Supporting planning for multiple benefits from REDD+ in Uganda

Exploring synergies with the Aichi Biodiversity Targets

REDD pac

MINISTRY OF WATER AND ENVIRONMENT
REPUBLIC OF UGANDA

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National Forestry Authority

UNEP

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The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

ACKNOWLEDGEMENTS

This brochure was produced by UNEP World Conservation Monitoring Centre, as part of the REDD-PAC project under the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag.

Special thanks go to Sabino Francis Ogwal of the National Environment Management Authority (NEMA) of Uganda, John Diisi of the National Forestry Authority and Herbert Tushabe of the National Biodiversity Data Bank College of Agricultural and Environmental Sciences (CAES).

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CITATION

Väänänen, E., Runsten, L., Blyth, S., Mugumya, X., Mwebesa, M. and Mant, R. (2014). Supporting planning for multiple benefits from REDD+ in Uganda: Exploring synergies with the Aichi Biodiversity Targets. UNEP-WCMC, Cambridge, UK.

Available online at: http://wcmc.io/Uganda_REDD_multiple_benefits

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1. Introduction

According to the latest estimate from the Intergovernmental Panel on Climate Change (IPCC) (2013), land-use change, largely from deforestation, has accounted for an estimated net contribution of 10% of global anthropogenic emissions in the past decade. Management of forest carbon stocks has therefore been recognised as an important climate change mitigation strategy under the United Nations Framework Convention on Climate Change (UNFCCC). Developing country Parties to the UNFCCC have been encouraged to contribute to mitigation actions in the forest sector through five activities generally referred to as REDD+: reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks (Box 1). Countries can undertake a broad range of potential actions within these activities including: improving agricultural practice; reducing impacts of extractive use; protection measures; and restoration or reforestation.

Box 1: REDD+ Activities

REDD+

= **Reducing emissions from**
Deforestation and forest Degradation

+

Conservation of forest carbon stocks
Sustainable management of forests
Enhancement of forest carbon stocks

Land-use change also has a range of additional consequences for the goods and services that forests provide. Depending on how REDD+ policies are implemented, they could have negative social and environmental impacts, such as restricting local people's access to forest products or financing forest management strategies that harm biodiversity. To address these concerns, Parties at the UNFCCC COP 16 in Cancun, Mexico, agreed a set of safeguards, the 'Cancun safeguards'[1], which should be promoted and supported during implementation of REDD+ activities. Safeguard (e) also states that REDD+ implementation should be used to enhance other social and environmental benefits. It is increasingly recognised that REDD+ has the potential to deliver multiple benefits beyond climate change mitigation alone (Dickson et al. 2012). By maintaining and restoring forests, REDD+ can promote biodiversity conservation and the provisioning of ecosystem services, such as water regulation, soil erosion control and the supply of timber and non-timber forest products (Harvey et al. 2010). Additional potential social benefits from national REDD+ implementation can include improved forest governance and livelihood options. The potential for providing benefits beyond carbon could motivate greater political support for REDD+ actions (Dickson et al. 2012).

Box 2: REDD+ safeguards identified in Appendix I of Decision 1/CP.16

When undertaking the activities referred to in paragraph 70 of this decision, the following safeguards should be promoted and supported:

(a) That actions complement or are consistent with the objectives of national forest programmes and relevant international conventions and agreements;

(b) Transparent and effective national forest governance structures, taking into account national legislation and sovereignty;

(c) Respect for the knowledge and rights of indigenous peoples and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples;

(d) The full and effective participation of relevant stakeholders, in particular indigenous peoples and local communities, in the actions referred to in paragraphs 70 and 72 of this decision;

(e) That actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions referred to in paragraph 70 of this decision are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits;

(f) Actions to address the risks of reversals;

(g) Actions to reduce displacement of emissions.

This report examines potential steps in the REDD+ planning process that can support the delivery of multiple benefits and reduce risks. In section 2, we illustrate the importance of identifying potential benefits and risks in designing REDD+ interventions and country approaches to safeguards. The general focus of the report is on biodiversity and ecosystem services but the identification of benefits and risks is important in terms of both social and environmental issues. Section 3 specifically highlights the potential for synergies between REDD+, the Aichi Biodiversity Targets of the Convention on Biological Diversity and the National Biodiversity Strategy and Action Plan

1 UNFCCC. The Cancun Agreements: Outcome of the Work of the Ad Hoc Working Group on Long-Term Cooperative Action Under the Convention, Decision 1/CP.16, FCCC/CP/2010/7/Add.1.

