based on the fact that usually such smallholders have the least access to other policies. However, the dilemma is the operationalisation and implementation of such dogma.

One of the most interesting proposals for REDD+ benefit-sharing in Brazil are based on stock-flow logic to provide positive incentives to actors situated both in high flow reduction areas and large forest stock areas where future deforestation can be avoided. In February 2014, the Brazilian GCF (Governor’s Climate and Forest Task

Force) members released a document with a proposal for "U-REDD+" (REDD+ Units) allocation between the States and the Federal Government. The methodology for allocation is based on the concept of "stock-flux", which allows for a balanced distribution of U-REDD+ among the Amazonian states (GCF and IDESAM, 2014, adapted from Cenamo et al., 2014). It is based on two parameters: i) flux: contribution of each state to the reduction of deforestation (based on its historic rates of deforestation) relative to the reduction of deforestation verified for the entire Amazon biome and ii) stock: quantity of carbon stored in the forested area of the state in relation to the forested area of the whole Amazon biome. They called as a first proposal for 80% of REDD+ benefits allocated to the Brazilian Amazon states (evenly distributed between high carbon stocks and high flow reduction areas) with 20% to be held by the Federal Government. However, such proposal is understood as a fundamental premise that each state should establish a specific policies and regulation that determines how REDD+ should be managed at the state level and how its potential benefits would be divided among all relevant stakeholders (Cenamo et al., 2014).

The states argue that allocations based on these two factors allow for a fair and equitable distribution of benefits. It will benefit the federal government and federal states according to their particular situations and maximise the chances of achieving the national GHG emissions reduction targets (GCF and IDESAM, 2014). Many federal states are investing heavily in the fight to reduce deforestation, but continue to receive very little for it (Cenamo, 2014, personal communication).[145] Cenamo complements, *"Amazonian states are generating the greatest climate assets that Brazil can offer, but we still are one of the poorest regions of Brazil*" (he cites the fact that the Amazon region is responsible for only 8% of Brazil's GDP). Moreover, Gil (2010) suggests that this approach may promote incentives to halt deforestation in states located on the arc of deforestation and in those which are still not under direct threat. However, whether the government will consider the inclusion of such a proposal into the national strategy on REDD+ is still an unanswered question, because this topic is clearly not reflected in this final version of the ENREDD+.

The choice of policies and measures to establish benefit-sharing mechanisms will influence the whole REDD+ architecture by determining who is to be given incentives to do what and the kinds of interventions that are needed to facilitate the successful implementation of this process (Gebara, 2013). Benefits should be distributed following a

[145] Mariano Cenamo – Personal Communication

clear set of rules and be strongly monitored by competent authorities. The communities through the federal states should be aware of their rights and have the freedom to decide what their priorities are, respecting guidelines that guarantee alignment but also consider local realities (Pavan, 2014, personal communication).[146] However, a major problem at local level is related to carbon ownership (see further discussion item 6.9.2.4), because attributing ownership at local level include the fact that all achievements at the individual level would have to tally with national accounts, implying the need for integrated baselines, which would be extremely burdensome at administrative level (Skutsch et al., 2012). Therefore, some initiatives are focusing on PES schemes, in which the carbon rights are held by the government, but in which financial benefits from sale of carbon credits are distributed to eligible forest communities.

One example is the Bolsa Floresta Programme (BFP) implemented in the state of Amazonas. The BFP created in June 2007 was developed to benefit families living in Conservation Units in the state for leaving the forest stand. It constitutes the first Brazilian PES scheme that directly rewards forest dwellers for avoided deforestation through the REDD Juma Project (Sato, 2010). Its goal is to increase the value of forests *vis-a-vis* alternative land uses, resulting in improved quality of life of traditional communities and reducing deforestation actions. Participants are benefited through four main components: i) Bolsa Floresta Family, ii) Bolsa Floresta Income Generation, iii) Bolsa Florestal Social and iv) Bolsa Floresta Association. In April, 2008 through the Decree 27.600/2008 was created the Amazonas Sustainable Foundation (FAS) to manage the BFP. The Amazon Fund specifically supports the components BF Income Generation and the BF Association. The programme has received since its implementation several positive but also a lot of negative criticism. However, still little evidence exists with regard to whether and how the scheme is contributing to improve livelihoods within the communities. Moreover, although this initiative has received some awards such as the Millenium Development Goals Award from UN in 2014 and the Calouste Gulbenkian Award in 2016, some studies (see Gebara, 2009 and Lima, 2014) point out weaknesses specially concerning social empowerment, cooperative work, local participation in decision-making processes and benefit-sharing system' design.

[146] Mariana Pavan – Personal Communication

6.7.3 Equity

Specialists argue that the success of benefit-sharing mechanisms relies first and foremost on the observance of equity (Gebara, 2013; Griffiths, 2008; Peskett et al., 2008), which in practice implies the equal distribution of benefits between all stakeholders. Discussions about equity are very controversial since fairness can be a very abstract issue, especially at local level, because the problem is somehow to conceive the dynamics among individual interests. Nevertheless, it is also too early to analyse any REDD+ policy at national or sub-national level to whether equity is being achieved in Brazil. But when analysed in a broader scope, the complexity of this topic could be emphasised, for example, from the case of Roraima and Mato Grosso.

The state of Roraima has low historic deforestation rates (148 km^2 in 2014/2015) and claims that they should be compensated because they have been keeping the forest while Mato Grosso has high historic deforestation rates (1,508 km^2 in 2014/2015) (PRODES, 2015). However, since 2009 the state of Mato Grosso reduced their deforestation rates by 87.23% (from 11.814 km^2 to 1.508 km^2) showing a great representativeness in terms of REDD+ results, and consequently, they claim to be rewarded since they have curbed deforestation activities. At this point it gets complicated, because of the difficulty in deciding who gets the scarce resource first. If the government gives the money to the one that did not deforest, the targeted (GHG emission reduction) environmental outcome is not achieved, on the other hand, if who deforests receives the money, this will be seen as a discouragement to fight against deforestation and keep the forests. Apart from that, it should be not forgotten that threats that are currently lower in certain areas, due to the growing demand for wood products, minerals, and cattle may increase pressures to deforest in the next few decades.

Using that logic, REDD+ needs to be comprehensive to avoid leakage from one area to another as well as perverse incentives. Furthermore, bringing this discussion to the local level, the definition of who the beneficiaries will be is extremely important in the context of the 3Es (equity, efficiency and effectiveness). A PES/REDD+ scheme should not provide a benefit just because people are suitable in the socio-economic aspect (e.g. poor communities). It is necessary a better qualification of those who are going to receive these rewards, at the risk of such resources turning only an extra and temporary small income for the beneficiaries. Therefore, monitoring systems needs to be very clear. This is a point of criticism to a federal PES initiative in Brazil called Bolsa Verde Programme that gives financial incentives to communities in conservation areas.

However, when this action is analysed deeper in detail, it is observed that such programme is more aimed to achieve poverty alleviation rather than to pay for environmental services.

Equity could also be achieved in several others ways, including additional transfers of forest tenure or codification of carbon rights. As an example, in Cameroon through a management agreement with the Ministry of Forestry and Wildlife, a village community could be permitted to manage 5,000 ha of a specific forest area in accordance with a simple management plan developed for that purpose (Egute and Albrecht, 2014; Egute et al., 2015). Products from the community forest belong solely to the community permitted by the ministry and it also has the right to benefit from ecotourism in the forest (Egute, 2015, personal communication).[147] This serves as an incentive for local communities to participate in forest management and conservation. On the other hand, in Cameroon the law formally recognises only the portion of community land that is "used and occupied", but not the community land managed as common property (Gray et al., 2015). From this perspective the tenure security is weakened and may leave the communities vulnerable to losing their land and natural resources in the future and, it might encourage people to exploit the land inadequately maximising short-term benefits (Gray et al., 2015). Nevertheless, according to Sikor et al. (2010), the transfer of tenure to forestland and connected resources is the key strategy to overcome people's exclusion from forest management. According to Crippa and Gordon (2012), it is often the case that forest-dependent communities in the Amazon region still have no legal land title. Thus, in the Amazon, unclear land tenure is a major deforestation driver that serves as a disincentive to sustainably managed forests (Lele et al., 2000). This topic addressing the Brazilian context will be further discussed in item 6.9.2.

6.7.4 Non-carbon benefits

This brings into discussion the importance of promoting indirect benefits that enforce several REDD+ strategies to concretely address the core causes of drivers of deforestation and forest degradation, thereby catalysing change that results in GHG emissions reduction (Meyer, 2013). Also, it results in permanence and resilience of ecosystems and providing benefits such as improvement of livelihoods and biodiversity

[147] Dr. Terence Egute – BTU Cottbus-Senftenberg – Personal Communication

maintenance. This means, although the primary goal of REDD+ is the reduction of GHG emissions (consistent with the goal of the UNFCCC to achieve "stabilisation of GHG concentrations"), a pertinent designed REDD+ framework is expected to deliver much more than GHG emissions reductions, contributing also to the promotion of multiple benefits. Surely, as mentioned these co-benefits or non-carbon benefits (see figure 16) must be associated with a robust safeguard regime (Hvalkof, 2013), as well as prioritised and identified according to national goals, perspectives and contexts. Such actions would also guide funding allocation decisions. For example, should land tenure be largely uncontested in a country, investments of time, effort and funds may be lower than in a country with highly insecure land tenure in forested areas (Meyer, 2013). Moreover, the approaches in which these benefits are incentivised will be the key to scaling up and improving the effectiveness of financing for REDD+ initiatives.

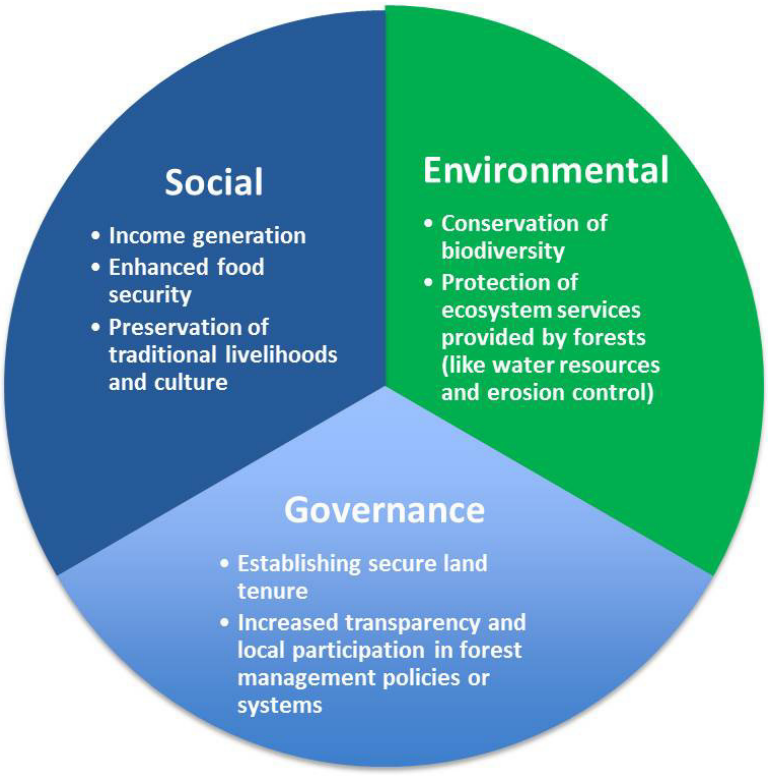

Figure 16. Potential non-carbon benefits (Source: EDF, 2013)[148]

Community-based benefits do not necessarily address individual opportunity costs (Gregory, 2011; Lima, 2014). However, for Bekessy and Cooke (2011), (individual)

[148] Online available at: http://blogs.edf.org/climatetalks/2013/08/19/clarifying-the-role-of-non-carbon-benefits-in-redd/

opportunity costs are often higher than PES payments, meaning that such schemes are barely cost-effective compared with alternative land uses (Lima, 2014). Thus, it seems improbable that the participants will get voluntarily involved exclusively for economic reasons; therefore, something else must be driving interest and participation of beneficiaries. In this sense, offering indirect benefits could be seen as a great opportunity to drive engagement of local participants (Lima, 2014). Two different studies Cromberg et al. (2014) and Lima (2014) assessed local perceptions regarding REDD+ initiatives in the Brazilian Amazon. Their results indicate that participants consider (in many situations) communal benefits such as technical assistance, mechanisation, investments in infrastructure, better education for their children and better health system more important than direct cash payments. An interesting circumstance is pointed out by Lima (2014), though. Although her respondents acknowledged they would prefer indirect benefits better as the direct payments, at the time of her research they have declared they would prefer the cash payment because some of the agreed improvements have not been implemented. They would feel safer with the money in their hands. From this perspective it should be remembered that trust among stakeholders also influences the achievement of equitable outcomes in such schemes (Gregory, 2011).

6.8 Forests and Brazil's Nationally Determined Contribution (NDC)

Brazil issued its INDC on 28^{t} September 2015 committing to decrease its GHG emissions by 37% (1.300 MtCO_2eq) in 2025 and by 43% (1.160 MtCO_2eq) by 2030 below 2005 levels. Since Brazil adopted the Paris Agreement on 12 September 2016, these targets are then Brazil's commitments to the new climate agreement. However, applying the 37% and 43% reductions announced in Brazil's Second National Communication implies absolute emissions of 1.440 MtCO_2eq for 2025 and of 1.300 Mt CO_2eq for 2030, which do not correspond to the absolute targets announced (IDDRI, 2015). All policies, measures and actions to implement Brazil's NDC derive from the National Policy on Climate Change, the 2012 Forest Code and the National System of Conservation Units Law (Law 9.985/2000) and relevant further regulations as the REDD+ mechanism (MMA, 2016c). Nevertheless, Brazil's NDC presents some inconsistencies (especially related to the forest context). For example, in 2012, the last year with available data and the year with the lowest rate of deforestation ever registered, Brazil's total GHG emissions were 1.203 MtCO_2eq. Hence, Brazil is

committing to residual reductions over the next 15 years, proposing only to stabilise emissions in the coming years slightly below the level it was in 2012, less than 10% (Gebara, 2015a).

On the other hand, the NDC provides a very clear description of the precise level of emissions targeted and methodologies used (Spencer, 2015). Moreover, Brazil is promoting an important shift because Brazil it is the first major developing country that has committed to an absolute reduction of GHG emissions from a base year (2005), as opposed to reductions-based on projected emissions or per unit of GDP (Romeiro and Biderman, 2015). Brazil has been a proponent in the negotiations of so-called "concentric differentiation" in which countries would progressively converge towards more precise and rigid climate obligations. Although Brazil pledged to enhance cooperation initiatives (particularly in forest monitoring) with other developing countries – such so called South-South[149] knowledge sharing is unique in the NDC – the forest sector can highlight how modest targets are (Gebara 2015a; Romeiro and Biderman, 2015). The NDC indicates that Brazil aims to restore 12 million hectares of forest. This target is markedly lower than the target set out in the 2012 Forest Code, which calls for the recovery of 21 million hectares of natural vegetation. This means, this target is a reduction of 58% of the legislation's goal for restoring degraded areas (Gebara, 2015b). This number of 21 million means that around four million properties have insufficient land set aside for areas of permanent protection and legal reserves within their boundaries (Edwards, 2016). In this sense, successful implementation of Brazil's 2012 Forest Code will be critical to achieving Brazilian NDC goals.

Also, there is a difference between restoration and reforestation and each of them should have gained pledges and more specific details about their implementation (Gebara, 2015b). This means, establishing commercial tree plantations can be considered as "reforestation" within the multiple-use approach. As previously discussed, a natural forest could be clear-cut and replaced with a plantation and this action may not be considered as being deforestation (DeShazo et al., 2016). For example, in Brazil, the Forest Code (the legislation states that properties must have areas of alternative land use) legally allows harvesting on private properties of up to 20% of forestlands in the Amazon Biome, 65% of forestland in the Cerrado biome within the Legal Amazon, and

[149] Brazil is already involved in others South-South cooperation activities as the case of Brazil's progamme More Food International (MFI), an action inspired by Brazil's More Food Programme which aims to enhance the productive capacity of smallholders farmers in African countries, who are claimed to have similarities to Brazil's family farmers (Cabral et al., 2016).

80% of forestlands in the other biomes; opening this way the opportunity to replace natural forests. Forests plantations also highlight the conflict about leakage and permanence, because occasionally those trees will be harvested. However, Galbert et al. (2013) proposes a different perspective. They argue that with each harvest a new carbon stock is created outside the forest. They mean that carbon continues to be stored over time in durable, long-lived wood products such as furniture and construction material, creating a reservoir of carbon storage which lasts after the material is removed from the forest.

Nevertheless, DeShazo et al. (2016) argue that forest plantations deplete the resilience of ecosystems. For example, a tree plantation (usually genetically engineered) grows more rapidly than the native species, making this “forest” less able to adapt to disturbances. As a result, tree plantations are more susceptible to collapse and the release of stored carbon (DeShazo et al., 2016). On the other hand, forest plantations can also play important roles in enhancing connectivity between areas of native ecosystems and in buffering native forest remnants, thereby contributing to conservation of biodiversity (Brockerhov et al., 2008) and delivering important ecosystem services (Bauhus and Schmerbeck, 2010). Pawson et al. (2013) such other authors as Carnus et al. (2006), Parrota et al. (1997) and Paquette et al. (2009) agree that while the establishment of forest plantations that replace natural vegetation typically causes several losses locally, plantations established on formal agricultural or degraded land may provide significant opportunities for conservation.

According to Hartmann et al. (2010) for further development of policies and institutional frameworks (e.g. REDD+) a more specialised approach to forest management should be addressed. Such developments should assess the contribution of forest plantations in protecting biodiversity at higher spatial scales, considering whether plantations reduce the pressure of logging on natural forests, what kind of land use and/or vegetation they replace, what other potential alternative land uses there are to be compared with, whether local species had enough time to colonise and adapt to the new habitat. For Pawson et al. (2013), the potential of unmanaged natural forests to adapt to climate change impacts is considerably limited, while in contrast, the adaptive potential of forest plantations is substantially bigger as forest managers can modify silvicultural regimes and tree species composition to maintain the productive and thus economic capacity of these forests to adapt to, or mitigate, the effects of climate change. Therefore, sustainable forest production could not only lead to significant mitigation

outcomes, but contribute to adaptation and social and economic effects as well (Galbert et al., 2013).

In addition, the Brazilian NDC commits to eliminate illegal deforestation by 2030, but this target is actually a step back from the country's previous commitments (made in 2008) that envisaged reaching zero-illegal deforestation by 2015. This means that for the next 15 years the Amazon and especially the other regions of Brazil will most probably be still dealing with illegal deforestation problems. Moreover, considering that the NDC aims to halt illegal deforestation only in the Amazon biome is absolutely contradictory with the National Policy on Climate Change (NPCC) goals (of "recovering and conserving all biomes").

The discussion about conservation actions aside from Amazon is even more complicated. Although in theory all other biomes are also considered priorities for the development of REDD+ initiatives in Brazil, most conservation efforts have been directed at the rainforest. While Ribeiro (2013) illustrates the disparities between policies for Amazon and Cerrado, by citing the creation of the PPCerrado six years after the creation of PPCDAm, Souza (2013) mentions the importance of the Atlantic Forest and Caatinga biomes for the REDD+ national strategy establishment. Souza (2013) argues that actions to promote forest recovery and preservation of the remaining vegetation of the Atlantic Forest (since only 7% of the original cover still remains (SBF, 2013)), as well as the adoption of sustainable forest management to supply the intense demand for firewood in the semi-arid region (since only 6% of the demand comes from sustainable activities (SBF, 2013)), confirm the potential (apart from the necessity) that these biomes also have to contribute to the Brazilian REDD+ strategy. In addition, Ribeiro (2013) also argues that the anti-deforestation targets (40% of reduction of deforestation rates) established for the Cerrado should be stricter given that it has already lost almost 50% of its original cover. As a result, deforestation mainly due to agricultural expansion has increased in the Cerrado biome, even as it has slowed significantly in Amazonian lands. Spera et al. (2016) found out that between 2003 and 2013, farmland grew from 1.3 million hectares to 2.5 million hectares (75% at the expense of native vegetation) in this region. A valuable attempt to hinder this situation would be to extend the soya *moratorium* to the Cerrado areas, for example.

The Brazilian NDC also pledges to compensate for "legal suppression of vegetation". Firstly, this also seems to be related only to Amazon, and it remains unclear to what extent this can be interpreted as net-zero emissions from deforestation. Outside

the Amazonian context, the dilemma becomes even more complicated since the Forest Code already allows a great portion of legal deforestation in a rural property (as previously showed only 20% must be protected). In addition, it cannot be perceived a political will to change patterns where this kind of deforestation is authorised by environmental licensing agencies. However, achieving net-zero emissions from deforestation and forest degradation is crucial to arrive at an economy-wide emissions level consistent with the NDC (IDDRI, 2015). It should be noted that the zero net deforestation is only possible with large stocks of native forest recovery, which implies high costs that do not ensure that all carbon (previously existent) will be reabsorbed (Moutinho et al., 2014). Forests in recovery will be increasingly vulnerable to several factors such as fire, grass invasion, savanisation and climatic conditions (see respectively, Soares-Filho et al., 2012; Brando et al., 2011; Oyama and Noble, 2003; Malhi et al., 2008), meaning that even under human intervention the recovery of the biomass is not 100% complete (Moutinho et al., 2014). Under these conditions, to compensate for the net loss of forests, it would need to recover an area far greater than the one previously occupied by the original forests (Balch et al. 2010).

