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The Terrestrial Carbon Group

A Compendium on Capacity for Implementing Land Based Mitigation

*An overview of policy, institutional, economic, and scientific
developments in twenty countries*

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Acronyms

AFOLU	Agriculture, Forestry and Other Land Uses
CBD	Convention on Biodiversity
CDKN	Climate Development Knowledge Network
CDM	Clean Development Mechanism
COMESA	Common Market for Eastern and Southern Africa
COP	Conference of the Parties
DNA	Designated National Authority
FAO	Food and Agriculture Organization of the United Nations
FCPF	World Bank Forest Carbon Partnership Facility
FIP	World Bank Forest Investment Programme
IPCC	Intergovernmental Panel on Climate Change
LCDS	Low Carbon Development Strategy
LULUCF	Land use, land-use change and forestry
MRV	Monitoring, Measurement, Reporting and Verification
PES	Payments for Ecosystem Services
REDD	Reducing emissions from deforestation and forest degradation in developing countries
REDD+	Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
R-PIN	Readiness Plan Idea Note
R-PP	Readiness Preparation Proposal
SFM	Sustainable Forest Management
tC	tonne carbon
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Collaborative Programme between FAO, UNDP and UNEP on REDD

Introduction

The *Compendium on Capacity for Implementing Land Based Mitigation* has been produced in response to an identified demand from Common Market for Eastern and Southern Africa (COMESA) and other country officials for greater information on national policy contexts regarding the inclusion of land in the climate change solution. It was made possible with funding from The Climate and Development Knowledge Network (CDKN).

By providing accessible information to fill this gap, this work is intended to enable readers to better understand cumulative capacity globally. It is also intended to facilitate sharing amongst countries of lessons, policies, measures and institutional frameworks. The information in this report has been obtained from publicly available sources, including UNFCCC texts and government announcements of policy actions. For each country we have attempted to provide a brief snapshot.

The findings are grouped around three categories: Policies and Institutions; Finance and Economics; and Science and Technical. Where possible we have used case studies to illustrate current progress. In some cases, information was not available on a particular topic. In other cases there was a wealth of information – more than we could capture in this synthesis – and we recommend the reader follow up the references we have provided for more details. Generally, the most abundant information related to forestry and REDD+, information on agriculture and other land use policies was less available. This is evidenced in the report.

The 20 countries were chosen to represent a range of circumstances, actions and approaches across Latin America, Asia and Africa. Some have more industrialised economies while others may have more stable governance and political structures. In particular, the countries chosen needed to have either domestic policy activities within the agricultural and/or forestry sectors with relevance to climate change; and/or participate within international forums and initiatives such as the UN-REDD Programme, the Forest Carbon Partnership Facility (FCPF) and the Forest Investment Program (FIP). Figure 1 provides more information on these activities by country. Statistics on the land use and terrestrial carbon for each country are available in Figure 2 and Figure 3. The countries chosen were:

Latin America	Asia	Africa
Brazil	Cambodia	Democratic Republic of Congo
Chile	Indonesia	Ethiopia
Costa Rica	Laos	Ghana
Colombia	Vietnam	Kenya
Guyana		Malawi
Mexico		South Africa
Peru		Tanzania
Uruguay		Zambia

In conducting research for this report, it quickly became apparent that:

- Implementation of REDD+ activities is beginning in some countries, while for the majority, the planning phase continues.
- There is widespread evidence of gaps between resource allocation and capacity required in implementing national climate change strategies.

- For some countries REDD was not as high a priority as expected, while for others agriculture and rural development planning had greater importance. In several countries the policy focus was clearly more on adaption than mitigation.
- There are unique challenges and opportunities faced by the forestry and agricultural sectors. At the same time, cross-sectoral coordination and cooperation between government departments needs to be strengthened in the majority of cases
- While some countries have strong policies and institutions, they may be weaker on finance and economics or science and technical capacity. The reverse may also be true, where a country may be strong on the science but have weaker institutions. Cumulatively, there is much capacity across the three themes (Policies and Institutions; Finance and Economics; and Science and Technical) that could be better shared between countries.

We recognise that what is written in on paper is not always the same as what is happening on the ground. It is clear that greater publicly available information is need that reports on and evaluates the actual outcomes of national policies and approaches. Greater transparency on the success or failure of implementation would be of benefit not just to policy makers in the future, but to other countries as well. In lieu of making judgements on effectiveness or relative capacity, we have compiled what stand out as ten key characteristics of a successful national approach to land based mitigation. These findings are based on the twenty case studies in this compendium. We also point to Creed and Havemann (2009), who detailed a set of important functions, institutions and transition pathways to deliver terrestrial carbon mitigation which readers may find useful.

Lastly, we do not claim to provide the 'definitive work' on this topic. While we have tried to be comprehensive, we recognise that only so much can be covered in such a synthesis. We hope that this overview provides a starting point for more comprehensive assessments of in-country capacity and implementation. We welcome additions or clarifications, particularly where more accurate or up-to-date information can be provided on any aspect of this report.

10 Characteristics of Success

Policies and Institutions

1. A national climate change plan or other overarching policy is used to signal the government's intent and ensure coordination between government policies, regulations and departments. Such coordination is made a priority and includes links between national and sub-national approaches.
2. A low emissions development strategy has been developed or is under development. Alternative livelihoods, particularly in rural areas, are included in this vision.
3. A multi-sectoral approach is taken to addressing the drivers of deforestation and forest degradation. For example, agroforestry is promoted to enhance farm forest cover and secure future timber supplies.
4. Land and carbon tenure arrangements are clarified and reformed in ways that are most appropriate given existing collective management arrangements and customary use.

Finance and Economics

5. Incentive systems are built on the recognition that both voluntary fund-based approaches and market-based system approaches have different merits and will be appropriate in different circumstances.
6. Where appropriate, national certification schemes and eco-labelling are being used to incentivise more sustainable management practices in forestry and agriculture, building on the lessons of previous payment for environmental services (PES) projects.
7. Multi-lateral and bilateral funding commitments are used to build national infrastructure and capacity, with a view to these activities becoming self sustaining over time.

Science and Technology

8. Investments are fit-for-purpose and build upon existing equipment available, technical capacity and expertise. Human capacity is harnessed in monitoring forest carbon stocks and communities are involved in field measurements where possible.
9. MRV capabilities are being boosted to create a national comprehensive carbon measurement system, which is complemented by an integrated and effective data management system that reconciles emissions and sequestration from all land use classes and avoids double counting.
10. Regional cooperation and coordination is undertaken to minimize MRV system costs, at the same time as maximizing system reliability. Such cooperation is in conjunction with capacity development at the national level.

Figure 1. Examples of forestry and agriculture related climate change activities

Forestry and Agriculture Climate Change Activities				
Country	FCPF	FIP	UN-REDD	Other
Brazil		✓		Amazon Basin Fund Norway - Brazil Bilateral
Cambodia	✓		✓ (Partner Country)	Denmark – Cambodia Bilateral
Chile	✓			Agricultural sector policies Incentive systems
Colombia	✓		✓ (Partner Country)	
Costa Rica	✓		✓ (Partner Country)	
Democratic Republic of Congo	✓	✓	✓ (Pilot Country)	Congo Basin Forest Fund
Ethiopia	✓			
Ghana	✓	✓		
Guyana	✓			Norway – Guyana Bilateral
Indonesia	✓	✓	✓ (Pilot Country)	Australia – Indonesia Bilateral Norway-Indonesia Bilateral
Kenya	✓		✓ (Partner Country)	
Lao PDR	✓	✓		
Malawi				Adaptation and food security in agriculture
Mexico	✓	✓	✓ (Partner Country)	Norway - Mexico Bilateral
Peru	✓	✓		
South Africa				Low emission development planning
Tanzania	✓		✓ (Pilot Country)	Norway- Tanzania Bilateral
Uruguay				Agricultural sector policies
Vietnam	✓		✓ (Pilot Country)	
Zambia			✓ (Pilot Country)	

Figure 2. Land use by country

Country	Area				
	Total	Forested	Other natural	Cultivated	Other
	ha / %	ha / %	ha / %	ha / %	ha / %
Brazil	858,746,915	407,430,711	249,892,785	200,825,225	598,194
	100%	47%	29%	23%	0%
Chile	75,939,338	19,121,577	53,148,593	3,570,428	98,740
	100%	25%	70%	5%	0%
Cambodia	20,722,606	7,716,001	7,252,156	5,753,583	866
	100%	37%	35%	28%	0%
Costa Rica	6,401,413	4,560,117	426,426	1,413,903	967
	100%	71%	7%	22%	0%
Colombia	117,624,329	52,892,874	43,835,774	20,851,543	44,137
	100%	45%	37%	18%	0%
DRC	226,320,538	188,110,478	31,991,502	6,185,119	33,440
	100%	83%	14%	3%	0%
Ethiopia	115,694,094	3,299,270	70,700,986	41,650,804	43,034
	100%	3%	61%	36%	0%
Ghana	24,654,196	9,183,631	11,103,497	4,288,029	79,039
	100%	37%	45%	17%	0%
Guyana	21,282,201	19,496,110	1,591,995	192,277	1,819
	100%	92%	7%	1%	0%
Indonesia	214,417,798	98,511,895	75,994,653	39,365,144	546,107
	100%	46%	35%	18%	0%
Kenya	59,551,960	4,764,206	47,961,628	6,779,047	47,079
	100%	8%	81%	11%	0%
Laos	25,986,804	3,776,835	18,102,050	4,106,140	1,780
	100%	15%	70%	16%	0%
Malawi	12,776,368	4,147,447	4,935,084	3,674,560	19,278
	100%	32%	39%	29%	0%
Mexico	202,486,085	74,427,908	99,389,612	28,375,781	292,783
	100%	37%	49%	14%	0%
Peru	124,141,725	69,658,307	50,295,762	4,070,060	117,596
	100%	56%	41%	3%	0%
South Africa	119,786,226	18,912,712	75,923,492	24,228,771	721,252
	100%	16%	63%	20%	1%
Tanzania	88,033,160	30,745,058	34,410,827	22,753,138	124,136
	100%	35%	39%	26%	0%
Uruguay	16,827,168	391,761	11,450,262	4,978,191	6,954
	100%	2%	68%	30%	0%
Vietnam	30,487,644	2,930,462	15,393,690	12,149,789	13,704
	100%	10%	50%	40%	0%
Zambia	70,428,789	43,237,962	21,817,245	5,320,553	53,029
	100%	61%	31%	8%	0%

Figure 3. Terrestrial carbon by country

Stored Carbon (above & below ground)				
Country	Total (tC)	Forested (tC)	Other natural (tC)	Cultivated (tC)
Brazil	131,121,568,244	87,320,336,558	34,889,449,149	8,914,564,901
Chile	7,576,908,295	3,596,762,478	3,517,545,595	478,664,998
Cambodia	2,078,573,461	970,496,105	820,841,094	287,236,262
Costa Rica	1,117,173,654	925,734,573	70,912,237	120,526,844
Colombia	22,489,946,100	13,007,022,786	7,630,084,541	1,854,317,377
DRC	45,590,616,498	39,172,131,601	6,019,631,520	398,853,377
Ethiopia	7,927,492,224	437,788,310	5,792,493,656	1,698,243,751
Ghana	2,709,058,876	858,452,274	1,692,979,033	157,627,570
Guyana	4,879,899,118	4,561,356,287	291,671,274	26,871,557
Indonesia	56,786,266,549	26,768,053,586	25,845,153,850	4,183,203,330
Kenya	4,289,295,178	514,005,630	3,385,207,356	390,082,193
Laos	3,589,100,738	667,459,299	2,760,594,796	161,046,644
Malawi	1,113,270,814	413,023,149	556,489,512	143,758,153
Mexico	20,743,627,524	8,976,035,822	10,145,360,219	1,630,292,590
Peru	20,545,550,149	16,637,667,664	3,709,844,701	198,037,783
South Africa	6,889,166,128	1,331,452,386	4,814,228,357	743,485,384
Tanzania	8,235,336,468	3,289,830,314	3,770,114,111	1,177,982,596
Uruguay	1,623,815,675	35,177,964	1,173,139,306	415,498,405
Vietnam	3,326,129,660	488,651,912	2,045,731,648	791,746,099
Zambia	7,716,343,984	5,192,228,766	2,269,320,431	254,794,787

Brazil

Policies and Institutions

Brazil is a federalist government where most regulation lies at the state level. This means navigating between national and sub-national policies and initiatives.

National Plans

The National Plan on Climate Change In Brazil, there is currently no national federal climate change law. Launched in 2008, the National Plan on Climate Change includes deforestation targets and cites REDD as a way to create an economic dynamic favourable to forests. It calls for a 70-percent reduction in deforestation by 2017 (World Bank, 2010a). The National Plan calls for the implementation of the National Public Forests Register, which identifies public forests to be protected, preserved, and managed, and implementation of a satellite deforestation monitoring programme (Champagne and Roberts, 2009). More recently, on December 29, 2009 the Brazilian Parliament adopted Law 12.187, which institutes the National Climate Change Policy of Brazil and set a voluntary national greenhouse gas reduction target of between 36.1% and 38.9% of projected emissions by 2020 (World Bank, 2010a).

The National Plan to Combat Deforestation and Plan to Combat Deforestation at State Level for the Period 2008–2011 (The Deforestation Plan) The Deforestation Plan provides for various measures for the valuation of forests to conserve biodiversity; improved forest management; the creation of 20 million hectares of conservation units; incentives for sustainable recovery of deforested areas; decentralized management and partnerships between federal, state and local governments; and the establishment of a legal framework for public forest management (Champagne and Roberts, 2009).

Forestry & REDD+

Forest protection is a charge of the Federal government (Champagne and Roberts, 2009). Under the Brazilian Forestry Code, all rural properties are required to have two types of protected or conserved areas. First, Permanent Preservation Areas are areas within public and private properties that have important environmental functions. Secondly, landowners must keep 80 percent of their forest land as a *Reserva Legal* (legal reserve). This land can only be exploited with an authorized sustainable management plan (Champagne and Roberts, 2009).

In Brazil, there is currently no national legal framework for REDD. The REDD process is instead governed by various federal and state policies, regulations, and laws (as well as a number of state carbon laws), which lay the legal foundation for initiating REDD projects in Brazil. The Governors' Climate and Forests Task Force also plays a role. The Task force is a subnational collaboration between 16 states and provinces from the United States, Brazil, Indonesia, Nigeria, and Mexico.

Agriculture

Over the past five years, the Brazilian government has developed programs to stimulate the adoption of more productive agricultural systems in order to reduce business risks, increase income in the field, and renovate degraded pasture areas (World Bank, 2010a). Yet, there remains a trade-off between (i) more efforts to increase livestock productivity to release more land and (ii) full enforcement of the recovery of legal reserves and crop expansion. Options to mitigate emissions or increase carbon uptake require the freeing-up of pasture lands. Full compliance with the Legal Reserve Law would result in the replanting of more than 44 million ha currently allocated to other activities (World Bank, 2010a). Researchers from Brazil's state-backed agricultural research corporation, EMBRAPA, have unveiled a plan for national low-carbon

agriculture with over 150,000 square kilometres of degraded pastures are earmarked to be rehabilitated in the next decade (Pearce, 2010).

Land and Carbon Tenure

There is extensive legislation regulating forests and land tenure in Brazil. Private land ownership is permitted by the Constitution guaranteeing the right to property. The existing legal framework in Brazil enables land users to obtain legal title (*usucapião*) over land that they have developed through their own work, and have made productive for five uninterrupted years (Champagne and Roberts, 2009). However, Brazil lacks a central land register and it is believed that only four percent of private land in Amazonia is covered by secure title deeds. Complicated systems of ownership have led to insecure tenure and disputes over land ownership. In an attempt to regularize title over public land in the Amazon, the *Terra Legal* Program (Legal Land Program, n. 11952/2009), was promulgated in June 2009. The new federal law is intended to set new norms to define property rights, and it aims to establish regulation of titles to 80 percent of the private landholdings in Amazonia over the next three years.

Protected areas are considered part of the public domain, and are therefore owned by the State. This means that forest peoples do not own the land. Indigenous land is the property of the federal government. It is unclear if indigenous peoples would be allowed to enter into REDD agreements or contracts with private entities. However, indigenous communities would be entitled to the income generated by payments for REDD activities, and can enter into REDD agreements/contracts with the State. Under Federal law, if the forest people are not included in the REDD scheme they do not lose their rights to access natural resources on the land (Champagne and Roberts, 2009)

Brazil does not have a national law that specifically addresses the legal ownership of carbon rights. The National Plan on Climate Change does not create any rights to carbon emissions, and does not allow for offsets or the possibility of trading the carbon stored in its forests (Champagne and Roberts, 2009). While the federal government maintains expropriation rights for all subsurface oil or minerals, it is presumed (but not legally explicit) that whoever owns the rights to use the land above ground – including private parties and indigenous groups – also has rights to the carbon (FAO, 2011). Brazil is also promoting the development of an organized carbon market to be overseen by the Brazilian Securities and Exchange Commission, which will encourage further clarifications of the nature of carbon rights (FAO, 2011)

Enforcement

While Brazil has laws to combat illegal logging, it has a fairly poor track record on enforcement. (Champagne and Roberts, 2009). In response to rising deforestation rates, Federal Decree 6321/07 was approved in 2007 (EDF, 2009). It allowed government to focus priority actions on deforestation hotspots – the 36 counties accounting for 50% of deforestation in 2007. Rural landholders in the 36 counties were required to present current descriptions of their holdings and land use, including GPS – mapped geographical coordinates, to the National Institute for Colonization and Agrarian Reform. Landholders who failed to comply within the specified time had their “rural landholding cadastre certificates” cancelled, effectively blocking access to government agricultural credit (essentially the only source of agriculture credit) and preventing legal sale or conveyance of properties. Following Decree 6321, the National Monetary Council of the Central Bank issued a Resolution requiring proof of compliance with environmental regulations for access to official credit.

Sub National Policies and Initiatives

State of Amazonas Under the legal framework for the State of Amazonas, the state is the natural resource owner. The *Amazonas State Climate Change, Conservation and Sustainable Development Policy (no. 3135 of 2007)* states that the property rights over forest carbon on state lands are held by the Fundação Amazonas Sustentável (FAS) – a new organization created by the state for this purpose (FAO, 2011). The Amazonas State can legally transfer the right to commercialize and manage the products and services, including the carbon credits generated by standing forests. The *Law for the State Policy for Climate Change* adopted by the Amazonas State promotes the creation of market instruments as well as the

regulation of REDD schemes. The law also puts forward a state climate change fund “to pay for environmental products and services, including those provided by forest peoples preserving their environment and reducing deforestation” (Champagne and Roberts, 2009).

Example REDD project in the State of Amazonas

The hotel chain Marriott International is financing a REDD project in the Amazonas State at the Juma Sustainable Development Reserve. It is designed to stop deforestation and related greenhouse emissions in a high land use pressure area in the implementation. The annual contribution is US\$ 500 thousand during the first 4 years, combined with revenues provided by hotels’ guests who chose to offset their associated carbon emissions. Marriott has also undertaken to purchase resulting REDD credits. By 2050, the project aims to have avoided deforestation of 329,483 hectares of tropical forests (FAS, 2009).

State of Mato Grosso The State of Mato Grosso has also recently enacted a law *Establishing the Executive Directors for the Fund for Forestry Development of the State of Mato Grosso*. Dealing with forestry management, this law regulates both title registration through a property registration system, and a land registry that records the physical characteristics of the land. However, the law does not determine whether a landowner is entitled to the carbon sequestration rights by engaging in forest conservation activities on his land (Champagne and Roberts, 2009).

State of Acre The State of Acre has legislation to reduce deforestation 83% from 2005 levels. To meet this target, the state has established stringent land use zoning, guidelines for investment, and increased enforcement (Champagne and Roberts, 2009). The State of Acre is also developing a regional REDD model articulated in the state’s “Program of Incentives to Environmental Services: A REDD+ proposal to Acre State” (Herbert, 2010). Acre identified six areas (totaling 5.8 million hectares) under the greatest risk of deforestation and degradation to provide a geographic focus for initial investment. The Incentives for Environmental Services (IES) will connect the financial flows to the providers of environmental services in these priority areas (Herbert, 2010). The government will initially provide incentives for reducing deforestation based on costs to keep forest standing. Public funding will provide the majority of the initial cash flow to the program’s implementation. The total amount of incentives being offered by the government is initially set for \$260 million. To produce the up-front money needed for projects, The Environmental Services Development Agency strategy is to solicit private sector buyers in need of emissions reductions to buy carbon credits at approximately \$3 per ton. The Agency then collects the investments from interested private sector participants, and distributes them as incentives to local level participants. (Herbert, 2010). It is anticipated that these initial incentives schemes will ultimately be replaced with payments through international REDD or PES markets, as those systems and markets develop.

In regards to MRV, Acre is working to establish a central geo-processing unit, UCEGEO, responsible for monitoring deforestation and forest degradation, maintaining the database of carbon stock, and monitoring production units at the state level and in priority areas (Herbert, 2010).

Finance and Economics

Brazil prefers a voluntary fund-based approach rather than market-based system to prevent deforestation. On payments for environmental services (PES) more broadly, various programs exist at the state and project scale. Note that information below are examples of some of larger financing sources and mechanisms.

Amazon Fund

Brazil is involved in the Forest Investment Program and a significant Brazil – Norway Bilateral Agreement. The Amazon Fund (Fundo Amazônia) has been established to raise donations for 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. Norway donated USD 1 billion for 2009-2015 and Germany has donated USD

27.93 million from Germany. The fund is managed by the BNDES, the Brazilian Development Bank, which will also undertake to raise funds, facilitate contracts and monitor support projects and efforts. The Amazon Fund has an Guidance Committee, assigned with the responsibility of posting guidelines and monitoring the results obtained; and a Technical Committee, appointed by the Ministry of Environment, whose is charged with certifying the emissions count from deforestation of the Amazon Forest. Nine projects had been approved as of November 2010 (Climate Funds Update, 2011).

Payment for Ecosystem Services (PES)

Projeto Viva Rios The *Projeto Viva Rios* aims to generate income from PES and carbon credits for farmers and foresters. The project is still in a planning phase. It is due to run from 2007-2017 and involves various Brazilian ministries, universities and federations. 3000 households will be involved in implementing new agricultural management practices, covering approximately 5,000,000 ha (Seeberg-Elverfeldt, 2010).

Bolsa Floresta The Bolsa Floresta rewards traditional communities for their commitment to stop deforestation by distributing payments for ecosystem services to families, communities, and family associations. In order to be eligible to receive the grants, families must attend a two-day training programme on environmental awareness and make a zero deforestation commitment. In addition, they must enroll their children in school. They then receive a monthly payment of 50 reais (US\$30). Community associations can also receive payments of up to 4000 reais (US\$2500) to support legal income generation activities that do not produce smoke, such as bee keeping for honey production, fish-farming or forest management. Cooperative investment for administrative support to family associations makes up 10% of the total paid for the families during the year. Bolsa Floresta funds are generated by the interest on a core fund, first established with contributions from the Amazonas government and Bradesco. Deforestation will be monitored on a yearly basis by Amazonas Sustainability Foundation and the Amazonas State Secretariat for the Environment and Sustainable Development (SDS) team and through satellite images analysed by partner institutions (Forest Carbon Portal, 2011)

Financing Agricultural Mitigation

Brazil's national development bank has launched a 1 billion reais (\$588 million) fund that will finance projects to reduce greenhouse gas emissions associated with agriculture. The program will provide low interest loans to farmers and cooperatives to recover degraded agricultural land, implement projects that integrate forests into cattle and crop production, establish and maintain forest plantations on abandoned agricultural lands, and restore legal forest reserves for permanent protection. BNDES will loan up to 1 million reais (\$588,000) at 5.5 percent, the lowest rate charged by the bank, per year to individual farmers and cooperatives (Ecoagriculture Partners, 2010).