(NBSAP) to implement the Aichi Biodiversity Targets in Uganda. Section 4 discusses how spatial analysis can support REDD+ planning for achieving multiple benefits. It is illustrated with example maps and makes recommendations for further spatial information that can support REDD+ planning in Uganda. Section 5 concludes with some reflections on the findings of the report.

1.1 Forests and biodiversity in Uganda

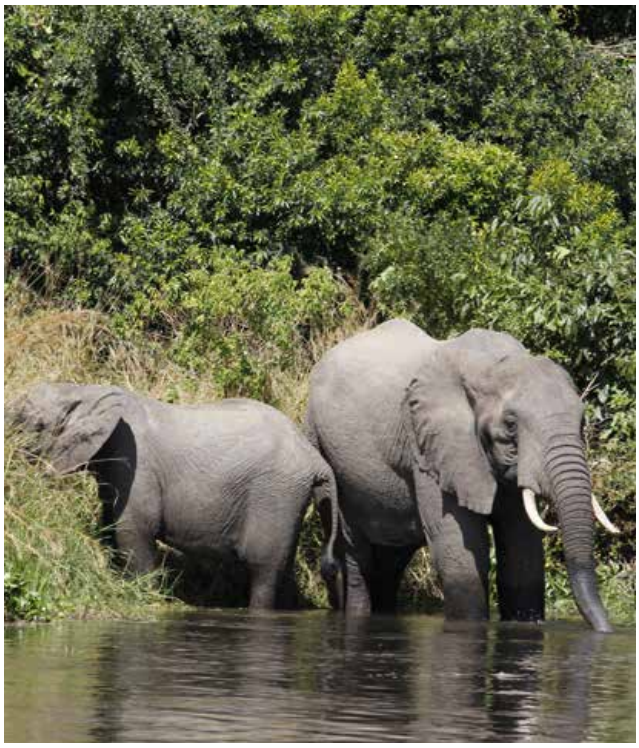
Uganda is a land-locked country situated astride the equator and bordered by the Democratic Republic of Congo in the West, by South Sudan in the North, Kenya in the East, by Tanzania in the South and by Rwanda in the Southwest. Covering an area of 236,000 km^2, Uganda is one of the smallest states in Eastern Africa.

In 2001, Uganda had an estimated 4.9 million hectares of forests and woodlands (Ministry of Water, Land and Environment 2001). The 2005 national land cover map distinguishes between four types of forest: broad-leaved, conifer, tropical high forest and woodland (NFA 2009). Other land cover types in the country include bush, grassland and wetland. According to the National Forestry Authority (2008), 81% (3,974,000 ha) of Uganda's forest is woodland, 19% (924,000 ha) is tropical high forest and less than 1% (35,000 ha) is forest plantations. Of the 4.9 million hectares of forests, 30% are in protected areas (Forests Reserves, National Parks and Wildlife Reserves) and 70% are found on private land. Protected Areas (PAs) contain the country's Permanent Forest Estate (PFE) (including Central Forest Reserves), which is 1.9 million hectares (Obua et al. 2010). The Permanent Forest Reserve is managed by the Uganda Wildlife Authority (UWA) and the National Forest Authority (NFA).[2] As forests on private land can suffer from poor management and degradation, and those in National Parks are inaccessible for provision of forest products, Central Forest Reserves (CFRs) are left as the only forest land available for uses by local populations that require high quality forests (NFA 2005).

Forests are of great importance to Uganda, particularly for the forest-dependent population. Not only do forests provide a number of ecosystem services related to agriculture, water and fisheries, they are also crucial for watershed and groundwater protection, erosion control and carbon sequestration (Obua et al. 2010). The total economic value of Uganda's forests, including marketable and nonmarketable values, was estimated at 593.24 billion Uganda shillings (or USD 304 million at the exchange rate of USD 1 = Ushs. 1920) in 2004 – equivalent to approximately 5.2% of the Gross Domestic Product (GDP) (NFA 2008).