Although according to Salvini et al. (2014), most direct interventions (e.g. sustainable forest management (SFM) or agroforestry) in REDD+ frameworks will precisely affect more forest degradation, rather than deforestation, Berenguer et al. (2014) pointed out that currently tropical forest conservation policies does focus predominantly on reducing carbon emissions from deforestation, not taking into account those emissions from forest degradation. Nevertheless, designing interventions to address forest degradation is also important because even if forest degradation has a relatively low carbon impact per unit area, it can have large cumulative effects over vast areas and hence cause large GHG emissions (Salvini et al., 2014). This can also be observed in the case of Brazil. There is no mention neither in the final version of the ENREDD+ nor the NDC how Brazil will account for emissions from forest degradation. Furthermore, the Paris Agreement follows the Decision 15/CP19 which only reaffirms, recognises and encourages the importance of addressing drivers of deforestation and forest degradation, but it does not establish a formal guideline for it.

This study from Berenguer et al. (2014) shows that disturbances from logging and understory fires can lead to severely impoverished and degraded forests that store substantially less carbon (on average, 40% less aboveground carbon than undisturbed forests and were structurally similar to secondary forests). They also compare estimates

of depleted carbon stocks in disturbed forests with Brazilian government assessments of the total forest area annually disturbed in the Amazon, indicating that these emissions could represent up to 40% of the carbon loss from deforestation in the region (Berenguer et al., 2014). They conclude the study affirming that mechanisms as REDD+ which aims to ensure the long-term permanence of forest carbon stocks will remain limited in their success unless they effectively avoid degradation as well as deforestation (Berenguer et al., 2014).

In order to discuss how Brazil could use REDD+ to enhance domestic forest governance involving the concept of sustainable landscape approach, the following sections will address the question of what areas of domestic policy should be followed to prioritise REDD+ in Brazil.

6.9 Improving domestic forest governance through REDD+ in Brazil

As previously discussed resolute national-level focus is critical to REDD+, implying also a solid domestic governance framework, which should seek for opportunities for complementary rather than competing strategic policy developments. This would result in more openness for more cross-cutting approaches across disciplines, sectors and government spheres, rather than policy issues being dealt with on an individual basis which, when developed in isolation, may reduce the impact or undermine the impact of other policy domains. At this part of the dissertation, the research considers the domestic governance framework necessary to achieve sustainable forest landscape under REDD+ scenario, identifying areas of policy, measures and instruments that need consideration in this context, in order to enhance better governance practices through REDD+. Here, four main topics will be focused: anti-corruption measures, land tenure, spatial planning and finance structure.

6.9.1 Anti-corruption measures

When challenges to the effectiveness of REDD+ are attributed to problems of “governance”, corruption and lack of policing usually are treated as core obstacles to

REDD+'s implementation. Corruption[150] undermines democracy breeding poverty and public mistrust of impartial justice and the government and, as a result, reduces economic growth (Winbourne, 2002). What makes the environmental sector distinctive from any other area is that corruption is provoked by large amounts of formal and informal revenues that can be gained from environmental products (e.g. minerals, timber, etc). For those countries that are well-supplied in environmental resources and whose economies are mainly based on them (e.g. Brazil), resource distribution, extraction and management become fertile grounds for a culture with widespread corruption, as exemplified by Renner (2002).

Corruption is difficult to measure, often relying on annual perception- or expert-based assessments (for example the reports from Transparency International) of national levels of corruption (Sundström, 2016). However, it has been pointed out that the use of such indicators may be dubious in the academic literature on natural resources since both the status of various environmental resources and corruption levels vary within regions and across different sectors of a country (Barrett et al. 2006; Sundström, 2016). Corruption is also an important enabler of deforestation (see table 10) in developing countries (Bofin et al., 2011). For example, Mendes and Porto Jr. (2012) have developed an index model to measure corruption over 538 municipalities from the Legal Amazon in Brazil. By performing a non-parametric analysis they have constructed a municipal corruption index based on objective data, which means, not perceptions-based figures.

They first found out, statistically significant effects of the economic growth rate on the level of deforestation (based on satellite imagery for the year 2004). However, the corruption seemed to have no significant impact. On the other hand, given the first results, they divided the information and analysed just the data from 25 municipalities from the states Pará and Mato Grosso (the two states with the most severe deforestation levels). They found out then that a part of the variance between municipalities within these two states is significantly attributed to rates of municipal corruption, which means, that in the second approach, corruption was statistically significant. A report from FAO from 2001 also identified forest corruption as a sub-category of a wider set of illegal

[150] The conventional definition of corruption characterises it as the "abuse of public office for personal benefit", however, there is no single definition of the term. Corruption can include giving or accepting bribes or inappropriate gifts, double dealing, under-the-table transactions, manipulating elections, diverting funds, laundering money and defrauding investors. Corruption can be illegal, but also can involve legal conduct in many countries (see Kaufmann and Vicente, 2005).

forest activities, highlighting its detrimental financial, environmental and social costs (FAO, 2001).

Table 10 Links between corruption and deforestation

Stage in Process	Corrupt Activity	Possible Impact on Deforestation
Planning	• Interest groups bribe public officials to skew design and implementation of land use plans • Large-scale farmers bribe politicians in exchange for agricultural subsidies • Corruption limits private investment in agricultural land	• Contributes to deforestation by undermining land use allocation process and enforcement of land use plans • Contributes to deforestation by reducing agricultural productivity (farmers deliberately use land inefficiently to attract subsidies) • Protects forests by limiting investments in extension of agricultural land
Harvesting	• Loggers bribe forestry officials to harvest without legal permits, or to speed up the issuance of such permits • Logging operators bribe local officials to obtain logging permits not recognised by the forestry regulatory framework for forestry • Logging concessionaires pay bribes so that over-harvesting is not monitored	• Contributes to deforestation by foregoing legal system for allocating harvesting rights • Contributes to deforestation by facilitating forms of harvesting not allowed within the legal system • Contributes to deforestation by foregoing the established system for monitoring logging activity
Transporting	• Loggers bribe public officials to allow transport of illegally logged timber	• Contributes to deforestation through facilitation of exit-routes for illegally harvested timber

Source: Adapated from Bofin et al., 2011; Taconni et al., 2009 and Brown, 2010

Within the forest sector context (see table 11), corruption undermines the framing, implementation and subsequent monitoring of policies aimed at conserving standing forests (Angelsen, 2009) and, illicit acts are often associated with interactions between public and private actors (Bulte et al., 2007), where financial incentives or status-related benefits are offered (or sought) to deviate from an established framework of rules and regulations (Williams, 2011). Although illegal logging and acts of forest

corruption are not synonymous, it is widely recognised that they can be linked (Bofin et al., 2011). Some researches have, therefore, investigated the relationship between corruption and illegal logging (see Lawson, 2010 and Palmer, 2001; for example).

In a context of forest management, the term "illegality"[151] is a complicated concept, because legal actions in the forestry sector are not always justifiable – certain logging concessions may be questionable for a range of reasons – and some illegal acts may in fact be rather acceptable, for subsistence reasons for example (Sundström, 2016). The FAO publishes recent data on changes in global forest cover within the Global Forest Resources Assessment in five-year intervals (Sundström, 2016). However, these reports do not include established measures of illegal actions. The extent of illegal activities in the forestry sector is notoriously difficult to estimate in order to determine the precise amount of deforestation (and, by extension, carbon emissions) that should be attributed to corrupt activity (Tacconi et al., 2009). In spite of the fact that the fight against corruption alone will not solve the problem of deforestation in Brazil, as previously discussed in the first chapter of this dissertation, corruption can be considered a pervasive socio-economic problem in Brazil, reaching almost the entire public sector in the country. Therefore, to reach the goal of zero illegal deforestation and make REDD+ workable (enforcing governance), the authorities in Brazil have to put massive effort in adopting anti-corruption measures and, ultimately ceasing the systemic corrupt practices culture in the country.

[151] Within this context, illegality can mean failing to conform to national laws and standards regulating forest resource allocation, forest management and extraction, processing, transport and trade.

Table 11 Examples of corruption risks and corrupt practices focusing on REDD+ scope[152]

Governance Level	Corruption Risk
National	• Agricultural or timber conglomerates bribe national politicians to undermine establishment of national REDD+ mechanism • REDD+ project developers bribe national politicians or senior officials to promote fraudulent REDD+ schemes • Public officials or politicians bribe technical staff to skew national baseline data • Politicians and senior officials extract rents from REDD+ revenues • Officials responsible for reconciling REDD+ projects with national accounting take bribes from project developers to double-count projects • Agricultural or timber conglomerates bribe national officials responsible for forest protection to ignore violations of conservation laws • Forest zoning is not done in a way that reflects best environmental, public and economic interests to allow logging in a new area • Insufficient tax is collected and entered into the system due to lower levels of timber extraction that are reported to reduce tax bill
Sub-national	• Agricultural or timber conglomerates bribe sub-national politicians and public officials to opt out of REDD+ implementation, or weaken REDD+ policies, in their areas • Agricultural or timber conglomerates bribe sub-national officials responsible for forest protection to ignore violations of conservation laws
Local	• REDD+ project host bribes official monitors either to overstate avoided emissions or understate problems of permanence/additionality of the project • REDD+ project host intentionally increases emissions in lead-up to implementation in order to benefit from higher credits • Local administrators extract rents from environmental service schemes aimed at benefiting local communities

Source: Adapated from Bofin et al., 2011; Taconni et al., 2009 and Brown, 2010

Furthermore, in the context of REDD+, there is a well-known dilemma. Usually, countries with the highest rates of deforestation are those with the weakest indicators of good governance, where corruption continues to be a pivotal factor in the political economy (Bofin et al. 2011; Williams et al., 2015). Therefore, there is significant evidence that corrupt activities undermine the effectiveness of state agencies in regulating the forest sector, and that this can occur from the uppermost levels of government down to the local level (see for example, Ascher, 1999; Burgess et al., 2011). Moreover, from the recent literature on REDD+, there are three main areas where REDD+ is thought to intersect with corruption risks (Williams et al., 2015):

[152] These possible risks outlined are based on considerable analysis and knowledge of past forest governance initiatives, and examples of corruption linked to the forest sector.

- If there is sufficient finance for REDD+ activities, it will enhance the value of forest land thereby strengthening existing incentives for political and business elites to secure undue access to forest resources;
- Since REDD+ is intended to result in performance-based payments, several types of data need to be gathered to determine payment levels. In the new and complex field of measuring forest carbon (an intangible commodity) opportunities to manipulate this data in order to increase REDD+ payments could present themselves;
- REDD+ payments are meant to be shared among stakeholders that play a role in forest carbon conservation (the government, private sector, land owners, indigenous communities and community based organisations, etc). Corruption could be used to capture REDD+ revenues, thereby skewing the intended sharing of financial benefits from REDD+ actions.

Since REDD+ activities are relatively recent, given the cumulative knowledge available related to previous forest governance reforms, the intention is that the REDD+ framework should contribute to an overall improvement in forest governance, including a potential reduction in forest-linked corruption (Williams et al., 2015). However, whether these potential corruption risks will be mitigated will depend on the appropriate policy responses. For the REDD+ architecture to be successful in the near future, it is relevant that efforts establish structures and a culture that supports transparency, accountability and integrity. In this regard, some authors have attempted to explicate national measures that could support in mitigating REDD+ corruption risks (table 12).

Table 12 Possible national anti-corruption measures for REDD+

Type of Measure	Possible Measures
Measures to improve regulatory and institutional framework	• Land use planning process • Allocation process for logging concessions • Statutory oversight institutions • Framework for broad stakeholder participation • Clarification of ownership or profit rights from forest uses
Measures to improve accountability and transparency	• Land use planning • Creation of REDD+ baseline data • Development of REDD framework (regulations plus institutions) • Regulatory framework for forests • Allocation process for logging concessions • MRV system for non-carbon benefits (including field-based monitoring) • Demand-side accountability institutions • Statutory oversight institutions • Data on donor support to REDD+ projects and programmes • Data on private sector involvement in REDD+ initiatives
Measures to improve law enforcement	• Capacity building to state prosecutors • Formal anti-corruption institutions, judges and court officials
Measures to reduce rents from deforestation	• Reform of national forestry taxation system • Addressing rents from land uses that replace native forests

Source: Adapated from Bofin et al., 2011; Taconni et al., 2009 and Brown, 2010

The rationale underpinning such suggestions reveal little about specific national circumstances. This means, how political, social and economic contexts will respond to the incentives that REDD+ involves is as yet unknown (Williams et al., 2015). Moreover, corruption is an adaptable phenomenon capable of altering in response to new policy environments, incentives and menaces (Williams et al., 2015). Therefore, the options above outlined represent a modest attempt to orientate about the frequent challenges and opportunities for REDD+ (applying also for the Brazilian context) in relation to anti-corruption scope. Moreover, since there is no evidence for the adoption of anti-corruption measures in the final version of the ENREDD+, the present discussion and information are also very useful for Brazil. In this sense, the Transparency International has launched in 2012 a structured and practical guideline (context-dependent)

explaining how to conduct an assessment of corruption risks for national REDD+ development processes, in five steps: i) establishing a risk assessment's purpose, scope and approach; ii) identifying and prioritising existing and potential corruption risks; iii) analysing these risks to identify common actors and root causes of corruption, iv) identifying existing instruments intended to address corruption risks, assessing current application and effectiveness, and pinpointing gaps; and, v) developing an integrity strategy, which prioritises what actions should be focused on for advocacy, mitigation and monitoring risks, and generating support for further actions (Transparency International, 2012).

Ultimately, to exemplify the situation of the Brazilian scenario, the Greenpeace Brazil has investigated and launched a series of reports suggesting that timber in the Amazon region is transformed from illegal logging to legal paper through prevalent corruption in government authorities. The timber industry in the Brazilian Amazon is a key driver of forest degradation and deforestation. Due to inadequate governance, logging opens up intact native forest areas to colonisation, damages the region's rich ecosystems and contributes to GHG emissions (Greenpeace, 2013). In 2013, a Greenpeace report, named *"The Amazon's Silent Crisis"*, revealed how loggers in the Brazilian Amazon were exploiting weaknesses in the country's regulatory system to launder illegally logged timber for the international market. Subsequently in 2014, a follow-up report was launched and named *"The Amazon's Silent Crisis: Night Terrors"*, which identified a number of public forests in the state of Pará that it suspected of fraudulently obtaining official documentation for the purpose of laundering illegally logged timber. One company called Agropecuária Santa Efigênia Ltda, had declared implausibly high levels of valuable Ipê (*Handroanthus spp.*) timber in the logged forested areas. Just like mahogany, Ipê are highly prized, sought-after timber trees, and loggers are willing to go deep into intact pristine forest in search of them (Greenpeace, 2013). Nevertheless, even after the report, timber continued to be traded with Santa Efigênia's documentation for a further couple of months.

Finally, in 2015 authorities in Pará state suspended the company from trading. They also fined it for submitting false information to the chain-of-custody system. However, by the time Santa Efigênia was suspended over 43,000 m^3 of timber had already been traded using its documentation (including nearly 12,000 m^3 of Ipê timber, potentially worth at least US$7 million if processed and exported). This shows that authorities – inside and outside Brazil – are failing to efficiently prevent illegal logging

among tropical countries even though there are actions to address illegal logging and the trade in associated timber products as the FLEGT[153] initiative. On the other hand, until currently, the Brazilian government has avoided joining the FLEGT, supposedly because of concerns about "non-tariff barriers" on its export products, especially those from the Amazon region (May et al., 2016). Nevertheless, in disregard of their due diligence obligations, several importers in the EU and elsewhere (e.g. USA, Japan, Germany, Italy, Portugal, France, etc), whose links with Santa Efigênia's supply chain were also exposed by the second report in 2014, continued to buy and market potentially illegal timber from the state of Pará sawmills linked to the suspended company (Greenpeace, 2015). The figure 17 shows Brazil's biggest wood export markets in 2014 (for wood, articles of wood and charcoal):

[153] FLEGT (European Union Forest Law Enforcement, Governance and Trade Action Plan or EU FLEGT Action Plan) is a European Union initiative to address illegal logging and the trade in associated timber products. In 2003, the Commission issued a proposal for an EU Action Plan to prevent the import of illegal timber into the EU, improve the supply of legal timber and increase the demand for timber from responsibly managed forests. The EU FLEGT Action Plan sets out a programme of actions with a focus on Voluntary Partnership Agreements (VPAs). VPAs are bilateral trade agreements between timber-producing countries and the EU. The purpose of a VPA is to support countries in producing legally verified timber besides to support improved governance in the forest sector of producer countries. Once the licensing system of the VPA is functional, timber products from this country can be sold on the EU market but only if it carries a FLEGT licence. Another important part of the action plan is the EU Timber Regulation, which bans illegal timber from the EU market and requires operators to exercise due diligence and take risk mitigating measures when they place timber on the EU market. This means, it requires EU member states to have legislation, procedures and penalties in place to enforce the regulation. By July 2015, 24 of the 28 EU member states had implemented the EU Timber Regulation. Opinions and facts are divided concerning the effectiveness of this initiative. For example, while an independent evaluation of the implementation of the EU FLEGT Action published in 2016 (Evaluation of the EU FLEGT Action Plan 2004-2014) confirmed that the EU FLEGT Action Plan is *"a relevant and innovative response to the challenge of illegal logging and that the Action Plan had improved forest governance in all target countries"*, in 2015 the European Court of Auditors issued a report that was very critical of the FLEGT. Moreover, the Greenpeace investigation above discussed demonstrates that EU Timber Regulation will be ineffective if fraudulent paperwork is accepted. A major criticism is related to the fact that it has been passed several years since the action plan was presented and no FLEGT licensing system is yet in operation and successive target dates for their introduction have been missed. Nevertheless, the prevailing international forest initiatives at the moment are FLEGT and REDD+. These initiatives offer innovative approaches to longstanding challenges in the land-use sector in developing countries. Although FLEGT and REDD+ use different approaches, methods and concepts, they both aim to address the drivers of forest loss in tropical countries. It is then expected that increased cooperation between these initiatives could advance forest governance reforms, strengthen stakeholder engagement and balance competing interests, such as using forests for local development, generating revenue and income, biodiversity conservation and carbon sequestration (Broekhoven and Wit, 2014).

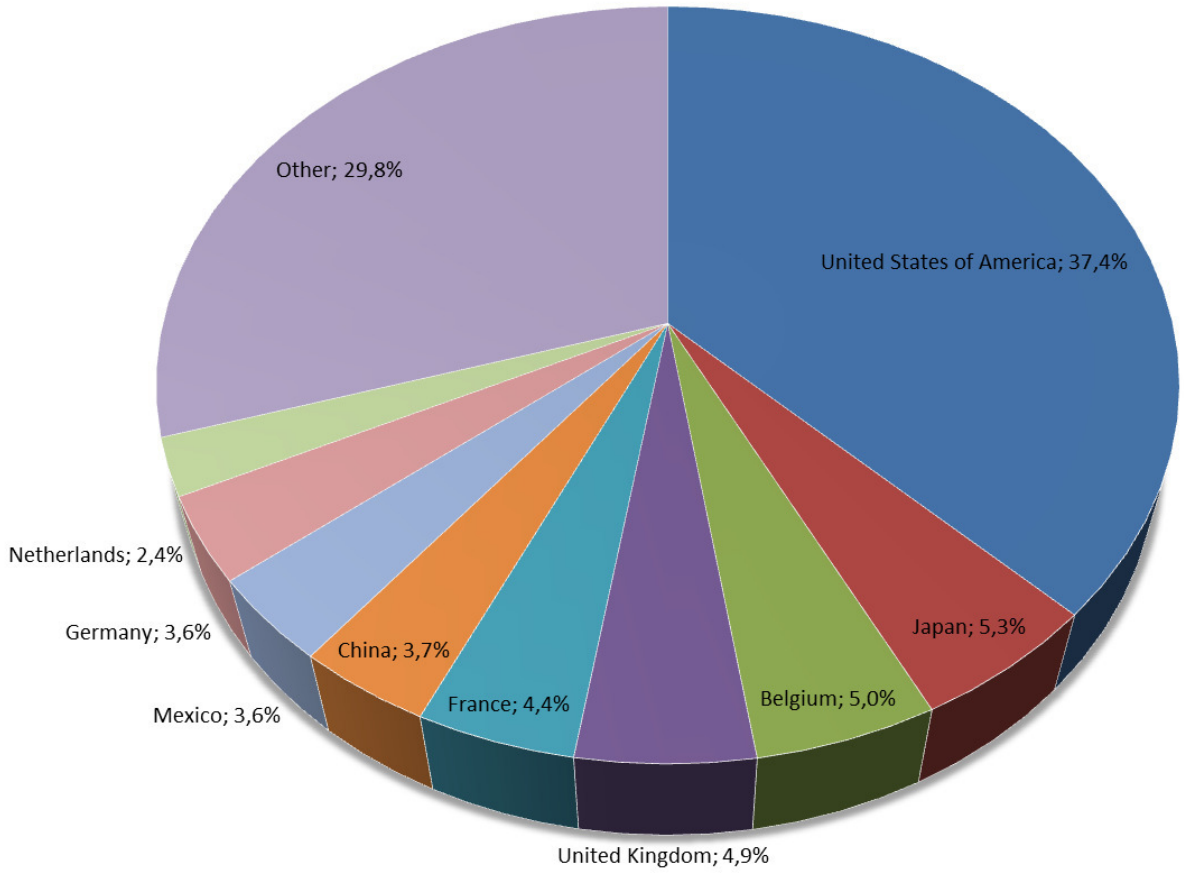

Figure 17. The Top-10 wood exports markets of Brazil in 2014 (Source: ITC, 2015)[154]

Within this context, it can be observed that the combination of weak law enforcement and inadequacy in the electronic systems established to control Brazil's timber industry has promoted a culture of illicit actions that strongly affect the entire sector, pervading through the global market. Therefore, timber companies (also in the international market) that are unwilling to face the challenge of carrying out adequate diligence and to verify legality independently must stop buying timber originated from this region altogether. Also, competent authorities must finally begin to take firm enforcement action against companies that fail to comply with the legislation on imports/exports of timber and timber products (Greenpeace, 2015).