In addition, the country's biggest bank, Banco de Brasil, has also declared that soya farmers wanting loans must prove their beans are not grown on newly deforested land (Pearce, 2010).

Science and Technology

MRV

Brazil's National Space Research Institute has four programs using different sensors to monitor deforestation, all of which make data publically available -- annual high-resolution analysis to measure annual deforestation (PRODES); monthly mid-resolution monitoring of clearings over 25 ha (63 acres) to detect new deforestation for enforcement purposes (DETER); yearly analysis of forest degradation (DEGRAD); and daily monitoring of fires using NOAA and other low-resolution satellites (EDF, 2009).

According to an assessment by Herold (2009), Brazil has excellent remote sensing capacity, both in terms of technical and human capacity. Monitoring of forest area change is well established. Brazil is regularly covered by Landsat TM & CBERS and both data is used within the diverse Brazilian monitoring programmes. However, Brazil still requires the development and implementation of a national forest

carbon measurement system and while a full national forest inventory is available, it has not been updated nationally since the 1970s.

The PRODES program (Project for Gross Deforestation Assessment in the Brazilian Legal Amazonia) monitors land cover using satellite and other remote sensing data, allowing the annual estimation of gross rates of deforestation. PRODES has developed sophisticated land use change predictive models, and near-realtime deforestation monitoring using coarse resolution (MODIS) imagery is in place. TerraAmazon, a product developed by Brazil's National Institute for Space Research (INPE), is available and is used to provide automated, weekly clear-cutting alerts to forest managers under PRODES (Herold, 2009).

A recently signed a MOU between INPE and UN-REDD will make Brazilian satellite monitoring systems available to other UN-REDD Programme countries. INPE has committed to sharing its experience in large scale monitoring of deforestation that can help provide accurate and transparent data to the public. These data and monitoring systems (TERRA-AMAZON, PRODES, DETER, DEGRAD) will be made available to other countries to help them advance their own forest monitoring where current system are not sufficiently accurate or do not exist. To develop technical and institutional capacity, INPE will be responsible for training in a new center in Belem, Brazil, while FAO will be responsible for the in-country training and implementation. In two years time, the goals are to train technical people from 30-40 countries (FAO, 2010).

Cambodia

Policies and Institutions

Forestry and Agricultural Management and Reforms

All forest resources in Cambodia fall under the general jurisdiction of the Ministry of Agriculture, Forestry and Fisheries. However, direct regulatory and management authority over forest resources within properly designated Protected Areas comes under the jurisdiction of the Ministry of Environment (Cambodia, 2010).

Under law, regional and local administrative authorities currently have no direct decision making authority over the use and management of most forestland resources in the country, but they do have supporting functions. Communes are mandated to protect and preserve environmental and natural resources under existing legislation, and are responsible for developing 5-year Commune Development Plans, rolling 3-year Commune Investment Programs (CIP) and Commune Land-use Plans (Cambodia, 2010).

The Department of Forest and Wildlife was reorganized into the Forestry Administration in 2003 to create a single line of authority for forestry at the national level (Yasmi et al., 2010). The government endorsement of the Sub-Decree on Community Forestry Management in 2003 was a milestone in forestry in Cambodia. The 2006 Guideline on Community Forestry and its relevant policies (*Prakas*) defines operational steps to secure a forest management agreement. Presently, there are more than 420 community forestry sites covering around 400 000 hectares, although only 94 sites covering 113 544 hectares are legal recognized (Yasmi et al., 2010).

Rectangular Strategy The Rectangular Strategy for Growth, Employment, Equity and Efficiency (Phase II) aims to ensure environmental sustainability, especially through sustainable management and use of natural resources. A priority area is enhancement of the agricultural sector, which includes:

- Improving agricultural diversification;
- Land reform and clearing of mines;
- Fisheries reform;
- Forestry reform.

Priority activities for forestry reform include:

- Law enforcement;
- Effective management of Protected Areas;
- Climate change actions;
- Community forestry.

All development partners, including bilateral and multilateral development partners, private sector, non-governmental organizations, as well as management and officials of ministries and institutions are requested to assist in implementing the policies and programs outlined in the Rectangular Strategy (Cambodia, 2010).

National Strategic Development Plan (NSDP) The NSDP is intended to serve as the implementation tool or roadmap for implementation of the Rectangular Strategy – Phase II. The updated NSDP 2009-2013 sets a national target of 60% forest cover (per the Cambodian Millennium Goals (Cambodia 2008), 450 approved community forests (noting that there are currently 420 community forests at various stages of development), and reducing fuelwood dependence by 2013. It also mentions the importance of the new National Forest Programme as the strategic framework for the forestry sector, and the role of protection forests, protected areas (PAs), community forests and improved management of forestry concessions

towards achieving the national target of 60% forest cover. Finally, the NSDP recognizes the importance of mobilizing resources, support, and financing to participate in global efforts to address the challenge of climate change, including REDD and greenhouse gas mitigation projects (Cambodia, 2010).

Improving livelihoods of smallholder farmers

Nordeco and CEDAC (Cambodian NGO), Oellingegaard (organic dairy in Denmark) are working to mitigate climate change by: (i) replacing chemical fertilizers with organic matter; (ii) planting trees; and (iii) introducing systems of rice intensification. Running from 2008–2012, a system of rice intensification has been implemented along with cut-and-carry cattle feeding and improved chicken and vegetable farming. There are now some multi-purpose (integrated) farms. 2500 households are involved so far, covering 2500 ha (Seeberg-Elverfeldt and Tapio-Bistrom, 2010)

Forestry Law

The Cambodia Forestry Law 2002 provides a legal foundation for government agencies in forest administration and enforcement, classifying forest land, establishing a permanent forest estate, defining forest harvesting rights and obligations of stakeholders and on collection of forest revenues. The law also makes provision for private and community forestry, conservation and protection of forests and wildlife, and assigning penalties for forestry crimes. This replaced the first forestry law of 1961 which focussed primarily on timber exploitation.

Key factors determining the future success of efforts to strengthen forest law enforcement, governance and trade include the degree of responsibility allocated to the Forest Crime Monitoring Unit and the capacity provided to implement direct action. Alternative livelihoods for military groups and greater regulation of harvesting and environmental management are likely to reduce illegal logging, although current road network expansion is at the same time liable to expand opportunities for illegal activities. The recent removal of the director of the Forestry Administration for failing to successfully crack down on illegal logging indicates another step in Cambodian forestry, although the likely impacts are far from clear (Yasmi et al., 2010). With respect to quality of logging, the implementation of codes of harvesting practice, which include reduced impact logging related measures, is weak in Cambodia. This is generally due to low capacity within forest authorities to supervise harvests (Yasmi et al., 2010).

Carbon and Land Tenure

Forest clearance is primarily driven by speculative land grabbing that is fueled by the lack of legal title to land and property, and the uncontrolled migration of people into rural areas. Most land in the country has not yet been registered and titled at the parcel level. Farm/residential land can be privately titled (few cases of this near forests as yet), communally titled (none as yet, but potentially large areas), or simply possessed, with recognition under traditional, local systems (the main type at present). There are around 600,000 million certificates of land possession issued through sporadic land registration (out of an estimated 4.5 million applications) and around 1.2 million titles of ownership through systematic land registration for both private and state land in both rural and urban areas. The demarcations between land for different uses for forests, agriculture, urban areas etc. are still vague. As such, administrative boundaries of various districts, communes, and other administrative bodies still need to be demarcated (Cambodia, 2011).

Forested land is almost all presumed to be state property, sometimes in defined management units (e.g. logging concessions), otherwise unclassified. Existing forest users have general rights recognised under law, and there are mechanisms to specify and map these rights in some classes of forest, but this has only been implemented on a limited scale to date. Community Forests are increasingly being declared, with increased harvesting rights and responsibilities for resource protection, based on management plans (Cambodia, 2011). Naturally occurring forest resources (and the carbon stored in them) growing on State Public Land is by definition property of the State. Since almost all forests in Cambodia are naturally grown, the majority of forest carbon in Cambodia is state property. (Cambodia, 2010)

REDD+

Cambodia joined the UN-REDD program in November 2010 as a Partner Country. The Cambodia REDD+ Roadmap was completed in September 2010 and is being used as the foundation of the UN-REDD National Programme Document. Cambodia is involved in the Forest Carbon Partnership Facility. The Roadmap will also be used as the basis for any future Readiness Preparation Proposal (R-PP) submitted to the FCPF. Funding for the Roadmap has been provided by UNDP and FAO, with the technical support of the UN-REDD Programme and the UNEP-World Conservation Monitoring Centre (Cambodia, 2010).

Cambodia's REDD strategy is based around the scaling-up of sub-national efforts into a national REDD system. This process is being undertaken by a REDD Technical Taskforce led by the Forestry Administration. The Taskforce reports to the Technical Working Group on Forestry and the Environment, which will be the main forum for review by Government agencies and Development Partners, and the National Climate Change Committee. The Taskforce will produce a REDD Readiness Roadmap, which will set out the activities to be implemented over the next few years to establish a national REDD programme. The Taskforce will also produce an institutional map of the current or planned activities of development partners where they relate to the Roadmap activities, in order to identify key priority areas for investment during implementation of the Roadmap (WCS, 2010a).

Finance and Economics

REDD+ Funding

Funding for the National REDD+ Programme has been made available from UNDP- Cambodia (\$550,000, TRAC resources), the UNDP-GEF Sustainable Forest Management (SFM) project (\$400,000, TRAC resources), FAO-TCP (\$450,000), providing parallel co-financing to the request from UN-REDD (\$3,001,350, including indirect UN agency costs) (Cambodia, 2010). The National Programme has been designed to complement and coordinate with the funding pledge of ¥900,000,000 from the Government of Japan, which will support both the REDD+ Monitoring System and implementation of the National Forestry Programme and is expected to be disbursed from 2012. The Japanese support will primarily be focused on infrastructure, equipment, capacity- building and technology, with a particular focus on the MRV system. The National Programme will complement the Japanese support by providing the initial technical assistance to design the REDD+ Monitoring System during 2011 and 2012. The Japanese funding should cover the main infrastructure, equipment and technology costs of the Monitoring system designed (Cambodia, 2010).

The Forestry Administration has roles and responsibilities relating to forest carbon trades and the sale of forest carbon credits from REDD+ pilot projects. For the Oddar Meanchey project, REDD+ carbon credit revenues are to be channeled through the Technical Working Group on Forestry and Environment (TWGF&E) during the first five years of the project (Cambodia, 2010).

Science and Technology

MRV

Cambodia has a large amount of existing forest carbon data from various historical forest inventories and more recently collected by REDD+ pilot projects. The datasets should provide fairly comprehensive information for most of the major dryland forest types, perhaps sufficient for Tier-2 levels under the IPCC guidance. However, very little forest carbon stock data exists for flooded forest types and mangroves (Cambodia, 2010).

Chile

Policies and Institutions

National Climate Change Action Plan

In 2008, Chile adopted a National Climate Change Action Plan for 2008-2012 which includes activities for studying impacts and vulnerabilities; funding adaptation measures; and supporting mitigation endeavours (European Commission, 2010). In particular, work has been underway to update the amount of information available regarding the vulnerability of the agricultural, livestock and forestry sectors based on improved projected climate scenarios (National Environmental Commission, 2010). In addition, actions related to mitigation the agriculture and forestry sectors are being carried out, including: by the implementing institutions:

- A technical and economic assessment of the production and use of biofuels
- Promotion of native forest management and recovery
- Promotion of afforestation

In terms of capacity building, the key objective is to design and evaluate instruments to promote economic development and technology transfer related to adaptation and mitigation. This includes implementation of:

- The Integrated Climate Change Project, which seeks to create technologies for climate change mitigation and/or adaptation in the agriculture and forestry sectors
- An environmental labelling system to inform consumers about the performance and emission levels of new vehicles, including CO₂ emissions.

For these actions, implementing Institutions include: the Office of Agrarian Research and Policies; Foundation for Agricultural Innovation; Agricultural Emergency Unit; National Environmental Commission; Institute of Agricultural Research; and, Forestry Institute (National Environmental Commission, 2010).

National Environmental Commission (CONAMA)

During the period 1990-2004, Chile strengthened its environmental institutions, most notably through the 1994 General Environmental Framework Law. This established the National Environmental Commission (CONAMA), which reports directly to the President's office through the General Secretariat of the Presidency. CONAMA is a public body that operates as a decentralised service under a special regime, coordinating government environmental policies, preparing environmental regulations and promoting the integration of environmental concerns in other policies (European Commission, 2010).

In 2003, Chile formed the Designated National Authority (DNA) for the Clean Development Mechanism (CDM). The Executive Board of CONAMA has the greatest representation in this new authority. To fulfill the functions of the DNA, a committee was set up whose role is to analyze the relevance and integrity of the information requested for CDM applications. This committee is chaired by the Executive Director of CONAMA and comprises a representative from CONAMA, the Ministry of Foreign Affairs, the Ministry of Agriculture, the National Energy Commission and the Clean Production Council. In order to analyze the relevance and integrity of the information presented by a CDM project proponent, the Committee uses the criteria behind the Environmental Impact Assessment System, or EIAS, which was enacted through Law No. 19,300 (World Bank, 2008).

Conservation

Chile has designated for legal protection almost one fifth of its territory, including nine Ramsar sites and seven UNESCO biosphere reserves. Chile has drawn up an Integrated Biodiversity Plan together with a series of components such as a National Biodiversity Strategy; and National Policies for Protected Areas, Threatened Species, Wetlands and Glaciers. Work has been done to establish a public-private partnership with the mining sector to enhance the latter's efforts to conserve biodiversity and to design a fund to finance research into biodiversity and climate change. It is, however, not clear whether Chile will meet its target of protecting 10 % of all significant ecosystems by 2010 (European Commission, 2010). This is partly because, despite improvements in recent years, nature and biodiversity protection and its enforcement are still under-funded (European Commission, 2010).

Agriculture

The Ministry of Agriculture is responsible for coordination across forestry, agriculture and rural development sectors. Agriculture, livestock and forestry are important economic sectors in Chile (National Environmental Commission, 2010).

The land used for agriculture and forest plantations represents around 8% of the total surface area of Chile (75,609,600 ha). Agriculture accounted for 15% of total GHG emissions in the country in 2000. In the 1980s the use of fertilizers in Chile increased by more than 223%. The use of nitrogen based fertilizers is now a large source of NO₂ emissions in the agricultural sector (World Bank, 2008).

The Climate Change and Agriculture Council was created in May 2008 under the wing of the Ministry of Agriculture and is comprised 22 professionals from the academic, private and public sector. Its main objective is to design Chile's response to the effects of global climate change by identifying actions to be considered in an adaptation program, as well as the main mitigation measures to be considered in the agricultural sector (World Bank, 2008)

Chile has a range of other agricultural sector institutions (World Bank, 2008). For example, the Institute for Farm Development (INDAP, Spanish acronym) along with the Agriculture and Livestock Service (SAG, Spanish acronym) administer a program titled Soil Recovery Program aimed at reverting the soil erosion process and the rapid salinity of these by offering cash incentives to producers that execute proper soil management and recovery practices. As a result of this program, around 1.7 million ha were improved for the period 2000-2005, corresponding to 40% of the land with erosion and/or salinity problems and around 30% of the land devoted to agriculture (World Bank, 2008).

Forestry

In Chile, forest policy is executed by the Ministry of Agriculture and is the agency under which the National Forest Service (CONAF) works. CONAF is responsible for forestry, forest conservation and forest law enforcement (Chile, 2008a). CONAF also coordinates the implementation of the UNCCD through the National Action Plan against Desertification and Drought (PANCCD, Spanish acronym) which contains a climate change component (World Bank, 2008).

Forests cover around 20.7% of Chile. Forests and land-use change accounted for 17% of total GHG emissions in the country in 2000 (World Bank, 2008). The major problem for Chilean forests is not deforestation but degradation. Deforestation in Chile is today considered as a consequence of a continuum process of forest degradation (from forest to degraded bushes populated lands) related to both the existence of an informal market for firewood and economies of subsistence that several small landowners are experiencing. In the case of Mediterranean forests, its deterioration is associated to its replacement by fruit-bearing cultivations and the urban expansion (Chile, 2008a). Law 20,283 is related to Recovery of the Native Forest and Forest Promotion whose main objective is the protection, recovery and the improvement of native forests, devoted to ensure the forest sustainability and environmental policy (Chile, 2008a). It builds on Decree of Law 701 (since 1974) which promotes the afforestation of highly eroded lands generated by several decades of excessive agricultural cultivation (Chile, 2008a).

Finance and Economics

Economic instruments

Chile has been a pioneer in the use of trading mechanisms such as tradable particulate emission permits in Santiago, nationwide trading of water rights and individual transferable quotas for some fish species (European Commission, 2010). Chile continues to use a wide range of instruments in connection with environmental policy: environmental impact assessment (EIA), other regulatory instruments, economic instruments including trading mechanisms, voluntary approaches and planning and information instruments. Chile has put limited emphasis on regulation and information and, more recently, has increased its focus on land use planning and voluntary approaches (European Commission, 2010).

For example, the government of Chile has introduced new measures aimed at improving forest management through a new law which allows for a one time tax credit for the following activities (World Bank, 2008):

- Reforestation of fragile soils, marshes or areas threatened by desertification;
- Recovery and forestation activities for eroded non-arable dry soils; and
- Sand dune stabilization and forestation.

CONAMA has also sponsored several projects in the forest sector aimed at a better understanding of the role of forests in the carbon market (World Bank, 2008):

- "Rio Condor Carbon Sequestration" in collaboration with Fundacion Chile;
- "Measuring Carbon Capture in Chilean Forests and its Promotion in the World Carbon Market" in collaboration with the Southern University of Chile; and,
- "Demonstrating the increase in carbon capture in Chilean forests by inoculating seedlings" in collaboration with the Forestry Institute.

Funding

Desertification currently affects two thirds of the national territory in Chile (World Bank, 2008). For the period 2000-2005, the National Action Plan against Desertification and Drought (PANCCD), attracted public investments of US\$ 480 million. The plan is reported to have covered 2.4 million ha and benefited more than 400,000 affected people.

An example of a bilateral funding agreement is the cooperation agreement between Germany and Chile to generate capacity building in forest management. This program went for 15 years, ending in 2007. The target of this program was small landowners and focused on the most productive forest types, known as Roble-Rauli-Coihue forest, specifically second growth forests. The main objective of the program was to create capacity for practicing sustainable forest management in order to avoid forest degradation. Institutions involved in this program were CONAF and GTZ Germany and several universities (Chile, 2008a).

Chile is also involved in the Forest Carbon Partnership Facility, however, it has not submitted any proposals or plans at this stage.

Science and Technology

MRV / Science

Forest Monitoring and inventories are the responsibility of the National Forest Service (CONAF) and the Forest Research Institute (INFOR) (Chile, 2008a).

Forest cover and land use change is mainly performed by CONAF. This institution is responsible for the National Land Survey and their updates, which is a tool to evaluate land use changes every ten years.

Aerial photographs were used in the last edition of the survey; it produced a minimum resolution of 1 hectare. The monitoring of surfaces is done by means of digital photography, the detection of changes with respect to baseline and the description of changes occurred in land, as well as the new variables of state of forests such as height, cover, and dominant species. The results are expressed in thematic maps scale 1:50.000 (cartography) and databases (Chile, 2008b).

The Forest Research Institute (INFOR) is the responsible agency for developing the Continuous National Forest Inventory, Based on the data of this forest inventory rules for degraded forest classification has been provided, and monitoring methods based in combination of field plots and medium resolution satellite imagery are currently being studied to approach REDD monitoring (Chile, 2008b). There is suitable digital cartography on land use at the national level from the National Land Survey (Catastro CONAF – CONAMA 1997) and the regional updates carried out since 1998. INFOR has thematic maps at 1:50.000 of growing stock of natural and exotic forests besides environmental information on forests.

The current system of monitoring has a good evaluation of land uses change but it can not detect forest degradation at high resolution. This is an important point given the role of forest degradation in forest loss in Chile (Chile, 2008a).

Colombia

Policies and Institutions

National Plans and Policies

Coordination across forest, agricultural and rural development is through the National Department of Planning and inter-ministerial agendas. The national government is responsible for planning the management and exploitation of natural resources to guarantee their sustainable development, conservation, restoration or substitution, though a decentralized structure and system has been developed to deliver this.

The Ministry of Environment, Housing, and Territorial Development (MEHTD) is the central leading entity that defines natural resource policy, including forests protection and use (Herold, 2009). The government has established a system of national parks and forestry reserves that cover more than a quarter of the national territory (IDB, 2008). It is worth noting that the Ministry's National Development Plan includes a framework on climate change and various conservation programs, but it does not focus much on the agricultural sector (Lau et al, 2010).

National Environmental System (SINA) The Constitution of 1991 and Law 99 of 1993 created the National Environmental System (SINA) that is responsible for overall policy formulation and coordination. Due to regional diversity, SINA provides a decentralized structure for environmental management and devolves enforcement and research to Autonomous Regional Corporations (CARs).

Decree 1791 of 1996 grants the Regional Autonomous Corporations (CARs), within their respective jurisdictions, the authority to plan forest management activities. Forest management planning includes preserving, marking forests' boundaries, and creating protective, productive, and productive-protective forest areas subject to specific exploitation rules. Each designated forest area should have a forest management plan prepared by the CAR authorities. The forest management plan helps the CARs make decisions about granting permits, authorizations, or concessions for forest exploitation as well as setting reserved areas for protection (Freja, 2009). CARs are required to draft 10-year regional development plans, 3-year action plans and annual investment operating plans, which must comply with the National Development Plans drafted by every newly elected president of the republic.

Integrated National Adaptation Plan In Colombia, the Integrated National Adaptation Plan (INAP) aims at addressing the impacts of climate change across the country with public policy interventions and the implementation of EbA measures. Pilot projects are being implemented in the most vulnerable ecosystems of the country. For mountain forests, the flagship project is located in the Chinganza Mountains, which provide water to Bogota, the capital city. The project includes ecological adaptation measures (such as ecological restoration and fire management), as well as activities related to mitigation (such as carbon monitoring), even though this project does not benefit from mitigation funding. Another significant project is the Joint Program for Integration of Ecosystems and Adaptation to Climate Change in the Colombian Mountains combines mitigation and adaptation activities in the landscape by protecting ecosystem services in the upper watershed of the Cauca River in order to address climate change and achieve the Millennium Development Goals (Colls et al, 2009; Locatelli et al, 2010).

REDD+

Colombia has advocated the right of country's to participate in the REDD mechanism through activities implemented at sub-national level. This option is proposed as a structural option and not as an initial step prior to expanding to national coverage (Freja, 2009). National approaches and baselines for REDD are opposed, as Colombia does not have the capacity to support national accounting.

As a FCPF participant country, the government of Colombia is actively engaged in building a framework for REDD+ and fitting it into the environmental management system that is in place to build capacity to receive payments for ecosystem services (Colombia, 2008).

A range of project-scale REDD activities are underway in Colombia. More information can be found at Gutman et al. (2010).

Carbon and Land Tenure

Of the total farmland in Colombia, 68 percent is owned by 4.3 percent of landowners, and half of Colombia's farms account for less than 2.3 percent of the farmland. The number of landless workers is estimated at 1 million, representing close to a third of the population engaged in agriculture (Encyclopedia of Nations, 2011). Most recently, President Juan Manuel Santos has declared land reform a government priority. Over the past three decades, paramilitary and guerrilla groups have either violently confiscated or illegally purchased an estimated 4 million ha of land. A bill proposed by the Santos administration will return two million hectares of land to around three million people over the next four years and formalize land tenure. The bill proposes a new land registry based on testimony by the displaced and their neighbours (Blomqvist, 2010; Shenfeld 2010).