Uganda has a relatively high rate of deforestation of 1.8 percent or 80,000 hectares per year (UBOS 2011). The key drivers of deforestation and forest degradation in Uganda include the lack of clearly defined ownership and tenure rights, unclear access controls (particularly for forests on private land), high population growth rates, unplanned economic growth and increased demand for forest products (NEMA 2010).

Uganda is exceptionally rich in biodiversity with surveys reporting occurrence of over 18,783 species of flora and fauna (NEMA 2006). Even though the country occupies only 2% of the world's area, it has 10.2% of the world's bird species, 6.8% of the world's butterfly species and 7.5% of the world's mammals (USAID 2006). Uganda's Kibale National Park contains the highest density of primate species in all of Africa, where an area of only 720 km^2 contains 12 species of primates, including gorillas, chimpanzees, and olive baboons (USAID 2006). Threats to Uganda's biodiversity include habitat degradation and destruction, pollution, expansion of agricultural land, livestock grazing, extraction of minerals, oil and gas exploration activities, blockage and fragmentation of migration corridors, and hydropower projects, among others. Due to these pressures, 183 Ugandan species have been categorised as threatened within the IUCN Red List of Threatened Species, with 44 classified as critically endangered (IUCN 2014).



Elephants, Murchison Valley: ©Edgar Luce 2013.

2 For a more detailed description of forest tenure and management arrangements in Uganda, see Annex 1.

1.2 REDD+ in Uganda

Uganda is currently developing its national REDD+ Strategy. Uganda's REDD+ Readiness Preparation Proposal (R-PP) marks the country's initial step towards this strategy and was submitted to the Forest Partnership Carbon Fund in 2011.[3] The R-PP sought to evaluate the current situation with regards to deforestation and forest degradation in Uganda, and provide an overview of the potential ways the country might address them. In addition to strategy options, the R-PP also outlined processes to examine reference levels and monitoring systems for forests and safeguards.

Uganda has since signed a Readiness Preparation Grant Agreement with the World Bank in July 2013 as well as a grant agreement with the Austrian Development Agency (ADA) to support the design and development of systems for national forest monitoring and information on safeguards in June 2013.

Semliki National Park: ©Sarahemcc 2006 (CC BY 2.0) www.flickr.com/photos/sarah_mccans/289964239.

2. The importance of identifying potential benefits and risks in designing REDD+ interventions and country approaches to safeguards

The success of REDD+ may ultimately depend on whether significant risks have been avoided, and multiple benefits have been secured. Identification of benefits and risks can therefore form an important part of the overall REDD+ planning process. This process also often includes the implementation of safeguards and spatial analysis (Figure 1). Although there is no fixed linear process for planning for REDD+, identifying potential risks and benefits of REDD+ early in the planning process makes it possible to address them within the design phase, and thereby increase the chances of successful implementation. Some potential approaches for identifying benefits and risks are presented in Box 3. One of these approaches, the UN-REDD Programme Social and Environmental Principles and Criteria (SEPC) (Box 4) was used at a workshop on 'Identification of potential multiple benefits from REDD+' to come up with an initial list of benefits and risks that may be relevant in the Ugandan context (Box 5). These were then used to guide the production of spatial analyses presented in section 4.

Figure 1 illustrates steps in the REDD+ planning process. It shows how designing REDD+ actions is related to the processes of spatial planning and developing a country approach to safeguards. The figure also illustrates how benefits and risks analysis can feed into these parallel processes. Identifying the desired outcomes that a country wishes to achieve through its REDD+ policies might be an important starting point for developing a national REDD+ strategy. Even though the primary goal of REDD+ policies is to support climate change mitigation, goals can also cover additional benefits to people and the environment. Identifying the desired benefits of REDD+ policies can help in evaluating whether the interventions being considered are sufficient for achieving them. Once a draft set of interventions has been identified, a further benefits and risks analysis of each intervention can help in ensuring that the design avoids potential risks and enhances possible benefits. As the REDD+ process moves forward, it can be important to perform several of the steps in the planning process iteratively to ensure that new circumstances are taken into account and that interventions are adapted accordingly.