6.9.2 Clear tenure rights

[154] Online available at: http://www.timbertradeportal.com/countries/brazil/

6.9.2.1 Statutory Law *versus.* Customary Law

There is increasing recognition that secure access to land – considering that what constitutes secure access is relative and the attributes of security will change from context to context – is needed for rural households to make use of sustainable livelihood development (FAO, 2002).[155] In this sense, Mueller (2016) states that property rights are often seen as a one-dimensional concept that can be either "secure" or "insecure", although when it comes to understanding how individuals' and groups' land use choices and behaviors are affected, a more rigorous understanding of property rights would be needed. Usually, land tenure is characterised by the relationship, whether legally (statutory law) or even customarily secured, among people, as individuals or groups, with respect to land, including other natural resources such as water and forests (FAO, 2002). Statutory tenure systems include state or private ownership where private can mean individual or a group of individuals acting as a collective, a communal or common property arrangement or an indigenous group (Naughton-Treves and Day, 2012). In many tropical countries, national regulation is poorly implemented and executed and forestlands are often used on the basis of informal customary system (Cotula and Mayers, 2009). Although customary laws give the people the right to use the forests, overlapping statutory and customary laws predominantly prioritise the rights of the government to manage and profit from forest resources and REDD+ activities (especially related to carbon rights). Land tenure is the bundles of rights,[156] rules, and institutions that define individual or community access to land (in other words, rules invented by societies to regulate behaviour related to the use of land). They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions (Bruce et al., 2010). Critical rights (table 13) include (Ostrom and Schlager, 1996):

- Rights of access: rights to enter an area;
- Rights of withdrawal of resources: rights to extract resources, such as through collection of non-timber forest products, timber harvesting, harvesting of agricultural products, etc;

[155] See FAO Land Tenure Studies n.03. Online available at: http://www.fao.org/docrep/005/Y4307E/Y4307E00.HTM (Accessed on 23, March, 2017).

[156] The bundle of rights is commonly taught in order to explain how a property can simultaneously be "owned" by multiple parties. The term came into use during the late 19th century and continued to gain ground thereafter.

- Rights of management: rights to make decisions about access and use, and to undertake management activities;
- Rights of exclusion: rights to determine who can – and cannot – access, harvest or manage lands and resources;
- Rights of alienation: rights to sell and/or lease management or exclusion rights.

The rights of management, exclusion and alienation are of great significance for tenure reforms, considering their decision-making attributes (Westholm et al., 2011).

Table 13 Relation between "Bundle of Rights" and "Holders of Rights" in the tenure context

Holders of Rights	Bundle of Rights				
	Access	Use rights/ Withdraw	Management	Exclusion	Alienation
State (Public Property)	X	X	X	X	X
Collective (Common Property)	X	X	X	X	
Individual (Private Property)	X	X	X	X	X

Source: Adapted from Westholm et al., 2011

Rules of tenure define how property rights to land are to be allocated within societies. Rules are the essential condition to the implementation of both public policy and market instruments. No protective measure, contract, transaction or investment can be safely and effectively performed in a context of prevalent illegality (Fosci, 2014). The lack of secure tenure for local livelihoods is recognised as a main force of deforestation actions in many tropical countries (Angelsen, 2008). Therefore, secure tenure is also a critical condition for equitable and effective REDD+ frameworks (Cotula and Mayers, 2009). However, it is not assured that secure tenure *per se* implies equally distributed tenure (Westholm et al., 2011). According to Fosci (2014), secure tenure consists in an essential piece of the foundation for the establishment of a rational regime of forest governance because it defines the rights and responsibilities of actors in a context often dominated by corruption, crime and conflict. On the other hand, during the analysis of

common pool resources around the globe, Ostrom (1990) concludes that informal institutions with certain characteristics (e.g. collective-choice arrangements allowing for the participation in the decision-making process) can successfully manage common pool resources even in the absence of a formal system of private property rights. This means, forcing new and external rules over an established common resource governance system might injure an already well settled local governance regime. Therefore such variables must be respected within the REDD+ framework but, nevertheless, the respect and recognition of customary rights to lands, territories and natural resources supports more effective stewardship of forest landscapes and safeguards against potential displacement risk. Moreover, effective enforcement of rights of exclusion also motivates responsibility and accountability besides thwarting a resource rush (Sunderlin et al., 2013). However, in many countries these local systems are not recognised at law yet, and the relationship between customary and state tenure is a major challenge in many rainforest nations (Cotula and Mayers, 2009).

6.9.2.2 Land tenure in the context of governance

Much of the existing literature that addresses the influence of institutional arrangements on forest management identifies that secure tenure relies on, and is conditioned by, governance. Rights without effective sanctions against their violation are insufficient, while institutional effort in support of sustainable forest management in the absence of clear forest use rights is likely to be undermined (Cotula and Mayers, 2009). Therefore, effective tenure is unexpected to be achieved without supportive policy and institutional systems. In countries where tenure security over forest is weakened, REDD+ can pose a risk for forest-dependent communities, who could be dispossessed, excluded and marginalised (Barbier and Tesfaw, 2012). From this perception, the indigenous community has expressed concern about possible negative impacts that could emerge from the implementation of REDD+. For instance, many fear that where land tenure rights are uncertain and decision-making remains top-down, new conflicts could arise among indigenous and local communities and between them and the State.

While insecure tenure makes local people vulnerable to dispossession as land values increase (might leading to “land grabbing”[157]), secure resource tenure gives them

[157] The illegal grabbing of public lands refers to the practice of creating false documents in order to take possession of land illegally.

more influence in negotiations with government and the private sector. Insecure or contested resource rights may also increase risk for investors – reputational risk, for example, in relation to possible conflicts with local communities (Cotula and Mayers, 2009). Such uncertainties could adversely impact long-term investments in REDD+ frameworks, endanger the permanence of forest carbon sequestration, and exacerbate poverty and social inequality. In this sense, the devolution (the transfer of administration and control of tenure rights) of forest rights to local communities has been proposed as an approach to promote participation of indigenous and forest-dependent communities in REDD+ actions (see example Box 1). However, at the global level, the management rights of publicly owned forests are still dominated by public administration, which could trigger a wave of tenure re-centralisation in the context of REDD+ payments (Phelps et al., 2010).

Box 1. Community Controlled Forests. Adapted from FAO (2016)

Over the past 40 years considerable attention has been paid to Community Forestry (CF) and related forest tenure transformations, with the aim of involving communities and smallholders in forest management and governance. As also applied to the Amazon region, community-based forestry has been seen as one of the most promising options to achieve results of combining forest conservation with rural development. For example, Brazil's Alto Juruá Extractive Reserve maintains 99% forest cover after a decade (Ruiz-Pérez et al. 2005). Community-based forestry has no longer been limited to a few pilot projects applied in remote places, but it has found recognition in mainstream development as it is estimated that, to date, almost one-third of the world's forest area is under some form of CF management. Failure of top-down approaches, an increasing number of stakeholders coming to fore, national legislation and international obligations, as well as reductions in availability of financial resources assigned to forestry investments of the public sectors, are the drivers propelling the emergence of CF worldwide. Far-reaching de-centralisation policies that have been applied in many parts of the globe have also made CF highly relevant, shifting the forestry focus from national to regional and communal levels.

The last time that FAO comprehensively documented the impact of Community Forestry was in 2001. During this time, while studies on forest tenure indicate a notably trend towards increased forest areas under community-controlled forest management, reports about the effectiveness of the management have been mixed. Conversely, though, CF practices can also been seen – rather than as genuine devolution of forest management to local forest users – an extension of state hegemony. This means that most countries that have adopted collaborative forms of community-based forestry have policies in place to decentralise and devolve rights and responsibilities. However, in practice, decentralisation and devolution have been only partially realised and several governments retain significant authority over forest management. By creating or giving space in a new policy arena, states are making trade-offs with local communities to restore and conserve forests lands without providing even nominal incentives to them. Moreover, not only local people and government administration, but very often also a large number of NGOs – as well as bilateral donor agencies – are actors claiming a stake in community-based forestry. At present, several agencies, as well as national and international organisations are promoting CF through programmes, projects, legal and institutional reforms. Concomitantly, other actors point at several difficulties and call for the necessity to make changes to the way CF interventions are executed, meaning that the community forestry faces major restrictions.

For instance, CF is often applied only in highly degraded forests (those with least value to communities); communities rarely have access to valuable resources from community forests (commercially valuable timber, for example); emphasis is often on community responsibility for protection rather than on authority to manage. Without real devolution of power, the objectives of community forestry will be difficult to achieve because they are premised on this transfer. While collaborative forms of CF have sometimes contributed significantly to improving rural livelihoods and livelihood security, they have not always done this in a way that targets the poorest members of communities, or in other words, benefits have often been captured by local elites. Findings regarding the strong influence that external frameworks of state and civil society exert on social choices, make clear that the internal factors of community forestry are probably not key. Yet, despite its recent popularity hype, the concept of CF rarely receives the attention or analysis it requires from those concerned with forest management. Thus, it can be generalised that largely because of internal and external constraints, collaborative forms of CF are performing below expectations and are still fragile.

Furthermore, unclear or insecure tenure may in itself promote deforestation activities. Natural resource users may not feel compromised in protecting the resource if they feel they are not involved in reached resolutions. Deforestation may be a way of showing occupation where land claims are contested (Cotula and Mayers, 2009). Additionally, tenure disputes may influence the distribution of risks, costs and benefits of financial transfers linked to forest conservation (Cotula and Mayers, 2009). To reduce such uncertainties, REDD+ architecture should therefore draw on the lessons learned from successful forest common management, including how customary tenure and governance rules reduce internal conflicts within communities and encourage sustainable use of natural resources (Barbier and Tesfaw, 2012).

On the other hand, tenure is only a piece of this scenario. Even with a secure tenure system, governments or users face pressures, or respond to incentives, to degrade and clear forests, including for instance, pressures to reduce poverty (e.g. through agricultural colonisation of forest areas, as in Brazil), or to address public revenue, national debt or balance of payment issues (Cotula and Mayers, 2009). It also includes opportunities for corruption and the flouting of weakly enforced law in relation to land use measures. To create effective incentives for protecting forests, action to strengthen resource tenure must be combined with policy interventions to address these forces. In this sense, REDD+ frameworks should also seek to improve the likelihood of success by making forest conservation more profitable, which could be achieved according to several specialists through sustainable management. Understanding tenure requires, therefore, an understanding of the extent to which national legislation is actually applied on the ground.

6.9.2.3 REDD+ as catalyst of land tenure reform

Improving forest governance in tropical countries is an arduous task requiring widespread reforms of the judiciary, law enforcement and (to some extent) also local culture and behaviour (Fosci, 2014). Although significant tenure reforms have taken place worldwide during the last decades, the lack of balance in ownership continues to be remarkable (Westholm et al., 2011). It is also recognised that tenure reforms are frequently a long-term process. Changes in land ownership usually follow large-scale political change, for example, over the past decades, shifts of decentralisation of government responsibilities of forest control to a more local level have happened in

various tropical countries (Phelps et al., 2010). Indeed, forest tenure reforms[158] have been largely driven by international trends such as biodiversity conservation, recognition of indigenous rights and decentralisation (Barry et al., 2010). Nevertheless, rarely these countries lay the foundations to reach efficiency and equity benefits implied in such decentralisation, even though initiatives have been launched in the majority of forest countries (Ribot et al., 2006). On the other hand, several multi- and bi-lateral institutions advocate with the belief that strengthening local property rights and promoting land tenure reform can contribute to promoting social and economic development, encouraging local investment in land and resources, enabling access to credit through use of titles as collateral, improving land markets, establishing a legal basis for excluding competitors and as result reducing resource conflict and encouraging sustainable resource use (Sunderlin et al., 2008). Moreover, without clear tenure rights is difficult to identify the responsible ones for deforestation, making it also challenging for landholders to enter into long-term agreements to commit themselves to reduce deforestation and access potential REDD+ benefits.

This means that land tenure and property rights are strongly tied to carbon ownership and consequently to distribution of benefits in the REDD+ scope. Thus, land tenure reform should be prioritised in REDD+ frameworks. However, recent studies such as the new research from the Rights and Resources Initiative (RRI) show that REDD+ has not been a catalyst of tenure reforms across REDD+ countries, even though most countries with a REDD+ framework have identified the clarification of tenure as a key component of their strategy (RRI, 2014). Brazil can be included in this scenario. Sunderlin et al. (2013) also suggest that in some REDD+ countries tenure challenges are being addressed on a “second-best” basis but nevertheless, national tenure reform are well short to be adopted. Nevertheless, extending forest tenure reforms does not guarantee maximising in the case of REDD+, legitimacy, effectiveness and equity particularly because such approach has been criticised for being top-down through which governments formalise tenure rights through communal demarcation and granting individual property rights only (Corbera et al., 2010). This also confirms how relevant participatory processes are and therefore, such aspects must also be considered in designing REDD+ frameworks.

[158] Although forest tenure reforms also respond to livelihood demands as the agrarian reforms, it differs for the aim of forest conservation.

The background of land tenure and agrarian reform in Brazil is here presented for a better understanding of the Brazilian scenario (adapted from Guedes and Reydon (2012) and Rezende and Guedes (2008)):

Brazil's history is marked since the beginning by land concentration. In the colonial time, the Portuguese Crown has given land grants in order to stimulate the sugarcane production (due to favourable climate and soil fertility conditions). However, conditionality in turn, stated that the land granted stay conditional on its occupation and productive use, otherwise, the Crown would cancel the concession. It can be observed, nevertheless, that the form of property was not full ownership (typical capitalism feature), since the principle of conditionality limited the fully free use of property rights of the land. The Crown recommended the distribution of land according to the appropriate size for its full usage, which in practice was not followed. That's mainly on account of two major problems: i) the inaccuracy of land demarcation techniques and ii) due to the imperative of generating economic surplus to the Crown, territorial ownership has been fairly liberal, since the Crown omitted itself in relation to non-compliance of conditionality by grantees. The result was the consolidation of a model of large-scale agriculture of monocultures (high yield products in foreign markets, such as sugar) and slavery (workforce which guaranteed land ownership by land grantees). Extensive ownership of land occurred, moreover, due to rudimentary techniques applied to agriculture, which quickly exhausted soils and forced the search of fertile land.

Only after the Independence of Brazil could the new Brazilian State desire to establish full ownership of land and to have a land policy with minimal control over the occupation of the territory. This would be the main target of the Land Law launched in 1850. However, because the interests of powerful landowners, the Land Law further allowed the regularisation of possessions, permitting the occupation of vacant land and making it impossible to establish a register. Apart from the adverse possession or “squatting” (which permits after a few years that the “squatters” are able to regularise their property), the states themselves in some historical moments gave properties with or without titles. In 1864, a new institutional obligation enacted an established practice that endures until nowadays and which ultimately generates greater uncertainty and inability to effectively regulate the land market in Brazil: the need to register the possessions and properties in registry offices. Somehow, the registration in the office transmits a legality feature without any mechanism to ensure this.

As a result, the process of falsification of possessions and properties by the public sector and within the Brazilian registry offices is common and widespread. After Brazil proclaimed itself a Federative Republic in 1889 a period of political and administrative decentralisation was established, since federal states regained all the vacant land within their boundaries. The liberality in managing the inherited territorial heritage varied from state to state, but regardless created more ambiguity in granting titles and consequently failure to regulate the land market. As consequence, the first effect of such change was the abandonment of a national land policy development, since federal states gained autonomy to legislate freely on this matter. Secondly, this decentralisation afforded to large landowners/leaseholders the ability to decisively influence on state policies regarding land tenure and land reforms.

During the dictatorship (1964-1989), the agrarian reform (1964 Land Statute) allocated rights over unclaimed unproductive (idle) lands to rural people who put them back to a productive use. These lands were mainly located in the Amazon, where productive use was demonstrated by clearing the vegetation to start an agro-pastoral activity. The Brazilian 1988 Constitution states that land should also serve a social function (article 5). In this sense, according to it, the Brazilian government must 'expropriate for the purpose of agrarian reform, rural properties which are not performing their social function (article 184)'. This re-democratisation process, on the other hand, allowed for grassroots movements to pursue their own interests against the government and the elite, reflecting thus in the background scenario where the Landless Workers' Movement – MST (in Portuguese: Movimento dos Trabalhadores Sem Terra) fits in this context. The MST is a social movement in Brazil, being generally regarded as one of the largest in Latin America with an estimated informal 1.5 million membership in 23 of Brazil's 26 states.

According to them, they fight for general access to the land for poor workers through land reform in Brazil and through activism around social issues impinging on the achievement of land possession, such as unequal income distribution, racism, sexism, and media monopolies. Since in the Federal Constitution the conditions/definitions for social function are vague and not defined objectively, the "social interest" principle for land reform can be seen in different ways. In this context, the MST participants identify what they believe to be unproductive rural land which "does not meet its social function" and they occupy such properties throughout the entire national territory. They also claim their actions based on 1996 census statistics, that just 3% of the population owns two-

thirds of all arable land in the country. The redistribution of land through the land reform (in the task of establishing a broad layer of small farmers) has been not well succeed in Brazil, mainly due to the fact that these farmers do not obtain the land title's, since as established by the Federal Constitution, the title can only be granted after ten years the land has been given. In addition, despite numerous government initiatives, demarcation and registration of public and private lands have not been carefully carried out throughout the country. The consequence is that the land cannot widely be used as collateral for agricultural credit. Thus, the scenario in Brazil is characterised by the inhibition of mortgage agricultural credit, the dependence on government budget for agricultural finance and increasingly recurrent "packages" of agricultural refinancing, which only benefit the improvident farmers and those aware that the debt always will, in future, be renegotiated.

6.9.2.4 Carbon ownership

Many unanswered questions remain regarding the allocation of rights and liabilities, and accountability in trade and benefit sharing, under REDD+ actions (Larson et al., 2010). In several tropical countries it is considered that in the absence of specific legislation and regulation, ownership of carbon rights is somehow tied to land and forest rights. On the other hand, the question if 'will carbon rights be linked to land ownership or will the government retain carbon rights' remains. In national approaches it is expected that governments will receive payments linked to emissions reductions across the whole forest estate compared to a national reference scenario. In this case, the state would be held responsible for liabilities before the international community. However, if rights are linked, landowners would experience an increase in the value of their land and could potentially obtain a new source of income, on the other hand, probably would also become directly liable for future carbon losses (Larson et al., 2010). Although there is no single operational definition of "carbon rights" at the international level, it can be understood as an umbrella term which includes two concepts: i) property rights to sequestered carbon (contained in land, trees, soil etc.) and ii) the rights to benefits that arise from the transfer of these rights, for example in emissions trading schemes (Peskett and Brodnig, 2011). Moreover, it can be broadly defined as 'intangible assets created by legislative and contractual arrangements that allow the recognition of separate benefits arising from the sequestration of carbon in the biomasses'. However,

this concept has so far been inadequately understood because it is highly contextual and is open to many interpretations. Owning an intangible resource such as sequestered carbon poses more challenges to traditional property law systems that provide a basis for defining carbon rights (Rosenbaum et al., 2004).

That said, carbon ownership is a new and unprecedented type of property right, being considered a form of property that "commoditise" carbon and allow it to be traded in voluntary and regulatory markets (Streck, 2009). While the stored carbon would be a self-contained property independent of the physical biomass, the right to trade carbon needs to be created by virtue of legislative and/or contractual arrangements. Thus, understanding the nature of carbon (e.g., sequestered carbon, carbon sink and carbon sequestration potential) as property and the derivative rights associated with trading are important to defining carbon rights legally (Peskett and Brodnig, 2011). This means that a legal distinction between ownership and rights to carbon stocks, including any increases in stocks (which can be measured as standing, within the trees) and ownership and rights to reductions in emissions of carbon (which are measured against a baseline) must be differentiate (Skutsch et al., 2012). Moreover, a number of additional aspects of carbon rights will need to be regulated for the establishment of a marker-based approach to REDD+, as determining whether carbon rights can be separated from the land, how certificates are classified (e.g. as goods or securities) and electronic systems for recording the transfer and tracking of certificates (Lopes et al., 2013). In this context, a range of scenarios regarding the ownership of forest carbon have been developed based on the idea and empirical observation, presented below (adapted from Rosenbaum et al. (2004)):

- **The forest owner owns the carbon sequestered in the forest:**

∗ The carbon sequestered in the forest may not be sold independently of the forest. However, the owner may undertake the obligation to manage the forest in a way to increase the carbon stock. This obligation could be in the form of:

• A contract;

• A covenant that runs with the land, binding anyone who owns the property in the future;

• A covenant that attaches to a person;

• An easement or servitude, which may attach to a dominant estate or to a person.