Enforcement

Colombia faces serious institutional challenges and environmental authorities are attempting to streamline forest management instruments and implement them to a greater extent (Gutman et al., 2010). There is deficient capacity to enforce laws. The first draft of the FCPF R-PIN cited a lack of interactions of policies, plans and legislations across different sectors as being a governance issue. Key governance issues also stem from the presence of illegal armed groups that generate instability (Colombia, 2008).

Finance

Payment for Ecosystem Services

Several payment for watershed services projects began in the 1990s but have expired. Examples can be found at (IUCN, 2010). An example is the Project Cuencas Andinas (CONDESAN-GTZ) payment for environmental services scheme in the Lake Fuquene, which began in 2004. (IIED, 2007) The project aimed to reduce nutrient loads in the Fuquene Lake by helping farmers access commercial bank loans to improve their agriculture practices and switch to more environmentally friendly methods (e.g. reducing use of fertilizers). The German government (GTZ) donated seed capital which provided the collateral necessary for commercial banks to approve these loans.

Science and Technology

MRV

According to Herold (2009), Colombia has a good level of forest monitoring, with forest area change monitoring undertaken between the years 1986, 1996 and 2001. Columbia is covered by CBERS and Landsat TM. However, technical capacity is required for image processing and analysis. A national monitoring system could be developed and implemented, based on Landsat, SPOT and CBERS as primary source of remote sensing data (Herold, 2009).

The Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) and SINA (National Environmental Information System) Research Institutes are responsible for national forest monitoring and forest inventories (Colombia, 2008). IDEAM is a government agency within the Colombian Ministry of the Environment, Housing and Regional Development.

The principal source of data on degradation and deforestation is the annual report on the status of the environment and renewable natural resources in Colombia published by IDEAM in 2004 (Colombia, 2008).

There is limited national data and no central body to house data, so generating a national baseline has been difficult. The problem is magnified by the inaccessibility of some areas. To overcome this, IDEAM, has established regional baselines for forestry projects (Colombia, 2008).

IDEAM and Fundación Natura are implementing the "Institutional Scientific and Technical Capacity to support REDD Projects to Reduce Emissions from Deforestation in Colombia", with resources from the Gordon and Betty Moore Foundation (Gutman et al., 2010). The overall goal of this initiative is to "Strengthen the technical and scientific capacity in Colombia to support projects to reduce emission from deforestation." The Moore Foundation provided USD two (2) million to be used in the following activities:

- Establish a baseline for information about deforestation processes
- Develop protocols for satellite imagery analysis and for mapping changes in forest cover
- Identify priority areas to implement REDD projects
- Establish agreements and commitments in pilot projects for REDD projects and for on site validations of the protocols
- Strengthen the national capacity for monitoring, reporting, and verification of deforestation processes in order to improve the available tools for sustainable management of forests in Colombia.
- Support for a pilot project in areas identified as of high conservation priority

Costa Rica

Policies and Institutions

Forestry

Costa Rica had high deforestation during the 1960s and 1970s (Pfaff et al., 2010). Deforestation reached an all time high in 1985, at 1.4%, but had fallen to almost zero by 2005. This happened despite strong economic growth. In fact, the ecotourism sector is heavily dependent on the country's forests, and tourism more generally is now the main foreign exchange earner for the country (Brown et al., 2010). Despite the fact that in Costa Rica forest coverage is being recovered (net deforestation is negative), forests are still being lost (there is gross deforestation) (Costa Rica, 2010). This ongoing deforestation is the result of the policies of economic development focused on agriculture and cattle ranching, with agricultural expansion not as relevant as livestock expansion (Costa Rica, 2010).

The 1996 Forest Law prohibited conversion of forest to other land uses (Brown et al., 2010). It provides the legal and regulatory basis to contract with landowners for environmental services provided by their lands (Costa Rica, 2010). The Forest Law explicitly recognized four environmental services provided by forest ecosystems:

- 1 Mitigation of GHG emissions;
- 2 Hydrological services,
- 3 Biodiversity conservation; and
- 4 The provision of scenic beauty for recreation and ecotourism.

It created the National Forestry Financing Fund (FONAFIFO), for administrating and allocating fiscal funds paid by those in society who benefited from the provision of ecosystem services. Article 22 of the Law allows FONAFIFO to issue forest landowner certificates for forest conservation, which represent payments for ecosystem services (FAO, 2011).

Following the 1996 Forest Law, the Payment for Environmental Services Program (PPSA) was started in 1997 and continues to date. It was the first nation-wide PES programme and changed the concept of incentives, previously oriented towards commercial timber production, to focus on forest conservation. The PPSA policy shifted the source of funding from the government budget via subsidies to an earmarked tax and payments from beneficiaries of the services. It also allowed payments for environmental services to move beyond a project-by-project approach to one fully integrated and institutionalised in a national policy (Brown et al., 2010).

Some have critiqued the program for an apparent bias in payments towards low threat areas, which effects payment impact (Pfaff et al., 2010). Landholders may also choose to enrol land they were unlikely to clear even in the absence of any payment. Lastly, differences in allocation rules across the agency offices within Costa Rica also yielded greatly varied impact of payments (Pfaff et al., 2010). Overall, it seems these policy instruments have allowed the country to develop a legal framework, institutions, social capital, and an improved governance scheme (Costa Rica, 2010).

REDD+

Costa Rica is a UN-REDD Programme Partner Country and involved in FCPF. The agency responsible for implementing the REDD+ Strategy is FONAFIFO. Engagement in REDD communication is high (Herold, 2009). In 2010, Costa Rica's R-PP was submitted for assessment and is currently being revised (FCPF, 2011). The REDD+ Strategy has a national scope.

Costa Rica is in the position of developing its REDD+ reference scenario, building on existing information at a satisfactory level of detail (tier 1 and 2).

Carbon and Land Tenure

Costa Rica has a relatively simple land tenure regime compared with other countries of the Latin American region. A total of 24% of the country's land area (well over a million hectares) now lies within National Protected Areas, from a starting point of almost zero in the 1960s.

According to the 1984 Agricultural Census (last census of this type), 69 percent of the land in the country is private property with an estimated 96,000 holdings (Navarro, 2010). In privately owned land on protected wilderness areas, landowners usually have restrictions on their land because they have to dispute the recognition of their rights with the State. Their lack of formal title can also limit their legal access to use of forest resources. When private owners do hold a title, there are usually other restrictions to, for example, the approval of a forest management plan or harvesting permits as the State can demand additional requirements such as environmental impact study amongst others.

Costa Rica's land tenure system and forest law have implications for the impact of the PES program. For example, in private land on protected wilderness areas, forest owners cannot access PES if they do not hold a land title because that type of land is usually in dispute with the State (Costa Rica, 2010).

Costa Rica's legal system does not address carbon property rights explicitly. Instead, property rights in natural entities are inferred from elements of the civil code. The owner of the land also owns the trees or forest that grows on the land and the carbon sequestered. The owner can negotiate the right to sell or manage carbon and can in return reap the resulting benefits (FAO, 2011).

Under FONAFIFO's auspices, the government may sign a contract with individual land property owners who are responsible for managing carbon sequestration. The property owner gives the government the right to sell carbon. The government may then bundle the sequestered carbon into attractive packages for international investors. Property owners must show proof of identity, ownership and tax payment with their application, and provide a sustainable forest management plan. Groups of property owners can apply collectively and jointly manage their land for maximum carbon sequestration. By signing these contracts, the government implicitly recognizes that the carbon belongs to the private owner. The government will own the right to sell the carbon and the right to define the terms under which the property owner manages carbon sequestration for the length of the contract (FAO, 2011). Private landowners are also free to negotiate their own deals with foreign investors, as the government does not maintain exclusive rights to market carbon (Navarro, 2010). Foreigners are able to own land in Costa Rica and can market their own carbon. Easements are also possible but only where clear land title exists (FAO, 2011).

Finance and Economics

Payment for Ecosystem Services

The Payment for Environmental Services Program (PPSA)

The PPSA is organized so that land users receive direct flat rate payments for limiting their activities to specified land uses, including forest protection (5 year duration and USD210/ha dispersed over 5 years), sustainable forest management (15-year duration and USD327/ha dispersed over 5 years), and reforestation activities (15 to 20 year duration and USD537/ha dispersed over 5 years). Since 2003, payments for sustainable forest management are no longer made, but payments for agroforestry systems were introduced instead. In 2006, the programme also included natural forest regeneration as a fourth eligible activity (Karousakis, 2007).

The PPSA has created a Local Market of Environmental Services (water, biodiversity, scenic beauty, and carbon) accounted for in avoided deforestation as well as maintenance and increase of carbon stocks. In return for payment, the landholders cede their carbon and other environmental service rights to FONAFIFO

for the length of the contract. Afterwards, they are free to renegotiate the prices, or sell the rights to other parties. However, they commit to manage or protect the forest for a period of 20 years (15 in the case of reforestation) (Karousakis, 2007).

Article 69 of the Forest Law 7575 (1996) and Decree 25721 (1996) establishes that a third of fuel tax should be assigned to FONAFIFO for funding PES program. Other sources of funding for FONAFIFO originate from the water tax, 40 percent of the forest tax and international funds and donations for promoting forestry investments. FONAFIFO has acted as a broker among public-private and private-private stakeholders for allocating PES at local level.

Science and Technology

Monitoring, Reporting and Verification

The National System of Conservation Areas (SINAC) is responsible for conducting the country forest inventory. Costa Rica does its forest inventory at local sites using remote sensing data.

FONAFIFO is responsible for monitoring forest cover by using satellite images combined with field verification (Herold, 2009; Costa Rica, 2010).

Expertise in processing and analysis of remote sensing data is available, but existing technical capacity for image processing and analysis should be expanded to increase detail and accuracy for measurements and monitoring. A national forest carbon inventory also needs to be established (Herold, 2009).

A national monitoring system for degradation and cover quantification is in the planning stages (Herold, 2009). Two options have been identified for monitoring changes in carbon stocks (carbon stock change method): 1) Continuing forest inventory of fixed parcels and area, and 2) Continuing forest inventory of variable area (Costa Rica, 2010).

Democratic Republic of Congo

Policies and Institutions

Forestry and REDD+

The 2002 Forest Code introduced a number of innovative aspects related to forest management. The existing legal framework covers forest rehabilitation measures through the implementation of reforestation and natural forest programmes (articles 77–80) that are aligned with the principles of REDD and REDD+.

Only two categories of forestry space are currently subject to active management): forestry businesses (intended for wood production) that fall under private State domain and the protected areas (intended for biodiversity preservation), which fall under public State domain. The first is subject to a contract between the administration responsible for the forests and a private producer (forestry agent); the second have been managed (since 1975) by a public establishment responsible for nature preservation, placed under the authority of the ministry in charge of forests (Fétiveau and Mpoyi, 2009; DRC, 2010b).

Climate change issues have been included in the 2009 Decree adopted by the Ministry of Environment, Nature Conservation and Tourism, which regulates institutional aspects of REDD implementation (FAO, 2011). This REDD Decree, signed by the Prime Minister on 26th November 2009, has formalised the national REDD process and backed a number of key REDD institutions, notably a National Coordination for REDD (CN-REDD), which is functional and very active, and two steering committees (a National REDD Committee and an Inter-ministerial Committee), which are being established. A notable number of organisations from civil society and representing forest peoples have organised themselves into a single structure, named the Working Group on Climate-REDD (GTCR) (DRC, 2010a).

DRC is very engaged in the REDD process. It is a UN-REDD Programme Pilot Country and has submitted a National Communication to UNFCCC (including a GHG inventory for LULCF, tier 1), participated in five REDD submissions. It is a Forest Carbon Partnership Facility country and in 2010 submitted its final R-PP (FCPF, 2011). It is also developing a roadmap for building the REDD+ Strategy with a horizon to 2030.

Carbon and Land Tenure

Much of the country's forest area can be considered as local community property. In accordance with their rights as customary users, communities freely harvest the resources and can convert them according to the need for farm land. Deforestation for farm activities is not subject to obtaining a license for a surface up to 2 hectares (section 53 of the Forest Code).

Though recognized by the Congolese legal system (qualified by rights of enjoyment or ownership), these forest rights cannot be considered as individual property rights, whether by law or in relation to the mode of collective management of the spaces they support (family, clan, grouping, chiefdom) (Fétiveau and Mpoyi, 2009).

Lack of clarity in property rights and overlapping land, forestry and mining concessions are issues that need to be resolved to allow for the implementation of payments to communities based on results (DRC, 2010b). However, so far, forest community rights do not specifically refer to payments for environmental services such as carbon sequestration (FAO, 2011). The 2002 Forest Code does not specifically refer to carbon rights.

Finance and Economics

REDD+ Funding

The DRC is a participant in the UN-REDD Programme. From June 2010 – Dec 2012 its estimated funding budget is: US\$ 22.7 mil (UNREDD \$5.5M, FCPF \$3.4M, Funded \$1.8, Unfunded \$11.9).

Carbon sequestration and rural alternative energy in the Tshilenge Savannah, Kasal Oriental

This project seeks to create a carbon sink in the Tshilenge Savannah. (Seeberg-Elverfeldt and Tapio-Bistrom, 2010). Implementing organization and partners include the Community Development Objective/APROPADEK Congo Basin Partnership Fund and the rural communities in 28 villages in the Tshilenge District. 5 400 households are involved, covering 14 000 ha. Four main activities planned are:

- 1 The establishment of communal plantations of *Jatropha Curcas*;
- 2 Distribution of manual presses for oil extraction and its marketing;
- 3 The installation of rural energy systems operating with *Jatropha Curcas* oil; and
- 4 Parallel development of handicraft activities (e.g. soap production with the oil).

The Congo Basin Forest Fund also provides a source of accessible funding. The Fund, backed by the Governments of the United Kingdom and Norway, is intended to build forest management and conservation capabilities within Congo Basin countries.

Science and Technology

MRV / Science

The Department for Permanent Service for Forest Inventory and Management (SPIAF) under the Ministry of Environment, Nature Conservation and Tourism (MECNT) is responsible for forest monitoring and inventories and for FRA reporting (Herold, 2009). DR Congo participates in the GOFC-GOLD Regional Networks: SAFNet and OSFAC (Herold, 2009).

DRC has not yet defined national REL / RL but will do so based on adjusted historical data.

In a first instance, the MRV system in the DRC aims for a Tier 2. The current approach enables the implementation of an MRV system in an 'operational state' that will allow DRC to assess and report on carbon stock variations at a Tier 3 in the future.

DRC has capabilities in remote sensing and cartography, but further expertise is needed to monitor fine-scale forest changes and forest degradation, and for in-situ measurements of carbon stocks and changes. A national forest carbon inventory needs to be established and fire monitoring is recommended (Herold, 2009).

DRC would benefit from a sustained regional cooperation and coordination on forest monitoring. In fact, the MRV system is being built to enable a regional approach to minimize MRV system costs at the same time as maximizing reliability at the national level. This regional approach is requested by the DRC and was recommended at a regional workshop of the Congo Basin in early February 2010 in Brazzaville (DRC, 2010a; DRC, 2010b).

The work to implement the MRV system will rely on the support of international experts. Currently, several international forest and deforestation mapping activities address the entire Congo Basin eg. Observatory for the Forests of Central Africa (OFAC, JRC), in close cooperation with the national

authorities in the region. Several land cover products are available for DRC, produced by or with support from external institutions or consultants (e.g. CNIE, UCL), including a LCCS based LC Map. Only 70 % of the country area can be covered by current Landsat receiving stations. There is no information available on cloud free SPOT data (Herold, 2009). Examples of specific studies that have been conducted in the region, particularly in the estimating historic deforestation and degradation, include:

- The Joint Research Center (JRC) and UCL are monitoring of forest cover on the basis of samples for the years 1990-2000-2005. These studies evaluated deforestation, degradation, reforestation and regeneration based on techniques and automated interpretations of predetermined decision rules (Duvellier et al., 2008).
- The Central African Regional Program for the Environment (CARPE) program, in collaboration with its NASA partners (the University of Maryland and University of State of South Dakota) has done the mapping of decadal changes in forest cover in the DRC. This is a national assessment of forest cover change between 1990 and 2000 based on Landsat and MODIS imagery. A new evaluation of the 'wall-to-wall' using Landsat imagery for the year 2005 and 2010 is planned. (CARPE, 2008).

Ethiopia

Policies and Institutions

Forestry and REDD+

There are currently no dedicated forestry institutions at the national level. Instead, the role has been filled by a variety of institutions, albeit with sometimes unclear and overlapping roles and responsibilities. Without a strong forest sector, other initiatives have been gaining ground at the expense of forestry, notably the expansion of large-scale agribusiness in areas of natural forest (Ethiopia, 2011).

Forestry policies relevant to addressing deforestation and degradation (Ethiopia, 2011)

Policy/Proclamation	Level	Attributes of relevance to deforestation and degradation
EPE (1997)	Federal	It ensures the development of agreed partnerships between local communities and the private sector or the state (whichever operates the plantations forest) whereby the community benefits financially and so affords protection to the forest
Forest Development, Conservation and Utilization Proclamation (542/2007)	Federal	It provides various measures that stipulate the engagement of communities in forest management.
Oromia Forestry Proclamation (72/2003)	Oromia	Provides a definition of forest ownership to cover state and private forest and community forest ownership.
Rural Land Administration & Use Proclamation (No 110/2007)	SNNPRS(Also similar proclamations in most other regional states)	Aims at devolving rural land user rights and enables communities to register communal land, which can include forest.
Proclamation no. 542/2007	Federal	Provides for the engagement of communities in the management of state forest and in the receipt of benefits from the forest.

Ethiopia's overall climate change objective is to achieve its 0% emission target by 2025. REDD+ is one component of this overall aim. The Federal Environmental Protection Authority (FEPA) of Ethiopia is chairing the REDD+ readiness process. A number of REDD+ Pilot Projects are underway in Ethiopia. More information can be found at Ethiopia (2011). Ethiopia is a FCPF country. A formal assessment of its R-PP is due to take place in March 2011 (FCPF, 2011).

Agriculture

Agricultural Development Led Industrialisation (ADLI) The Agriculture Development Led Industrialization strategy (ADLI) was officially formulated and inaugurated during the 1995 elections and continues to shape the country's development strategy (Gebreselassie, 2006a). However, contrary to the experience of many countries in Asia and Latin America, the agriculture-led growth strategy has not been fully realised in Ethiopia. Even though the country has tried to implement a 'green revolution'-like agricultural-led development strategies, success is moderate to date (Gebreselassie, 2006a).

Carbon and Land Tenure

Land is a public property in Ethiopia and has been administered by the government since the 1975 (Gebreselassie, 2006b). The regional states, in accordance with federal laws, have the authority to administer forest resources (forestry administration; management; selling of carbon credits) (Ethiopia, 2011).

Some argue, given the current level of farm productivity and investment, the average farm size becomes 'unviable' as a farm unit and so unable to support the livelihood of people dependent on it. Apart from the land policy, the fast growing population coupled with lack of migration has significantly contributed to 'sub-economic' holdings and tenure insecurity (Gebreselassie, 2006b). Uncertainty over forest user rights and assured benefits in the past has also limited the motivation of local people to protect the forest (Ethiopia, 2011).

Finance and Economics

Payment for Ecosystem Services

Over the last ten years, two NGOs - FARM-Africa and SOS Sahel - have successfully promoted participatory forest management (PFM), and this has now been included in regional and federal forest planning. (Tadesse, 2009)

Bale Mountain Projects

The Bale REDD project is investigating the costs of avoided deforestation to the livelihoods of communities living in and around the forest as a first step to assessing the viability of REDD+ type project(s) here. There are also plans to establish a trust fund, managed by representatives of the forestry department, community based organisations, NGOs and a member of the carbon finance sector. This fund would receive a large proportion of the carbon revenue and aid in the re-distribution of funds to communities (Tadesse. 2009).

Science and Technology

MRV / Science

In an inventory conducted during the R-PP development process on available monitoring and carbon accounting expertise and software resources, significant gaps in capacity and resources were identified. This in depth assessment can be found at Ethiopia (2011).

Besides the need for improved capacity on above ground land cover estimation, there is a lack of human capacity for soil carbon stock estimation. This capacity will have to be developed sufficiently for the accurate reporting of emissions and removals by REDD+ and by the other economic sectors (Ethiopia, 2011).

Ghana

Policies and Institutions

Forestry and REDD+

The Forest Commission is charged with the management of forests and decides almost exclusively on the granting of timber concessions and felling rights for economic purposes.

Many forest sector institutional and governance reform efforts are taking place in Ghana, including the Natural Resources and Environmental Governance Development Policy Operation (NREG) and the Voluntary Partnership Agreement (VPA) concluded under the EU Forest Law, Law, Governance and Trade (FLEGT) process.

Alongside these, Ghana has established a number of institutions with responsibilities for REDD+ in the country. Ghana is a FCPF and Forest Investment Program country and is considered to be very engaged in the REDD process (Herold, 2009). Its R-PP was assessed in March 2010 and a readiness grant is expected to be signed in 2011 (FCPF, 2011).

The National REDD+ Steering Committee (NRSC) within the Forestry Commission was established to advise the Ministry of Land and Natural Resources (MLNR) on REDD+ issues and lead REDD+ management. The Climate Change Unit of the Forestry Commission serves as the Secretariat of the NRSC. The NRSC is composed of ministries, private sector, civil society groups, local communities, landowners and other relevant stakeholders and serve as forum to share knowledge and experience on REDD+ initiatives in order to inform policy formulation and develop projects and programs. NRSC proposals will be submitted for approval to the Environment Advisory Council (Chagas et al., 2010).

Multiple factors cause deforestation and forest degradation in Ghana. Yet, those targetable under REDD readiness activities are largely forest governance related and include: low forest fees, biased allocation of timber rights, a log export ban and biased sharing of timber re-venues as well as low enforcement of harvesting rules and rules protecting farmers' rights (Hansen, 2009). This is reflected in the country's recently approved R-PP which highlights a range of focus areas and activities to be promoted within the Ghanaian national REDD+ strategy (Chagas et al., 2010). These include:

- Improving timber supply and stock enhancement on reserve and off-reserve areas;
- Improving the emissions profile of charcoal and fuelwood production;
- Encouraging carbon-friendly cocoa sector production; and
- Reducing emissions via improved fire management.

Examples of project-scale REDD+ Activities in Ghana (Chagas et al., 2010).

Project Name and Proponents	Location	Design Elements and Project Activities
Name: Forest, Climate and Communities Proponents: Rainforest Alliance, Inc. (funded by Norway's International Climate and Forest Initiative)	Location: Western Region, pilot sites being defined,	Targeting CCB and VCS certification Project Activities: - Technical Assistance for SFM - REDD Activities and Strategies - Meet sustainability standards - Build market linkages and long-term commercial sourcing relationships

Name: A Rocha Ghana Proponents: A Rocha Climate Stewards (UK)	Location: Kumasi in central Ghana and Damongo in the North of the country	Reforestation on designates sites. Climate Stewards funds the materials, management, and training for community and student participation CCBA certification targeted
Name: Carbon Credit Ghana Project Proponents: Vision 2050 Forest Foundation	Location: Ashanti Region, Kumasi	Planting 450 million trees over a five year period. Pay to participate and get seedlings and technical support, registration renewal annually. People without land can pay to participate and plant on the Vision Foundations land bank.

Carbon and Land Tenure

Natural and forest resources in Ghana are predominantly administered by the State. In particular, all rights to trees with economic value are vested in the President in trust for the benefit of traditional authorities.

The power of the State to administer natural resources extends to both on and off-reserve areas. In private lands, however, land owners and users have the right to fell naturally regenerated trees for crop cultivation (Chagas et al., 2010).

Transparent rules on the allocation of carbon rights, participation in subnational activities, and domestic approval requirements need to be established (Chagas et al., 2010).