3 The Forest Carbon Partnership Facility (FCPF), hosted by the World Bank, is one of the multilateral initiatives that support countries' REDD+ readiness efforts. The UN-REDD Programme, a United Nations Collaborative initiative between FAO, UNDP and UNEP, as well as the World Bank's Forest Investment Program (FIP), are further multilateral initiatives supporting REDD+ readiness.

In developing REDD+ plans, spatial analysis can support the identification and visualisation of the distribution of benefits and risks. It can also support identification of the conditions in which REDD+ may be implemented (for example, in terms of distribution of current forest cover and other land-use) and areas where REDD+ may be implemented (see spatial planning stream of Figure 1). As part of the design of an intervention it is important to consider where interventions may be implemented. Section 4 discusses the potential role for spatial analysis in more detail.

The development of a country approach to safeguards is another key step within the national REDD+ planning process. There is no fixed method to developing a country approach to safeguards, as it will depend on what safeguards are in place in the country and on what governments want the safeguards to achieve, including risks to be minimized and benefits to be enhanced (UN-REDD Programme 2013). There are however some generic steps which may be useful for countries planning such an approach, shown in the safeguards stream of Figure 1. After identification of nationally relevant goals, a review of existing policies, laws and regulations (PLRs) may indicate that existing PLRs do not cover all of the Cancun safeguards and nationally relevant goals, and may require development of new PLRs. As the UNFCCC Agreements request countries to provide information on how the Cancun safeguards are being addressed and respected, countries may also wish to develop a Safeguards Information System (SIS). The development of an SIS may be supported by a further gap analysis of existing country information systems and the development of indicators, data collection methodologies and approaches for providing information. Spatial planning, particularly maps of benefits and risks of actions and of priority areas for interventions, could input to the processes of indicator development and development of data collection and information provision.

Landscape: © flöschen 2011 (CC BY-NC-SA 2.0) www.flickr.com/photos/floeschen/5471077201/in/photostream/.