In the latter case, the carbon sequestered in the forest may be transferred independently of any land transfer.

∗ The carbon sequestered in the forest is the object of a separate, alienable property right, such as a usufruct right, governed under the laws concerning land ownership. The owner can sell that right without conveying land ownership. In this context, two options may be envisioned:

• The owner of the carbon has the right to affect the use of the forest to protect the existing forest carbon stock, or to enhance it;

• The owner of the carbon has no inherent right to affect how the forest is used. However, the land owner may separately grant this right through a contract, or through a covenant or other legal mechanism that "runs with the land" and binds any property owner.

- **The carbon sequestered in the forest is a publicly owned asset**

∗ The government holds the forest carbon stock as trustee for the benefit of forest owners or of the public, with no power to sell it or give it away. In this context, two different options may be envisioned:

• The government has no particular power to require landowners to protect or enhance sequestration; or

• The government has the power to regulate the use of land to protect or enhance carbon sequestration.

∗ The government has the power to sell or give the forest carbon stock away. In this connection, two main options may be configured:

• The acquisition of carbon stocks may be open to anybody;

• Only a limited number of entities may be eligible to own carbon stocks, such as entities emitting carbon and desiring offsets; "banks" chartered to deal in mitigation credits; NGOs interested in environmental protection; indigenous peoples or other groups of forest stewards.

Furthermore, one of the key questions that have arisen in the context of the REDD+ debate surrounds which actors have the right to exploit the benefits and the associated rights to international payments originated from GHG emissions reductions

performances (Peskett and Brodnig, 2011). Clarifying who is legally entitled to receive benefits under REDD+ strategies and actions is a complex process, as multiple actors have overlapping forest/land tenure and usufruct rights. For instance, the owner(s) of the carbon sequestration potential could be same or different from, the owner(s) of the carbon sink, who might also be same or different from, the owner(s) of the sequestered carbon in case of usufruct rights. The complexity might be eased to some extent through careful analysis of the history of forest tenure, ownership and control rights that help reforms or transforms the inequitable and imbalance power relations among stakeholders. Thus, community groups and indigenous peoples are disquieted due to the concern that very little of this money will trickle down to the local communities or small forest owners.

In collectively owned properties issues arise as well regarding the distribution of rights and liabilities. Revenues may be distributed in favour of households with greater available capital, disposable income and active participation in project activities, to the detriment of those who lack resources but still hold rights over collective forests (Corbera et al. 2007). Indeed it is argued that in the design and development of REDD+ actions, insufficient attention has been given to the particular issues of collective, community and indigenous lands and rights. Therefore, proposals for a “nested” approach to REDD+ have been suggested in part to strengthen the position of local communities (Skutsch et al., 2012). In some proposals for nested systems, carbon credits would be calculated at the local level, and attributed directly to the communities’ involved (Cortez et al, 2010). However, the term nesting has also been used in a more general sense, for instance in the context of sub-national jurisdictions nesting within national ones and may not invariably imply that the local actions will receive all the credits generated at that level. Apart from other considerations, attributing all credits to the local level could result in accounting conflicts with the national approach to REDD+ besides the major technical problems with assessing deforestation achievements at the local level (Skutsch et al., 2012). Nevertheless, adaptive and flexible models permit initiatives to be developed on the specific characteristics of each community or territory (Larson et al., 2010).

6.9.2.5 Perspectives on land tenure and carbon rights in Brazil

As previously discussed, while private ownership is permitted in Brazil, in practice, experience has created a complicated system of ownership, leading to insecure

tenure and even violent disputes over land ownership (Champagne and Roberts, 2009). Apart from conflicts and inequality, the bureaucratic environment of land rights governance faces several challenges into this context such as institutional complexity, limitations of land registry and the lack of an integrated database (Costa, 2016). Multiple institutions share responsibilities for governing land property rights in Brazil. Frequently, their mandates contradict or overlap, lacking this way coordination and communication among their activities. These institutions are responsible for executing a wide range of tasks and services related to land management, including agrarian reform, environmental monitoring and protection, community rights, and tax collection. To exemplify the complexity of this system, according to Costa (2016), just at the level of the federal government, eleven institutional bodies share oversight of different aspects of land rights and management (more details Annex III).

Moreover, due to the lack of integration of records between land-management agencies, there is no land register covering the entire Brazilian territory. Furthermore, the absence of a proper database aggregating all the public lands (which represents over 20% of the national territory) also shows why it is so difficult to develop a clear picture of the problem (Costa, 2016). The lack of connection between rural cadastres and land registry limits legal security in real estate transactions, preventing the implementation of more effective land policies and increasing fraud and illegal appropriation of land (Costa, 2016). A differentiation here is needed nevertheless. The land registry is a national record of all properties' transactions (e.g. purchase, sale, donation, and inheritance) and all the interests related to the land (e.g. mortgage and easement) in Brazil, which is mandatory for all urban and rural properties. Real estate buyers are required by law to register their purchasing titles. The notaries[159] issue the certificate of registration, which is a legal document that certifies ownership rights over a declared property. The rural cadastre is a database that indicates the geographical location and attributes of rural properties (the CAR mechanism, explained in Chapter five). Thus, such activities should be a joint exercise and, to the extent that it is consolidated, should be transferred to municipalities (Reydon, 2011). The idea is that municipalities should (as they have more resources, structure and trained personnel)

[159] In Brazil, notaries do not always properly check the authenticity of documents used to register private properties, either due to a lack of capacity of the staff or corruption, and therefore registration based on false documents is common. For each individual notary, fees are based on the number of registrations they complete, regardless of the accuracy of the information registered.

coordinate land registers as well the rural cadastre and all other activities of governance and regulation of land use, particularly the collection of land taxes.

In Brazil, public lands are administered by the federal government, federal states and/or municipalities in the interest of the common good. On public land, concessions may be allocated under the Law on the Management of Public Forests (Law 11.284/2006). This law establishes principles[160] for the management of public forests for sustainable production (timber concessions by conceding rights to manage public forests for the exploration of products and services). Within the structure of the Ministry of Environment (MMA), the Brazilian Forest Service (SFB) was created to manage such system as well as the creation of the National Fund for Forest Development (FNDF).[161] Also, this law establishes three forms of management of public forests: i) creation of protected areas, which allow forest production in a sustainable way, for example the national forests, ii) allocation for community use, in the form of forest settlements, extractive reserves, quilombo areas and sustainable development reserves and, iii) forest management concessions (for private users), obtained through public biding processes and demanding payment for the use of natural resources. Conservation units are considered part of the public domain, and are therefore owned by the State. This means that forest peoples do not own the land, although some may have been living there for several generations. However, the federal government grants them the right to use the land, and they are responsible for the sustainable use of the land under management plans (Champagne and Roberts, 2009). In addition, carbon rights lies with the federal government. This policy expressly prohibits the inclusion of terms in a forest concession which grant rights to commercialise carbon credits from forestry concessions derived from avoided deforestation (Champagne and Robert, 2009).

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[160] The forest management should be in accordance with the principles of protecting the ecosystem, of ensuring the rational use of natural resources and the sustainable development in the region, of respecting the local population's access rights and of seeking to improve their living conditions.

[161] The FNDF will be used primarily for projects in the following areas:

- Research and technological development in forest management;
- Technical assistance and forest extension;
- Restoration of degraded areas with native species;
- Rational economic utilization and sustainable use of forest resources;
- Control and monitoring of forestry activities and deforestation;
- Training in forest management;
- Environmental education;
- Protecting the environment and conserving natural resources.

These projects alone will benefit from FNDF resources if they are run by public agencies and entities, or private non-profit organizations.

The Fund predicts that up to 20% of revenue should be used to support the system itself, including resources for the SFB and IBAMA. The remaining 80% can be divided into 30% for the federal state where the public forest is located, 30% for municipalities and 40% for the National Forest Development Fund.

Forest concessions have been the topic of many discussions. On the one hand, it is sometimes praised by environmental groups who believe in greater control of deforestation due to the establishment of sustainable management methods in the timber sector. On the other hand, criticisms are made by entities linked to environmental conservation who believe that the government will benefit large timber companies, facilitating deforestation. These organisations fundament their arguments mainly based on unsuccessful experiences of some other forest countries (Ferreira, 2006). However, after more than ten years (from 2006 until nowadays), the forest concessions system in Brazil can not be considered outstanding either. Some critics alleged excessive bureaucracy (limiting the participation of small and medium-holders), there are those who pointed out legal uncertainty (in terms of long-term contracts) and the lack of incentives to be a competitive activity, but according to Rodrigues (2016), what is observed is a certain unwillingness of the Brazilian governmental structure to deal with the private sector.

The fact is, there are only 842,000 hectares under public concession in Brazil currently, which are distributed into five national forests: i) National Forest from Jamari, ii) National Forest from Sacará-Taquera, iii) National Forest from Sacará-Taquera (South), iv) National Forest from Jacundá and v) National Forest from Altamira (SFB, 2016). Curiously all those areas are located in the Amazon region, being that a criticism because theoretically the policy was defined to be applied in all Brazilian biomes, but as usually happens, it is only discussed involving the Amazonian thematic. These cited areas should be sustainably managed by eight timber companies during 40 years. It is estimated that Brazil's potential can reach 13 million hectares. The actual goal is to reach 7 million hectares by 2022, meeting 30% of today's demand (SFB, 2016).

Within this context, the REDD+ mechanism could be the tool to aggregate all these activities. For example, the monitoring and control of public lands is an activity extremely dependent on labour and financial resources. Under the umbrella of REDD+ and forest concessions this control could be more effectively achieved (but the monitoring must happen). The main conception is to change the timber market dynamic, ending the illegal logging extraction and offering an ecological alternative for large-scale production conciliating also the conservation concept. Adalberto Verissimo from Imazon (a non-profit research institution) in interview to Alexandre Mansur (2016) says that through forest concessions it is also possible to promote the “preservation of disinterest”. This means, the user would have no interest in clearing the forest area to change the

land use (for crops or cattle for example) because no one could legally appropriate the area. However, this “disinterest” could lead to inadequate logging practices and, it should be noticed that such practices disturb the ecological balance increasing forest degradation even if the forest cover remain in place. Thus, this endorses the importance of monitoring within the policy framework.

Ultimately, it is expected that forest concessions will bring the economic dynamics to a significant amount of state forest areas. Logically, the implementation of such measure can be a good strategy for the conservation of public forests and a valuable economic instrument if some aspects are considered. For instance, the federal government must be able to evaluate, control and penalise the missteps of beneficiaries (Pereira, 2009). In this sense, there is a criticism concerning the human and financial capacity (which is limited) of the management and monitoring institutions, respectively the Brazilian Forestry Service (SFB) and the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) in establishing the legal instrument. During the interviews, the respondent from SFB also recognised this fact, declaring: *“Brazil is huge. We from SFB need to be extended, to receive more resources to work at scale”* (SBF, 2014, personal communication).[162] Nevertheless, the allocation of public forests should be diversified, with several different goals such as integral protection, tourism, timber production, non-timber forest products (NTFP), environmental services, environmental education, and scientific research, among others. According to Pereira (2009), it would be possible to curb deforestation in public forests through forest concession if these are strategically located around conservation units, creating a protection buffer which hinders the illegal invasion in such areas.

Approximately 80 million hectares of undesignated public forests in the Amazon could be allocated as protected areas, production forests or other categories of use (Moutinho et al., 2016). This allocation could also preserve a stock of 10 billion tonnes of forest carbon and contribute significantly to the conservation of biological diversity of the region (SFB and IPAM, 2011). Moreover, land designations would benefit from flexible agreements between the government and land users, given the recent evidence that flexibility of some use rights for smallholders can increase achievement of conservation goals (Moutinho et al., 2016; Pfaff et al., 2013). Thus, pro-active policies toward the integration of small-scale logging and processing activities into the formal economic sphere are deeply needed (Karsenty, 2007). An attempt to regularise public land but

[162] SBF – Brazilian Forest Service – Personal communication

also in the Amazon region from the federal government is the programe called Terra Legal (Law 11.952/2009) which would distribute land titles to smallholders. The target is to distribute land to 150 thousand smallholders; however, up to 2014 the government granted 6,500 land titles covering only over 6,000 hectares (Moutinho et al., 2016). Some critics fear that this offer of free land may actually trigger deforestation in new areas, rather than curb the practice. On the other hand, by establishing clearly defined property rights, it is expected that without incentives to move further in to develop forest, beneficiaries will stay and improve their land. In addition, once REDD+ framework is established, landowners would be incentivised to receive payment not to cut their trees, as opposed to moving to clear uncut forest. Moreover, incorporation of more properties into the land register would make it easier to ensure landowners are abiding by the rules and that benefits are distributed (Champagne and Roberts, 2009). Conclusively, it should be understood that secure land tenure is a critical part of forest governance as it can ensure the permanence of standing forests.

6.9.3 Benefits of spatial and land use planning and zoning for sustainable landscape in REDD+

Land-use planning is a broad strategy that promises to forge a consensus between conservation and development at landscape scale (affecting governance), where lands should be ranked on the basis of their best uses. But first, a common definition of terms and concepts is crucial to significant understanding in land use planning and zoning (Sidle et al., 2010):

- Land use plan: a plan that determines the stratification of land uses within a landscape scale, providing basic guidance for each land use zone and the integration of these zones;
- Planning: process in which stakeholders come together to discuss and decide how to manage resources in a given geographic area;
- Zoning: process of delineating geographic areas separated by differing land uses as a part of a broader land use planning process. Thus zoning is an intrinsically political intervention that reveals underlying power struggles and social conflicts (Jacobs, 1998).

Spatial planning may predominantly follow three approaches (Fosci, 2014): i) segregative approach, which separates the natural environment from human land uses; ii) integrative approach, which seeks to achieve a win-win situation whereby human needs are met while maintaining ecological functions (e.g. agroforestry) and iii) driver approach, which will depend on how the driver has evolved in a particular geographical context. For example, primary native forests can be turned into protected areas, whereas less valuable forests could be assigned to croplands when necessary, or limiting the impact of industrial logging, most typically by refusing to grant concessions for timber and pulp extraction in primary forests, or even allowing for sustainable resource extraction that benefits local communities (Wolfersberger et al., 2015). For Fosci (2014), when deforestation is caused by small-scale activities such as farming and wood extraction, integrative planning approaches are most desirable. Spatial planning can help even further as for instance, in the optmisation of production systems of managed forests in a more sustainable way. For example, in the context of forest protection, such efforts have contributed to reduced harvesting quotas, which may have resulted in an imbalance of the environmental functions of the forests and forest management in terms of wood supply, for instance (Kašpar et al., 2016). Thus, considering economic and spatial factors (apart from environmental) in production systems (e.g. during harvest stage) may reduce production costs by increasing the logistic efficiency as well as conserve biodiversity (since incorporating maximum harvesting opening size constraints into planning can help to minimise biodiversity losses).

Sustainable practices can also be promoted through a participatory process that limits tenure rights through local land use plans, providing incentives (e.g. carbon payments) to subsidised credit for sustainable activities, promoting compliance with such plans. In this sense, zoning is a sensitive given topic because it requires strong clarity of property rights and usually it faces several inherent challenges such as increased conflict over land and resource use. For example, in some situations, zoning helps solve land use dissensions, but it also has the potential to create new disagreements or intensify existent disputes. Moreover, zoning does not always include equitable access for different resource users and therefore, some local people may see conservation areas as an imposition on their land and rights. Furthermore, zoning does not always reflect transitory and moving aspects of biodiversity and conservation, such as migratory wildlife (Jackson et al., 2007). This conveys that opportunities to adapt and rezone for

biodiversity purposes need to be included into plans, just as such opportunities are offered for future economic development (Naughton, 2007). Thus, some have been advocating the use of wildlife corridors in parks and zone planning.

In the context of REDD+, it is argued that present large scale use decisions are being densely influenced by global demand for resources and economic considerations, and consequently, the significance of transparent and coordinated land use planning and zoning combined with a participatory planning at local level is preeminent (Sidle et al., 2010). By participatory it should be understood as a collaborative process mutually respected by all actors, including a participatory consultation process involving all relevant stakeholders, which should be enforced in REDD+ actions. In this respect, spatial planning can therefore become a tool that will channel participation in land use decisions, although such participation occurs mostly in the early stages of development (Fosci, 2014). Moreover, it would provide a permanent institutional structure that can be used by stakeholders on a regular basis to receive information, provide further inputs, or file complaints. However, institutions strongly shape outcomes. New national policies promoting participatory planning open opportunities for negotiation but might also create uncertainty (Naughton, 2007).

On the other hand, experiences in developed countries (e.g. The Netherlands, Belgium and Poland) demonstrate that land use plans and zoning can be flexible and adaptive if adequate regulatory and institutional frameworks are adopted (Halleux et al., 2012). This institutional structure needs therefore to facilitate communication across levels of government, and between stakeholders and the public sector using a nested system (Fosci, 2014). To improve participatory land use planning and zoning outcomes, it is critical to evaluate and observe global experiences. For example, case studies (mostly of the cases engage the UNESCO Biosphere Reserve model) have shown that participatory zoning has succeed in attempts to link conservation with development, resolve conflict, and promote sustainability (Rotich, 2012). These cases reveal that governance, funding commitments, ecological context, and the use of science and innovative mapping techniques can restrict or improve spatial planning outcomes.

According to Rotich (2012), there are several novel techniques that may be used in the zoning process. Some approaches feature high-tech methods while others highlight local participation, including:

- Geographic Information System (GIS): a system of hardware, software, and procedures designed to support the capture, management, manipulation,

analysis, modeling, and display of spatially referenced data for solving complex planning and management problems (see Harris and Hazen, 2006);

- Participatory 3-Dimensional Modeling and Community Integrated Geographic Information Technology (GIT): these methods emphasise community participation in the mapping and zoning process to capture the cultural importance of land as well as geographic characteristics. It refers to physically building 3-D maps with communities; while community integrated GIT uses technologies such as GIS to capture community knowledge and perceptions of place (see Harris and Hazen, 2006);
- Quantitative Zoning: Sabatini et al. (2007) have formulated a quantitative method to "expeditiously zone" protected areas by assigning potential land uses based on land aptitude, priority of use, biodiversity conservation, and the influence of the surrounding areas;
- Zoning with Satellite Images: satellite images allow practitioners to see and compare large areas of land and to differentiate land types. In this technique, zones are delineated according to the analysis and weighting of land attributes such as type of soil, topography, hydrology, and prevalent agricultural use (see Salm et al., 2000);
- Adaptive co-management: an approach that recognises the evolving, place specific nature of governance over social ecological systems. The emphasis is on collaborative planning and decision-making among multiple stakeholders that cross community, regional and national levels. Recognising that socio-ecological urgencies and stakeholder needs may change over time, adaptive co-management promotes trust building as the basis for governance, which involves dialogue and feedback from stakeholders, periodic monitoring, and a willingness to modify process, goals and outcomes.

Spatial and land use planning and zoning can be a key prescriptive tool for administration and management of protected areas also. However, the lack of zoning is common for most protected areas in developing countries and, as result several protected areas are not effectively achieving the goals for which they were created (Rotich, 2012). This indicates that zoning procedures may lessen communities' traditional management practices in common areas and lead to an acceleration of ecosystem degradation if communities do not understand and accept the reasoning of

zoning or were not involved in its design and implementation (Rotich, 2012). Under such rationale, REDD+ should consider targeting its actions. A collaborative planning would generate political support for REDD+ scope, since REDD+ actions compete with others policies objectives and it would create synergies with others environmental initiatives.

Moreover, it would assist REDD+ actions to enable the coordination and integration of national policies across sectors and levels of government, generating investor confidence to adopt more sustainable land uses, apart from the fact that it would provide more accurate information on drivers and reference levels (Fosci, 2014). However, perhaps not all stakeholders would be benefited, yet building alliances and collaboration among multiple stakeholders can lead to more equitable and less costly management and monitoring of land use plans (Rotich, 2012). Nevertheless, for Fosci (2014), land use planning and zoning could lead to a direct reduction of forest carbon emissions in all cases where a low-carbon solution comes at little extra cost. He states that even when relocating development initiatives or achieving sustainable resource use is costly, costs may still be lower than trying to implement a REDD+ framework without previous spatial planning since the fragmentation of land use decisions at the individual level (estimates show that around 50 to 80% of climate mitigation actions depend on decisions made at sub-national and local levels, (UNDP, 2014))[163] would not facilitate the identification of cost-effective options to business-as-usual emissions.

In Brazil, the Ecological-Economic Zoning (EEZ) is considered as a strategic point to enable sustainable development by reconciling socio-economic development with environmental conservation. The EEZ is an instrument of the National Environmental Policy of Law 6.938/1981, and regulated by Federal Decree 4.297/2002. The EEZ is shared competence of the three governmental spheres: the federal government, the states and the municipalities. The Supplementary Law 140/2011, which establishes rules for cooperation between these entities in the exercise of common jurisdiction over the environment (article 23 of the Federal Constitution), constitutes the administrative action of the federal government for the preparation of the national and federal states to elaborate the state-level EEZ, and the municipalities for the elaboration of the management plan. The new 2012 Forest Code establishes a period of five years

[163] See at: http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/climate_strategies/undp_projects_thatcontributetogreenlecrds/national_sub-nationalstrategies.html (Accessed on 22, March, 2017).