CARE International Program, SLATE – Security of Land Tenure (SLATE)

The SLATE project addresses the underlying causes of poverty among Ghana's rural land users in Greater Accra, Western and Northern Regions. SLATE's purpose is to support national, organized civil society advocacy to ensure that the implementation of Ghana's land policy includes mechanisms, accessible to poor land users, for equitable security of tenure (Care, 2011).

Community Resource Management The concept of Community Resource Management Area (CREMA) has been introduced for the communities to manage flora and fauna within the community lands (UNDP, 2004). The CREMA concept devolves management authority of wildlife and other natural resources to community based organizations.

Finance and Economics

Ghana has benefited from diverse multi-donor support for natural resource management in recent years. Programmes have included milestone investments such as the Forest Resource Management Programme (FRMP), Natural Resource Management Programme (NRMP), and others (Ghana, 2010).

Natural Resources and Environmental Governance (NREG) Program

A five-year Natural Resources and Environmental Governance (NREG) Program has been designed by the Government of Ghana for sectoral budget support and reforms between 2008 and 2012. It is a program to coordinate donor contributions and other finances related to the environment. It includes three sectors— Forestry and Wildlife, Mining, and Environmental Protection. Numerous international funders provide sectoral support for the design, implementation, monitoring, and evaluation of NREG (Pfaff et al., 2010). A Progress Assessment Framework tracks performance measures for each subsector. Program Matrices and Outcome Indicators were jointly defined and agreed upon in March 2009 and this Voluntary Partnership Agreement process may suggest a successful consultation process.

NREG is currently being implemented and will be involved in coordinating REDD funding.

The NREG decision making body is the Environment Advisory Council. This high level council was established in late April 2010 and is chaired by the Vice President. It links various Ministries and is a cross sectoral national decision making body on climate change.

In Forestry and Wildlife, NREG's stated purview spans management and governance and involves coordination of implementation including linkages between sectors and aligning donor assistance with the Ministry's Expenditure Framework.

The Agriculture Ministry is not part of the NREG Programme, even though agriculture is an important driver of deforestation. This may change as NREG is building an interministerial body to which the REDD Steering Committee will report. Such coordination will likely be critical to its success (Pfaff et al., 2010).

Science and Technology

MRV

In Ghana, the Resource Management Support Centre (RMSC) of the Ghana Forestry Commission (FC) holds a Resource Information System (RIS) and is responsible for forest monitoring, mapping, and forest inventories. The Centre for Remote Sensing and Geographic Information Systems (CERSGIS) of University of Ghana stores geographic location and descriptive attributes of the managed forests. It provides services to the FC with respect to satellite maps of all forest areas as well as remotely sensed data.

A second National Communication (NC) is being developed by the Environmental Protection Agency (EPA) in Ghana. The EPA has been working on developing landcover maps for forestry and agriculture cover for 2000 using Landsat imagery and 2007 using MODIS imagery. However this effort has progressed slowly to date (Ghana, 2010).

However, no regular monitoring system in place. Recently, the CERSGIS has started to process time series of satellite into forest image maps for the Ghana Forestry Commission to assess trends of changes in forest cover. Building upon the existing equipment available, technical capacity and expertise is needed to monitor forest degradation and carbon stock changes from remote sensing data (optical, radar), for the field measurements and the estimation of forest carbon stock changes (Herold, 2009).

Guyana

Policies and Institutions

Low Carbon Development Strategy (LCDS)

The Office of the President is responsible for overseeing climate change initiatives at the national level and provides direction in climate change and REDD policy. The overarching policy and developmental framework for climate change in Guyana is the Low Carbon Development Strategy (LCDS). REDD is one component of the LCDS.

The (draft) LCDS sets out a vision through which economic development and climate change mitigation will be enabled through the generation of payments for forest services in a mechanism of sustainable utilization and development. The result would aim to be the transformation of Guyana's economy whilst combating climate change (Guyana, 2010a). The key focus areas of the LCDS are investment in low-carbon economic infrastructure and in high potential low carbon sectors; expansion of access to services; new economic opportunities for indigenous and forest communities and the transformation of the village economy; improved social services and economic opportunities for the wider Guyanese population; and investment in climate change adaptation infrastructure. The third draft of the LCDS, *Transforming Guyana's Economy while Combating Climate Change*, was launched in May 2010 and identifies eight priorities that will be the initial focus of LCDS implementation 2010 and 2011. This version incorporates further feedback from national stakeholders and input based on the outcomes of UNFCCC COP-15 in Copenhagen and other international processes (FAO, 2011).

The LCDS aims to ensure economic development while preserving the country's forest resource and its carbon stocks for national and global benefit. However, there is a chance that Guyana's current low rates of deforestation and degradation may increase over the next years due to several factors. One factor is the expansion of agricultural activities projected by the LCDS, currently the most prominent scenarios discussed (Office of the President, Republic of Guyana, 2009). Another is the project of upgrading the existing unpaved road that connects Georgetown with Brazil, running through Guyana's forested hinterlands (Conservation International, 2009) (Henders, 2010).

Forestry and REDD+

As High Forest Low Deforestation (HFLD) country, the REDD+ concept including compensation for preservation of existing carbon stocks could prove very beneficial for Guyana, as it would not benefit much from a pure REDD approach to reduce (historical) emissions from deforestation and degradation (da Fonseca et al., 2007; Conservation International, 2009). However, Guyana's national circumstances indicate that if incentives and governance are not directed to controlling deforestation and degradation, both of these rates and their associated emissions are expected to significantly increase. This is likely not least because much forest suitable for logging and conversion to agriculture remains and because access to Guyana's forests will be significantly increased during this decade. Most notably, a major international highway from Brazil through Guyana is being planned (Guyana, 2010a).

Guyana does not have any specific legislation for REDD. Therefore, until such legislation is passed REDD must fit within the existing constitutional and statutory framework. Guyana is currently developing a policy framework for REDD. In order to forward its position as country with valuable forest carbon resources, Guyana participates in the FCPF (Henders, 2010). Guyana has submitted a National Communication to UNFCCC (including a GHG inventory for LULUCF, tier 1). To prepare for participation in the World Bank's FCPF Readiness Mechanism, Guyana has developed an R-PIN and an R-PP. Both documents contain general statements of Government policies aimed at improving readiness for participation in REDD, some of which include using FCPF funding to continue the Guyana Forestry Commission's (GFC) efforts to reduce emissions (Janki 2009). There has been consultation on the R-PIN and R-PP with a variety of

stakeholders, including Amerindian communities and the forestry sector. Conservation International and WWF were involved with the R-PIN. Conservation International (Guyana) has also recently conducted the study on “Biodiversity Mainstreaming through Avoided Deforestation” under a project by the Inter-American Development Bank (Janki, 2009). The R-PP was assessed in June 2009. However a final R-PP has not been submitted, meaning no grant has yet been made (FCPF, 2011).

Ministry of Agriculture The Ministry of Agriculture has the responsibility for the forestry sector, and has also been responsible for a number of departments that have responsibility for various aspects of climate change and REDD activities. These Agencies include the Hydrometeorological (Hydromet) Division and the National Drainage and Irrigation Authority. The Agricultural Ministry remains integral to the coordination and implementation of REDD policy and activities.

Guyana Forestry Commission In Guyana, approximately 76 percent of the total land area is forested and the Guyana Forestry Commission (GFC) is responsible for the management of about 62 percent of the forest classified as State Forest Estate (FAO, 2011). The GFC is also responsible for the implementation of REDD activities in Guyana. The GFC’s main responsibility is policy enforcement, sustainable forest management, community forestry and planning the effective utilization of Guyana State Forest Resources. It coordinates the activities of the REDD Secretariat. The REDD Secretariat will be responsible for the facilitation of REDD activities (Guyana, 2010a).

The 1953 Forests Act and 2007 Forests Bill The forest sector in Guyana is governed by the Forests Act (CAP 67:01) of 1953. This legislation provides for leases or grants (title) of State forests, and gives the lessee the right to sell forest produce subject to payment of a royalty. The grant holder, as owner of the forest, appears to have the right to sell forest produce without paying a royalty. The Forests Act grants the GFC authority to grant permission for exploitation of Guyana’s forests (Janki, 2009). In January 2009, the National Assembly passed the Forests Bill 2007 with various amendments. Although it does not mention REDD, the Forests Bill does create a new system of sustainable management for Guyana’s State forests. The legislation also recognizes inter alia Guyana’s international obligations including, for example, under UNFCCC, the Kyoto Protocol and the CBD (Janki, 2009).

The Mining Act of 1989 With the exception of the coastal plain, Guyana is divided into six mining districts. As a consequence, State forests are located within mining districts. The Guyana Geology and Mines Commission (GGMC) has jurisdiction over all minerals in Guyana and is authorized to issue mining permits in any mining district of Guyana. The Forests Act does not exempt State forests from mining activities. Although Clause 5(1) of the Forests Bill imposes a general prohibition on using, occupying or damaging State forests, it expressly allows large-scale mining in State forests despite possible deforestation (Janki, 2009)

Summary of Efforts to Address REDD There have been many direct and indirect efforts to reduce deforestation and forest degradation through the various natural resources agencies as outlined in the table below:

Examples of efforts to Address REDD (Guyana, 2010a).

Efforts	Outcomes	Gaps/Challenges	Opportunities
Implementation of the Code of Practice for Harvesting Operations that allows for good practices to be implemented in SFM	The issuance, planning and management of large concession areas are executed in keeping with GFC’s guidelines which themselves lend to the implementation of SFM and legality which allow for deforestation and degradation to be kept to a minimum.	Community groups require additional capacity to implement all aspects of the CoP. In some cases capacity of institutions needs to be strengthened (GFC, GGMC) New areas allocated would have to undergo capacity building and in some cases	With compliance by forest land holders, deforestation and forest degradation at the national level will be maintained at the existing low rate and can even be lowered in the future Maintenance of a high level of legality will foster the maintenance of a

Efforts	Outcomes	Gaps/Challenges	Opportunities
		commitment of additional resources to enable these to be executed.	low rate of deforestation and degradation.
Land titling	96 village communities have title over their lands	10 villages do not yet have formal legal title Some villages currently exist without title because they do not yet fit the criteria for titling	With the implementation of REDD and the receipt of revenues generated from REDD, the land titling process can be sped up.
Effective implementation of the mining regulations	A stronger compliance with mining regulations allows for sustainable use of forest resources, thereby decreasing deforestation and forest degradation	More resources needed for additional communities to be targeted	With compliance by both large and small scale operators, deforestation and forest degradation at the national level will be maintained at the existing low rate and can even be lowered in the future
Monitoring of Infrastructural development	Conducting of Environmental Impact Assessments (EIAs) for large infrastructural projects & preparation of Environmental Management Plans for smaller scale infrastructural projects	Need for more qualified personnel on staff of both EPA & MPW&C to oversee planning & implementation of projects	Greater interagency coordination can allow for more effective monitoring and oversight of projects
Efforts have been made to limit the effects of agriculture on the forest resources.	Sustainable agriculture practices have been developed and implemented among operators.	More efficient technologies needed Need for more qualified personnel	Capacity building and support to better understand REDD & implications of agricultural development on REDD

Carbon and Land Tenure

Land tenure in Guyana is administered under the following categories: a) state owned land and b) privately owned land (Guyana, 2010a). Most of the land in Guyana, including the bulk of Guyana's forests, is owned by the State. The only significant private holdings are those lands held under Amerindian title. Approximately 13.7 million hectares of Guyana has been declared State forest. The State owns all minerals in Guyana (Janki, 2009).

The Forest Bill of 2008, states that: "All forest produce on, or originating from, public land is the property of the State until the rights to the forest produce have been specifically disposed in accordance with this Act or any other written law". However, under paragraph 11, the Guyana Forestry Commission (GFC) may, on application by any community group, enter into a legally binding community forest management agreement with the group concerned, which would authorize that group to occupy a specified area of state forest and manage it in accordance with the agreement. This option is also extended to afforestation agreements with individuals.

Article 142 of the Constitution protects interests in or rights over property. Under Article 142, usufruct rights held by Amerindian communities are treated as rights in the nature of property, and are also protected against a taking by the State. Therefore, any REDD scheme must not be set up in a way that diminishes these rights (Janki, 2009). Amerindians comprise 9.1 percent of Guyana's population. Furthermore, Amerindian communities are the largest private landowners in Guyana, owning approximately 14 percent of Guyana's land. Amerindian lands are privately owned lands held under a title issued under the State Lands Act. Legal title is held in the name of the Amerindian Village Council, which has legal recognition as a corporate body (Janki, 2009).

Unlike the GFC, Amerindian communities have legal authority to control mining within forests under their jurisdiction. Amerindian communities possess the power to veto small and medium-scale mining. A key issue for Amerindian communities has been to establish clear boundaries in order to prevent incursions by miners, loggers and other resource users, and in 1995 Amerindian leaders asked the Government to demarcate their titles. While government attempts to demarcate Amerindian titles were initially delayed as a result of opposition from a local NGO, the Amerindian Peoples Association, in recent years Amerindian communities have agreed to demarcation and subsequent agreement has resulted in the doubling of Amerindian land in three years (Janki, 2009).

Those forests located on State lands which have not been declared to be State forests fall under the jurisdiction of the Guyana Lands and Surveys Commission (GLSC), which is responsible for all public lands. The President has the power to issue grants (titles) and leases over State lands. The GLSC is responsible for granting licences for agriculture. Agriculture is the second biggest cause of deforestation in Guyana and in 2008 was responsible for the clearing of 21,903 hectares of forest (Janki, 2009).

Guyana's legal framework for forests does not contain specific provisions on forest carbon rights. However, as forest areas are traditionally occupied and used by Guyana's indigenous people, customary tenure systems are crucial in determining land ownership (FAO, 2011). The Government has prepared draft legislation to create a national protected area system. This legislation is expected to include protection of ecosystem services, including carbon storage or sequestration. To provide clarity, such legislation should also clarify who has the authority to deal with carbon stored in protected areas.

Guyana has two protected areas which are viewed as potential new carbon reserves. The Kaieteur National Park, established by the Kaieteur National Park Act in 1930 as a strict protected area and the Iwokrama reserve, which covers 360,000 hectares of tropical rainforest, established in 1996. The State owns the land and all resources, including the carbon, in the Kaieteur National Park. It is unclear who would have the legal authority to deal with the carbon in the forests located in the park, though it is likely the State would be the seller of the carbon credits. The Forests Bill specifically exempts Iwokrama reserve from becoming a State forest. Iwokrama has entered into an agreement with Canopy Capital to measure ecosystem services such as rainfall production, water storage, and weather moderation. However, the deal does not include carbon (FAO, 2011).

Finance and Economics

REDD+ Funding

Guyana's approach to REDD is heavily dependent on the development of carbon markets (Janki, 2009). Guyana is involved in the Forest Carbon Partnership Facility and benefit sharing is to be addressed under the R-PLAN. There are some concerns over the proposed forest compensation payments for Amerindian communities who take part in REDD. Under Phase 3 (2013–2020), the Government is depending on the expansion of the carbon compliance markets and the increased supply of REDD credits to generate payments of up to US\$580 million. In this phase there are no provisions for benefit sharing but only for all revenues to be spent by the Government on infrastructure and economic development projects. Under the LCDS the revenue will accrue to the Government. The Government intends to create the Guyana Low-Carbon Finance Authority to collect, manage, and monitor forest payments. A Low Carbon Strategy Project Management Office will also be established to drive key projects in cooperation with the Guyana

Office for Investment, which is responsible for attracting investments to Guyana. The Government also proposes that in the long term the Guyana Low Carbon Finance Authority should interface with a new tropical forest funding agency to ensure appropriate fiduciary oversight of funds. The intention is to have full transparency on disbursements and use of funds within Guyana, with strict controls and external audits (Janki, 2009).

Phase 4 is intended to start in 2020 with a full-scale REDD mechanism funding all the costs of avoided deforestation. The Government will remain in control of all funds and the LCDS notes that there will need to be a balance between using the forest payments to enhance opportunities for those who live in forests and recognizing the rights of other Guyanese citizens including the urban poor (Janki, 2009).

Memorandum of Understanding between Norway and Guyana The Memorandum of Understanding (MoU) between Guyana and Norway is a bilateral contract aimed at cooperation between the two countries in the fields of climate change, biodiversity and sustainable, low carbon development. The main part of the agreement is comprised by performance-based payments of US\$30 million in 2010 and potentially up to a total of US\$250 million by 2015 in compensation for Guyana's accelerated efforts to limit forest-based greenhouse gas emissions and establish appropriate institutions to achieve this objective (Government of Guyana & Government of Norway, 2009b). The support will finance both the implementation of Guyana's Low Carbon Development Strategy, and Guyana's capacity building efforts for REDD+ and the LCDS (Gov. of Guyana & Gov. of Norway, 2009a; Henders, 2010). In October 2010, the Guyana REDD+ Investment Fund (GRIF) was established as the financial mechanism for the ongoing cooperation on climate change between Guyana and Norway (Sattur, 2010).

Science and Technology

MRV

Guyana Forestry Commission (GFC) is responsible for planning, management and monitoring the forestry sector and is preparing the FRA reports. Guyana is engaged in the GOFC-GOLD Amazon Regional Network. In Guyana, monitoring of forest cover and inventories are done locally, only in relation to harvesting activities. A national forest inventory is available but very old. More technical capacity (hard- and software) is required for image processing and analysis (Herold, 2009). Until now no satellite data has been applied for this purpose. Guyana is regularly covered by Landsat TM & CBERS. Recently, GFC has acquired full country coverage of historical Landsat and CBERS data (1990, 2000 and 2005). Guyana currently plans to complete a baseline time series of deforestation and degradation together with Conservation International and the Netherlands (Herold, 2009).

The GCF has established a Steering and Technical Sub Committee to establish a Monitoring Reporting and Verification System. Two aspects, among a number of other areas, of the MRVS have commenced:

- Historic mapping and change assessment in forest and non forest by driver for the periods: 1990 to 2000, 2001 to 2005 and 2006 to 2009. First Year annual assessment is being completed for the forest year 2010. A number of interim indicators are being reported on annually, commencing in 2010, including gross deforestation rates, and intact forest landscape; and
- Implementation plan for a systematic national forest carbon measurement system with long term monitoring including map/stratification, sampling design and measurement variables and protocols. Sampling design completed, including protocols established for forest carbon stock assessment as well as for carbon stock changes: system of sampling, and approaches to quantify national expansion and conversion factors (Guyana, 2010b).

The REDD+ Reference scenario would be a combination of historical data and future projections. The LCDS presents one scenario of possible future deforestation under a national development plan. This will be refined, and other scenarios developed.

Indonesia

Policies and Institutions

REDD+

Indonesia is a UN-REDD Programme Pilot Country and a FCP Facility and Forest Investment Program country. Its R-PP was assessed in June 2009. An FCPF R-PP Assessment Note is under preparation and a preparation grant is expected to be signed in the coming months (FCPF, 2011).

In 2008–2009, Indonesia established the world's first national laws relating to REDD. These laws are necessary to clarify the legal and policy framework needed to attract REDD investment (FAO, 2011). On 1 May 2009, the Indonesian Minister of Forestry signed the Ministry of Forestry Regulation P.30/2009 on Procedures for REDD+ Regulation. It introduces the world's first national legal regime for the implementation REDD+ projects, and the issuance and trading of carbon credits in respect of the greenhouse gas reductions such projects generate.

The Ministry of Forestry has the main responsibility for developing the national REDD-plus strategy in Indonesia, though this responsibility now seems to have been taken over by the National Development Planning Agency (BAPPENAS). (Scheyvens, 2010) The main coordinating bodies are National REDD Working Group, National Council on Climate Change (DPNI), and BAPPENAS.

Key government and government-established institutions for REDD in Indonesia (Terrestrial Carbon Group, 2009).

Name of Institution	Mandate
Ministry of Forestry	Responsible for the overall management of forest areas, including improvement and managing public access. Focal point of UNFCCC for Indonesia, with the Ministry of Environment.
Directorate General of Forest Production	Responsible for the management of production forest and industrial forestry estates. Sets production targets and decides on the use of production forest areas.
Ministry of Environment	Involved in implementation of REDD through environmental impact assessments and environmental service concessions. Primary focal point to the UNFCCC.
Coordinating Ministry of Economic Affairs	Responsible for mainstreaming climate change into general development policies. Instructed by the President through Presidential Instruction 5/2008 to the Ministries of Forestry and Environment to issue REDD regulations and gives a clear mandate to coordinate REDD implementation.
BAPPENAS (the national development planning agency)	Coordination of implementation of bilateral and multilateral projects including REDD pilots funded by AusAID and BMZ (German Federal Ministry of Economic Cooperation and Development). Working towards the establishment of a climate change multi-donor trust fund. It is responsible for development and management of national REDD fund. It leads international coordination and overall coordination with line ministries.

Name of Institution	Mandate
National Climate Change Council (NCCC-DNPI)	Newly established. Composed of six government working groups to deal with issues of adaptation, mitigation, technology transfer, finance, forestry and post-Kyoto issues. The exact roles and responsibilities of the forestry working group and links to IFCA are not yet clear. Potentially critical in establishing the Indonesian policy and regulatory framework for REDD. Has been given considerable authority to advise and oversee implementation of climate change adaptation and mitigation policies. Likely to be the future UNFCCC focal point. Relationship with the Ministry of Environment as yet unclear. Established by PP No. 46/2008

The main features of Indonesia's REDD-plus strategy are: (i) policies to reduce emissions from the forest sector will be developed by the national authorities, (ii) REDD-plus activities will be regulated at the national level, including incentive mechanisms and payment distribution, (iii) methodology and institutions will be developed at national and sub-national levels to generate high quality REDD-plus credits; (iv) demonstration activities will be implemented at district or forest management unit level; (v) all levels of government are responsible for stakeholder consultation; and (vi) identification of further studies (Indonesia, 2009).

Indonesia Climate Change Sectoral Roadmap In December 2009, BAPPENAS released *Indonesia climate change sectoral roadmap: Synthesis report* in an attempt to develop a coherent plan that can be supported by line ministries to mainstream climate change into their medium-term development plans (Triastuti, 2010). It looks at adaptation in the agricultural sector, specifically as relates to food production and plantation production (Scheyvens, 2010). In the Ministry of Forestry, key mitigation measures are:

Sink enhancement

- Forest rehabilitation activities mostly on protection forest and watershed
- Development of industrial plantations (HTI), plantations with private entrepreneurs and communities (HTR) on production forest
- Stimulate plantations outside forest lands for rehabilitation or wood production
- Management of natural secondary forests in production, protection and conservation forests.

Emission reduction

- Improved silviculture and logging activities in productive natural forest
- Reducing emissions from forest land conversion particularly on peat forest land
- Reducing emissions from illegal logging and fire.

Tim-8 Under Ministerial Decree the Minister of Forestry has assigned eight experts (Tim-8) as a special think tank team to advise him, inter alia, on the national target of 26% GHG emissions reduction by 2020. Tim-8's work began in Feb 2010 on (i) the macro situation of forestry, (ii) a matrix for forestry reform, (iii) institutional reform, (iv) policy briefs, and (v) special coaching to the Minister. This work has resulted in six policy briefs submitted to the Minister, including one on REDD. Tim-8 recommended various following measures, including:

- Tighten control on forest conversion and implementation of best management practices in concessions;
- Increase establishment of new forest stands, including industrial timber estates, small-scale plantations, community forests on state forest land, village forests, private forests, and forest rehabilitation.

Sub-national approaches

Indonesia has four nationally endorsed REDD+ demonstration sites, including the The Nature Conservancy (TNC)/USAID-led Berau Forest Carbon Program (BFCP), which emulates a national REDD+ mechanism (Yasmi et al., 2010).