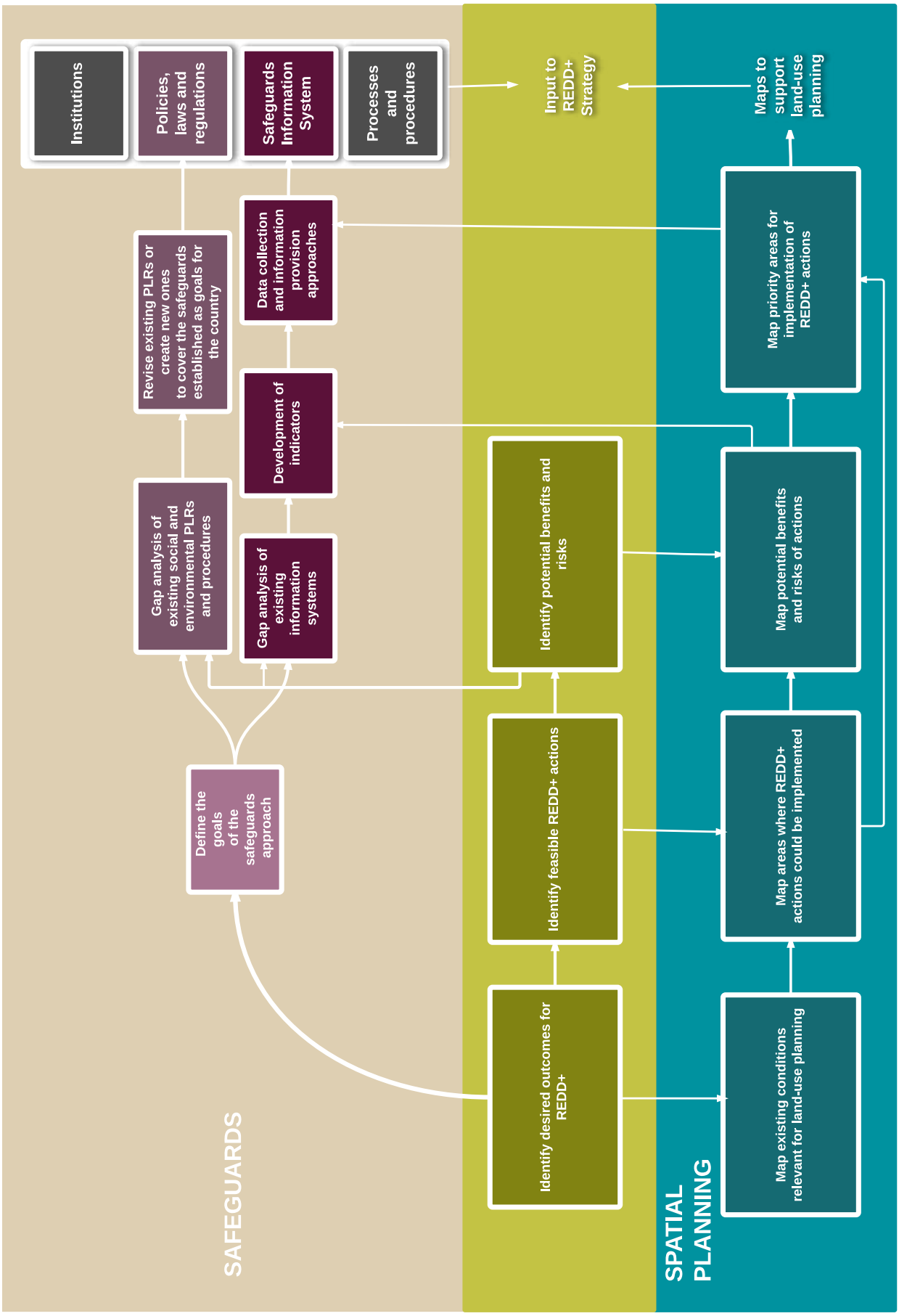


Figure 1: Overview of how the process of designing REDD+ actions is related to the processes of spatial planning and developing a country approach to safeguards. All these processes are connected to the REDD+ Strategy.

Ugandan kobs: ©Edgar Luce 2013.

In addition to the commitments all countries have made to promote and support the Cancun safeguards, a country may also wish to design their safeguards to respond to other objectives. Hence, the benefits and risks related to these objectives should also be considered. Potential objectives include:

- Donor requirements, such as the Forest Carbon Partnership Facility's (FCPF) Strategic Environmental and Social Assessment (SESA);
- National legislation, such as the requirement for Environmental Impact Assessments under Uganda's National Environment Act (1995); or international commitments such as the Convention of Biological Diversity (CBD) (See section 3);
- Specific social and environmental risks and benefits that might be associated with REDD+ in the country;
- Standards listed under Verified Carbon Standard and other voluntary market systems.

By clearly defining the goals of the safeguards approach, it is more likely to be designed to the country's needs. Some countries have chosen to develop a REDD+ safeguards document that outlines principles, criteria and indicators drawn from various relevant sources.

Box 3: Approaches and tools for analysing benefits and risks and developing country approaches to safeguards

Different approaches and tools exist for the identification of potential risks and benefits and developing country approaches to safeguards. The UN-REDD Programme Social and Environmental Principles and Criteria (SEPC) are a set of guidelines that expand on the Cancun safeguards. Countries may find it helpful to use the SEPC to translate the Cancun safeguards to the national context. The SEPC was used in the December 2013 Multiple Benefits Workshop for Uganda to structure the identification of benefits and risks in relation to REDD+ interventions identified in the Uganda R-PP. A broad synthesis of issues addressed by the SEPC is presented below (Box 4).[4]

The spreadsheet-based UN-REDD Country Approach to Safeguards Tool (CAST) can support domestic planning for REDD+ safeguards and SIS activities by identifying, prioritizing and sequencing activities and making note of available information resources for each step. Furthermore, the tool clarifies how the processes under various safeguards initiatives correspond.

The UN-REDD Benefits and Risks Tool (BeRT) was developed to support the review of Policies, Laws and Regulations (PLRs) in the development of country approaches to safeguards. Also spreadsheet-based, the BeRT can help countries to identify benefits and risks associated with specific REDD+ actions and identify gaps in PLRs with respect to the Cancun safeguards.

The REDD+ Social and Environmental Standards (SES), developed by the Climate, Community & Biodiversity Alliance (CCBA) and CARE International, is a further framework designed for national REDD+ programme development. These voluntary standards may be helpful in the assessment of risks and benefits from REDD+, and it is envisioned by their developers that the REDD+ SES could be used in further steps towards developing a SIS (REDD+ SES 2012).