(article 13 §2) for all federal states to prepare and approve their EEZs, according to a unified methodology established by the federal norm.

This collaboration takes place through the Coordinating Commission for the Ecological-Economic Zoning of the National Territory (CCZEE) (Decree n. 28/2001), a political body responsible for planning, coordinating, monitoring and evaluating the implementation of EEZ efforts. The technical support comes from the EEZ Brazil Consortium (article 6 of Decree 28/2001), composed of 15 public institutions (such as Geological Service of Brazil – CPRM) to advise the CCZEE and the federal states, elaborate methodologies and guide the preparation of the EEZ reference term. It has been elaborated mostly for priority macro-regions of Brazil as the Amazon. However, it has not been conceived to include urban regions in the planning. With increasing recognition in recent years on Brazil's sugarcane ethanol and palm oil diesel biofuels programmes, the federal government began researching the introduction of agro-ecological zoning for sugarcane and palm, which became a fact through presidential decrees from June 2009 and May 2010, respectively. On the other hand, agricultural zoning is not a new phenomenon and indeed, has been practiced in Brazil since 2002 but has been primarily focused on agro-economic criteria (Leopold, 2010). The REDD+ framework in Brazil should therefore contribute to consolidate such actions, combining the efforts on agro-ecological zoning with environmental conservation measures integrating actions and information under a consolidated national system. Moreover, it can assist in enforcing the Forest Code to establish the EEZs nationwide.

6.9.4 Managing the national finance structure

6.9.4.1 Market-based *versus* international allowances

In contrast to the simple economic model from which REDD+ was previously established – from a project-level scheme, similar to the CDM mechanism, with funding from private sector, predominantly from the voluntary market – REDD+ became a national or jurisdictional-level mechanism with funding provided by international donors to national or sub-national governments (Laing, 2014). However, it is difficult to predict which REDD+ finance architecture would be the most appropriate. According to Streck and Parker (2012), there are four major challenges associated with REDD+ finance

context, which affects the national structure as well: i) defining the costs and estimating the financial needs of REDD+ frameworks; ii) mobilising sufficient international and national funding to cover the costs of REDD+ policies, programmes and measures, iii) allocating and disbursing REDD+ finance efficiently, effectively and equitably to produce reliable and measurable performances (results) and iv) pairing the requirements and needs of political authorities and other actors in developing countries with those of investors and donors in REDD+ finance, strengthening and/or creating (new) institutions to implement policies and instruments and manage REDD+ funding.

There is tremendous debate over whether REDD+ should be linked to carbon trading system, which would allow countries to offset their GHG emissions by financing forestry projects mainly in developing countries. Many critics, particularly indigenous groups and traditional communities, fear that REDD+ will lead to investors and speculators buying up forestlands to earn carbon credits, threatening their homes and livelihoods (Chivers and Worth, 2015). Moreover, the carbon market has also shown in the past years its unpredictability. Nevertheless, the capacity and experience developed through the carbon market is still very much needed (Schneider et al., 2015). On the other hand, although there is an evident need to move away from a dependence on public funds alone (Palmer, 2013), there is also an apparently and contradictorily consensus that, whatever the architecture decided for REDD+, there is a need of public funding for supporting policies and measures (Karsenty, 2012). Furthermore, regardless of whether the REDD+ mechanism can be considered a cost-effective measure as a climate mitigation strategy, numerous studies have demonstrated that REDD+ implementation even at a regional scale will have a high annual cost. For example, the Global Canopy Programme estimates that around US$30 billion will be needed annually to protect the world's forests, following an initial spending of US$81 billion.

The real problem is that the likelihood of a viable market-based financing mechanism remains a moving target (IFF, 2014). The evolving landscape of carbon offsetting (post-Paris) will be a byproduct of market adoption and the eventual functionality of the regime (Gehring and Philips, 2016). Nevertheless, developing appropriate REDD+ carbon markets pools is a potentially significant tool to give value to forest ecosystem landscapes (Bluffstone, 2013). On the other hand, currently there is no source of demand to pay for medium to long-term emission reductions from REDD+ at the scale to meet emission reduction targets in tropical forest nations before 2020. There is a US$15 to 48 billion funding gap for REDD+ until 2020, because it is estimated that

the supply of REDD+ credits is 13 to 39 times greater than the potential demand, for a 50% reduction in the rate of global deforestation by year 2020 (IFF, 2014). As uncertainties surrounding the offset-based carbon market exist, it is therefore important to have some control over supply and demand of REDD+ credits (Gil, 2010). This can be done through the establishment of purchasing commitments and price floors/ceilings, limitations to the number of REDD+ units eligible for compliance and continuous issuance of carbon credits during commitment periods, which can avoid unexpected disturbance in supply associated with ex-post crediting (Gil, 2010). Moreover, an indirect threat imposed by market solutions is the dogma that often ignores questions as justice and fairness and therefore, questions on distributive justice must be consider in policies developments.

Furthermore, concerns over the rent seeking behaviour of market participants looking for short-term economic returns continues to raise questions relating to the use of carbon offsetting as a policy instrument (Gehring and Philips, 2016). As the carbon market expands, increased diligence must therefore be placed on ensuring the carbon credits being generated actualise sustainable development. A further criticism to offset-based payments according to Fosci (2013) is that the approach is not as efficient as assumed, because only a carefully crafted policy design can reduce costs. As explained before inaccuracy in setting reference levels may impulse the so-called transaction costs, that is, the price paid for activities that do not generate emissions reductions (Knox et al., 2011). Moreover, if payments are made through the purchase of carbon offsets priced internationally, the actual opportunity cost of a REDD+ action would be overlooked. The divergence between the opportunity cost of implementing a REDD+ activity and the amount paid for it at the level of offset purchase generates a private profit (or rent) for the seller or the financial intermediary. If payments were based on the international price of carbon offsets, they would not match highly variable opportunity costs, creating huge profits where emission reductions are inexpensive and failing to protect forested areas where deforestation action is highly profitable (Fosci 2014; Eliasch, 2008).

Nevertheless, as previously shown the international financing support slowed after 2010 (Norman and Nakhooda, 2014). In addition, even though ambition concerning investments from the private sector were high, the absence of a compliance market for REDD+ credits has determined that private sector engagement and investments consequently have been low (Diaz et al., 2011). Bluffstone (2013) asserts that this fact

may be particularly seen as problematic, because when prices are absent for something, some people may perceive the value as null, which can be interpreted as meaning carbon sequestration services are not at all scarce and therefore (i) there is no reason to provide them and (ii) forests should be used for other purposes. While public sources are essential in the initial preparation stages, the private sector may play a role in financing REDD+ implementation activities. This could be an opportunity for bilateral and multilateral funding to mobilise the dynamics and the liquidity of the private sector. By co-sponsoring the active integration of existing activities into their surrounding landscapes, the Green Climate Fund (GCF) and other public donors have the chance to support the private sector in standing firm with the existing local/sub-national REDD+ actions and taking advantage of their experience and local support (Dutschke and Manfrinato, 2016).

In 2007, a proposal was submitted to the climate negotiations that would facilitate early actions by private investors in REDD+, the so-called “nested approach”. The basic idea was to create “forest conservation nests” within national boundaries that used third-party monitoring, reporting and verification services to generate carbon credits. These offsets would partially be provided to the government as a mandatory reserve for later use under the UNFCCC, while the remainder could be sold to private-sector investors (Dutschke and Manfrinato, 2016). Consequently, private finance would be motivated and attracted, while creating capacities to deal with conservation interventions at local and sub-national level, with a view on integrating these actions into a national policy framework afterwards.

For example, the California Climate Action Registry has developed rules for nesting and the VCS launched its “Jurisdictional and Nested REDD+” Standard in 2012 (Dutschke and Manfrinato, 2016). However, although REDD+ was adopted in the Paris Agreement, the basis for the nests – sub-national approaches – were no longer supported. That’s why countries should adopt a national framework. But there is no implemented mention in the Paris Agreement how and/or if sub-national actions should be integrated into the national scope. Nevertheless, further with Dutschke and Manfrinato (2016), a question remains: What will happen to the privately funded REDD+ activities already implemented in tropical countries? Under some national regulations these emission reductions may still qualify under a domestic accounting system, although with limited market liquidity. However, in Brazil even this possibility was removed by the presidential decree ruling out any private REDD+ emission reductions to

be used for compliance purposes (Dutschke and Manfrinato, 2016). Therefore, without the possibility to market carbon credits from REDD+ private initiatives for now, non-carbon motivations need to be explored to make such actions financially viable. Hence, the most successful REDD+ interventions feature a combination of different modalities targeting the improvement of rural livelihoods, including energy production and demand-side measures.

6.9.4.2 Results-based financing

In this scenario, both bilateral and multilateral[164] foreign allowances, which were initially envisioned as a temporary measure to drive REDD+ mechanism into existence, became one of the main funding sources for REDD+ initiatives (Angelsen and McNeil, 2012; Sunderlin et al., 2014). However, the literature identifies the need for a weighty new forest fund for climate, biodiversity and poverty with an appropriate scale of ambition which bases performance on a set of shared principles which frame targets at a national level and require demonstrated political commitment and engagement against nationally adopted strategies to achieve these goals (Karsenty, 2012). Funding sources, access modalities and disbursement remain points of disagreements between beneficiaries and donor countries and financial arrangements are often perceived as inadequate (Well and Carrapatoso, 2016).

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[164] 2015 has seen few approvals for REDD+, although there has been some progress in disbursement. While since 2008, US$ 2 billion has been approved for REDD+ activities just US$ 17 million has been approved in the last 12 months (Watson et al., 2016). According to the Overseas Development Institute, Germany, Japan, Norway, the UK and the US provided 83% of all REDD+ finance delivered between 2010 and 2012. Norway was the largest contributor, with a total of US$ 968 million.
Each of these donors focuses its support for REDD+ according to its own priorities:

- Germany: focuses its support on the biodiversity benefits of REDD+. Another area of focus is delivering technical assistance to REDD+ countries. Germany's REDD+ Early Movers programme promotes forest conservation and strengthens performance-based payments for reduced emissions in countries that have already taken independent action to mitigate climate change;
- Japan: support has focused on building capacity for monitoring, reporting and verification, and on technology transfer;
- Norway: has made large-scale commitments to REDD+ financing as part of its International Climate and Forest Initiative, which aims to ensure REDD+ is a credible component of an ambitious global climate change agreement;
- United Kingdom: finance for REDD+ focuses on forest governance, including commodities, markets and the role of the private sector;
- United States: funding for REDD+ features market-based approaches, a strong role for global conservation organisations and commodity supply chain initiatives such as the Tropical Forest Alliance 2020.

The three main multilateral initiatives on REDD+ are the FCPF, UN-REDD and FIP (as presented in Chapter four). However, other multilateral channels for REDD+ finance include:

- The World Bank's BioCarbon Fund Initiative for Sustainable Forest Landscapes
- The Green Climate Fund, set up under the UN Framework Convention on Climate Change

Experiences with funds have shown that there is often a trade-off between (i) funds embedded in national budgets being misused or channeled to other priorities, and (ii) funds managed by an independent body which are often plagued by complicated disbursement procedures and fail to create a critical mass of expertise in the national administration (Karsenty, 2012). In 2013, the negotiations on REDD+ resulted in the Warsaw Framework for REDD+. Through this framework, REDD+ becomes an operational mechanism with formal rules for creating institutions, establishing reference levels, recognising mitigation activities, ensuring safeguards, and adopting performance-based approaches. Performance-based (or results) funding is receiving increasing attention as an innovative tool to effectively disburse climate finance. Results-based financing approaches are characterised as a modality under which links payments to outcomes, whereby finance is dispersed upon achievement of pre-defined results (Schneider et al., 2015).

In December 2011, in Durban, parties agreed during the COP17 that "*results-based finance provided to developing country parties that is new, additional and predictable may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources"* and that *"appropriate market-based approaches [. . .] to support results-based actions by developing countries"* could be developed and established (UNFCCC, 2012).[165] In the context of REDD+, results are defined as mitigation outcomes, (carbon emission reductions) and/or enhancements in forest cover and carbon stocks (sinks) measured against a benchmark (FREL/FRL) expressed in tonnes of carbon dioxide equivalents per year (Voigt and Pereira, 2015). However, as the focus of REDD+ has broadened progressively, from emission reductions to the inclusion of other goals such as biodiversity conservation, the improvements of livelihoods, strengthening of indigenous rights and good governance, a performance-based incentive structure that stimulates a broad range of measures (imperative to reduce forest loss) is needed. Results-based payments for REDD+ should consequently also be based on monitoring outcomes of key governance, social and environmental elements, consistent with the Cancun Agreements (adopting tools to evaluate, monitor and enforce them). On the other hand, safeguards addressing fiduciary risks and financial transparency for REDD+ are restricted. Therefore, there is a

[165] See Decision 2/CP17 § 66. Online available at: https://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf

need for comprehensive consideration of the instruments required to ensure effective, transparent and accountable financial flows for REDD+.

According to a document from the Green Climate Fund (2016), performance-based finance can produce meaningful incentives as long as it is on a sustained and regular basis, and that it can leverage other forms of finance, including domestic and private finance, available for land-use activities, with the vision of shifting the paradigm towards low-emission development. However, the scale and predictability of result-based finance has been too limited to trigger the necessary transformational changes in the forestry and land-use sector. Moreover, another concern with results-based payments is that such approach may fail to address the root causes of ecosystem degradation and might based on the notion that financial gains are the primary motivation for action (Lovera et al., 2016). Experiences on result-based finance schemes are still limited, but these experiences provide remarkable lessons learned in setting the specific arrangements for receiving such funding (GCF, 2016). Nevertheless, such experiences also show how difficult it is to actually establish performance criteria and benchmarks (including reference levels). Thus, it would be almost unrealistic to think that all REDD+ financing must be performance based, even though it can still play an important role in the mechanism. Integrating and enhancing existing projects and initiatives as investment finance for REDD+ is therefore a necessary, practical and efficient way forward for achieving results.

Despite the suggestion in Decision 1/CP.16 that REDD+ should over time gradually evolve towards performance-based finance, there is no specific requirement for developing nations on when or how to follow this pace (Voigt, 2016). The adopted phased approach may suggest that national strategies should be the first step of the process towards performance-based finance, but this may not necessarily be the case of countries that already have established policy and legal frameworks for the forest sector as in the example of Brazil. Brazil has established a financial infrastructure to cover different finance needs of the three REDD+ phases. The core part of this architecture is the Amazon Fund established in 2008 (but its REDD+ national strategy was launched in 2015), which is based on a payment-for-performance fundraising model supported by international climate finance and national contributions, as previously explained in Chapter five. In December 2013, Brazil and Norway expanded and extended the Amazon Fund to December 2021. While Norway remains the largest donor to the Amazon Fund, Germany and Petrobrás (oil state company) have also contributed

(Birsdall et al., 2014). Since the international community is increasingly interested in the role that national climate funds and financial institutions can play in delivering climate finance, the Amazon Fund experience offers practical insights, and suggests both challenges and opportunities (Forstater et al., 2013).

Dalene (2011), who analysed the governance framework of the Amazon Fund, describes the fund's principles as being based on credible forest monitoring and politically acceptable reference levels against which annually avoided deforestation is measured. However, the Amazon Fund does not take degradation into consideration regarding the measurement of emission reduction, and this can be seen as a disadvantage. Authors as Birsdall et al. (2014) and Dalene (2011) agree that such agreement has helped the government to improve domestic political legitimacy of forest policies. For example, the standing of the MMA in relation to other ministries has been enhanced (Birsdall et al., 2014). On the other hand, aspects like lack of transparency lower the overall political legitimacy in the scheme. This could be related to the fact that as BNDES (which has been set as the regulator on conceding projects investments) is a bank that mostly gives loans and, in a loan context should be less transparent. This can be seen as negative aspect because activities that apply for loans and activities that apply for donations are different issues and BNDES has only partially changed its methods for approving initiatives for the Amazon Fund in comparison with activities that receive loans (Dalene, 2011). Nevertheless, Forstater et al. (2013) argue that the Amazon Fund has shown that developing country-based institutions can meet high fiduciary standards, and provide relevant transparency on fund operations. However, competent fund administration does incur costs and the full costs of administering the Amazon Fund were higher than budgeted (Forstater et al., 2013).

According to Forstater et al. (2013), there is room to strengthen the active role of multi-stakeholder governance, to help advance a more strategic approach that is better aligned with national needs and priorities. However, as a result, currently there is only a small contribution to the overall national policy on deforestation (Dalene, 2011). This means, it is questionable if the approved projects will be able to really tackle the drivers of deforestation and forest degradation. Some respondents from Birsdall et al. (2014) state that the Amazon Fund's initial approach is too focused on projects and not sufficiently strategic; they would prefer to see the fund aim for larger, more systemic impact by engaging in policy-level initiatives. An example of such actions would be to support for large-scale implementation of cadastral registration of private lands under the

new 2012 Forest Code, which will in turn support a new market that promotes efficient land use. Another respondent proposed using the resources to purchase VER from REDD+ initiatives, resounding other discussions of the possibility of managing funds on a payment-for-performance basis to sub-national jurisdictions or project-level initiatives such as the Zero Deforestation Pact[166] (Birsdall et al., 2014).

Although small compared to the size of Brazil's economy, the amount (US$1 billion) can be considered as a significant addition to funding in support of reduced deforestation (Birsdall et al., 2014). However, in practice, payments are not being delivered through the Amazon Fund on the scale that it would take to really shift incentives structures (Forstater et al., 2013). Hence, one of the major criticisms is related to the difficulties to get the projects financed, promoting a mismatch between the resources available and the disbursement to support projects. Therefore, due to bureaucratic processes and strict specifications many of the possible beneficiaries are excluded from the Amazon Fund. This is marginalising indigenous, small landowners and forest communities and neglecting their chance to get projects supported. Moreover, during interviews it was suggested the necessity of more flexible mechanisms, which would shorten the distance between the resources's source (e.g. Amazon Fund) and the application of such financial resources. Nevertheless, committed national action on low-carbon development requires political will and policy reforms which must be established domestically (Forstater et al., 2013). Thus, climate funds need to be part of domestic efforts to drive sustainable development.

Forstater et al. (2013) say that the international funding can assist this transition, but it cannot impel it. The UN-REDD Programme asserts that identifying domestic budget and aligning them towards REDD+ strategies will contribute to developing REDD+ countries to send a strong political signal and show their commitment to REDD+ goals. Under that logic, the Brazilian Government should also pursue financial channels within its own range of existing national mechanisms to establish the REDD+ in the country. This would enable Brazil to identify opportunities to align existents investments with anti-deforestation policies in sectors such as agriculture, whose expansion is one of the main drivers of deforestation in the country. On the other hand, since 2014, Brazil has been facing a challenging macro-economic crisis, with negative GDP growth, tight fiscal constraints, and higher inflation and interest rates than during the previous decade

[166] This policy has given incentives and concessions to local governments and cattle ranchers in areas of high deforestation in exchange for what the government hopes will be cooperation on stemming further deforestation in the Amazon.

(Edwards, 2016). Under these circumstances scaled-up international climate finance for REDD+ will be even more critical to assist Brazil in mobilising domestic resources and leverage private investment to achieve and go beyond its NDC goals.

6.9.4.3 Command-and-control measures *versus* economic instruments

In a classical context, regulatory command-and-control measures have prevailed in the environmental policy arena across the globe. More recently, market-based incentives have begun to play a noticeable role in this context (Karp and Gaulding, 1995). Command-and-control approach to public policy is commonly defined as the imposition of (environmental) standards – a mandated level of performance enforced through a piece of legislation, e.g. limits on the volume of timber harvest – where governments mandate individuals and/or a corporate sector, by enacting a law, steering behaviour, leading people to obey the law (at least theoretically) and delegating authorities to enforce the law, for example, by imposing fines, sanctions or penalty to violators. Moreover, in the environmental policy context, it basically involves setting standards to protect or improve environmental quality and avoid pollution.

The origins of command and control lie in Machiavelli's idea (about 1515) of acquiring and maintaining political power. Machiavelli saw in command and control a way of maintaining political power in a monocentric manner (Gebara, 2015a). On the other hand, in order to reduce or eliminate pollution and emissions, the economic-oriented regulatory approach works by creating an incentive for the private sector to incorporate pollution abatement into production or consumption decisions and to innovate in such a way as to continually seek for the least costly method of abatement (EPA, 2010). Examples of economic instruments include measures such as taxes, subsidies, funds, payments for environmental services, among others. Reducing market barriers can also help to curb environmental damages, since, in some cases, substantial gains can be made in environmental protection simply by removing existing government-mandated barriers to market activity (Stavins, 2003). Incentive-based approaches are often referred to as market-based approaches because the market, including private-sector companies, is driving the change. This approach is also based on the polluter

pays principle,[167] which ensures that the costs of environmental control (considering the environmental factor as valuable) fall, in the first place, on the polluters. Thus, market forces take these costs into account and resources are allocated accordingly in production and consumption.