The various REDD-plus demonstration activities and projects sprinkled throughout much of the archipelago will offer important lessons for the development of the national REDD-plus system on issues such as RELs, monitoring, reporting and verification, measures to counter drivers of deforestation and degradation, and ways of engaging with indigenous people and local communities. The government appears to be proposing a REDD-plus national knowledge and learning network, which could have an important role to play in drawing out these lessons and bringing them to the attention of the architects of the national REDD-plus system (Scheyvens, 2010).

Carbon and Land Tenure

Since the 1960's Indonesia has divided its land area into two for administrative purposes: the national forest land, *Hutan Negara* and non forest land. The forest land, currently of the order of 112 million ha or about 60% of the land surface, has been administered by the Ministry of Forestry as a national resource for the nation, while the balance of the land has been administered for agriculture and settlement by the other line agencies, including the Ministry of Agriculture (and Estate Crops). Technically the National Land Administration Agency (*Badan Pertanahan Nasional*) has responsibility for the tenure of all land, land surveying and the issuing of entitlements. Enclaves of rural and forest dwelling people within the state forest have been accommodated in a number of ways, since the 1967 Basic Forest Law. (Indonesia, 2008)

Indonesian Forest Land is divided into three major functional categories: Production Forest (*Hutan Produksi*), Protection Forest (*Hutan Lindung*) and Conservation Forest (*Kawasan Konservasi*). Within each of these categories there are a number of other functional zones which constrain the range of uses to which the forest can be put. (Indonesia, 2008)

Indonesia has undergone a shift towards decentralization, environmental protection and restructuring of the forest industry in the past decade (Yasmi et al., 2010). The authority for granting timber and forest conversion licenses and collecting some revenues was rapidly decentralized to the district level during 1999- 2002, followed by some re-centralization. While decentralization of forest management has resulted in some local economic benefits, it has not appeared to have slowed degradation and conversion of forests nor increase the security of property rights for local communities. While locals may be granted timber licenses, they lack the capital to do logging and usually contract with large logging companies, leaving them vulnerable to exploitation. They also lack legal bargaining power, meaning local elites are more likely to triumph in any dispute over property rights (Pfaff et al., 2010; Yasmi et al., 2010).

Legislation related to carbon rights has been enacted that authorizes provincial and district governments to issue permits for the utilization of environmental services, called *Izin Usaha Pemanfaatan Jasa Lingkungan* (IUPJL). The IUPJLs are granted for a term of 30 years and entitle permit holders to store and absorb carbon in both production and protection forests. Ministry of Forestry Decision 36/2009 establishes procedures for granting IUPJLs (Box 16). Although there is no clear statement in the regulations to the effect that an IUPJL for carbon storage entitles the holder to all carbon rights, it is generally accepted that the permit refers to carbon ownership rights. While these regulations add some clarity over carbon rights in protective and productive forests, outside these areas the situation is unclear (FAO, 2011).

Enforcement

Illegal logging and trade have become increasingly important issues in Indonesian forestry. Following the Bali Ministerial Declaration on Forest Law Enforcement and Governance of 2001, many countries, including China, the European Union, Japan and the United Kingdom, developed bilateral agreements with Indonesia to address forest crime and associated illegal trade. In 2005, related efforts included presidential instructions aimed at eradicating illegal logging and associated activities, including a programme to combat corruption which included specific reference to combating illegal logging. The

government has since strengthened control capacity and established a Special Forest Ranger Quick Respond Unit (Yasmi et al., 2010).

With respect to quality of logging, capacity and extent of implementation of codes of harvesting practice, which includes reduced impact logging related measures, is weak in Indonesia. The control of forest and protected areas in Indonesia is also generally weak (Herold, 2009). This is generally due to low capacity within forest authorities to supervise harvests.

Harmonized legality standards to differentiate legal and illegal timber are being developed. Criteria and indicators for sustainable management of natural production forests were made compulsory by the MoF following ministerial decrees in 2002. At present, Indonesia is negotiating a Voluntary Partnership Agreement (VPA) with the European Union. Decree No. P.38 issued by the MoF in 2009 concerning standards for SFM and timber legality denotes recent progress towards this objective (Yasmi et al., 2010).

The national certification scheme – the *Lembaga Ecolabelling Indonesia (LEI)* is not directly comparable with internationally recognized systems as environmental and social requirements are generally less stringent, although over 1 million hectares of forest area have been certified by the LEI. The LEI scheme, however, agreed to work with the FSC in May 2010 to advance collaboration of forest certification in Indonesia (Yasmi et al., 2010).

Finance and Economics

Finance / Economics

The Ministry of Finance Responsible for the design and implementation of payment mechanisms – for example a possible levy on REDD generated revenues and a possible national fund, including a Public Service Agency to manage REDD finances, similar to that managing revenues generated through the reforestation levy (Terrestrial Carbon Group, 2009).

In September 2009, Indonesia pledged to cut its emissions by 26% by 2020, up to 41% with international support, showing leadership months before COP15. A draft report on emissions targets from the State Environment Ministry showed that with the 26% target, Indonesia should cut about 0.7 million tons of CO₂ with an expected cost of Rp 83.3 trillion (9.2 billion USD). If developed nations provided Rp 168 trillion (18.5 billion USD), Indonesia could reduce its emission by another 15% to meet the pledged 41%. Of these emissions cuts, 48% would come from land conversion and the forestry sector and 12% from reduction of peat fires (Simamora, 2010).

Norway LOI Indonesia and Norway have signed a Letter of Intent (LOI) under which Norway intends to provide US\$ 1 billion to support Indonesia's REDD-plus efforts. Specific activities that Norway will support include completing the national REDD-plus strategy, establishing the framework of an independent institution for MRV, and implementing a province scale REDD-plus pilot. It also includes a two-year suspension on all new concessions for conversion of peat and natural forest, starting from Jan. 2011. This will represent the first national mitigation strategy in the forest sector, which is additional to existing plans and targets. The Ministry of Forestry has identified approximately 104.8 million ha of forest that will be affected by the moratorium. Of this, 21.07 million ha of peat forest, 43 million ha of primary forest and 48.5 million ha of secondary forest will be protected from business activities. However, existing concessions will remain valid. Also, according to the Chief Economic Minister, the moratorium on clearing natural forests will apply to the forestry and mining sectors, but it will not apply to developers of strategic infrastructure, such as geothermal power and other renewable energy projects. The Indonesian government plans to establish three institutions to make the LOI operational, namely a financial institution, an MRV institution, and a REDD-plus institution (Scheyvens, 2010).

A significant number of other bilateral funding commitments have been made in regard to REDD+ in Indonesia. For example, under the Australia – Indonesia Bilateral Partnership, the Australian Department of Climate Change and Energy Efficiency and AusAID, Australia is assisting Indonesia to develop its own national forest carbon measurement systems (DCCEE, 2010). The United States is also investing over \$17

million to help Indonesia's efforts to reduce both deforestation and greenhouse gas emissions from its globally critical tropical and peat forest landscapes (United States, 2011).

Science and Technology

MRV / Science

The Directorate General of Forest Plan (the forest spatial planning directorate “Badan Perencanaan”) under the Ministry of Forestry is responsible for the Forest Resource Inventory System (FRIS) and integrated into the National Carbon Accounting System which monitors terrestrial carbon. FRIS will be the MRV basis for REDD and GHGs (Terrestrial Carbon Group, 2009).

Remote Sensing capacity in Indonesia is high because land cover maps and deforestation measurements were done by using Landsat imagery (Herold, 2009). Carbon stocks have been estimated using Tier 1 default factors, but a national inventory is not available. The Indonesian Natural Resources Accounting and Environment Society (MASLI) contracted GMES (Global Monitoring for Environment and Security) to carry out GHG inventories for five pilot areas. Indonesia has submitted a R-PIN for the FCPF and is also engaged in the GOF-C-GOLD SEARRIN Regional Network (Herold, 2009).

For MRV in Indonesia, the key challenge is institutional. Technical capacity does exist within Indonesia, including serviceable hardware and software, but staff numbers and institutional structures must be improved to efficiently coordinate the use of such resources (Herold, 2009). Integration between central institutions (such as a national forest inventory) and regional capacity is lacking and needs improvement. Capacity building towards implementing efficient monitoring strategies and sustainable management is required especially at district level where most decisions concerning forestry are made (Herold, 2009).

The Norway Lol requires the creation of a national independent agency for MRV. It is not certain how and when this will be established. Large differences in national emissions estimates appear to be mainly due to differences in estimates of LUCF sector emissions, especially from peat fires. Studies to reconcile differences are a priority of the government.

There is a larger support program to install a National Accounting System financed by AusAid (Indonesia, 2010). The Ministry of Forestry is participating in various programmes to improve forest cover monitoring. It has collaborated with South Dakota State University to monitor forest cover using low-resolution satellite images (Moderate Resolution Imaging Spectroradiometer, or MODIS) and with Wageningen University using SPOT-Vegetation satellite images. It reported that a pilot project using airborne interferometric synthetic aperture radar (IFSAR, 125 meter resolution) is underway. There is a lack of interpretation expertise within the Ministry, and this pilot project should contribute to building its capacity. JICA is providing support for PALSAR (Phased Array type L-band Synthetic Aperture Radar) use (Centre for International Cooperation, MoFor 2010).

All these activities will contribute to the Indonesia's National Forest Carbon Accounting System (INCAS), which is intended as a highly integrated system that will compile information from Indonesia's forestry and agricultural sectors to provide a robust emissions profile using remotely sensed land cover change data, land use and management data, climate and soil data, growth and biomass data, and spatial and temporal ecosystem modelling. As described above, under the Australia – Indonesia Bilateral Partnership, AusAID, as the key donor assisting Indonesia in developing the INCAS, is providing support for government management teams and equipment to support the INCAS, models adopted, calibrated and further developed by the GOI to estimate emissions from land use change, land cover change analysis and compilation of land use and management information as well as existing ground based measurements, and capacity development of the GOI to operate an effective data management system (Centre for International Co-operation, MoFor 2010).

Kenya

Policies and Institutions

Forestry and REDD+

The revised Forest Act 2005 came into force in 2007, although the new policy is still in draft form. The dominant features of the revised policy and Act are provisions for a new institution to replace the Forest Department, enhanced civil society participation and partnerships in forest management, new benefit sharing arrangements, and recognition of the important role of forests in livelihoods and sustainable development. The subsidiary legislation and the operating rules and regulations required to implement the Act effectively are currently at various stages of development but generally progress is slow (Kenya, 2010a).

The new forest governance measures and associated programs are at an early stage of implementation and have not begun to show results yet. The excision of over 67,000 hectares of the Mau Forest complex for agricultural settlement in the early 2000's was reversed in 2009/10 and the forest is currently being replanted (Kenya, 2010b). Kenya is a FCPF country and a UN-REDD Programme Partner Country. Its R-PP was submitted for review in June 2010. A formulation grant has been signed and funding disbursed (FCPF, 2011).

The Kenya Forest Service (KFS) is designated as the body responsible for coordinating REDD+ readiness activities in Kenya and established a secretariat for the purpose, consisting of representatives from each of its core management programmes. KFS has regulatory as well as management functions. It is a young institution and is still at the stage of developing its organizational structure and decentralized management levels. The day-to-day REDD+ readiness and coordination activities for the R-PP in Kenya are managed by the Climate Change Response Programme at the KFS, as was the formulation of the R-PIN previously (Kenya, 2010a).

Kenya's REDD + strategy has the following main objectives:

- To reduce emissions from deforestation and degradation of existing forest lands
- To increase carbon stocks in existing forests
- To reduce pressure on forests
- To enhance the value of forests to livelihoods and the national economy

The strategies that are proposed to attain these objectives are designed to address the main drivers of deforestation and degradation (clearance for agriculture, unsustainable utilisation and poor governance) and draw on lessons learned and successes in addressing degradation and enhancing carbon stocks in recent years. The drivers are interlinked (for example both unsustainable utilisation and clearance for agriculture are partly due to poor governance) and some of the strategies proposed will have an impact on several drivers (Kenya, 2010a).

The strategies proposed for the R-PP fall into priority areas as follow:

- Reducing pressure to clear forests for agriculture
- Promoting sustainable utilisation of forests
- Improving governance in the forest sector
- Promoting enhancements of carbon stocks (Kenya, 2010a)

Vision 2030

Kenya Vision 2030 is the country's new development blueprint covering the period 2008 to 2030. It aims to transform Kenya into a newly industrialising, "middle-income country providing a high quality life to all its citizens by the year 2030".

Agricultural interventions call for increase in productivity "through better yields in key crops, increased small-holder specialisation in the cash crop sector (2-3 crops per plot), utilisation of a million hectares of currently uncultivated land, and new cultivation of up to 1.2 million hectares of newly-opened lands." The flagship projects for 2012 will involve:

- Preparation and passage of consolidated agricultural policy reform legislation.
- Development and the implementation of a 3-tiered fertilizer cost reduction programme.
- Improving the value gained in the production and supply chain through branding Kenyan farm products.
- The planning and implementation of 4-5 Disease Free Zones and livestock processing facilities to enable Kenyan meat, hides and skins to meet international marketing standards. There will be more domestic processing of these products for regional and international markets.
- The creation of publicly accessible land registries, under an improved governance framework.
- Development of an Agriculture Land Use Master Plan
- Tana River Basin Agricultural Development Scheme

Kenya aims to be a nation that has a clean, secure and sustainable environment by 2030. The goals for 2012 are: (i) to increase forest cover from less than 3% at present to 4%; and (ii) to lessen by half all environment-related diseases. Specific strategies will involve promoting environmental conservation in order to provide better support to the economic pillar flagship projects and for the purposes of achieving the Millennium Development Goals (MDGs); improving pollution and waste management through the design and application of economic incentives; and the commissioning of public-private partnerships (PPPs) for improved efficiency in water and sanitation delivery. Kenya will also enhance disaster preparedness in all disaster-prone areas and improve the capacity for adaptation to global climatic change. In addition, the country will harmonise environment-related laws for better environmental planning and governance.

The flagship environment projects for 2012 are:

- The Water Catchment Management Initiative: – This calls for rehabilitating of the 5 water towers (i.e. Mau Escarpment, Mt. Kenya, Aberdares Range, Cherangani Hills and Mt. Elgon)
- Securing the Wildlife Corridors and Migratory Routes Initiative: – Kenya will conserve wildlife corridors and migratory routes;
- The Land Cover and Land Use Mapping Initiative: – comprehensively mapping land use patterns in Kenya. (Kenya, 2007)

Agriculture

On-farm tree planting has gained momentum in recent years as a result of agroforestry extension efforts over the past two decades and this is set to increase with efforts to achieve the National Plan (Vision 2030) target of 10% of land area covered in trees. In addition there is increasing interest shown by private individuals in establishing commercial plantations in recent years. Wood processing is primarily a private sector activity and in recent years a number of saw-millers have established fast-growing plantations as a means of securing future timber supplies. Private companies have expressed interest in taking concessions on state plantations as this is now provided for in the 2005 Forests Act. However, no concession arrangements have been agreed to date and the regulations governing the same are now being finalized (Kenya, 2010a)

Of particular note is the Agriculture (Farm Forestry) Rules 2009 introduced under the Agriculture Act, aimed at promoting and maintaining farm forest cover of at least 10 per cent of every agricultural land holding as a means of preserving and sustaining the environment in combating climate change and global warming. The proposed new constitution, also refers to a target of achieving and maintaining tree cover of at least 10% of the land area of Kenya (Article 69(1)(b)). The new constitution if passed in a national referendum later in 2010, is also likely to have important implications on management of trust lands where % of Kenyas forest resources are found. The constitution redefines land public, community and private land, and provides for revision of existing land laws and for establishment of a new Land Commission responsible for regulation and management of land and land-use planning in Kenya. In addition new Land Policy has been drafted and is currently under public discussion. The new policy aims to streamline land management and administration, review existing land laws and address past problems including inequalities in access to land, land tenure issues, under-utilisation or abandonment of land, and over exploitation and unsustainable use of land. The new constitution and land policy are likely to have far reaching impacts on the management of forests in trust lands currently managed by district councils (Kenya, 2010b).

Carbon and Land Tenure

Land is a critical resource for the socio-economic and political developments spelt out in Vision 2030. A national land use policy needs to be completed that will facilitate the process of land administration, the computerisation of land registries, the establishment of national spatial data infrastructure in order to track land use patterns, and the introduction of an enhanced legal framework for faster resolution of land disputes (Kenya, 2010a)..

KFS owns and manages all State Forest Reserves, but under the new Act it also has regulatory functions relating to all other public and private forests. These regulatory functions are aimed at ensuring forests receive appropriate protection and are managed sustainably through management plans. Trees on private farms are not subject to state regulation. Private forests consisting mainly of commercial plantations, and fuel wood plantations owned by tea estates, are not subject to KFS interference except in cases of destruction or mismanagement, in which case they can be declared provisional forests and are temporarily brought under the jurisdiction of KFS. Local Authority forests on trust lands are not regulated by the KFS unless requested to do so by the Local Authority (Kenya, 2010a).

Finance and Economics

World Firsts

The US-based conservation consultancy Wildlife Works Carbon issued the world's first offset credits for the voluntary carbon market from a project designed to reduce emissions from deforestation and forest degradation (REDD). The Voluntary Carbon Standard (VCS) issued the Voluntary Carbon Units (VCUs) to Wildlife Works' Kasigau Corridor REDD project, which protects over 500,000 acres of forest in Rukinga, Kenya (Warner and Peters-Stanley, 2011)

Vi agroforestry, a Swedish NGO, has also begun the implementation of Africa's first agricultural carbon sequestration project in Kenya. Through the program, small-holder farmers are trained in diverse cropland management techniques, including cover cropping and agro-forestry, intended to make the land more resilient to climate change and improve food security in the region (Forest Carbon Portal, 2010). Developed with the support of the World Bank, the Kenya Agricultural Carbon Project the project generates carbon credits which are sold to the Bank-administered BioCarbon Fund. The direct benefit to local communities is over \$350,000 with an initial payment of \$80,000 to be made in the first year, 2011. The Project is located on 45,000 hectares in the Nyanza Province and Western Province of Kenya (World Bank, 2010b).

Science and Technology

MRV

The Kenya Forest Service (KFS) is in charge of forest inventory and monitoring in Kenya. The organization has a forest inventory and GIS Department carrying out natural and plantation forest inventories, biodiversity and socio-economic surveys. The Department of Resource Survey and Remote sensing (DRSRS) is a government agency for natural resource surveys, remote sensing, aerial surveys, vegetation mapping and database development (Herold, 2009).

In terms of information gaps related to the drivers of deforestation and degradation, there is inadequate data on the forest resources and trees outside forests, private plantations, biomass in bush and dryland forests. There are also data gaps related to the impact of fires on forest resources and carbon stocks (Kenya, 2010a).

Landsat and CBERS imagery covers only a small part of Kenya and forest inventory data in Kenya is limited. Technical capacity is required for regular image processing and analysis (Herold, 2009).

Lao PDR

Policies and Institutions

Forestry and REDD+

Lao PDR's REDD engagement is rated high. Laos is a FCPF and Forest Investment Program country and has submitted an R-PIN to the FCPF (FCPF, 2011). It has also submitted a National Communication to UNFCCC (Herold, 2009).

Lao PDR has a Forestry Strategy 2020 (FS2020) which articulates current Lao Government policy for forests and forestry. This policy, endorsed in 2005, guides the development of the forestry sector in line with other national strategies (Yasmi et al., 2010). The major targets for the forestry sector which must be achieved to contribute to poverty eradication, that are set out in the Forestry Strategy 2020 are:

- To improve quality of existing forested area, which is about 70% of the total land area, by naturally regenerating up to 6 million ha and planting trees up to 500,000 ha in unstocked forest area as an integral part of a rural livelihood support system encompassing stable water supplies and prevention of natural disasters.
- To provide a sustainable flow of forest products for domestic consumption and generate household income through sale and export, thus contributing to livelihood improvement, fiscal revenue and foreign exchange earnings whilst increasing direct and indirect employment.
- To preserve the many species and unique habitats, which are, for different reasons, threatened both within the country and elsewhere.
- To conserve environment including protection of soil, conservation of watershed and climate.

Many important steps have been taken towards achieving these targets, such as the establishment of National Conservation Forests (NCF) and Production Forest Areas where sustainable management is being practiced and timber originating from these areas can be "Certified". The Forest and the Wildlife and Aquatic Laws and subsidiary Decrees on Production Forest Management have recently been promulgated as well as a National Biodiversity Strategy and Action Plan. (Laos, 2010a)

Lao PDR also has a REDD R-PP (Laos, 2009). A REDD+ Task Force and a REDD+ focal person within Department of Forestry have been responsible for progress to date. However, major changes are needed to effectively implement the Readiness Implementation phase (Laos, 2010a).

Sub-national REDD Project The Wildlife Conservation Society (WCS) is currently working with the Government of Lao PDR under the international *Convention on Biological Diversity* to plan for and manage two large landscapes under the *Program of Work for Protected Areas*. These landscapes are, i) the Nam Et Phou Loey National Protected Area in north-eastern Laos and, ii) Bolikhamxay province in central Laos, including the Nam Kading National Protected Area. In these landscapes, WCS is now collaborating with various partners to undertake feasibility assessments to determine how two sub-national REDD projects focused on the voluntary carbon project might be developed and implemented to provide long-term sustainable financing while achieving the "triple benefits" of, i) reducing deforestation and degradation, ii) conserving biodiversity, and iii) improving local livelihoods. The feasibility assessment for each landscape will include: assessments of carbon stocks, based on available plot data; analyses of deforestation rates, based on available satellite imagery and ground-truth data; analyses of drivers of deforestation; spatial modelling to construct a baseline scenario; and estimation of a project scenario, based on the assumption of being able to reduce deforestation by a certain percentage. The steps for moving ahead are informed by previous WCS experience in successfully setting up sub-national REDD projects to secure triple benefits for pilot sites in the Makira National Park in Madagascar and the Seima Protection Forest in Cambodia (Laos, 2009).

Agriculture

Agricultural markets remain a key issue in the Lao PDR though the face of these issues is changing. Market access for smallholder farming households is still a barrier to increasing incomes and improving livelihoods, although increasingly the socio-political pressures that influence smallholder farming households are leading to a wider range of issues including inequitable contracts, undermined food security, lack of access to land and pressures to use land for designated production. Mechanisms are needed to equip smallholder farming households to operate within increasingly complex market places and contexts. (CIAT, 2010)

The four priority policy goals for the agriculture and natural resources sector are:

- 1 Food security;
- 2 Commercialization of agriculture;
- 3 Stabilisation of shifting cultivation; and
- 4 Sustainable forest management (Laos, 2010a).

The Agriculture Development Strategy (ADS) 2011 to 2020 is a long term framework for the development of the sector.

Lao Agriculture Development Strategy 2020 In Lao PDR, the forestry portfolio is linked with agriculture and other functions (e.g., fisheries). The Ministry of Agriculture and Forestry (MAF) adopted a 5-year Agriculture and Forestry Development Plan 2006-2010, which a target of increasing forest cover from 9 million hectares (42 percent) to 12 million hectares (53 percent) by 2010 (Yasmi et al., 2010).

Development Goals by 2020 include:

- Gradual introduction and increased application of modernized lowland market-oriented agricultural production, adaption to climate change and focused on smallholder farmers
- Conservation of upland systems, ensuring food security and improving the livelihoods of rural communities. (Laos, 2010b)

UNDP GEF Project: Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts The objective of the proposed project is to minimize food insecurity resulting from climate change in Lao PDR by reducing the vulnerability of farmers to extreme flooding and drought events. In order to achieve this and to help to increase the overall adaptive capacity of the agriculture sector in Lao PDR to a changing climate, and improve the resilience of food production systems, the project proposes the following four-pronged approach:

- Strengthening of the national knowledge and information base on climate change impacts in Lao PDR and their effects on agricultural production and food security;
- Enhancement of the capacity of sector planners and agricultural producers to understand and address climate change – related risks and opportunities for local food production;
- Demonstration and promotion of diversified and adaptive agricultural practices and other off farm livelihood alternatives at the community-level; and
- Adaptation monitoring and learning as a long-term process that assures that lessons learnt do benefit the local population, as well as national policies and international Climate Change adaptation efforts (GEF, 2010).