Box 4: Issues addressed by the UN-REDD Social and Environmental Principles and Criteria:

1. Democratic governance
2. Stakeholder rights
3. Sustainable livelihoods and poverty reduction
4. Contribution to existing policies
5. Natural forests
6. Multiple functions of forests
7. Impacts on non-forest ecosystems

Source: UN-REDD Programme (2012)

4 For the full UN-REDD SEPC, see: UN-REDD Programme (2012) Social and Environmental Principles and Criteria. Available at: http://www.un-redd.org/Multiple_Benefits_SEPC/tabid/54130/Default.aspx.

Murchison Falls: ©Edgar Luce 2013.

Box 5: Examples of benefits and risks

In the workshop on 'Identification of potential multiple benefits from REDD+' held in Entebbe, Uganda in December 2013, an initial benefits and risks analysis was undertaken using the list of potential interventions in Uganda's R-PP. The UN-REDD Social and Environmental Principles and Criteria (see Box 4) were used to create a list of potential benefits and risks from the range of potential interventions, further divided into categories. These benefit and risk categories are presented to exemplify the range of benefits and risks that may be relevant in the Ugandan context. Result of a brainstorming session without prior preparation, this is not a final list, but rather one that can give an indication of the areas that can either benefit or be at risk from REDD+. These sample risks and benefits informed the development of maps of potentially relevant information layers.

Benefits and risks from REDD+

Benefit category	Risk category
Sustainable land-use and reduced pressure on forests	Livelihoods
Biodiversity	Environment
Ecosystem services	Ecosystem services
Carbon and climate	Biodiversity
Livelihoods, employment options and well-being	Inclusivity and participation
Increased resource efficiency	Policy and governance
Reduced costs/increased revenue for government	Costs
Inclusivity and participation	Conflict
Governance and policy coherence	Benefit sharing
Better information access	

3. Exploring synergies between REDD+ and the Aichi Biodiversity Targets

As highlighted in section 2, countries may wish to consider other national commitments within the design of their REDD+ Strategy, including those related to the Convention on Biological Diversity (CBD). In 2010, the Parties to the CBD adopted the Strategic Plan for Biodiversity (hereafter referred to as 'the Strategic Plan') for the period 2011-2020, and 20 'Aichi Biodiversity Targets'. These targets range from the conservation of marine and terrestrial ecosystems, to the access to genetic resources and the benefits arising from their use. They also include ambitious targets for conservation, sustainable use and restoration of forests. The targets are global, but actions for achieving them are primarily implemented at the national, sub-national and local level. The Strategic Plan is translated into national circumstances and implemented by countries through National Biodiversity Strategies and Action Plans (NBSAPs). Countries are committed to revising their NBSAPs according to the Strategic Plan and developing national targets that support the achievement of the Strategic Plan and the Aichi Targets.

Within countries' REDD+ planning and implementation, it may be helpful to consider how activities under REDD+, and those aimed at achieving the Aichi Biodiversity Targets, may complement one another, and consequently, how to promote synergies between them, and enhance benefits and reduce risks.

Several of the targets are directly related to REDD+ activities. For example, Aichi Biodiversity Target 5, that the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, is very closely related to the REDD+ activity of reducing deforestation (Table 1). Additionally, the Cancun safeguards state that REDD+ actions are to be consistent with the conservation of natural forests and biological diversity, effectively involve indigenous people and local communities, as well as other issues that are aligned with the Aichi Biodiversity Targets. Working to meet the Cancun safeguards can therefore also work towards achieving some of the Aichi Biodiversity Targets (Miles et al. 2013).

While REDD+ holds promise for biodiversity conservation, it is unlikely to contribute to the achievement of all of the Aichi Biodiversity Targets, since these are broader than forests and their role in climate change mitigation. REDD+ could even counteract efforts to meet the Aichi Biodiversity Targets if pressure on forest land was displaced from one area to another, across national boundaries or into other ecosystems. Joint planning for

Ants: ©Edgar Luce 2013.

REDD+ implementation and achievement of the Aichi Biodiversity Targets could help countries to develop coherent and complementary approaches to climate change mitigation, sustainable forest management and biodiversity conservation.