Much of the policy discussion has to do with the efficacy and relative advantages of different approaches to environmental problems (Karp and Gaulding, 1995). However, specific policy tools will work better in some situations than in others. In deciding which approach to adopt, political authorities must be cognizant of constraints and limitations of each approach in addressing specific environmental obstacles. There are a number of strengths as well as weaknesses in such approaches. For example, a direct approach as the command and control has the advantage of a rapid implementation process; it also sets out clearly defined limits and shows the government or regulator to be acting decisively. On the other hand, it can also be a somewhat heavy-handed and complex approach to regulating activities.

A major challenge for governments is to ensure that regulatory measures are both effective and efficient: effective in the sense that they resolve the problem achieving the main goal they were introduced to address; and efficient in the sense that they minimise both the direct compliance costs borne by those subject to the regulation, and other, often more indirect, costs which may be imposed on the public (Hepburn, 2006). On the other hand, it should be noted that efficiency differs from cost-effectiveness. A policy is cost-effective if it meets a given objective at least cost, but cost-effectiveness does not encompass an evaluation of whether that objective has been properly placed to maximise social welfare. All efficient policies are cost-effective, but it is not necessarily true that all cost-effective policies are efficient. A policy is considered cost-effective when marginal abatement costs are equal across all polluters. This means, for any level of total abatement, each polluter has the same cost for their last unit abated (EPA, 2010). A lack of effectiveness in policy development commonly occurs because often objectives are not explicitly stated, poorly specified or there may be several potentially conflicting objectives. Thus, these aspects must be considered during design and during outcomes evaluation of policy implementation, establishing indicators to measure such efficiency.

It is frequently asserted that economic instruments have advantages over command-and-control measures. For instance, Zhang (2013) argues that economic-

[167] Internationally the polluter pays principle was introduced in the 1970s by the Organisation for Economic Co-operation and Development (OECD) and reaffirmed globally in the 1992 Rio Declaration on Environment and Development.

based instruments provide greater flexibility and financial incentives inciting producers and the companies to adopt the new technologies and equipment, creating better results in order to solve environmental problems. That is why in theory, economic-incentive instruments allow such achievements to be realised at the lowest possible overall cost to society. This means, rather than equalising pollution levels among individuals and companies, economic-incentive instruments equalise the incremental amount that producer and companies spend to reduce their pollution and/or environmental damage (their marginal abatement costs). Zhang (2013) states that actors will accept a policy more easily if either the benefit increases or the cost decreases, which could be reached through incentives, which would influence the individual's behaviour to a considerable extent.

Moreover, Zhang (2013) argues that market-based solutions try to change the logic of results in the "tragedy of the commons" (Hardin, 1968). This concept refers to a situation where individuals exploit scarce and rival common environmental resources for their own rational, self-interested aims, leading to over-production and the possible permanent depletion of the resource for all (Riley, 2011), because there is no incentive to stop gaining benefits in such an easy and cheap way (Zhang, 2013). However, it is mostly agreed that instead, a market failure occurs. Such over-utilisation happens when the natural resource in question has poorly defined (or non-existing) property rights attached to it while too many private economic agents engage in activity simultaneously for the resource to be able to sustain it all. Examples range from over-fishing of fisheries and over-grazing of pastures to over-crowding of recreational zones in urban areas. Some argue that the command-and-control approach that does not categorically consider varying performance of polluters, thus ignoring the efficiency principle, offering this way opportunities for other policy alternatives for environmental management (Elazegui, 2002). However, according to Grossman and Cole (1999), although the command-and-control approach has a number of limitations, when institutional and technological costs (e.g. monitoring costs) are considered, command-and-control regulations appear neither inherently inefficient nor invariably less efficient than theoretical economic approaches (e.g. emission trading programmes).

Usually the first response by governments is often to regulate, but in many situations there may be a range of options other than command-and-control regulation available, including more flexible forms of traditional regulation (such as performance-based and incentive approaches), co-regulation and self-regulation schemes, incentive

and market based instruments (such as tax breaks and tradable permits) and information approaches (Hepburn, 2006). However, policy makers remain reluctant to consider the use of alternative instruments in many situations, perhaps because of the uncertainties and perceived risks attached to alternative approaches, or because of institutional impediments (Hepburn, 2006). Nevertheless, to the extent such measures are replaced by market mechanisms, it should only be after case-by-case examinations of expected costs and benefits, including implementation and monitoring costs (Grossman and Cole, 1999).

Some authors as Gunnigham (2002) argue that deterrence should not be assumed as the principal tool available to authorities, regulators and policy makers. Instead, other motivational drivers are equally important, because policies differ by the motivational incentives they draw upon to achieve their goals; for example, command-and-control policies rely upon fear of sanctions and market-based instruments upon financial gain (Karp and Gaulding, 1995). In this sense, Karp and Gaulding (1995) also state that environmental policy process would benefit from a more explicit consideration about human behaviour. Within this context, Gebara and Agrawal (2016) argue that instruments that offer rewards and/or punishments relies only on supporting limited behavioural changes on the ground, generating negative adaptations of deforestation practices, and perhaps producing only short-term outcomes at the expense of positive long-term land use changes. Furthermore, both approaches ignore local heterogeneities and power relations[168] as for example, usually in the case of Amazon, most of the times only smallholders are reached by administrative fines against environmental liabilities (Gebara and Agrawal, 2016).

6.9.4.3.1 The context of incentives *versus* sanctions in the Brazilian scene

In Brazil, the main strategy adopted for forest conservation and ecosystem maintenance is command-and-control measures. As discussed in Chapter five these instruments may have played a meaningful role in reducing deforestation in recent years (see for example, Assunção et al., 2012). However, a major problem in Brazil concerns enforcement of environmental policies, meaning that a policy instrument is not very effective if there is an inadequate level of compliance. Thus, Brazil should strengthen

[168] The term “power” has diverse definition, but all meant to describe the ability of a person or a group of people to influence and control the behaviour of others in the direction that is against their will (Makatta et al., 2015).

implementation of environmental policies and enforcement capacity at local level. Effective enforcement will also depend on the local actor's capacity to respond to environmental problems, thus, the importance of information, education and bargaining power (Elazegui, 2002). Therefore, regulatory policies will only gain leverage if programmes to instruct and educate the communities and targeted groups are also adopted.

In this sense, this dissertation argues that instead of prioritising a short-term gain through command and control, measures for forest conservation and reduction of deforestation should promote long-term results that recognise the heterogeneity of forest landscapes. In other words, the main pillar of the REDD+ national strategy should not only be the enforcement of the national forest regulation, in this case the Forest Code, which mostly focus on command-and-control actvities. The importance of economic instruments for environmental policy is emphasised in the UNFCCC (see Decision 2/CP17), which states that the use of economic instruments represents an advance for the national authorities (Gebara, 2015a). On the other hand, such instruments may not replace command-and-control measures; instead, may reduce some of the regulatory burden that undermines environmental policies (Karp and Gaulding, 1995). Moreover, in the search of self-interest motivations, rather than in the prevention of penalties, economic-oriented instruments may allow for a higher level of efficiency that command-and-control approaches cannot accomplish (Karp and Gaulding, 1995). On the other hand, the REDD+ national framework in Brazil should also go beyond implementing PES actions, which offers rewards. However, PES and command-and-control measures have been at the heart of several REDD+ initiatives on the ground in Brazil.

Schemes as PES might be effective to cover opportunity costs only concerning activities where the same are low, while regulation, proportionate law enforcement, demand-side measures and political will are needed to hinder the more profitable drivers to deforestation. Therefore, effective combinations between regulations and incentives will be needed in order to avoid important drifting of the costs and prevent the capture of financial resources by opportunistic and powerful actors (Karsenty, 2012). However, the REDD+'s institutional framework should go even further and include a broader set of policies such as demand-side measures and crop-livestock-forest integration, especially focusing on capacity building, technology transfer and social learning.

In Brazil, the main economic instruments used to encourage changes in behaviour are fiscal and financial instruments (Gebara, 2015a; Nogueira and Borges,

2012). However, several of these instruments (such as the differentiation of taxes and financial subsidies for agriculture and livestock) are actually encouraging deforestation, especially in the Amazon region (Gebara, 2015a; May et al., 2011; McFarland et al., 2015). Thus, rather than just controlling, environmental policies should be based on an understanding of the pivotal processes and practices that structure and drive deforestation, such as increasing demand for forest and agricultural commodities and subsidies that encourage the production of such commodities, prioritising sustainable landscapes and reflecting the natural stages of the ecosystem as well. Under that logic, the REDD+ framework should be aimed at changing this scenario, considering to redirect, remove, replace or at least to reduce such perverse incentives. For example, the total REDD+ investment has been 70 times smaller than the subsidies provided to the agricultural sector in the country (Denier et al., 2015). Moreover, recognising the multiple functions of landscapes, and having finance directed to local landscape scale actions, REDD+ would maximise its impact in tackling the varied drivers of deforestation and ecosystem destruction within a landscape (Denier et al., 2015).

6.9.4.4 Forest transition theory

The concept of “forest transition” was first proposed by geographer Alexander Mather from Aberdeen University to describe an empirical regularity observed in several countries, namely a national-scale shift from a shrinking to an expanding forest area (Mather, 1992). He discovered how the people in Scotland cleared most forests by the end of the 16th century and then reforested such areas in the 20th century with active State support (Kant and Shuirong, 2013). Forest transition theory (figure 18) follows the “depletion-melioration model” proposed by Whitaker (1940), which argues that at an early stage, natural resource destruction is inevitable to meet the human needs (Indarto and Mutaqin, 2016). This means, this theory suggests that initially a country has a high forest cover and low deforestation rate. However, in order to foster economic development, countries start using their natural resource base in the form of agricultural products and timber, leading to damage of natural ecosystems, and the conversion of forests for expanded agricultural systems (Angelsen, 2007). As a consequence, countries will then have high forest cover and high deforestation rate. This can be considered the current case of Brazil (see figure 19).

According to Mattsson et al. (2016), additional development can reinforce and accelerate deforestation as a result of advancing infrastructure establishment that allows better access to markets with increasing demand for forest goods, resulting in low forest cover and high deforestation rates. Moreover, forest cover stabilises as countries develop economically, reducing the profitability of deforestation giving a low forest cover and low deforestation rate. At a later stage of development, economic activities shift from agricultural and resource extraction to an economy based on industry, agricultural expansion, higher incomes, increased environmental awareness and migration from rural to urban areas, reducing pressure on forests, and finally leading to forest recovery (Breitling, 2016). At some point, likewise forest scarcity increases the value of forest products which hinders further forest conversion leading to low forest cover and a negative deforestation rate. As a result, transition happens when declining forest cover trend reverse into increasing forest cover trend.

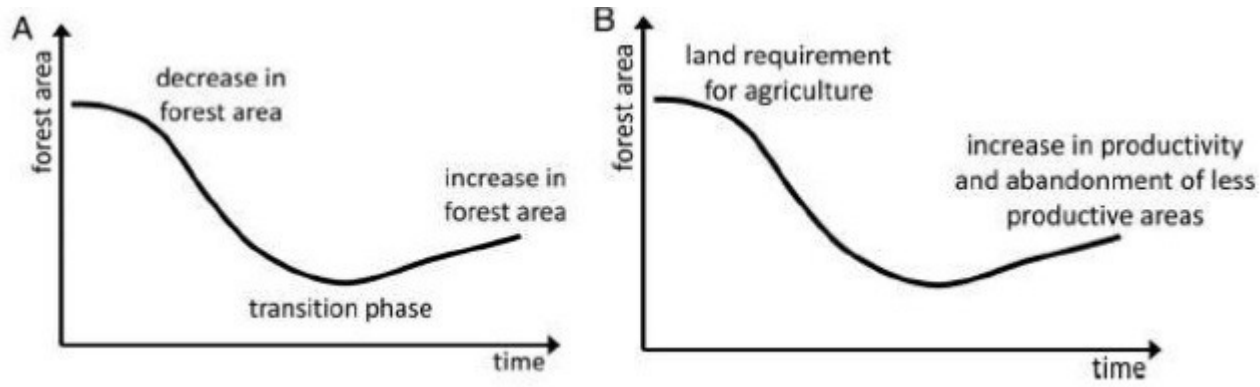

Figure 18. Forest transition theory (Source: Köthke et al., 2011)

Forest transition theory is, on the other hand, a highly contested framework due to its general tendency to oversimplify a very complex process. Evidence suggests that the theory adequately describes processes currently under way in Africa and Latin America, as well as patterns in the USA and Europe (Roessing, 2015), even though the theory has been criticised as an example of an unfounded “grand theory” with limited empirical support (Perz, 2007). In sum, the forest transition theory is best viewed as a historical generalisation about a recurrent pattern of change in forest cover over time. In this sense, the theory has regained momentum in the scope of the REDD+ discussions and some have used it as a conceptual framework for setting reference levels for forest cover change (baselines) for REDD+ strategies (Angelsen and Rudel, 2013).

Along the transition curve (figure 19) if a country's location can be identified, an "anticipated deforestation rate" could gain more reliability (Leischner et al., 2011). The environmental effects of these forest transitions are very variable, depending on whether deforestation of old-growth forests continue, the proportions and types of tree plantations versus natural regeneration of forests, and the location and spatial configuration of the different types of forests (Meyfroidt and Lambin, 2011). By integrating the theory into the establishment of REDD+ baselines, a baseline could be set in a manner which firstly is based on national historic deforestation and secondly takes into account local circumstances, both requirements for baselines established in UNFCCC negotiations (Leischner et al., 2011). Moreover, since experience has shown that REDD+ policies must be tailored to the specific national circumstances, given the different characteristics at each stage, and the need for different policies and the differences in ability to implement policies, it is argued by Angelsen and Rudel (2013) that different policies or sets of policies might be more appropriate and effective if they are established at different stages of the forest transition process. This means, policy makers would be able to derive some policy alternatives from this theory (Indarto and Mutaqin, 2016). Accordingly, two main policy directions can be derived from this theory, which are policies to curb deforestation and policies to accelerate the transition towards increasing forest cover (Lambin and Meyfroidt, 2010).

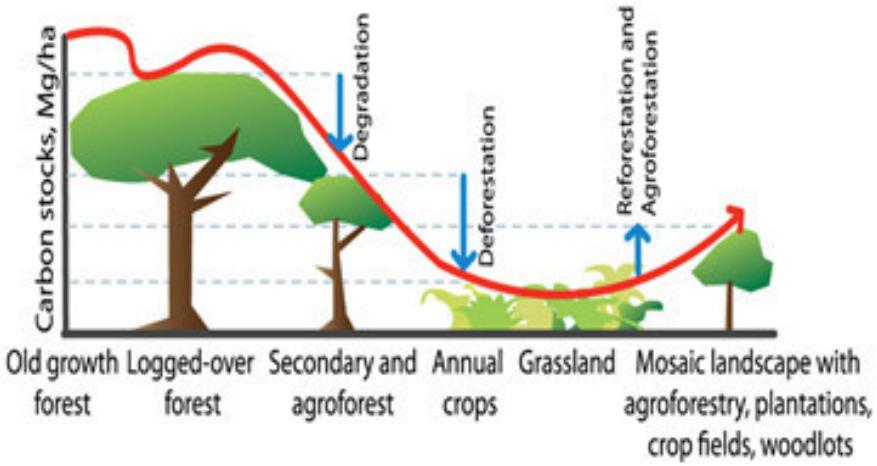

Figure 19. Forest curve (Source: CIFOR, 2017)[169]

[169] Online available at: http://www1.cifor.org/pmrv/activities/rsgis/introduction.html

Within this context, nevertheless, it is also argued that the forest transition theory may influence the REDD+ governance. For example, REDD+ actions could be directed to shortening the forest transition period, leading to a quicker stabilisation and recovery of forest areas (Roessing, 2015). Following this reasoning, it appears the potential that REDD+ may have to galvanize meaningful support for the broader architecture of global forest governance (Roessing, 2015). This can be analysed in the case of Brazil. For instance, at some point the transition turnover would occur as a result of the Brazilian economic development. With regard to the Amazon, this could occur now, with about 80% of Amazonian forests still intact, or it could occur when there will be only 1% of the remaining forestlands. However, this does not mean that attention should no be given to other biomes. Probably the result in more degraded biomes would be visible and strongly significant, even though it would be more moderate in its overall magnitude. Nevertheless, the REDD+ should be used – if financing appears and is well applied – to foster economic activities that will give economic sense to the maintenance of the forest (involved in a heterogeous landscape) and, in this way, will assist for this transition to happen earlier.

In this context the concept of pro-active policy may be applied. It is argued by Drechsler et al. (2011) that that a delay-and-repair outcome may actually be much more expensive than a pro-active policy. They advocate that pro-active policies may lead to win-win situations where better conservation can be achieved at lower costs (Dechsler et al., 2011). Thus, if REDD+ may be capable of enhancing a forest-based economy (acting as a pro-active action), supported by sustainable forest management at landscape level, probably forest felling would not make further sense. The problem is that forest management requires a very high initial investment, for returns that will only come in the medium and long term. Should REDD+ provide that initial capital, which would support entrepreneurs (in the broadest sense of the word, e.g. large landowners, cooperatives within protected areas or indigenous groups, etc), REDD+ could leave as a legacy a forest transition period resulting from the implementation of a forest-based economy. These forms of systematically-managed forest landscapes represent important opportunities that relate directly to the fight against climate change and it might constitute necessary additions to the current REDD+ structure (Galbert et al., 2013).

CHAPTER 7 Conclusions

7.1 Lessons learned

The relationship between trees and global warming is more complex than the elementary question of the GHG they absorb and emit. However, it is known that deforestation and forest degradation release great amounts of GHG and aggravates global and local warming. Around the world, particularly in developing countries, land use change is one of the major causes of a large share of GHG emissions. Deforestation is considered the most frequent land-use change in Brazil. Most of this deforestation process is attributed to the expansion of pasturelands and agriculture. In spite of the profits provided by agricultural activities, recent data suggests that the conservation of forested areas is extremely important for climate balance. The natural dynamics of any forest ecosystem guarantees the balance of carbon flows, as well as the good health of other biogeochemical processes (e.g. water cycle, recycling of nutrients, photosynthesis etc.). In this context, deforestation results in considerable changes in the cycles of these elements and allows carbon stocks to quickly reach the atmosphere, altering atmospheric composition (Manfrinato et al., 2007).

Hence, the argument that an economic value needs to be attributed to natural resources has taken a different perspective over the past decades. Markets have valued resources that are used for industrial purposes, such as minerals, water, soils, and a myriad of natural resource that can be introduced into the productive process and added value through transformation (even timber can be possibly thought in that way). Nonetheless, the forest itself has been introduced to the center stage in recent decades given the role it plays in so many processes related to things less tangible, such as the natural regulation of climate. Thus, the question related to the fact that if such a natural resource be transformed due to the economic development of a given region, affecting the characteristics of nature elsewhere, then the matter of attributing a value to the transformed forest to be taken by development and turned into agricultural areas, this has impacted the debate to a different level. The complexity of such hypothesis might give difficulties for our modern society to discuss and accept the issue that humans can impact nature in such a way that it will change the natural world to an extent that is irreversible or create impacts to our planet that externalities become something rather larger then the desired development.

In this context, the role of forests to mitigate climate change has been fully recognised also in the Paris Agreement during COP21. With a specific article devoted to REDD+ (article 5), the document establishes that tropical and sub-tropical countries can receive both public and private funding if they succeed in reducing their GHG emissions from deforestation and forest degradation. Together with the fact that the Agreement comprehends REDD and the 'plus' part of REDD (the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries), this is claimed to be a clear call to action for countries to endorse policies that conserve standing forests. In Brazil, the REDD+ debate has also moved forward over the past years. In 2010, the federal government started developing its national strategy on REDD+, the so-called "ENREDD+". Efforts have been made to (i) ensure the successful implementation of a REDD+ policy aimed at promoting sustainable forest use while accounting for the driving forces of deforestation, and (ii) integrate REDD+ into existing conservation instruments. Brazil also incorporated REDD+ in its INDC to the UNFCCC, now Brazil's Nationally Determined Contribution since the Brazilian Government adopted the Paris Agreement on 12 September 2016. In 2015, REDD+ was also regulated in the Brazilian environmental legislation through Decree 8.576/2015. However, exactly how REDD+ is to be inserted into national development and climate strategies prevail as the major questions (Angelsen and Verchot, 2015) and different aspects of the mechanism remain disputed.

The ENREDD+ is the document that formalises how the Brazilian Government has structured efforts until the moment and how it intends to improve them by 2020, focusing on coordinated actions to prevent and control deforestation and forest degradation, promote forest recovery and promote sustainable development. The overall objective that guides the ENREDD+ is to contribute to mitigate GHG emissions defeating illegal deforestation, conserving and restoring ecosystems, promoting socio-economic and environmental benefits. The National Commission on REDD+ (CONAREDD+) will coordinate monitoring, finance and benefit-sharing systems, but it will be highly influenced by three thematic advisory board based on three pillars for fostering a sustainable forest economy: (i) coordination of public policy on climate change and forests, (ii) measurement, reporting and verification (MRV) of results and safeguards, and (iii) financing, fundraising and distribution of payments for REDD+ results.