Smallholder Agricultural Market Development in the Uplands of Lao PDR Phase III of the Small Smallholder Agricultural-market Development in the Uplands of the Lao PDR (SADU) Project is a four-year project to be implemented between July 2009 – June 2013, by the International Centre for Tropical Agriculture (CIAT) in partnership with the National Agriculture and Forestry Research Institute (NAFRI) and the National Agriculture and Forestry Extension Service (NAFES) and Provincial Agricultural and Forestry Offices in Xieng Khouang and Luang Prabang Provinces. The Project is funded by the Swiss Agency for Development and Cooperation (SDC).

Carbon and Land Tenure

The Constitution and Forestry Law clearly affirm the state as the sole landowner and ultimate decision-maker over resource use (Yasmi et al., 2010). Tenure rights over forest land are defined by the Forestry Law (2007), whereby natural forest and forestland is the property of the national community/ managed by the State and user rights can be granted by State. Trees planted by people or planted by an organization in designated areas shall become their property, if their labor and/or funds have been used. Rights to use natural forest, planted forest and forestland areas can be allocated by the State to village administration authorities for long term sustainable use according to the management plan and laws and regulations (Art. 90). The right to use natural forest can not be transferred through inheritance (Art 91). (Laos, 2010a)

While the Forest Law (2007) and the Land Law are clear about the status of land, they place restrictions on the area of degraded and barren forestland that can be approved for conversion by district, provincial and national authorities. Conversion of stocked forest (>20% crown closure) is only allowed under special circumstances and must be provided for in the NSEDP and approved by the National Assembly. By implication all other conversion of forest is illegal although large areas have been approved for conversion in recent years. Land-use plans only map areas with forest cover and do not include information on the quality of the forest. so that approval may be given for the use of a specific area without any information as to whether it carries forest and if so in what condition. Many concessions appear to be granted on the basis of rough boundaries drawn on maps. The Law is frequently disregarded for a variety of reasons (Laos, 2010a).

There is a wide range of forest resource tenure rights, including state property; communal rights that may be shared by members of the community; private assigned to individuals, corporate bodies and non profit organizations; and open access. As a result, several different stakeholders may have rights and interests, and consequently entitlements to REDD+ benefits. The entitlement of ethnic groups and local communities to REDD+ benefits presents a particular problem because they typically do not hold registered title and enforceable rights over the land they manage. During the PLUP process, agriculture and forest land is delineated and may be followed up with Allocation as Village forests or for Community management according to local circumstances (Laos, 2010a).

Carbon tenure is linked to who owns or manages the forests. In Lao PDR, forests are considered as a national asset, but the law has provision for forests to be allocated to villages to provide a local source of forest products, and Communities can be assigned responsibility for managing local areas of state forest. Carbon stocks differ from timber, in that their value on the carbon being conserved while timber's value depends on its utilization. Under present arrangements for timber, the government collects the major part of the stumpage value and only a very small proportion is allocated to local communities. In the case of carbon, the government will receive payments if the carbon stock in state forests is conserved, but in principle, the villagers should receive the payments if their carbon stocks are conserved (Laos, 2010a).

Enforcement

With respect to quality of logging, capacity and extent of implementation of codes of harvesting practice, which includes reduced impact logging related measures, is weak in Lao PDR. This is generally due to low capacity within forest authorities to supervise harvests (Yasmi et al., 2010).

The Forest and the Wildlife and Aquatic Resources Laws have recently been revised and promulgated and provide a good regulatory framework, but many officials at lower levels in Province and District are not familiar with the provisions, so that enforcement is generally weak. Illegal logging is a serious problem despite many provisions in the Law that could be used to control it. The government has created a new Department of Forest Inspection charged with dealing with this problem, but the staff are still under training and it suffers from severe budget limitations (Laos, 2010a).

The recent establishment of the new Department of Forest Inspection within MAF to improve Law enforcement in all forest related activities including illegal logging, is a step towards improving monitoring and governance in the sector. Progress, however, is severely hampered by inadequate allocation of funds in relation to the magnitude of the tasks and by lack of experienced staff to implement the measures,

especially at Province and District level. The REDD+ concept is highly relevant for Lao PDR, since it will provide some of the essential funding as well as some motivation to stakeholders to commit to forest conservation and sustainable management (Laos, 2010a).

Finance and Economics

Lao PDR is considering the possibility of establishing a new and special REDD+ fund through discussions with the Ministry of Finance and other stakeholders (Laos, 2010a).

There are a number of on-going projects that are involved in land-use planning at different levels and in different parts of the country that will provide vehicles, to which REDD+ funds can be added to incorporate assessment of forest quality and carbon stocks into their work in selected villages, district and provinces to pilot the planning work needed and to later assess the reduction in emissions achieved. Such projects have been funded by the Asian Development Bank, Germany and Finland. The project funded by Finland is develop integrated spatial plans for the selected Provinces (Laos, 2010a)

Lao-German Climate Protection through Avoided Deforestation for (CliPAD) Program Based on the Government to Government negotiation in April 2008 and subsequent pledges from the German government, the implementation of the “Climate Protection through Avoided Deforestation for (CliPAD) Program” started in January 2010 with the Technical Cooperation Module implemented by the Department of Forestry and GTZ. The German technical cooperation contribution provides national policy advisory services, capacity development and institutional support in the area of forests and climate change mitigation. These are implemented within selected REDD pilot activities in and around the conservation areas of Nam Phui (Sayaboury Province) and Nam Et Phou Loey (Houphphan Province). The results will be fed into the national, regional and international debate on forest conservation and climate change mitigation. The relevant support components are: provision of advice by local and international long-term and short-term specialists, training of partner staff, local subsidies and financing contributions for the implementation of REDD pilot measures. The focus of the CliPAD program is on forests in and near national protected areas under acute or potential threat through destruction or conversion into other forms of land use combined with high GHG reduction potential and particular significance for species protection and water management in the region (Laos, 2009).

Science and Technology

MRV / Science

The Department of Forestry (DOF), part of the Ministry of Agriculture and Forestry (MAF) is responsible for forest inventories and monitoring. Lao PDR is regularly covered by Landsat and CBERS, however, there is only very limited in-country expertise concerning the application of remote sensing techniques and no archives with this information (Herold, 2009). The data on historic and current land-use is incomplete and inconsistent, since it is compiled and archived by several different institutions at national level. A National Forest Inventory was carried out between 1991 and 1999 and it is proposed that a new inventory will be conducted as soon as possible. Most provinces also hold data on land-use, which frequently differs from that held centrally. The most important source of historic data is the Assessment of Forest Cover and Land-use change 1992-2002, published by the Forestry Department in 2005. (Laos, 2010a)

A reference emission level has been developed using a development model to assess the likely changes in emissions from 2011 to 2015. This shows a slow decline in emissions from an estimate of around 51 million tonnes CO₂ in 2010 to around 42 million tonnes in 2015, but it is not a linear decrease as a substantial expansion in the area cleared for hydro-power is expected in the next few years. The model estimates are very dependent on the many assumptions that are made, which have been necessary due to lack of complete data (Laos, 2010a).

In Lao PDR, the information base is much better for production forests than for other forest categories (Herold, 2009). Changes in forest biomass and carbon are key issues for REDD+ monitoring and reporting. For the future, REDD+ will need strict verification of actual reductions in CO₂ emissions, and there is a risk that the lack of control over what is happening on the ground will mean that actual reductions achieved in some areas may be offset by additional emissions elsewhere (Laos, 2010a).

LIDAR Pilot (SUFORD)

The LIDAR pilot was supported by the Government of Finland and implemented through the Sustainable Forestry and Rural Development (SUFORD) project. A recent study in Lao PDR has demonstrated that aboveground and belowground carbon can be estimated accurately, and effectively using LiDAR technology in combination with satellite imagery and field sample plots. (Laos, 2009)

Monitoring Techniques for Carbon Stock Monitoring in Lao PDR – Pilot Study (SUFORD)

The objective of the study was to develop and demonstrate a proof-of-concept system to monitor land cover and forest resources in a tropical region using satellite imagery. The system combined wall-to-wall medium resolution satellite data, a sample of Very High Resolution Data (VHR) and field data. (Laos, 2009)

Lao PDR needs resources to improve its capacity of remote sensing. More personnel and more training is needed to facilitate the use of GIS and remotely sensed data (Herold, 2009). Previous experience suggests that a combination of ground-based inventories and analyses of remotely sensed data (satellite images, aerial photographs) using multi-phase or multi-stage sampling approaches has to be used to monitor carbon emissions and removals. While already a large amount of relevant data and information for REDD+ has been collected in Lao PDR, a major shortcoming is the proper storage, retrieval and reporting of the very information. Instead of preparing a separate reporting system for forest carbon and REDD+ , it is will be incorporated it into the proposed integrated Forest Information System (Laos, 2010a) .

The Program for Forest Information Management (FIMP) will address the problem of inconsistency between forest cover assessments at various times by preparing a nation-wide forest base-map 2010 using ALOS, SPOT-5 and Rapideye imagery and carrying out a nation-wide field survey in 2010 collecting basic information on species, diameter, height and density and will use SPOT4 imagery to prepare a nation-wide forest cover map for 2005. (Laos, 2010a). The country also participates in the Southeast Asia Regional Research and Information Network (Herold, 2009).

Malawi

Policies and Institutions

Forestry and REDD+

Malawi's forests cover about 36% of the country. Most of the forest in Malawi belong to the Miombo woodland and have a low commercial value due to slow growth. Nevertheless, the rate of deforestation in Malawi is high: Between 1990 and 2005, the country lost nearly 13 percent of its total forest cover due the fact that the majority of people depends on forests for fuel wood. Malawi has few natural resources except forest and could benefit from sustainable forest management and eco-tourism initiatives (Wines, 2005).

In the 1990s, Malawi's National Environmental Action Plan (NEAP) identified deforestation as one of nine key issues with a recommended revision of the environmental and natural resource sector policies. The resulting Malawi National Forest Policy (1996), and the Forest Act of 1997, aim to provide an enabling framework for promoting the participation of communities and the private sector in forest conservation and management. Eliminating the restrictions on harvesting forest products by communities is a central priority (Government of Malawi, 1996). This was reinforced in 2003 when a supplement to the Forest Policy; Community Based Forest Management was launched. Malawi emphasises the role of local communities and the private sector in forest management and protection. The Standards and Guidelines for Participatory Forestry in Malawi (2005) provide the basis for all community level forestry interventions from tree planting through to co-management of state forest reserves/plantations. The EU invested €15m to support co-management of state forest reserves through the Improved Forest Management for Sustainable Livelihoods Programme (IIED, 2008).

The Department of Forestry has the overall responsibility for the management of the forest sector and the formulation of forestry policies (SADC, 2011). The National Forest Programme (2001) has as one of its 12 key strategies "Support for community based forest management: recognising a broad range of village institutions and developing their capabilities, along with those of extension staff, for collaborative management" (Government of Malawi, 2001). The National Land Policy also advocates a community approach to resource management but with a slightly stronger emphasis on customary land being exclusive to the Traditional Authority with a formalisation of the traditional supervisory roles of chief, clan leader, head person and family heads (Government of Malawi, 2000; IIED, 2008)

In general, the Malawi Government is primarily focused on adaption and engagement in REDD+ is more limited. The Ministry of Agriculture is responsible for agricultural adaption policies. The Government of Malawi Department of Forestry, the Forest Research Institute of Malawi as well as the Mzuzu University have been involved in preparatory projects together with international partners to evaluate the potential for REDD+ and find appropriate methodologies for implementing a future REDD+ mechanism (SADC, 2011).

Agriculture

More than 90% of the people of Malawi, mainly resource-poor rural communities, are predominantly engaged in subsistence rain-fed agriculture. Currently about 60% have insecure access to food on a year-round-basis, with female- and children-headed households the most vulnerable. Extreme weather events due to climate variability, and low capacity to adapt to the adverse impacts of climate change aggravate food security risks. This situation is further compounded by rapid environmental degradation as a result of agricultural expansion to marginal lands and deforestation, inadequate knowledge and skills in the productive use and management of land and natural resources, inadequate access to land and credit, poor health services, and gender inequalities. By better managing the climate risks that exacerbate all of these problems, the proposed project addresses one of the core challenges identified by the Government's Malawi Growth and Development Strategy (MGDS) 2006–2011, contributes to achieving and sustaining

the Millennium Development Goals, and fosters food-security, sustainable economic growth and improved rural livelihoods (World Bank, 2007).

Carbon and Land Tenure

Most of the land in Malawi is held under customary tenure. Customary land is land falling under the jurisdiction of a recognized traditional authority, which has been granted to a person under customary law; such land is allocated to the person, resident or immigrant, by the traditional leaders holding jurisdiction over the land. Once customary land has been allocated to the family or lineage under the customary tenure, the land is perceived as the property of the family in perpetuity (Chirwa, 2008).

The World Bank (2003b) notes that the majority of the rural population, which produces 84 percent of agriculture value, on average own only 1 hectare of land. More recent estimates indicate that 55 percent of smallholder farmers have less than 1 hectare of cultivatable land (Chirwa, 2008).

Following a number of studies on land access and utilisation, the Government formulated a National Land Policy, which seeks to give legal recognition to customary land and in which 'a customary estate will have private usufructuary rights in perpetuity, and once registered, the title of the owner will have full legal status and can be leased or used as security for a mortgage loan' (Chirwa, 2008). The Malawi Government has also introduced a willing seller/willing buyer approach to land redistribution and a resettlement programme to the landless or near landless (GOM, 2002a; World Bank, 2004).

In 2004, the Government launched a pilot project, the Community-Based Rural Land Development Project (CBRLDP) in four districts (Mulanje, Thyolo, Machinga and Mangochi) in southern Malawi – where the average land holdings among smallholder farmers are smallest with the highest population density. The CBRLDP is funded by the World Bank through the International Development Association in the form of a grant to the Malawi government amounting to US\$27 million. The main objective of the CBRLDP is to increase the incomes of about 15,000 poor rural families in the four pilot districts by providing land to the landless and land-poor (Chirwa, 2008).

It is reported that the key district level organization (the District Forest Office) has inadequate technical and financial resources. There is a general perception by District Executive Committees that the Department of Forestry has failed to devolve financial functions to the district level. For example, in 2007 the annual budget for one district with multiple staff and vehicles was MK 75,000 (US\$ 500). This is not adequate for the scale of activity required for effective CBFM. But with decentralisation coming into effect, this situation should now improve. (IIED, 2008)

In terms of carbon, benefit sharing mechanisms for community-based forest management are unclear, and the ratios for sharing profits between the forest dependent communities, district and central government authorities for co-management of state forest resources have not yet been finalised. While there are some examples of community development funds being opened and used, the general situation is that the revenue collected from sale of forest produce goes to the Treasury. Local government authorities such as the District Forest Office therefore have little motivation to develop workable solutions as they do not receive proportional operational funding commensurate with the forest revenue generated (IIED, 2008).

Finance and Economics

Agricultural Development

Smallholder Crop Production and Marketing Project (SCPMP) The African Development Bank's *Smallholder Crop Production and Marketing Project (SCPMP)* was approved in July 2006 by the AfDB Board, and signed by the Malawi Government and AfDB in November 2006, with AfDB grant financing for the equivalent to USD 21.6 million. The overall sector goal of the SCPMP is to contribute to poverty reduction and food security in rural Malawi, specifically aiming to increase productivity and income of rural households This will be achieved through the promotion of intensification and diversification of the

existing agriculture systems and improvement to the marketing system, which will significantly increase production, productivity and incomes of the small farmer whilst improving household nutrition and environmental management of natural resources (World Bank, 2007).

Comprehensive Africa Agriculture Development Program (CAADP) CAADP was established by the African Union's New Partnership for Africa's Development (AU/NEPAD) in July 2003 and is the highest policy level framework for the development of agriculture in Africa. The overall goal of CAADP is to "help African countries reach a higher path of economic growth through agriculture-led development, which eliminates hunger, reduces poverty and food insecurity, and enables expansion of exports." The Common Market for Eastern and Southern Africa (COMESA) has the mandate to implement the CAADP agenda in eastern and southern Africa. Malawi entered the CAADP compact in April 2010. To realise CAADP's objectives, participating African governments agree to increase public investment in agriculture to a minimum of 10 percent of their national budgets with the aim of raising agricultural productivity by at least six percent annually. So far, only Malawi and Zimbabwe have met and beaten the 10 percent budget allocation. Malawi is focusing on several priorities including food security and risk management; commercial agriculture and marketing; and, sustainable land and agricultural management. In its 2010/11 National Budget, Malawi has allocated about \$210 million to the agriculture and food security sector, representing 11 percent of the budget.

Science and Technology

MRV

Technical Support for the Development of REDD Projects in Malawi, USAID Working with the Malawi, Environmental, Endowment Trust (MEET), and Bioclimate Research and Development, on a project funded by the United States Agency for International Development (USAID), a participatory process has been developed. This process is for Monitoring Assessment and Verification of ecosystem service benefits from Reduced Emissions from Deforestation and Forest Degradation (REDD) projects in national parks and forest reserves in Malawi. It has been undertaken in collaboration with technical staff from Forest Research Institute of Malawi (FRIM), LEAD, and the Government of Malawi Department of Forestry. Local technical staff and community field workers were trained in mapping, forest survey, and participatory approaches to defining REDD baselines, and estimating project effectiveness; and produced methodologies, technical papers, and contributions to project design documents for submission to the Plan Vivo Foundation (Ecometrica, 2009).

Mexico

Policies and Institutions

Forestry and REDD+

The Interministerial Climate Change Commission (ICCC) was created in 2005 for the purpose of coordinating the actions of the agencies and entities of the Mexican Federal Government related to the design and implementation of national policies for preventing and mitigating greenhouse gas emissions, adapting to the effects of climate change and, in general, promoting the development of climate change action programs and strategies geared to the fulfillment of the commitments made by Mexico (Sanchez et al, 2006).

This means the ICCC is in charge of decision making on climate change issues, such as adaptation and mitigation policies, while the National Forest Commission (CONAFOR) coordinates the implementation of the REDD-strategy.

Mexico is involved in the FCPF and Forest Investment Program and is a UN-REDD Programme Partner Country. Mexico has submitted a National Communication to UNFCCC (including a GHG inventory for LULUCF, tier 1) and prepared an R-PIN for the FCPF in 2009. Its R-PP was assessed in March 2010 (FCPF, 2011).

The Strategic Forestry Program for Mexico 2025, created in 2001, is also the responsibility of the National Forestry Commission (CONAFOR). The objective is to develop Sustainable Forest Management (SFM) in accordance with the guidelines established by the "Montreal Process" (Sanchez et al, 2006). The Program of Direct Support for the Countryside (PROCAMPO) facilitates sustainable forestry projects, agroforestry systems, and ecotourism projects in more than 2,500 pieces of land covering some 32,000 hectares.

Agriculture

Agricultural sector mitigation actions fall under different laws. They are within the Law for Sustainable Rural Development. However, there are programs that cut across both forestry and agricultural sectors. An example is the forest fire prevention program. The agricultural sector collaborates with the forestry sector in forest fire prevention by encouraging the substitution of slash-and-burn practices crucial to natural vegetation management in shifting peasant agriculture, and employed most especially in rainforest areas in southeastern Mexico, through the dissemination and application of alternative methods. It also carries out forest fire prevention activities in order to improve response capacities with the participation of local authorities, peasant communities, and volunteers (Mexico, 2009). Mexico plans to use AFOLU to meet 58% of national mitigation. Actions will include:

- Soil rehabilitation, enhancement and conservation in agriculture.
- Improvement of land grazing practices.
- Reconversion of agricultural lands to perennial crops and forests.
- Conventional production systems to organic production.
- Co-responsibility principle: establish commitments with farmers to
- Include sustainable practices in their productive activities.
- National system to combat desertification. (Mexico, 2009)

Carbon and Land Tenure

Most of the forest land in Mexico is communal land (or '*ejido*' in Spanish). The *ejido* system is a process, strengthened by the reform of the Mexican Constitution, whereby the government promotes the use of land by communities. The land is divided into communal land and 'parcelled land' owned by the community members. Therefore, in order to be effective, any forestry project has to consider local communities' needs (FAO, 2011).

80% of land is under communal management (*ejidos*) and smallholders have strong property rights but strict land use regulations prevent communities from gaining incomes from forestry related activities, increasing forest conversion (Karaisl, 2009).

The national legal framework does not contemplate forest carbon rights specifically. Nevertheless, private contracts could be considered as an alternative way to regulate the interests of the parties. To stipulate a contract, the federal civil code requires only an agreement between the contracting parties and the definition of the object. Contracts could be stipulated between local land owners and buyers of carbon sequestration rights. To reduce transaction costs, potential buyers of carbon rights would presumably be encouraged to invest in projects covering an extended forest area, implying cooperation agreements among local land owners (FAO, 2011).

Enforcement

In 1992, Federal Agency for Environmental Protection (PROFEPA) and laws to prevent unauthorized land-use change and illegal logging were established to protect forests on communal lands (Johnson et al, 2010). PROFEPA is tasked with enforcement of forest laws. However, insufficient human and financial resources prevent effective enforcement of forest laws. Successful expansion of forestry sector interventions in Mexico depends on institutional changes in forest management, improved public financing mechanisms, and the development of a market for sustainable forest products (Johnson et al, 2010).

Finance and Economics

REDD+ Funding

During the United Nations climate change negotiations (COP16) in December 2010, Norway and Mexico sign a US\$15 million collaborative agreement to build Mexico's REDD+ capacities in the area of measuring, reporting and verification (MRV). The agreement, entitled "Reinforcing REDD+ Readiness in Mexico and enabling South-South cooperation", aims to strengthen Mexico's capacities for a national MRV system of greenhouse gas emissions by sources and removals of sinks, forests carbon stocks and natural forest area changes in accordance with UNFCCC decisions and methodological guidance (UNREDD, 2010b). The implementation of the agreement will be carried out by the National Forestry Commission (CONAFOR) with the technical and administrative support from UN-REDD Programme's FAO and UNDP agencies. Norway and Mexico agreed that disseminating the Mexican experience in developing its own MRV system with other REDD+ countries, and promoting the regional exchange of experiences and capacities on REDD+ will be key in expanding the global knowledge base on such methodologies and approaches (UNREDD, 2010b).

Mexican Carbon Fund (FOMECAR)

Launched in September 2006, this is a joint initiative between National Bank for Foreign Trade (Banco Nacional de Comercio Exterior, or Bancomext) and the Mexican Ministry of the Environment and Natural Resources (Semarnat), with initial capital of US\$ 350 million and plans to add additional lines of credit valued at US\$200 million. This initiative makes Mexico the first country to finance CDM projects through a government mechanism. Through FOMECAR, the use of financial instruments in line with CDM will be promoted and GHG Emission Reductions Certificates and/or carbon credits will be generated so that the companies proposing these projects can decrease costs and generate additional annual income,

estimated at between US\$300 and US\$400 million. Bancomext has signed technical assistance agreements with the World Bank to secure this organization's support of the formation of FOMECA. In the short term, the Fund would operate like a trust fund, with largely private participation, to which would be added financial companies and institutions such as the Inter-American Development Bank (IDB) and the World Bank, as well as Carbon Funds in purchasing countries like Spain (National Environmental Commission, 2010).

CDM in the forestry sector

Under the coordination of CONAFOR, carbon capture in an integrated forestry and agroforestry system in the Los Tuxtlas Biosphere Reserve in the State of Veracruz, is an approved CDM project. This Reserve conserves one of the most important remaining tracts of tropical rainforest in Mexico. The enormous biodiversity of this forest is threatened by a very high annual deforestation rate driven by land-use conversion to cattle ranching. This project has an estimated annual emissions mitigation potential of slightly over 59,000 tons of CO₂e. Another project is the Seawater Agroforestry Project, which aims to restore and afforest 3,000 hectares of coastal desert scrub and intertidal zones in the Kino Bay, State of Sonora, Sea of Cortés, with salt tolerant mangroves, *Salicornia*, and *Atriplex* species. A carbon capture capacity of 143,000 tons of CO₂e by 2012 is estimated, rising to 228,000 tons by 2017.

Efforts to develop carbon capture projects are multiplying in Mexico thanks to the involvement of local authorities, research centers, and NGOs. Of note are: Scolel Te, State of Chiapas; the Sustainable Forestry Project in the Sierra Gorda Biosphere Reserve, State of Querétaro; Integrated Resource Management for Carbon Capture in the Communities of the State of Oaxaca; Reforestation in the Monarch Butterfly Biosphere Reserve, in the State of Michoacán; and School Furniture Production from certified timber in indigenous communities, State of Oaxaca (supported by the Forest Stewardship Council) (Sanchez et al, 2006).

Payment for Ecosystem Services

National Programme for Hydrological Environmental Services aims to incentivise land owners to develop carbon sequestration projects to sell "hydrological services" on a market. Funds are also used to build necessary institutional structures to promote transaction of carbon credits from terrestrial sources. Initially Mexican government paid project developers (farmers) directly, however, many projects no longer continue.

A Mexican Forest Fund was also created by CONAFOR in 2003, as a financing mechanism to promote conservation and SFM to facilitate access to financial services and facilitate PES (Johnson et al, 2010).

Science and Technology

MRV / Science

For national forest monitoring and forest inventories CONAFOR is responsible for implementing forest monitoring and forest inventories. The National Institute of Statistics, Geography and Informatics (INEGI) is responsible for developing land use and vegetation cover (LULC) maps at the national scale. Mexico is strengthening environmental institutions. The Mexican Carbon Program (a network of research institutes and universities) is involved in carbon related research. In Mexico national forest monitoring includes analysis of remotely-sensed data to identify changes in land cover at regional/national level using MODIS. (Herold, 2009). Technical capacity is available for image processing and analysis. Capacity for moving to a national carbon accounting and annual monitoring system needs to be strengthened. There are institutional capacities, staff number and technical skills to implement forest monitoring in Mexico, although there are some limitations (Herold, 2009).

Peru

Policies and Institutions

REDD+

Peru is involved in the FCPF and the Forest Investment Program. Its R-PP was submitted for informal review in March 2010. A revised draft R-PP was presented in November 2010. The formal submission of the R-PP is pending (FCPF, 2011).

The Ministry of the Environment (MINAM) is responsible for the conservation of more than 10 million ha of forests and is now the National Authority overseeing climate change and mitigation activities in Peru, including REDD+. MINAM is responsible for the protection of forests through the management of timber, conservation and eco-tourism concessions. MINAM oversees the national system of protected areas and ensures proper inter-institutional coordination with regional and local governments that participate – directly or indirectly in the management of declared protected areas. It also regulates regional, municipal and private conservation initiatives (Peru, 2008).

The Agriculture Ministry (MINAG) works in parallel with MINAM and is the national authority for the forestry sector production and regulation. MINAG has retained responsibility for the management of forest and wildlife resources. It is therefore MINAG that is responsible for granting and regulating forestry concessions for production (Peru, 2008). Furthermore the Ministry of Agriculture (MINAG) is the authorized entity for the national level policies and control of the agrarian sector (Herold, 2009).

Cross-sector land planning into the national, regional and local development plans are done through a tool called Ecological Economic Zoning (ZEE) (Peru, 2008).

A National Commission on Climate Change In line with its mandate, MINAM has established a National Commission on Climate Change to incorporate climate change into policies, plans and programs (regional and sectorial) and to strengthen the population's response capacity to face climate change impacts. The REDD Task Force will fall under this (Peru, 2010). This constitutes the first step in developing a coordinated REDD+ strategy which includes the various stakeholder groups and different sectors.

Carbon storing in the Andean peatlands of Peru

The objective of this project is to monitor soil carbon content and quality in agricultural systems and develop soil protection strategies to mitigate GHG emissions. The implementing organization and partners are the International Potato Center (CIP) and MINAM. In the implementation phase, the project covers 250 000 ha (Seeberg-Elverfeldt and Tapio-Bistrom, 2010)

Finance and Economics

It is estimated that the opportunity cost to reduce 60 % of the deforestation could be more than USD 150 million per year (Peru, 2010).

REDD Readiness preparation is underway through FCPF and Peru was just accepted as FIP Pilot Country.

The project "Enabling the implementation of a REDD program in Peru" financed by the GBMF was approved in June (USD 2 million).

Science and Technology

MRV

MINAM and MINAG are providing conceptual and technical frameworks to develop consistent methodologies for reference scenarios at regional level and then scale up to national level. (Peru, 2010). Peru monitors forest cover by the Forest Intendance (part of MINAG) which is responsible for the monitoring activities and forest management.

Peru is regularly covered by Landsat TM & CBERS. However, forest area monitoring capabilities are limited and do not provide full national coverage. Institutional capacities, staff number and technical skills to implement a forest monitoring system could be strengthened (Herold, 2009).

South Africa

Policies and Institutions

Long Term Mitigation Strategy

In March 2006, the South African Cabinet commissioned a process to examine the potential for mitigation of the country's greenhouse gas emissions. The process was to be informed by the best available information. The aim was to produce Long Term Mitigation Scenarios (LTMS) that would provide a sound scientific analysis from which Cabinet could draw up a long-term climate policy (GoSA, 2007a). Input Report 2 on 'Non-energy Emissions: Agriculture, Forestry and Waste' – the conclusion is that agriculture mitigation activities, though not as significant as from other sectors, can be beneficial for development and achieve measurable emissions reductions.

The Department of Water Affairs and Forestry is pursuing a restructuring programme in the forestry sector, which will eventually see the department becoming a sector leader and regulator of forestry in South Africa (South Africa Online, 2011).

Sub-national approaches

In the Western Cape province around Cape Town, where half of the country's export agriculture grows, the province has decided to be proactive. It has adopted a climate change response strategy and action plan – the first of its kind on the continent. It includes recommendations on minimising water use, developing farming methods that are resilient in the face of climate change, and reducing energy demand (Joubert, 2009)

The Indigenous Trees for Life project

Nhluhluwe, a rural village in South Africa's eastern seaboard province of KwaZulu-Natal is part of an innovative project that has planted hundreds of thousands of trees since it began in 2005. The Indigenous Trees for Life project is a partnership between the Wildlands Conservation Trust and multinational company Unilever. Rather than simply going out and planting trees, it involves communities, by getting people (mainly youth) to grow indigenous trees themselves – which they then barter for food, clothes, bicycles and other necessities that the Trust secures through corporate donations. There are currently around 2,200 of these 'treepreneurs' in 23 communities in KwaZulu-Natal. The planting area is revisited every few months to track the progress of the trees (Joubert, 2009).

Land Tenure

Land reform The Department of Land Affairs aims to be a global leader in the creation and maintenance of an equitable and sustainable land dispensation that results in social and economic development for all South Africans. The department's key focus is on providing enhanced land rights to all South Africans, with particular emphasis on previously disadvantaged individuals, which will result in increased income levels and job opportunities, productive land use and well-planned human settlements. South Africa's land reform is premised on three programmes: land-tenure reform, redistribution and restitution. While the Department of Land Affairs implements land-tenure reform and redistribution, the Commission on the Restitution of Land Rights (CRLR) implements the restitution programme. The department has four branches, namely Land and Tenure Reform, Restitution, Land Planning and Information, and Financial Management and Corporate Services (South Africa Online, 2011).

Land restitution The CRLR is a statutory body set up in terms of the Restitution of Land Rights Act, 1994, as amended. The role of the commission is to provide redress to victims of dispossession of rights in land, as a result of racially discriminatory laws and practices that took place after 1913. The commission is led by the Chief Land Claims Commissioner and has nine regional offices headed by regional land claims commissioners. By the end of 2007/08, 74 747 claims had been settled, involving more than 1.4 million beneficiaries (South Africa Online, 2011).

Land Tenure Security Bill The Land Tenure Security Bill is aimed at promoting and protecting the relative rights of persons working on farms, persons residing on farms and farm owners; enhancing the security of tenure of persons residing on farms; creating conditions conducive to peaceful and harmonious relationships on farms and in farming communities and to sustain production discipline on land in the interest of food security (BuaNews, 2011).

The Rural Development Department says the proposed amendments to the Land Tenure Security Bill are aimed at protecting farm dwellers against inhuman treatment and denial of basic human rights by some land owners. The Bill addresses the need for the productive use of agricultural land to meet the vision of sustainable rural communities and food security. It also seeks to provide for the continued protection of the rights of persons living and working on farms. The Bill will seek to address loopholes in the Extension of Security of Tenure and the Land Reform acts which have been passed to provide security of tenure to persons residing on farms (SABC News, 2010).

Forestry

There are about 530 000 ha of indigenous or natural forests in the country, which occur mainly along the southern and eastern escarpment, the coastal belt and in sheltered kloofs or ravines. (South Africa Online, 2011). Meanwhile, South Africa has developed one of the largest planted forests in the world. Plantations cover about 1.3 million ha of South Africa's land surface. Production from these plantations amounted to more than 22 million m³ of commercial roundwood, valued at almost R5.1 billion (South Africa Online, 2011).

Agriculture

Heiveld Co-operative The small-scale farmers of the Heiveld Co-operative are working with researchers and climate modellers at the University of Cape Town to respond to the climate change threat. They're changing their farming methods: they're collecting weather records, planting wind breaks, laying thatch on bare soil, changing ploughing styles, watching what happens when the veldt burns, and shifting the times of the harvest (Joubert, 2009).

Food security The Integrated Food Security and Nutrition Programme aims to eradicate hunger, malnutrition and food insecurity by 2015. By May 2008, through the Household Food Production Programme, 15 765 food-production packages had been distributed and 6 390 vegetable gardens established. Through the Farmer Support Programme, 903 clients received Micro-Agricultural Financial Institutions of South Africa loans and R8.5 million was disbursed between January and March 2008 (South Africa Online, 2011).

LandCare A LandCare Programme has been established in South Africa (South Africa, 2011). LandCare is essentially a concept involving a process of participation that focuses on land resource management through the promotion of sustainable use practices. LandCare involves 'local people taking local action in their local area' to achieve sustainable land use and management. LandCare includes individual and group activities directed at on-ground action. It also provides an opportunity for local landholders to take a leading and responsible role in planning and undertaking activities to conserve their most important assets. LandCare encourages community interest and action through the formation of LandCare groups. LandCare groups assess local problems, determine priorities and undertake action. The National LandCare Secretariat plans to build on previous experiences locally and in Australia to develop the National LandCare Programme. This will increase community awareness and help those, involved in LandCare work towards sustainable land use. The National LandCare Secretariat seeks to establish a climate that will favour the development of realistic, transdisciplinary solutions by those who face particular problems. This will require

policies and programmes, which encourage desirable actions and discourage undesirable actions, through the balanced use of incentives, standards and penalties.

Finance and Economics

Payment for Ecosystem Services

Working for Water (WfW) programme Payments for ecosystem services (PES) system first came about in South Africa with the establishment of the government-funded Working for Water (WfW) programme that clears mountain catchments and riparian zones of invasive alien plants to restore natural fire regimes, the productive potential of land, biodiversity, and hydrological functioning. The success of the programme is largely attributed to it being mainly funded as a poverty-relief initiative, although water users also contribute through their water fees. Nevertheless, as the hydrological benefits have become apparent, water utilities and municipalities have begun to contract WfW to restore catchments that affect their water supplies. This emerging PES system differs from others in that the service providers are previously unemployed individuals that tender for contracts to restore public or private lands, rather than the landowners themselves. The model has since expanded into other types of ecosystem restoration and these have the potential to merge into a general programme of ecosystem service provision within a broader public works programme. There is a strong case for concentrating on the most valuable services provided by ecosystems, such as water supply, carbon sequestration, and fire protection, and using these as 'umbrella services' to achieve a range of conservation goals. The future prospects for expansion of PES for hydrological services are further strengthened by the legal requirement that Catchment Management Agencies be established. These authorities will have an incentive to purchase hydrological services through organisations such as WfW so as to be able to supply more water to their users (Turpie et al, 2008).

The WfW programme has focused primarily on projects that improve water delivery, and not on ecological restoration per se. This constraint led to the creation of two new programmes, Working for Wetlands and Working for Woodlands, which are engaged in restoration of those habitats. The wetlands programme is largely motivated by the impact on biodiversity as well as hydrological services. The woodlands programme is geared towards carbon sequestration services. The Working on Fire initiative is another offspring of the WfW programme: it promotes and is actively involved in the responsible and safe use of fire as an environmental management intervention. Taken together, these developments could be paving the way for the development of an overarching 'Working for Ecosystem Services' organisation that houses nature-oriented (restoration) poverty-relief programmes. The existing model and potentially extended model differ substantially from other PES systems in that restoration is carried out via a contract with individuals other than landowners, and that there is a significant poverty-alleviation component. This is not to say, though, that landowners may not incur opportunity costs. The certainly may in the case of wetland or woodland restoration initiatives (Turpie et al, 2008).

Science and Technology

MRV

South Africa has a detailed inventory of all its natural forests, which is used to accurately monitor changes in forest areas. The Department of Water Affairs and Forestry has completed a classification of natural forests, represented by 24 broad forest types. The Natural Forests Protected Areas System guides the setting aside and redemarcation of natural forests as protected areas (South Africa Online, 2011).

Tanzania

Policies and Institutions

National Climate Change Coordination

The government has put in place a National Climate Change Steering Committee (NCCSC) and a National Climate Change Technical Committee (NCCTC) to oversee and guide the implementation of climate change activities in the country. The NCCSC is a cross-sectorial body comprised of Permanent Secretaries from 13 Ministries and society organizations and the private sector. The NCCSC reports to the Vice President's Office. The NCCSC which handles all climate change related issues in Tanzania.

REDD+

Tanzania is a FCPF country. Though it prepared an R-PIN, grant funds have not been requested by Tanzania. Its R-PP was submitted for Formal Assessment in November 2010 (FCPF, 2011). Tanzania is also a UN-REDD Programme Pilot Country and is considered to be highly engaged in the REDD process (Herold, 2009). The NCCSC is the top decision-making body for the national REDD scheme. Technical issues are the responsibility of the NCCTC (Tanzania, 2010).

In 2008, the Vice President's Office and Ministry of Natural Resources and Tourism established an interim National REDD Task Force. The Task Force is responsible for developing a National Strategy for REDD and the enhancement of the voluntary carbon market in Tanzania. The National REDD Task Force and Secretariat operates under the NCCSC (Tanzania, 2010). The Task Force constitutes members from the Vice President's Office-Division of Environment and from Ministry of Natural Resources and Tourism – Forestry and Beekeeping Division. This Task Force is working in partnership with other stakeholders in the process of establishing and implementing the country's REDD Strategy. However, the number of Task Force members may increase in the near future to accommodate Zanzibar representatives and other specialties in relation to REDD (Tanzania, 2010). The Strategy is currently due to be finalised (Tanzania, 2011).

REDD Strategy The Tanzanian government is undertaking 5 in-depth studies that will provide inputs into national REDD strategy (Tanzania, 2011). They are:

- 1 Modalities of establishing and operationalising a National REDD Trust Fund
- 2 The role of REDD for rural development
- 3 Legal and institutional framework review in the context of REDD intervention
- 4 Development of business case for carbon trade through REDD initiative
- 5 Preparation of REDD information needs, communication and REDD knowledge management

The REDD strategy is also supported by the REDD demonstration projects to generate lessons and improve the knowledge base. There are nine pilot REDD projects planned to be commissioned to different NGOs. However, only seven projects had commenced as of July, 2010 (Morogoro, 2010):

- 1 HIMA – Piloting REDD in Zanzibar through Community Forest Management, 2010 – 2014 (CARE International)
- 2 Advancing REDD in the Kolo Hills Forests (ARKFor). Kondo district (AWF)
- 3 Building REDD Readiness in the Masito Ugalla Ecosystem Pilot Area
- 4 Combining REDD, PFM and FSC certification in South-Eastern Tanzania (MCP)

- 5 Making REDD and the Carbon Market work for Communities and Forest Conservation in Tanzania (MJUMITA)
- 6 REDD Mechanisms for Sustainable Forest Management in Semi-Arid Areas (Case of Ngitilis in Shinyanga Region (TaTEDO REDD projects in Mbeya and Sumbawanga (WSCT)
- 7 REDD Readiness in South Western Tanzania (WCS)

Agriculture constitutes roughly 80% of Tanzania's economy. In 2009, the government launched the Kilimo Kwanza initiative which seeks to attain a 'green revolution'. It calls on the involvement of both the public and private sectors to help smallholder farms enter into large-scale commercial agriculture so they can compete with developed countries (TZOnline, 2009). It is unclear if this initiative is being managed with reference to the REDD Strategy.

Carbon and Land Tenure

In the United Republic of Tanzania, the Land Act of 1999 and the Village Land Act of 1999 establish that land is the property of the state and can only be leased from the government for a specific period of time and activity. However, according to the Ministry of Lands and Human Settlements Development, land areas can be sold under a 99-year lease agreement. Under the Land Policy and Land Act, the payment of compensation by the state to the landowner extinguishes customary rights to the land, legally passing the right to lease the land to the state and its derived rights to the new land owner. The Land Act of 1999 states that "where a granted right of occupancy exists in any transferred land or a part thereof, a transferred land shall, unless the instrument of transfer provides otherwise, operate 'as a compulsory acquisition of that right of occupancy' and compensation on it shall be payable". Conditions attached by the government include: development conditions and rights, which include payment of land rent, development of the area by reforestation, protection of the boundary, and sustainable use of the land according to cross-sectoral laws associated with land management. All of these properties and crops are detailed in the title deed transfer, including the amount paid (FAO, 2011). All that being said, the ownership of large areas of forest is not clearly defined.

In 1995, the Tanzanian government instituted the National Land Policy (NLP), with a primary objective to ensure the sustainable use of land, guide allocations, and resolve conflicts. This policy is one of the major guiding principles for environmental management by local authorities (Mniwasa and Shauri, 2001). The NLP reserves village lands and some communal areas for conservation purposes and protects highly sensitive areas such as water catchment areas, forests areas of biodiversity, national parks, wetlands, etc. and attempts to raise public awareness of linkages between environment and livelihood (Tanzania, 2011b). The NLP directs that "permits, licenses, claims and rights for exploitation of natural resources be issued in line with land use policies, and environment conservation policies and programmes." However, the coordination of licensing mandates at the local and central government levels is unclear as is the devolution of land management responsibilities from the Commissioner for Lands to the local government. A lack of proper instruments for enforcement of legislation and policies by local authorities is also a problem. (Mniwasa and Shauri, 2001).

Finance and Economics

REDD+ Funding

The estimated funds needed to carry out Tanzania's 'Readiness Plan' is approximately USD 10 million. The funds are expected to be sourced from Norway, Finland, UN-REDD, and the Clinton Climate Initiative (Tanzania, 2010).

The Tanzanian government, from money from UN-REDD and FCPF, has begun a study to develop the business case for carbon trading through the REDD initiative. Little is known about the present status of REDD related carbon trading projects in Tanzania. There is little or no information on what projects, have been undertaken and where they have been implemented. The proposed study seeks to answer these

questions through a detailed review of existing carbon trading projects in Tanzania. The purpose is twofold; firstly, to assess and document the status of the forest carbon sector in Tanzania in the context of global markets for carbon offsets, and secondly, to draw lessons for scaling up these initiatives (Tanzania, 2011).

Under the Government of Norway's International Climate and Forest Initiative, NOK 500 million (approx USD 80 million) is being made available in funding for Tanzania for five years (Fast Start Finance, 2010). The purpose of the partnership is to provide financial and technical support to help Tanzania prepare for a future global mechanism for REDD+.

Increasing community revenue

Community management projects have been documented as increasing revenue and benefits for local populations. One example is The 2002 Forest Act, which devolved timber licensing and revenue collection responsibilities from the district to the village. Transparency and accountability have been increased by requiring that village institutions document and publicly share all revenues and expenditures, yielding increases in revenue collection and the financing of public services (Pfaff et al., 2010).

Science and Technology

MRV

Several land cover/land use maps are available for different regions of Tanzania. Landsat data is available for the whole country area, while CBERS covers about 73% of Tanzania. Tanzania has a National Forest Database (NAFOBEDA) and a National Forest Assessment and Monitoring Programme (NAFORMA) have been established.

The Forestry and Beekeeping Division (FBD) of the Ministry of Natural Resources and Tourism (MNRT) is responsible and coordinates monitoring, forest inventories and law enforcement. FRA reporting is the responsibility of the Tanzania Forestry Research Institute.

Available capacity and infrastructure for effective implementation of the carbon accounting system are limited, especially in the areas of modeling, GIS simulation, monitoring and evaluation, and carbon stock assessments (Tanzania, 2010). More forestry staff needed to carry out forestry programmes and more specialized expertise is required at national and district levels. Given high estimates for forest degradation, a monitoring programme is recommended which can detect degradation (Herold, 2009). Tanzania already participates in the Southern African Fire Network (SAFNet) as well as in the Miombo Network.

Key actions that are central to ensuring successful MRV REDD establishment in Tanzania are (Tanzania, 2010):

- Reinforce MRV country coordination for provision of data and methodologies
- Strengthen institutions that deal with issues related to forest assessment, monitoring and reporting
- Strengthen cross-sectoral participation and approach (both vertical and horizontal)
- Establish the the NCAS-T and the National Carbon Monitoring Centre (NCCM)

The REDD strategy is putting emphasis on capacity building and infrastructure development at the national and sub national levels (Tanzania, 2010). It is supported by the following monitoring activities:

- National Forestry Resources and Monitoring (NAFORMA) with collaboration with partners
- Establishment National Carbon Monitoring Centre (NCCM) NCAS-T; Clinton Foundation – Tanzania initiative, WRI Fred Stolle, Australia government, GEO, ESRI, WRI, Heniz Center
- Monitoring of natural resources by communities by K:TGAL; Monitoring Matters (MOMA) initiative on REDD, in collaboration with TNRF, TFCG (Morogoro, 2010).

In addition, the UN-REDD Programme in Tanzania is collaborating closely with the Finish-funded National Forest Resources Monitoring and Assessment of Tanzania (NAFORMA) Programme to train national experts in remote sensing and forest mapping. The NAFORMA project is currently undertaking a National Forest Inventory of Tanzania, based on field samples comprising biophysical, environmental and socio-economical parameters identified by national users and stakeholders. NAFORMA will produce a 2009/2010 Land Use Land Cover map of Tanzania (UNREDD, 2010c).

In addition to the above in-country training, the global UN-REDD Programme, in collaboration with the Brazilian Institute for Space Research (INPE), has organized intensive training on the satellite forest monitoring system based on the INPE model, with experts being trained in Brazil (UNREDD, 2010c). Google has also announced it will provide NAFORMA with data collector handheld sets, to test new technologies that can improve data collection and data integrity from the National Forest Inventory (UNREDD, 2010b).

Uruguay

Policies and Institutions

National Climate Change Policies

Since Uruguay ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto Protocol in 2000, the Climate Change Unit, an office under the National Directorate of the Environment (DINAMA) of the Ministry of Housing, Land Planning and Environment (MVOTMA), has been responsible for facilitating the Convention implementation in the country and for developing the country's National Communications to the Conference of the Parties (COP) in the UNFCCC, undertaking the procedures and making the arrangements needed to provide continuity to the process (Uruguay, 2010).