Brazil has chosen to set their reference levels by biome, using at first historical data monitored in the Amazon, adopting the historical average from 1996 to 2005

(19,625 km^2) and, for the Cerrado the historical average from 1999 to 2005 (15,700 km^2) and will later encompass all biomes. However, the ENREDD+ does not define very clearly how monitoring (MRV) activities will be adopted, improved, financed and extended to all biomes. On the other hand, the Ministry of Environment (MMA) released in November 2015 its Environmental Monitoring Strategy for All Biomes. Moreover, the government is developing its Modular System for Monitoring GHG Emissions Reductions (SMMARE), which may also be used for the purposes of performance-based payments, once the GHG emissions reduction results can be made available through the system. On the other hand, although Brazil has a sophisticated satellite-based forest monitoring system, a critical point relies on the inability to distinguish between legal and illegal logging.

The collection of resources will be based on achieved and measured results, whereas the distribution of resources will take place in a decentralised manner guided by the CONAREDD+. However, it remains unanswered how such distribution of resources will be established and implemented. The fundraising actions will seek bilateral partnerships or international financial institutions willing to offer payments by results through the Amazon Fund. The Amazon Fund is a private fund created by the federal government in 2008 aimed at raising donations for non-reimbursable investments in efforts to combat deforestation, and to promote the sustainable use of forests (NORAD, 2011). Nevertheless, it should be noted that international financing support slowed after 2010 due to the global economic crisis (Norman and Nakhooda, 2014). On the other hand, the likelihood of a viable performance-based market mechanism remains uncertain. Furthermore for some specialists, much of the claimed climate financing mobilisation is relabeling of existing official development flows, meaning that financing issues will remain the most important dilemma into the REDD+ context. Regardless this impasse, the reluctance of the Brazilian Government to be against financial options on market mechanisms, may result in loss of opportunities in the future. The government should also pursue financial channels within its own range of existing national mechanisms to establish the REDD+ in the country. This would enable Brazil to identify opportunities to align existents investments with anti-deforestation policies in sectors such as agriculture, whose expansion is one of the main drivers of deforestation in the country. Moreover, since the REDD+ framework has broadened its targets, it opened possibilities for other sources of financing. However, the main question is to know if

whether the ENREDD+ will accept these others sources as official funding (Alves-Pinto et al., 2016).

In the strategic scope, the National Policy on Climate Change (NPCC) and the Forest Code provide the groundwork guidelines for REDD+ actions throughout Brazil. In the tactical-operational dimension, the action plans for prevention and control of deforestation in biomes are the main instruments for the integration and articulation of REDD+ initiatives. The Amazon and the Cerrado are the two out of six Brazilian biomes that have plans of action in execution phase – the PPCDAm, since 2004, and the PPCerrado, since 2010. The PPCDAm and PPCerrado have interfaces with sectoral plans for mitigation and adaptation to climate change such as the Low Carbon Agriculture Plan (ABC Plan) and the Plan for the Reduction of Emissions of the Steel Industry (Charcoal Plan), for example.

Nevertheless, the Brazilian Federal Government still fails to channel the necessary level of resources into REDD+ and environmental initiatives often stumble over economic interests, especially regarding agriculture expansion and infrastructure development. Problems such as lack of governance, poorly defined property rights, land use conflicts and negligence with the environmental legislation persist (Fatorelli et al., 2015; Gebara et al., 2014) also add uncertainty about REDD+'s potential to halt forest clearance. The high level of corruption and bureaucracy in the public sector has contributed to the emergence of environmentally damaging policies and laws in the past (Alves, 2014; Valberg, 2011) and the recent decrease in deforestation rates in Brazil is threatened by agricultural growth expectations in face of increasing commodity prices (The World Bank, 2015). Altogether, these problems pose obstacles to the establishment of an effective and efficient REDD+ strategy, putting already vulnerable groups of society at greater risk. At the same time, they suggest the need to build a new vision on what development pathway Brazil should pursue considering the natural aptitudes of all Brazilian biomes and integrating environmental protection with economic interests while addressing social constraints.

REDD+ has been proposed as a potentially paradigm-shifting alternative to previous forest-climate related policy interventions. Moreover, REDD+ has become highly politicised (with the possibility of substantial international payment for results). In this sense, it was recognised that in order to succeed, REDD+ should be seen as more than just a framework focused on forests and the rate of deforestation, but rather, it should be considered within the broader context of economic development (Albani et al.,

2012). Moreover, it was noticed that only by providing a direct market incentive it would be probably insufficient for deforestation rates to be reduced, because the opportunity costs of land users are exceedingly high. Furthermore, there are also complex issues of governance involved (i.e. land tenure and rights of indigenous and local communities), while at the same time strong economic interests exist to convert forests to agricultural land (Hein et al., 2012). Paradoxically, with the increase in scope of REDD+, the institutional and technical challenges to implement such framework have also drastically increased. This means, in the exercise of trying to make REDD+ implementable and serve a wide variety of interests, its implementation becomes more and more difficult (Vijge, 2016).

This research converges on its goal from different main directions. Questionnaires and interviews were applied and conducted to collect primary data focused on addressing the major challenges and barriers existent in the Brazilian context. In total, 58 different respondents have participated, among them, 15 ministries and secretariats (comprising federal and state level). Moreover, two independent consultants; six universities (four national and two international); four private companies; 18 Civil Society Organizations, Funds, Foundations (twelve national and six international); 13 Institutes, NGOs, Non-Profit Organizations (ten national and three international). Secondary data spanned recent scientific literature on topics such as climate change, the REDD+ mechanism, forest governance and several other documents – strategic, policy studies, legislative (e.g. ENREDD+ official public document) – were examined.

The approach to determining the relative importance of constraints to the development of REDD+ at national level in Brazil is peculiar to this research which conceptualised policy development as a bridge building exercise. In terms of constraints, the most significant challenges indicated by most of the interviewees with regard to the Brazilian scenario were those related to governance. The most cited problems were the lack of coordination between different governmental agencies, contradictions among forest-related policies (agriculture/livestock, conservation, energy and mining), coordination of actions at local and sub-national levels with the ones at the federal level, lack of participation in decision-making, land tenure conflicts, lack of cross-sectoral interaction and deficient long-term financing. Within the governmental sphere, those challenges related to policies' implementation and financing of activities were mostly recognised. Interviews revealed three predominantly highlighted opinions regarding

interaction issues: i) lack of interaction among involved institutions, ii) lack of a comprehensive understanding of the Brazilian strategy on REDD+ and iii) lack of a comprehensive understanding of how the developed activities could better cooperate among them under the proposed REDD+ framework. On the other hand, the challenges that provoked the least concern among interviewees included leakage, scope of activities and monitoring system.

In order to completely achieve its mitigation potential, the REDD+ architecture requires changes in the form of modified economic (by offering new economic incentives), regulatory and governance frameworks, removal of perverse incentives and reforms of forest sector and agribusiness policies (Angelsen et al, 2012). The question is to know if REDD+ will be able to enhance the combat to deforestation or whether business as usual policies will be maintained. The idea is that REDD+ as a policy domain enforce policy actors to disrupt existing policy monopolies that have engendered unsustainable patterns of forest loss (Jodoin, 2015). Moreover, to catalyse the development and adoption of transformative policies that can enhance carbon sequestration in the forests, tackling problems at the intersections of forest governance, climate change, and sustainable development.

In this sense, it has been argued throughout this dissertation that alongside the technical issues, there are also concerns over equity and the role of the forest-dependent communities in the context of REDD+. Furthermore, successful REDD+ strategies require strong multi-level coordination, linking the global need and 'willingness to pay' for climate action with national and sub-national institutions and local people's needs and aspirations as well as linking effective information, incentives and institutions across levels (Angelsen et al., 2012). REDD+ might be the opportunity to promote sustainability, based on a new development paradigm, even though engagement and commitment of actors or the coordination of policies and actions are not easy tasks (Gil, 2010). Governments must therefore assume their role in this transition process, setting up a national strategy to be followed in all levels, agreed upon between all stakeholders and ensuring the political, legal and institutional conditions for the implementation of sustainable solutions. The following are central obstacles identified during the analysis that need to be overcome for a worthwhile establishment of the Brazilian national strategy on REDD+:

- Brazil in its NDC is committing to residual reductions over the next 15 years, proposing only to stabilise GHG emissions in the coming years;
- The restoration targets implied by the Forest Code are greater than the 12 million hectares of forest indicated in the NDC goal;
- The multiple-use approach of reforestation demands great attention because “reforestation” activities could mean establishing commercial tree plantations (replacing natural forests);
- The Brazilian NDC commits to eliminate illegal deforestation by 2030, but this target is actually a step back from the country’s previous commitment (2008) that envisaged reaching zero-illegal deforestation by 2015;
- Although in theory all other biomes are also considered priorities for the development of REDD+ initiatives in Brazil, most conservation efforts have been directed at the Amazon;
- The Brazilian NDC also pledges to compensate for “legal suppression of vegetation”. Firstly, this also seems to be related only to Amazon, and it remains unclear to what extent this can be interpreted as net-zero emissions from deforestation;
- There is no mention in the final version of the ENREDD+ how Brazil will account for emissions from forest degradation. The Paris Agreement follows the Decision 15/CP19 which only reaffirms, recognises and encourages the importance of addressing drivers of deforestation and forest degradation, but it does not establish a formal guideline for it. Furthermore, degradation is also not considered regarding the measurement of emission reduction within the Amazon Fund scope;
- Interviewees declared that, since 2012, the REDD+ scenario has substantially changed at the national level. There was a reduction of participation and discussion levels within the REDD+ policy processes;
- There is a low level of representativeness from the civil society, indigenous groups and forest-dependent communities in the National Commission on REDD+ (CONAREDD+);
- One of the major problems concerning the implementation of safeguards is the difficulty in establishing indicators that truly demonstrate that these safeguards are being addressed under the REDD+ system;

- The ENREDD+ still lacks important details on the incorporation and operationalisation of national mechanisms for benefit-sharing;
- Objectives for coordination and governance have been set but implementation details are deficiently described in the final version of the ENREDD+;
- An impediment to the development of the national strategy on REDD+ in Brazil is the lack of alignment between state-level policies and the federal government;
- The ENREDD+ must consider the incorporation of previous REDD+ sub-national and local actions into its scope under the national umbrella;
- Brazil lacks a clear distribution of responsibilities for following up on the policies and plans established in the National Policy on Climate Change (NPCC), reflecting in this way the REDD+ implementation throughout the country;
- The Brazilian institutional design is also a problem. Actors involved in institutional structures often do not have the same power or influence, and several new actors remain outside of the official political system. Various inter-ministerial conflicts exist due to discrepant interests and forest protection is not always a shared priority (Valberg, 2011);
- Brazil‘s legal framework in the environmental and forestry areas spreads governance responsibilities among a number of state- and federal-level institutions, which can create confusion and disputes;
- Although the Ministry of Environment has assumed a leading role on the development of the ENREDD+, it does not seem to be able to coordinate state and federal actors nor to link up different sectors and levels relevant to REDD+ framework, not including in this policy network arena an important role for the private sector (Gebara et al., 2014).

Additionally, it is already commonplace to observe that sustainable development may only occur if a country has “good institutions” in place. Therefore, implementing a framework as REDD+ requires substantial policy change and governance reform (Angelsen, 2009; Corbera and Schroeder, 2011; Brockhaus et al., 2014) which involves conflicting interests, power disputes and complicated policy processes in a complex governance system of different actors from different sectors and levels (Brockhaus et al., 2014). On the other hand, an appropriate REDD+ framework might be a catalyst for these changes as well as contributing to their occurrence. In this sense, this dissertation also deliberated the domestic governance framework necessary to enhance sustainable

forest landscape under REDD+ scenario, identifying areas of policy that need consideration in this context in Brazil, focusing on four main topics:

- Anti-corruption measures

When challenges to the effectiveness of REDD+ are attributed to problems of "governance", corruption and lack of policing usually are treated as core obstacles to REDD+'s implementation. Corruption undermines democracy breeding poverty and public mistrust of impartial justice and the government and, as a result, reduces economic growth (Winbourne, 2002). What makes the environmental sector distinctive from any other area is that corruption is provoked by large amounts of formal and informal revenues that can be gained from environmental products (e.g. minerals, timber, etc). For those countries that are well-supplied in environmental resources and whose economies are mainly based on them (e.g. Brazil), resource distribution, extraction and management become fertile grounds for a culture with widespread corruption. Within the forest sector context, corruption undermines the framing, implementation and subsequent monitoring of policies aimed at conserving standing forests (Angelsen, 2009) and, illicit acts are often associated with interactions between public and private actors (Bulte et al., 2007), where financial incentives or status-related benefits are offered (or sought) to deviate from an established framework of rules and regulations (Williams, 2011). Although illegal logging and acts of forest corruption are not synonymous, it is widely recognised that they can be linked (Bofin et al., 2011).

In a context of forest management, the term "illegality" is a complicated concept, because legal actions in the forestry sector are not always justifiable – certain logging concessions may be questionable for a range of reasons – and some illegal acts may in fact be rather acceptable, for subsistence reasons for example (Sundström, 2016). The extent of illegal activities in the forestry sector is notoriously difficult to estimate in order to determine the precise amount of deforestation (and, by extension, carbon emissions) that should be attributed to corrupt activity (Tacconi et al., 2009). In spite of the fact that the fight against corruption alone will not solve the problem of deforestation in Brazil, corruption can be considered a pervasive socio-economic problem in the country, reaching almost the entire public sector in Brazil. Therefore, to reach the goal of zero illegal deforestation and make REDD+ workable (enforcing governance), the authorities in Brazil have to put massive effort in adopting anti-corruption measures and, ultimately ceasing the systemic corrupt practices culture in the country.

- Land Tenure

There is increasing recognition that secure access to land is needed for rural households to make use of sustainable livelihood development at landscape level. Much of the existing literature that addresses the influence of institutional arrangements on forest management identifies that secure tenure relies on, and is conditioned by, governance. Rights without effective sanctions against their violation are insufficient, while institutional effort in support of sustainable forest management in the absence of clear forest use rights is likely to be undermined. Therefore, effective tenure will remotely be achieved without supportive policy and institutional systems. In countries where tenure security over forest is weakened, REDD+ can pose a risk for forest-dependent communities, who could be dispossessed, excluded and marginalised. While insecure tenure makes local people vulnerable to dispossession as land values increase secure resource tenure gives them more influence in negotiations with government and the private sector. Furthermore, unclear or insecure tenure may in itself promote deforestation activities. Deforestation may be a way of showing occupation where land claims are contested.

In Brazil, inadequate access to land and insecure land tenure are factors behind rural poverty, violence, human rights abuses, etc. In the Amazon, unclear land tenure is a major deforestation driver that serves as a disincentive to sustainably managed forests. Moreover, the uncertainty about property rights indirectly leads to the exclusion of local populations in the political process and benefit-sharing processes, as they lack the opportunity to participate in the implementation of REDD+ initiatives, for instance. Thus, tenure and rights link closely to safeguards for REDD+. That said, the fair distribution of REDD+ benefits will not be achieved without a prior reform in forest governance and more secure tenure systems, which is not explicitly reflected in the national strategy on REDD+. Approximately 80 million hectares of undesignated public forests in the Amazon could be allocated as protected areas, production forests or other categories of use (Moutinho et al., 2016). This allocation could also preserve a stock of ten billion tonnes of forest carbon and contribute significantly to the conservation of biological diversity of the region. Moreover, land designations would benefit from flexible agreements between the government and land users, given the recent evidence that flexibility of some use rights for smallholders can increase achievement of conservation goals.

Ultimately, clarifying tenure rights is pivotal to an equitable and effective REDD+ framework as it can help identify who the key REDD+ stakeholders are, who should obtain benefits, who should participate in decision-making processes, ensuring the permanence of standing forests. It is believed that strengthening local property rights and promoting land tenure reform can contribute to promoting social and economic development, encouraging local investment in land and resources, enabling access to credit through use of titles as collateral, improving land markets, establishing a legal basis for excluding competitors and as result reducing resource conflict and encouraging sustainable resource use (Sunderlin et al., 2008). Moreover, without clear tenure rights is difficult to identify the responsible ones for deforestation, making it also challenging for landholders to enter into long-term agreements to commit themselves to reduce deforestation and access potential REDD+ benefits. This means that land tenure and property rights are strongly tied to carbon ownership and consequently to distribution of benefits in the REDD+ scope. Thus, land tenure reform should be prioritised in REDD+ frameworks.

- Spatial and land use planning and zoning

Land-use planning is a broad strategy that promises to forge a consensus between conservation and development at landscape scale (affecting governance), where lands should be ranked on the basis of their best uses. In the context of REDD+, it is argued that present large scale use decisions are being densely influenced by global demand for resources and economic considerations, and consequently, the significance of transparent and coordinated land use planning and zoning combined with a participatory planning at local level is preeminent (Sidle et al., 2010). By participatory it should be understood as a collaborative process mutually respected by all actors, including a participatory consultation process involving all relevant stakeholders, which should be enforced in REDD+ actions.

In this respect, spatial planning can therefore become a tool that will channel participation in land use decisions, although such participation occurs mostly in the early stages of development (Fosci, 2014). Moreover, it would provide a permanent institutional structure that can be used by stakeholders on a regular basis to receive information, provide further inputs, or file complaints. It would also assist REDD+ actions to enable the coordination and integration of national policies across sectors and levels of government, generating investor confidence to adopt more sustainable

land uses, apart from the fact that it would provide more accurate information on drivers and reference levels. The REDD+ framework in Brazil should therefore contribute to consolidate such actions, combining the efforts on agro-ecological zoning with environmental conservation measures integrating actions and information under a consolidated national system.

- Finance

The relatively high opportunity costs of conservation compared to more profitable land-use options and the lack of viable alternatives to generate income in forested areas mostly result in high deforestation rates. A key question is to find avenues for extracting value from forests other than from timber. Moreover, even though extensive monitoring and strict legislation are the fundamental basis to any policy that seeks to extinguish deforestation, they have not been sufficient to reach this goal, as observed in the Amazon region. Thus, by attributing a financial value to the carbon stored in forests and offering tropical countries economic incentives to fight deforestation, REDD+ started gaining support as an adequate alternative tool to halt forest destruction while reducing GHG emissions. In this sense, although the value of forests can be hardly calculated, REDD+ payments may outline the economic balance away from loss of forests and in favour of sustainable forest management.

Finance has been a pivotal issue for the prosperity of REDD+ since its inception and is a continual topic in international negotiations. However, knowledge remains incomplete and still there are challenges and gaps that make it difficult to have comprehensive and conclusive remarks about the state of REDD+ finance. REDD+ has evolved from the idea that forest conservation could attract relevant financial resources by allowing the generation of carbon credits that could be used for compliance in cap-and-trade programmes in developed nations, towards a national framework in developing countries with funding provided by international donors. However, there is tremendous debate over whether REDD+ should be linked to carbon trading system. Many critics, particularly indigenous groups and traditional communities, fear that REDD+ will lead to investors and speculators buying up forestlands to earn carbon credits, threatening their homes and livelihoods. Therefore, with the delayed development of these compliance markets, the REDD+ framework relies primarily on public sources of funds. Nevertheless, the World Bank estimates that investments

needed for such actions far exceed all international development assistance, suggesting an opportunity for carbon market activities.

On the other hand, although there is an evident need to move away from a dependence on public funds alone, there is also a contradictorily consensus that, whatever the architecture decided for REDD+, there is a need of public funding for supporting policies and measures. However, there is also a growing awareness that contributions and investments from the private sector are necessary in this context. Political authorities could choose from an array of relevant instruments such as: from changes in fiscal policies, to advance market commitments de-risking private investments to the use of green bonds raising capital for delivering REDD+ results. However, in Brazil several of these instruments (such as the differentiation of taxes and financial subsidies for agriculture and livestock) are actually encouraging deforestation, especially in the Amazon region. Hence, the REDD+ framework should be aimed at changing this scenario at landscape level, considering the re-direction of these financial flows that currently support and enable such environmental damages, promoting this way a transition towards alternative forms of development.

REDD+ finances are used for implementation, monitoring and “readiness” plans. The Warsaw Framework adopted at COP 19 brought REDD+ closer to being operational as a global mechanism under the UNFCCC. Parties agreed that the Green Climate Fund would play an important role in channeling REDD+ payments to developing country governments, and that performance-based payments will depend on result-based actions. This means, payments will come after the recipients prove that deforestation rates have been reduced. Experiences on result-based finance schemes are still limited, but these experiences provide remarkable lessons learned in setting the specific arrangements for receiving such funding. Nevertheless, such experiences also show how difficult it is to actually establish performance criteria and benchmarks (including reference levels). Emerging outside of these formal multilateral institutions the most interesting are perchance the bilateral agreements. For example, in 2008, Norway pledged up to US$1 billion to Brazil for verifiable proof that deforestation had decreased. This was the starting point from the Amazon Fund. On the other hand, it is argued by some specialists that funding sources, access modalities and disbursement remain points of disagreements between beneficiaries and donor countries and, that bilateral financial arrangements are often perceived as inadequate. In the case of Brazil, since the Amazon Fund will remain the ruling instrument of REDD+ actions financial source,

there are several improvements that should be implemented, as explored in this dissertation.

REDD+ raises questions about how result-based approaches works in practice, its advantages, and its limitations. Performance-based finance may produce significant incentives tackling climate change or a broad range of other social and economic challenges with the vision of shifting the paradigm towards low-emission development. However, the scale and predictability of result-based finance has been too limited to trigger the necessary transformational changes in the forestry and land-use sector. Moreover, another concern with results-based payments is that such an approach may fail to address the root causes of ecosystem degradation and might be based on the notion that financial gains are the primary motivation for action. Thus, while performance-based finance is meant to align incentives to improve governance, this can not be promised or guaranteed.