In May 2009, the National System to Respond to Climate Change and Variability (SNRCC) was established. The system arises as a new forum for the cross-sectional co-ordination of any action to be undertaken by public and private institutions in the field of risk prevention, mitigation and adaptation to climate change (Uruguay, 2010).

Following its creation was the development of the National Plan on Climate Change (PNRCC). In this National Plan, key issues for adaptation are related to risk management, water resources, energy, ecosystems and biodiversity, production and consumption, industrial production, tourism, consumption and quality of life of the population. For mitigation, the focus is abatement of emissions by each sector and the implementation of the Clean Development Mechanism (CDM) provided by the Kyoto Protocol (Uruguay, 2010).

Forestry

Uruguay is located in the temperate zone of South America (Uruguay, 2010). Its lands are predominately grassland and savannah, with only 5% of the territory classified as forestland. Of this land, 3% is considered native forestland protected from harvest by law, although selective cutting is allowed for domestic consumption (World Forest Institute, 2002). Uruguay's importance as a forestry country lies more in its potential for fast-growing plantations than in existing resources or industry. The geography and topography of the land is conducive to easy cultivation, harvesting, and transport of forest products. Since 1994 there has been a significant increase in the number of plantations in Uruguay. The forest sector is one of the few productive sectors in the country that has designated a strategy to measure the sustainability of its production activities. This is monitored through the National Forest Plan (World Forest Institute, 2002).

Agriculture

The Agriculture sector accounted for 80 % of the 2004 national emissions expressed in equivalent CO₂. During the last 20 years same period, most crop yields have increased by 30-80% and sunflower and maize by 100-200%. Some mitigation options that can be applied to this sector would include increasing the no till area and the area under improved pasture which would lead to carbon sequestration in the soil. To this end, a study was conducted in 2001 considering a 2020 scenario where the Uruguayan annual 2000 crop area of 1.06 million ha would double (World Bank, 2008). Among the results are:

- Crop productivity would increase leading to a carbon sequestration capacity of 131,000 tC/year
- Increasing the area under no till would lead to a carbon sequestration of 264,000 tC/year
- Increasing the area under improved pastures would result in a carbon sequestration of 1.6 MtC/year, the largest increase

As one action under the National Plan on Climate Change (PNRCC), institutional boards were established to initiate carbon footprint studies in the main agro-exports chains, as a means to raise awareness and identify areas for policy development (Uruguay, 2010).

Finance and Economics

Climate Change Funding

In the National Budget presented in 2010 for the five forthcoming years, climate change is a priority area. However, there are not sufficient national resources to cover all the lines of action within the National Plan on Climate Change. Capacity building and outside financial assistance will be crucial if the objectives are to be achieved (Uruguay, 2010).

Meanwhile, an adaptation strategy designed to operate at a local level, with the aim of cutting greenhouse gas emissions and helping local areas adapt to climate change, has been funded with 1.5 million dollars donated by various international bodies. It is sponsored by the United Nations Development Programme (UNDP) and covers semi-rural and rural areas around the capital, Montevideo, as well as the neighbouring provinces of Canelones and San José. The plan is being implemented through Agenda Metropolitana. Agenda Metropolitana emerged in 2005 from a political agreement between the governments of the provinces of Montevideo and Canelones, with the aim of taking a joint approach to agricultural and climate change-related problems. These three provinces in the south of the country on the coast of the Rio de la Plata (River Plate) estuary are home to two-thirds of Uruguay's 3.3 million people, and represent two-thirds of GDP (Acosta, 2010).

Forestry Investment

Historically, forestry has not been big in Uruguay. Its forest industry supplied the domestic market alone, and the timber was used specifically for the paper companies or as fuel. In 1975 the Uruguayan government offered incentives to promote the development of its forest industry. However, it was not until the establishment of Forest Law 15.939 in 1987 that significant expansion of the forest base occurred. This 1987 Forestry Law 15,939 forms the basis for Uruguay's forest development plan. The law defines an area of 3.6 million hectares for afforestation. Selected species are eligible for financial incentives.

Changing dynamics of agriculture in Uruguay

About 15.3 million hectares of Uruguay's total land base is zoned for agriculture and livestock production (World Forest Institute, 2002) Strong commodities' prices and growing global demand for food have led to an increase in foreign investment in Uruguay. In the first half of 2010 there were 950 farmland transaction operations registered, 9.3% more than the same period in 2009, which represents 180.000 hectares (up 25.8%) involving 451 million US dollars (up 37.5%) according to official numbers from Uruguay's Agriculture Statistics Department. Business delegations from Iran, Qatar, Saudi Arabia and Colombia have been reported. Another consequence of the growing interest in farmland is that cattle-breeding is also changing. While traditional grasslands are converted to cropland, the cattle industry is either moving to more marginal lands or feed-lots. Currently Uruguay has a million hectares with soy beans, compared to less than 200,000 hectares a decade ago (MercoPress, 2010)

In essence, Uruguay is following the Chilean forestry example, launching codes to support investment in the forestry industry. Forest subsidies of between 20% to 50% of the afforestation cost are available, depending on the species planted, afforestation density, and type of establishment. Plantation owners must meet the following requirements to be eligible for these subsidies:

- Afforest in designated priority forest areas
- Afforest with the species indicated by law

- Plant a minimum forest area of 10 hectares
- Prepare a forestry plan for the project that has been evaluated and signed by a professional forest engineer or agronomist
- Ensure that 75% of the original planted density survives after one year of establishment

Several international companies have purchased land for afforestation in Uruguay. Weyerhaeuser Corp (USA), Shell (Holland), Emce (Spain), West Fraser (Canada), Cholguan (Chile), Madesal (Chile), Los Alpes (Chile) and other Chilean companies are major foreign buyers. Important Uruguayan forestry companies such as Cofusa, Fymnsa, Caja Bancaria, Paso Alto, and other small investors from Mercosur have invested in forestry land (World Forest Institute, 1999).

At least one forestry CDM project is also underway in Uruguay. The 'Posco Uruguay' afforestation on degraded extensive grazing land project seeks to undertake afforestation and reforestation of degraded land over a large area. It is being run by a private sector entity, Posco Uruguay S.A. The projected volume of emission reductions is 21,957 metric tonnes CO₂ equivalent per annum (CDM Executive Board, 2010; UNFCCC, 2011).

Science and Technology

MRV

The Climate Change Unit is the office responsible for developing the National Inventory in Uruguay. The Unit has implemented a data management system that covers the collection of data and information as required (Uruguay, 2010).

Uruguay undertook a National Greenhouse Gas Emissions Inventory (INGEI, Spanish acronym) in 2004, as well as a Comparative Study of the Country's Net Greenhouse Gas Emissions for the years 1990, 1994, 1998, 2000, 2002 and 2004. Based on inventory results, the country's total emissions decreased by approximately 11.3% between 1990 and 2004. This was mainly due to a significant absorption of CO₂ by the woody biomass and soils (Uruguay, 2010).

The Inventories were developed using the methodology described in the Revised 1996 Guidelines for National Greenhouse Gas Inventories of the Intergovernmental Panel on Climate Change (IPCC) and applying the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories and the IPCC's Good Practice Guidance for Land Use, Land-Use Change and Forestry (LULUCF) (2003).

Uruguay has developed and strengthened information systems and technology, specifically: the creation of the National Environmental Data System (SISNIA) implemented by the National Directorate of the Environment, and the CLIBER Project for the institutional and technological strengthening of the National Directorate of Meteorology (Uruguay, 2010).

Vietnam

Policies and Institutions

Forestry

The Ministry of Agriculture and Rural Development (MARD) coordinates all activities related to Vietnam's forests; other departments contributing include the Forest Protection Department (FPD) and the Department of Forestry (DOF) that provides annual monitoring reports (Herold, 2009).

Vietnam is one of the ten countries with the largest annual projected net gains in forest area for 2005 to 2010. The net growth in forest area can largely be attributed to national reforestation programmes. In contrast, the area of primary forests decreased in the period 1990-2005 by about 78%. The main drivers behind the forest loss are conversion of land for agriculture, migration, and unsustainable forest management, partly resulting from a lack of co-ordination between agencies leading to excessive exploitation of timber resources (FAO, 2006).

Vietnam has been pursuing a policy of forest land rehabilitation through the Five Million Hectare Reforestation Project since 1998 (Yasmi et al., 2010). Since nationwide introduction of free market principles in 1986, and particularly during the last decade, substantial changes have taken place in the forestry sector, including the re-organization of state forest enterprises and changes in forest ownership and growth in wood products exports. Forests have been classified into three types – special-use (conservation), protection and production forests (Yasmi et al., 2010).

Forestry has moved towards greater participation, improved forest protection, increased plantation establishment and increased timber processing both for domestic demand and export. State-forest enterprises are being dissolved or re-arranged into companies and Forest Management Boards. Legislation has been introduced during the past decade to allocate land to households and individuals for sustainable forest production, conservation of flora and fauna and forest protection (Yasmi et al., 2010). Forest areas under community management have expanded from a very low level in 1990 to 3.5 million hectares in 2007; an area equal to 27 percent of the national forest estate. However, land allocated to communities is often degraded.

Forest degradation remains a serious problem and is widespread throughout the country. Between 1999 and 2005, the natural forest area classified as rich declined by 10.2 percent; the area of medium-rich forests declined by 13.4 percent during the same period. The commercial value of natural forests has also considerably declined and most rich forests are located in remote areas that are difficult to access (Yasmi et al., 2010). With respect to quality of logging, capacity and extent of implementation of codes of harvesting practice, which includes reduced impact logging related measures, is weak in Vietnam. This is generally due to low capacity within forest authorities to supervise harvests (Yasmi et al., 2010).

In 2007, the government approved the Vietnam Forestry Development Strategy 2006-2020. The strategy comprised five programmes:

- 1 Sustainable Forest Management and Development Programme;
- 2 Programme on Forest Protection, Biodiversity Conservation and Environmental Service Development;
- 3 Forest Product Processing and Trade Programme;
- 4 Programme on Research, Education, Training and Forestry Extension; and
- 5 Programme on Renovating Forest Sector Institutions, Policy, Planning and Monitoring.

REDD+

REDD participation of Vietnam is rated high. It is a FCPF country and has submitted an R-PIN. A R-PP formulation grant has been signed. Its Draft R-PP is due for review in March 2011 (FCPF, 2011). Vietnam has also submitted a National Communication to the UNFCCC, as well as submissions on REDD (Herold, 2009). It is also a designated pilot country in the UN REDD programme (Herold, 2009).

In Vietnam, the term “National REDD Programme” is used instead of REDD strategy as the country has formulated a national Forestry Development Strategy for the period of 2006-2020 and any initiative falling within the framework of this strategy is considered a programme (Scheyvens, 2010).

Vietnam intends to develop REDD as a national-based programmatic initiative that is able to avoid in-country leakage, allowing at the same time for project-based options and market-based implementation (Cuong, 2009). The development of the national REDD programme is tasked to the Directorate of Forestry (DoF) under the Ministry of Agriculture and Rural Development (MARD) (Scheyvens, 2010).

The Programme focuses on building national level government capacity for co-ordination and management in setting up the REDD mechanism, building local capacity through activities in two districts in Lam Dong province, and building regional level co-ordination on leakage issues (UNREDD, 2011).

Some idea of the strategies for reducing emissions and enhancing forest carbon stocks that Vietnam’s national REDD programme might focus on is provided by the Initial National Communication. The INC assessed six options for forest and land use change based on mitigation potential and abatement costs (Scheyvens, 2010).

Carbon and Land Tenure

Starting with the Doi Moi reform in 1986, the government has implemented a series of policies and land tenure reforms devolving land-use rights to individuals and other non- state actors for the management of land and forests. The Constitution of Vietnam states that land and other natural resources are owned by the collective population of Vietnam and that the state manages these resources on their behalf. The 1993 Land Law names the state as the representative of all landowners (Scheyvens, 2010).

Under the 2001 Law on Forest Protection and Development, the state can allocate forest and forestland to organisations and individuals for long-term protection, development and utilisation. Under revisions in 2004, forest and forestland use rights continue to be leased to individuals and households for long-term use. Government Decree No. 200/2004/ND-CP aims to increase the effectiveness of state forest enterprises or dissolve the completely ineffective ones and reallocate the forestland to communities and individual households. Community-based forest management was introduced in the 1990s and played an important role in the recognition of community land tenure. Communities are recognized as legal entities eligible to participate in forest land allocation based on the Land Law of 2003. This tenure is in terms of use rather than ownership (Scheyvens, 2010).

The Vietnam Forest Protection and Development Law of 2004 provides for reform of state enterprises, reclassification of forests, allocation of forest land to households and other organizations, and forest protection and reforestation/afforestation . Currently, households or individuals are allocated areas of forest land of up to 30 hectares for a maximum of 50 years (Yasmi et al., 2010).

Vietnam’s legal system has evolved and now provides greater clarity regarding land tenure and land-use rights, but implementing the reforms and making them beneficial to the local communities and indigenous people have proved problematic (Clement and Amezaga, 2009). Land allocation has been slow, partially due to the strict conditions that come with it (Sikor, 2001) and partially due to limited instructions on implementation at field level (Nguyen Quang Tan et al. 2008). Other potential causes are the slow process of reallocating roles between former state forest enterprises and districts, inadequate funding at provincial level (Heimo, 2010), and the overlapping mandates of MARD and MONRE (NPD, 2009; Scheyvens, 2010).

Finance and Economics

Funding for REDD+

A budget of USD 4.5 million was approved by UN-REDD for actions in Vietnam in March 2009.

Vietnam, although the area of natural forests is small, has also become a leader in developing REDD readiness. Significant revenues could be secured if international agreement and associated funding are realized (Yasmi et al., 2010).

Funding for MRV

The Finnish government is supporting the development of the Management Information System for Forestry Sector project (FORMIS) which aims to build an information system for forestry sector management that can be scaled up to the national level (FORMIS, 2010). The specific actions planned are:

- Establish regulations and procedures for managing, updating, and sharing information between forestry units as a basis for operating and for linking forestry information systems;
- Carry out the design and implementation of forestry information databases and software;
- Conduct training needs assessment, prepare training materials, collect data and conduct information and community technology training courses in the selected provinces and at central level;
- Provide equipment (hardware, network, data collection equipment) and software

The Embassy of Finland is also providing technical assistance to DoF for the development of the national REDD programme, consisting of collecting information and analysing trends of forest resources and forest carbon stock for the establishment of the interim baseline reference scenarios component (NPD, 2009).

The Forestry Agency of Japan has funded the testing of potential uses of forest cover maps and has estimated forest carbon stocks in two provinces through data collected by the Japanese Advanced Land Observing Satellite (ALOS)/PALSAR (NPD, 2009; Scheyvens, 2010)

Science and Technology

MRV

The Forest Inventory and Planning Institute (FIPI) under MARD is responsible for forest monitoring, inventories and also for the FRA reporting to the FAO (Herold, 2009). Monitoring of forest cover occurs through the National Forest Inventory Monitoring and Assessment Program. Vietnam jointly uses remote sensing and field data and has approved a natural resources project that envisages the installation of a receiving station for SPOT 5 and other remote sensing imagery (Herold, 2009). Vietnam is also engaged in the Southeast Asia Regional Research and Information Network (SEARRIN) (Herold, 2009).

Vietnam faces problems with the types of data, data accuracy as well as data consistency. With respect to types of data, the Forest Inventory and Planning Institute (FIPI) does not collect data for computing forest biomass and forest carbon stocks, therefore accurate estimates of CO₂ emissions from deforestation and forest degradation cannot be made. Also, the categories of forest data vary from one dataset to another, so the necessary consistency for the development of a national REL is lacking (Scheyvens, 2010). A FIPI report discusses how collection of data for forest resource inventories is faulty and how inaccuracies are amplified through faulty statistics and through using surveys that update the inventory, instead of collecting an entirely new set of data (FIPI 2009). The report also finds that the accuracy of forest inventory data suffers from administrative drawbacks and that current budgets are inadequate to secure high-resolution data (Scheyvens, 2010).

Problems of data synchronization have been identified as a priority issue in Forestry Development Strategy (2006-2020). (Vietnam, 2007). It is clear that greater human capacity for the data processing is needed, as is a

stronger information flow between national and provincial/local level. This is especially so in the context of forest degradation (Herold, 2009).

Fortunately, in addition to Finland and Japan, there are a number of organisations contributing to the development of the monitoring system in terms of methodology or actual measurements (NPD, 2009; Scheyvens, 2010). For example::

- Winrock International is conducting baseline measurement for carbon stock estimations for the Da Nhim watershed (Lac Duong district, Lam Dong province).
- The Centre for International Forestry Research (CIFOR) is providing a methodology for participatory carbon monitoring, to be tested under the UN- REDD Programme, and training people involved in the demonstration project in the planning and mapping process. The test site is expected to provide carbon stock survey data by the end of 2010.
- GTZ is working on inventory methods for carbon stocks in mountainous and mangrove forests ecosystems.
- Tropenbos International Vietnam is working on a methodology for forest dataset analysis (ecological, social information, etc.) and is conducting research and training on the application of Geographical Information Systems for forest management.

Zambia

Policies and Institutions

REDD+

Zambia is a designated pilot country in the UN REDD programme (Herold, 2009). Responsibility for land management and REDD+ implementation activities resides with all levels of government, from ministerial to the local traditional administration. However, there are currently no high-level coordination structures to consolidate natural resource management across various ministries or between levels of government (Zambia, 2010). The Government is in the process of addressing these issues, but faces considerable barriers. For example, a policy analysis indicated that 21 policies either accentuated or promoted deforestation and forest degradation by providing legitimacy to activities or developments that transform forest resources (Zambia, 2010).

The National Joint Programme (NJP) focuses on preparing Zambia for future REDD+ funding under the UNFCCC and encourages donor participation. This will include developing a National REDD+ Strategy. The NJP will comprise:

- A multi-sectoral approach in order to reliably assess the drivers of deforestation and forest degradation;
- Capacity development to produce and maintain reliable data;
- Capacity development to access various REDD+ funding streams for implementation of National REDD+ activities;
- Development of appropriate strategies to reduce deforestation and forest degradation in different regions; and
- Consolidation of available information on deforestation and forest degradation.

Agriculture

Conservation Farming Unit (CFU) The Conservation Farming Unit (CFU) was established in 1995 to develop and promote the adoption of Conservation Farming (CF) and Conservation Agriculture (CA) practices by Zambia's small-scale farming community. The CFU was established in response to the realization that, even in good seasons, the majority of small-scale farmers in Zambia are unable to produce adequate quantities of food to feed their families until the next harvest. It was also acknowledged that conventional cultivation practices, including deforestation and burning, were unsustainable and were leading to significant environmental degradation in some areas of the country (Conservation Farming Unit, 2011). It was around this time that the Government of Zambia endorsed the promotion of CF as national extension policy. The government says at least 180,000 small holder farmers are now using CA principles, covering 325,000 hectares, with a focus on minimising soil disturbance, maintaining a permanent soil cover and promoting crop rotation (Bafana, 2010).

Carbon and Land Tenure

Zambia's land use policy is guided by the Environmental Council of Zambia within the Ministry of Environment and Natural Resources, which facilitates the implementation of relevant policies (Kalinda et al, 2008). Forests and land resources are loosely governed, with two classes of land tenure: customary land (94%) and state land (6%). Resources on customary land are communal / public and are held by the President on behalf of the people. Communal forests (described below) are managed by the Forestry Department and divided into three management systems (Zambia, 2010):

- The Joint Forest Management (JFM) System is the collaborative management of forests by local communities and the Forestry Department and enshrines forest resource tenure, access rights and

financial arrangements.

- The Woodland Management System governs indigenous forests and their protection, management, conservation and production.
- The Plantation Management System pertains to the management of plantation forests for commercial timber production.

Resident communities are granted rights to the benefits of natural resources, but have no legal management privileges. It is not currently possible to privatise resources or land that is designated as customary land. All trees are “owned” by the President, according to the text of the Forest Act of 1999. This presidential ownership may be a barrier to private sector investment in REDD+, because local communities do not have legal rights over the trees they are protecting. Enforcing regulations on customary land is challenging due to its open-access nature and the loose regulation by local traditional leaders. In contrast, land use planning on state land is generally comprehensive. However, local and district administrative bodies lack the capacity to regulate land management (Zambia, 2010). Other land governance issues include ((Zambia, 2005; Kalinda et al, 2008)

- Lack of harmonization between more than 30 different entities responsible for formulating and implementing land use policies guided by outdated and inconsistent regulations.;
- Insufficient human and financial capacity to properly develop, implement and analyze policies; and
- Limited local awareness of and participation in the Forest Development Credit Facility. This revolving credit facility was established in 2004 as a public finance mechanism to provide loans to communities involved in JFM to set up forest enterprises

Finance and Economics

REDD+ Funding

The ‘quick start’ UN-REDD national programme is not designed to meet the full costs of supporting Zambia through all the phases of Readiness (Zambia, 2010). Beyond ‘quick start’ the Zambian government will be required to meet the following objectives:

- Sustainable development to reduce local communities’ dependence on wood products;
- Strengthening of institutional, policy and legislative frameworks;
- Good governance that guarantees transparency in benefit-sharing;
- Appropriate nationwide land use planning to facilitate REDD+; and
- Effective implementation of natural resource policies concerning forest use, and enforcement of legislation across all of Zambia.

The Africa Carbon Credit Exchange

The Africa Carbon Credit Exchange (ACCE) is creating an electronic trading platform to bring together buyers and sellers of carbon credits and other ‘green’ instruments. The Exchange will comprise an electronic trading space, a coordinating center in Lusaka, and a network of brokers throughout Africa. The framework for the trading platform is based on that of the Lusaka Stock Exchange (LuSE), which is fully harmonised with the Johannesburg and London Stock Exchanges and others. ACCE is working with the Securities and Exchange Commission of Zambia to ensure that the trading platform is covered by statutory regulation (ACCE, 2010).

Initially the Exchange will focus on trading of Certified Emissions Reduction (CER) and voluntary market credits. Forward contracts traded on ACCE will generate seed capital for implementing low-carbon projects, filling a critical gap in the current project development process for Africa. It is foreseen that the platform will mature into raising ‘green’ capital and trading ‘green’ bonds, insurance products and

renewable energy certificates (ACCE, 2010). The ACCE would be Zambia's third trading platform after the LuSE and the Zambia Agriculture Commodity Exchange (ZAMACE) (Chulu, 2010).

Several organizations including ACCE and USAID are working on a project to leverage voluntary carbon markets to support food and income security objectives. It involves financial incentives for tree retention, agroforestry systems and CA practices. The project is to run from 2010–2050, although it is currently still in the planning stage. 12,000 households are involved, covering 12,000 ha. The estimated CO₂ benefit per ha per year is 7.6tCO₂/hh/yr (Seeberg-Elverfeldt and Tapio-Bistrom, 2010).

Science and Technology

MRV / Science

Zambia has submitted a National Communication to UNFCCC, including a GHG inventory for LULUCF (Tier 1). A second GHG inventory supported by UNDP is in preparation. Zambia is engaged in the GOFC-GOLD Regional Networks: SAFNet and Miombo (Herold, 2009).

The Forestry Department of the Government of Zambia is responsible for FRA reporting. A new National Forest Assessment is currently in progress with the support of FAO (Herold, 2009).

Building on existing initiatives, institutional and human capacity is needed for regular forest monitoring including satellite based forest change analysis and ground measurements. A national monitoring strategy needs to be developed (Herold, 2009). As a UN-REDD pilot country, Zambia is working to gather information and build capacity to develop a reference scenario (Zambia, 2010).

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