Ultimately, finance for REDD+ can come from a variety of sources, but no single source may be sufficient for a triumphant outcome. Some critics state that much of the claimed financing mobilisation is relabeling or redirection of existing official development flows, which means that financing issues will remain the most important dilemma influencing how rapidly developing countries will move on implementing their NDCs. On the other hand, one of the key messages in this context is that although international finance is distinguished and necessary, identifying domestic investments and aligning them towards REDD+ frameworks may contribute to REDD+ countries sending a strong political signal and show their commitment to REDD+ goals.

In summary, sharing power and responsibility in REDD+ policy and governance development involves cross-sector and cross-scale stakeholders' links among government and non-governmental organisations, financial institutions and targeted groups (e.g. indigenous people) as well as the effective implementation of the rule of law. Ultimately, it is argued that the environmental and socio-economic aspects are not the only variables in the climate crisis equation. Combating deforestation and climate change should be transforming the existing relations of power, hierarchy and exploitation, revamping the manner in which the entire society consumes natural resources. For Gorz (1980), the global ecological crisis is largely addressed in terms of problem-solving and technical approaches. He states that policy makers and managers of capitalism usually attempt to assimilate ecological necessities as technical constraints

rather than a political or social problem, which enables their capacity to “adapt” the conditions of domination and exploitation of natural resources. Although techno-institutional and behavioural arrangements are significant in this equation, such occurrence on a global scale can not be limited to it. Therefore, the contemporaneous “social“ crisis related to the politics of climate change should not be preserved and sustained only by a set of bureaucratic and administrative manoeuvres but rather by a fundamental alteration in social equations of power (D’Souza, 2005). This implies for REDD+ that unequal power relations might be a relevant explanatory factor for inequitable access to natural resources and since debates on REDD+ are linked to climate justice and rural development, the success of REDD+ can not be based on a design promoting uneven development.

7.2 Final remarks

The present dissertation set out to investigate the overall framework of REDD+ development as a national strategy in Brazil, identifying the major challenges and policy constraints of this development design process. Moreover, the research discussed the pertinent domestic governance framework (identifying tools, mechanims and policy areas that should be prioritsed) necessary to achieve sustainable forest landscape under REDD+ scenario, in order for REDD+ to enhance governance practices. This dissertation has assisted this understanding and highlighted the importance of institutional strength and politics in shaping domestic REDD+ policies. Through the challenges and obstacles associated with the findings presented in this context, this dissertation may have shown several reasons that might lead to the REDD+ failure because so far REDD+ efforts have not been entirely able to change the basic deforestation logic. Instead, the main message is the opposite. The prospective discussion developed throughout the dissertation established the main features that should be pursued for enabling REDD+ to work in achieving its core goals, especially within the Brazilian context. As stated by DeShazo et al. (2016), it is important to understand the weaknesses of any policy before it would be possible to make the necessary adjustments to improve the chances of success of such policy.

Chapter one introduced the research background and provided the information needed to understand the research context. Also, the research problems, the research objectives, the methodological approach and the research limitations were introduced.

The next chapter, Chapter two, explored the sustainable forest landscape governance approach as the overarching concept for the effective implementation of REDD+ in Brazil. Chapter three focused on the role of forest issues in international politics. It examined the forest development context in international agreements centering the focal point on the relationship between forest and climate change. In Chapter four, the REDD+ mechanism was introduced. The chapter explored several aspects of the mechanism in order to provide a substantial understanding of its role in the climate agreement umbrella. It also examined the high complexity of technical requirements, as well as social, political, economic and institutional issues related to the REDD+ framework. Chapter five, focused on the Brazilian context in the climate debate. It started with an overview of Brazil. It described the context of forest conservation in the country and explored the evolution of the Brazilian position concerning climate change and forest-related issues as well as the development of domestic forest-climate-related measures. It ended discussing and introducing the context of REDD+ in Brazil. Chapter six presented the findings related to the research questions that guided the study, meaning that, in this chapter, the findings of the research were presented, discussed and interpreted.

As argued throughout this dissertation, Brazil faces several institutional challenges such as the lack of appropriate forest resource governance, weak property rights, land use conflicts and poor enforcement of the environmental legislation. Nevertheless, the National Strategy on REDD+ presents some key elements for building a solid REDD+ policy in Brazil. In particular, REDD+ has been framed as a public policy that, amongst several objectives, seeks to identify those which legitimately act towards forest conservation and deals with deforestation drivers under the logic of integrating existing policy initiatives. At the moment, the major challenge is to design an institutional framework that ensures the successful aggregation of all decisive features as well as the achievement of a permanent solution to remaining land use issues – including the promotion of sustainable development activities and land use regularisation, zoning and planning.

Clearly, the focal point should not only be sustaining low deforestation rates, but also tackling the institutional weaknesses driving deforestation. Understanding (not only identifying) the drivers behind forest disturbance and identifying the local demands is indispensable to the formulation of a sustainable solution to curb deforestation, disqualifying actions that destroy and degrade forests. Despite the achievements, more

than ever, this is the moment to act since the deforestation rates have been increasing since 2012 throughout the country, but mostly in the Amazon region. As argued, Brazil must develop an economic model without promoting deforestation; otherwise, deforestation rates will continue to increase as it is already happening. Should this be the new trend in Brazil, it will be extremely difficult for Brazil to achieve its GHG reduction targets until 2020 and forward.

The arguments of different specialists suggest that the design of a strategy is needed prior to the establishment of an operational system, meaning that setting regulations is essential for building a national strategy on REDD+. The establishment of an adequate institutional arrangement for REDD+ should be integrated into the national development interests and be in accordance with the national environmental policy. Otherwise, issues such as the growing demand for food and infrastructural development are likely to take precedence over the goals of environmental preservation. Thus, the successful formulation of the national REDD+ strategy must be concerned not only with the promotion of a more sustainable use of forest resources, but also take into account the forces behind deforestation, being integrated into a mix of existing conservation instruments. In this sense, adopting a consolidated and cooperative landscape approach would integrate multiple options and generate useful key-scenarios to formulating strategies for maintaining standing forests, dealing with the trade-offs between conflicting issues such as food security, energy needs, and the preservation of natural resources.

Since the Earth Summit, an increased emphasis is placed on environmental challenges whose solution requires addressing social aspects. Although Brazil is advancing on this aspect, the analysis reveals that the country must still shift its focus towards a broader and more holistic view on sustainable development. Many years have passed in the evolution of environmental policies in the country. However, as re-affirmed with the findings, the environmental conflicts that Brazil faces, it seems continuously to be the same ones, happening also in the context of REDD+. The evaluation indicates that an ineffective development of sustainable policies towards conservation still prevails in the country. In fact, these policies often result in misconceived land occupation, badly planned conservation areas, lack of financing and technical support, and absence of environmental monitoring and can even stimulate deforestation. Brazil should therefore emphasise the socio-economic and environmental aspects of this multi-dimensional context that also includes cultural ties as well as spiritual commitments. For example, by

turning forests into an economic asset and strengthening institutions and laws through sustainable participatory political processes (adopting for instance measures of conflict mediation), Brazil will be in a much better position to deal with the environmental challenges it has been facing. For instance, observing the economic history of the Amazon region is sufficient to notice that when a forest located in an accessible place is kept idle from an economic perspective and without the presence of traditional and indigenous communities, this asset becomes the target of clandestine exploitation. REDD+ should therefore be used to overcome the limits of command and control and create positive incentives to induce behavioural change.

This shift of paradigm still did not happen in Brazil, however. In certain aspects Brazil is even receding as by the fact that almost 70% of the planned investments on energy will go to fossil fuel in the next ten years. Although over the past two decades Brazil has "evolved" its stance and has gained political prestige in climate change and forest negotiations, it seems that the Brazilian Government only supports more sustainable activities according to the possibilities in achieving a higher political status in the international arena. But even this aspect is weakened within the governmental area at the moment. For instance, the federal government still has not signed the New York Declaration on Forests from 2014 (even though the state of Acre and several Brazilian NGOs supported the pledge), which endorse a global timeline to cut natural forest loss in half by 2020, and strive to end it by 2030. The economic and political crisis in which the country has plunged does not contribute to the defense of forests either. Nevertheless, sustainability in all its dimensions must be internalised and institutionalised into concrete actions of the government. This is required in cases where law enforcement is critical, as observed in Brazil.

Finally, REDD+ frameworks may be sufficiently broad to accommodate different interests. This means, REDD+ can make a significant contribution to climate change mitigation while also serving other goals (e.g. adaptation). Policies that support drivers of deforestation and related institutional arrangements hamper transformational change and create path-dependencies that are difficult to escape. Over time, these policies create institutional structures that drive up the profitability of competing land uses, effectively consolidating the power of key sectors driving deforestation and forest degradation. The question is therefore how to avoid such path dependencies. In this sense, REDD+ should be used – if financing appears and is well applied – to foster economic activities that will give economic sense to the maintenance of the standing

forest, enhancing pathways for consistent forest governance in Brazil. This way, Brazil would have the opportunity to lead the transition process from an unsustainable development model to a more sustainable one, based on the rational use of natural resources and using forest activities as a comparative regional advantage.

ANNEX I Face-to-face Interview Guidelines

1. What is the role that XXX plays in the formulation and implementation of the national strategy on REDD+? Should/could this participation somehow be more effective? Yes, no, how?

2. What is your understanding about the national REDD+ strategy?

3. What is the Brazilian strategy on REDD+? Which institutional model should be adopted for its implementation?

4. What should the main focus of the national strategy for REDD+ be?
i) Combating climate change,
ii) Combating deforestation/degradation or
iii) Supporting sustainable development
Would this definition be important for the formulation of the national strategy REDD+? (Yes, no, why)?

5. In your opinion, how the Federal Government stands concerning the national strategy on REDD+? Does the government really intend to adopt a national REDD+ policy? What would the principles of this policy be?

6. What is the current scenario of implementation of the national REDD+ strategy in Brazil? (*what has been done and what remains to do in order to achieve a effective implementation*)

7. What are the bureaucratic procedures to be followed regarding the implementation of REDD+ in the public sphere? How does this bureaucratic model adopted by Brazil influence the implementation process? In what aspects could this model be optimised? What are the major challenges to develop REDD+ in Brazil?

8. Some experts consider as “flawed” a REDD+ strategy that do not promote interaction among sectors. For example, they claim that a number of REDD+ initiatives do not focus on directly dealing with the main drivers of deforestation, such as agricultural expansion. How does Brazil aim to deal with it?

9. How strategies of coalition between the Federal Government and other stakeholders as state governments influence the decision-making process concerning REDD+? How to engage and use the experiences of federal states? Could decentralsation jeopardize the success of REDD+ implementation?

10. How to involve traditional communities, indigenous people and other actors such as NGOs, media and the society in the formulation of the national REDD+ strategy?

11. How adaptation measures to climate change would/should be involved in the formulation of the national strategy on REDD+?

12. How the concept of conservation would/should be incorporated into the formulation of the national strategy on REDD+?

13. What concepts could be incorporated into the strategy in order to promote a more holistic approach and take full advantage of the co-benefits that can be generated by REDD+?

14. The deforestation scenario shows that converting forests into other land uses can be a lower-cost option than conservation measures. What financial alternative could be offered to discourage the destruction of Brazilian forests? How to involve the REDD+ framework in this context?

15. Do you think the performance based REDD+ mechanism is feasible and why?

16. The Amazonian forestlands show its importance due to the fact that 55% of the overall CO_2 reduction emission target should be achieved through the decrease in 80% of deforestation rates in this region. While the land-use change sector decreased by 76% its emissions, the energy sector increased by 21% (2005 to 2011). Moreover, since the year 2012 deforestation rates rise again in this region. Should the strategy adopted be risky to reach the NPCC goals? How does this scenario influence the implementation of the REDD+ national strategy?

17. In the book of Jacques Marcovitch (*Management of the Amazon*) there is a sentence of Adalberto Verissimo (from Imazon) that says "Brasilia understands very little about the Amazon". The author adds and says that is not to deny that important national decisions should be taken in the relevant spheres of power. He claims, however, less political and more influence of local knowledge in this delicate management process. What is your opinion concerning this passage from the book?

18. Although there is no international regime on forests, the Ministry of Environment encompasses its activities in premises of international agreements. How about concerning REDD+?

ANNEX II Questionnaire

Brandenburgische
Technische Universität
Cottbus - Senftenberg

(Non-governmental Stakeholders)

The present questionnaire is part of the student's (Patricia Gallo Barbosa Lima – Brandenburgische Technische Universität Cottbus-Senftenberg) PhD dissertation. It consists of 12 questions. The answers provided by respondents will be kept under absolute confidentiality. Please do not hesitate to get in contact if any further information is needed: pgblima@gmail.com. A copy of the results can also be requested later per e-mail. The questions below were adapted from (Gebara, 2009) and (Gil, 2010).
I appreciate your cooperation!

Respondent:
Organisation:
Experience with forest and/or climate change issues (years):

Gebara, M. F. 2009. Distributing Benefits on REDD: exploring a Flexible Approach, a Case Study of the Juma Sustainable Development Reserve, State of Amazonas, Brazil. Master Thesis, London School of Economics and Political Science. London, UK.

Gil, J. 2010. Reduced Emissions from Deforestation and Forest Degradation (REDD) as a tool for climate change mitigation in Brazil. Master Thesis, Universität Hohenheim, Institute of Agricultural Economics and Social Sciences in the Tropics and Sub-tropics. Stuttgart, Germany.

1. What is your perception about the Brazilian (Federal Government) position concerning the REDD+ scope?

2. Enumerate what the most controversial points are for the REDD+ implementation as a national strategy in Brazil? (Please number the answers from most controversial to less controversial. Some of the options may have the same importance for you feel comfortable to rank them with the same weight).

( ) Addressing causes of deforestation
( ) Rights of indigenous communities, forest dwelling and forest dependent communities (livelihoods/participation on decision-making)
( ) Transparent Safeguards System
( ) Institutional weakness
( ) Tenure and property rights conflicts
( ) Level of Corruption and Bureaucracy
( ) Scale
( ) Baseline line/Reference line
( ) MRV (Definition of forest, deforestation, degradation; net deforestation vs. gross deforestation)
( ) Multiple benefits (fair distribution, equity, definition of benefits)
( ) Permanence (temporary nature of credits)
( ) Sustaining low deforestation rates

( ) Leakage
( ) Scope
( ) Opportunity Costs
( ) Financial Risks
( ) Other
Please give reasons to your answer:

3. The REDD+ mechanism (is) will be an effective tool mainly: (Please enumerate them to what should be the main priorities of action).
( ) as a mitigation action to combat climate change
( ) to curb deforestation in tropical areas
( ) as a tool to enhance sustainable development/forest governance
( ) other:
Do you believe this definition will be essential for the formulation of a national REDD+ strategy? Why?

4. Enumerate, in your opinion, what the underlying reasons are for the inefficient manner of addressing forest governance in Brazil? (Please number the answers from most relevant to less relevant. Some of the options may have the same importance for you feel comfortable to rank them with the same weight).

( ) Administrative insecurity
( ) Misguided government policies
( ) Low institutional capacity
( ) Negligence with the environmental legislation
( ) Weak property rights and unclear land tenure
( ) High level of corruption and bureaucracy
( ) Lack of political will
( ) Conflict of interests (national development goals X forest conservation)
( ) Economic/ Market interests
( ) Lack of dialogue with civil society, states and indigenous and traditional communities
( ) Lack of coordination between the national policies and state-led policies/programmes
( ) Low development of cross-sector interactions
( ) Low level of power and influence from actors such as the Ministry of Environment
( ) Lack of efforts in other biomes regarding forest protection as in Amazonian areas
( ) Other
Please give reasons to your answer. How these issues will affect the development of the REDD+ framework in Brazil?

5. How to use the REDD+ approach as tool of forest governance in the Brazilian context?

6. There is a recognised need for institutional initiatives on the development of REDD+ framework. In your opinion, what should the role of institutions in this scenario be? (Please, rank according to what should be their main priorities of action).
( ) Establishing property rights where they do not exist
( ) Facilitating bargains (between beneficiaries and resource right owners)
( ) Regulating, enabling, monitoring, enforcing trades so as to reduce costs and avoid administrative inefficiency
( ) Acting in behalf of disadvantage groups

( ) Coordinating active stakeholder engagement
( ) Addressing capacity gaps under the current forest management system
( ) Providing technical guidance
( ) Mobilising and disbursement of resources
( ) Enforcing governance
( ) Ensuring that projects/programmes/policies are designed in compliance with the national guidelines
( ) Monitoring social and environmental impacts
( ) Other:
Please give reasons for your answer. What should the institutional and regulatory model be to be adopted for the development of the national strategy on REDD+ in Brazil?

7. In your opinion, how should/could local participation be incorporated into institutional structures and decision-making processes for the development of a national strategy on REDD+?

8. Enumerate in order of importance what the conditions should be to avoid unfair REDD+ payments? (Please number the answers from most important to less important. Some of the options may have the same importance for you feel comfortable to rank them with the same weight):

( ) Clear definition and equitable allocation of carbon rights
( ) Provision of information on economic, cultural risks and potential costs and benefits
( ) Develop clear social strong mechanisms for community monitoring and verification of delivery of local benefits
( ) Use of participatory processes in the design and implementation of REDD+
( ) Access to and funding for legal and technical assistance to communities
( ) Transparent and accountable benefit distribution mechanism
( )Compliance with relevant international social, human rights and sustainable development standards
( ) Long term and focused investments for land tenure reforms
( ) Other:
How and according to which principles do you think benefits should be distributed in a REDD+ national strategy?

9. What is your opinion about a dual market proposal (also creating a new trading unit specific for REDD+ mechanism)? Which financing mechanisms would be more suitable for the establishment of a national REDD+ strategy?

10. In order of importance, what should the priorities of REDD+ investments be? (Please number the answers from most important to less important. Some of the options may have the same importance for you feel comfortable to rank them with the same weight).
( ) Financing capacity building and local adaptation
( ) Financing costs of implementing policies to reduce deforestation (law enforcement, taxation of forestland, restrictions on road building, agricultural zoning…)
( ) Financing costs of monitoring and verification of reduced deforestation
( ) Financing costs of monitoring social impacts
( ) Financing costs of implementing national baselines and improvements on nation carbon accounting
( ) Financing opportunities costs from adopting more sustainable forest use

( ) Financing costs of creating national REDD+ dialogue, REDD+ offices, and REDD+ consultation (including indigenous people and traditional communities)
( ) Financing costs of new governance mechanisms and institutional capacity
( ) Other:
Please give reasons for your answer:

11. In your opinion, is REDD+ able to delivery positive changes in Brazil? If so, what these changes may be?

12. Please, think about the existing REDD+ related policies and likely directions of policy design and implementation in Brazil. Do you believe these policies will effectively address the drivers of deforestation and degradation? Will these policies be effective in reducing national level carbon emission from REDD+ related sectors?

ANNEX III Brazil's land governance institutions and respective duties – Federal and State level (adapted from Costa, 2016)

Federal Government Executive institutions/bodies:

• Presidency of Brazil – responsible for titling of indigenous land and creating protected areas.

• National Institute of Colonization and Land Reform (INCRA) – responsible for land reform, establishing rural settlements, maintaining the National System of Rural Cadastre (SNCR), managing public/ federal lands, regularization and titling of quilombolas.

• Ministry of Agrarian Development (MDA) – responsible for land reform policies and land regularization in the Amazon biome.

• Department of the Environment (MMA) – responsible for forestry and environmental policies.

• Chico Mendes Institute for Biodiversity Conservation (ICMBio) – responsible for proposing, implementing, managing, protecting, inspecting, and monitoring federal protected areas, such as national parks and extractive reserves.

• Brazilian Forestry Service (SFB) – responsible for public forest concessions, managing the National Public Forest Registry (CNPF), and implementing and managing the Rural Environmental Registry (CAR).

• Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) – responsible for the environmental control, law enforcement, and licensing of the Brazilian forests.

• National Indian Foundation (FUNAI) – responsible for mapping out and protecting lands traditionally inhabited and used by indigenous peoples.

• Palmares Cultural Foundation (FCP) – responsible for recognising and certifying quilombolas communities.

• Federal Property Management Office (SPU) – responsible for managing the federal properties, which includes vacant lands, federal floodplain areas, others.

• Federal Revenue – responsible for collecting the rural land tax (ITR) and maintaining the Rural Land Cadastre (Cafir).

Legislative branch: Competent to enact laws on property rights, agriculture, environment, land expropriation, and land reform.

Judicial branch: Decisions on land tenure conflicts concerning federal lands.

State Government Executive institutions/bodies:

- Governor – responsible for creating state protected areas.
- State Land Institutes – responsible for establishing state rural settlements, managing public/state lands, regularization and titling of quilombolas.
- Environmental Agencies – responsible for proposing, implementing, managing, protecting, inspecting, and monitoring state protected areas. It is also responsible for the environmental control, law enforcement, and licensing of rural activities.

Legislative branch: Competent to enact laws on environment protection.

Judicial branch: Decisions on land tenure conflicts concerning private properties and state lands.

Note: In May 2016 President Michel Temer signed decrees extinguishing the Ministry of Agrarian Development and transferring the responsibilities of Incra and land reform policies to the Chief of Staff.

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