Planning for REDD+ that considers biodiversity is likely to enhance progress on Aichi Biodiversity Target 2, which aims to integrate biodiversity values into development and poverty reduction strategies and planning processes. One tool to help ensure this, is the practice of requiring Environmental Impact Assessments (EIA), Strategic Environmental Assessment and similar assessments, which enable the evaluation of trade-offs in decision-making (Cabrera et al. 2012). Such an approach is legislated in Uganda. The Environmental Impact Assessment Regulations (1998) make it a legal requirement under the National Environment Act (1995) that all development projects likely to cause significant impacts on the environment undergo an EIA. The National Environment Act states that projects subject to detailed EIA include reforestation and afforestation projects, large scale agriculture, use of pesticides, introduction of new crops and animals, as well as use of fertilizers. The National Environment Act also requires an EIA for Natural Conservation areas and management within them, including formulation or modification of forest management policies, commercial exploitation of natural fauna and flora and introduction of alien species of flora and fauna into ecosystems. Section 38 of The National Forestry and Tree Planting Act (2003) further specifies that an EIA is required for any project or activity, which may, or is likely to have a significant impact on a forest. The

scope of Uganda's EIA requirements, and the reference to particular activities and forests, suggest a particular relevance for REDD+. Applying existing EIA legislation in Uganda could not only work towards achieving Aichi Biodiversity Target 2, but also contribute to consistency with the conservation of biodiversity as required by Cancun safeguard (e).

Furthermore, the Strategic Plan urges Parties to use revised and updated NBSAPs as effective instruments for the integration of biodiversity targets into national development and poverty reduction policies and strategies.[5] The contribution of biodiversity and ecosystem services to livelihoods and coexistence of local people and ecosystems in a natural state are central to planning for multiple benefits from REDD+. This importance is also echoed in Cancun safeguard (e), which further requests that REDD+ activities are used to incentivise the protection of natural forests and their ecosystem services and to enhance other social and environmental benefits.

Buffalos: © Edgar Luce 2013.

Coordination of efforts may be particularly important in helping to enhance likely synergies, and minimise conflicts, since responsibilities for REDD+ and CBD implementation are often held by different ministries. This is applicable to wider cross-sectoral coordination with ministries responsible for agriculture, energy, infrastructure and extractive resources. Coordination may be especially important during the policy development, information-sharing, and stakeholder consultation processes. Efforts to collect information, manage and share datasets on forests, biodiversity and other national priority areas could help ensure coherent land-use policies.

Understanding local priorities and needs, and clarification of land tenure as envisioned by Uganda's R-PP, can be essential to ensuring that interventions are fair and effective and that their benefits are equitably shared. Both the UNFCCC and CBD emphasize the importance of stakeholder participation. The views of local and indigenous peoples may also allow identification of ecosystem services that are essential to well-being. By ensuring that REDD+ protects or restores the services valued locally, the sustainability of REDD+ efforts can be also increased and the risk of reversals reduced. Community consultations on the definition of essential services and spatial analyses on their distribution may both be useful for REDD+ and CBD purposes, encouraging the responsible country agencies to share results and avoid duplication.

Coordinated planning for REDD+ and implementation of the Aichi Biodiversity Targets holds great relevance for a country such as Uganda. Having ratified the UNFCCC and the CBD in 1993, Uganda is currently developing its REDD+ strategy and is in the process of revising its NBSAP. Table 1 relates the Aichi Biodiversity Targets to Uganda's draft NBSAP targets, REDD+ activities and key elements of the UNFCCC REDD+ safeguards, as well as to relevant REDD+ interventions identified by the R-PP for Uganda. This analysis suggests there are multiple complementarities between Uganda's draft NBSAP and REDD+. These synergies will be further explored in section 4, in relation to spatial information for REDD+ planning. Table 1 considers the most direct links and is not an exhaustive list. Uganda may want to compare a broader set of Aichi Biodiversity Targets against its plans for REDD+ for a full appreciation of the scope for synergies between the actions it is undertaking under REDD+ and the NBSAP.

5 CBD COP Decision X/2, para. 3d.

Table 1: Synergies between the Aichi Biodiversity Targets and REDD+

Aichi Biodiversity Targets (CBD Decision X/2)	Targets from Uganda draft NBSAP	REDD+ elements - activities, guidance and safeguards (UNFCC Decision 1/CP.16)	Examples of relevant REDD+ interventions identified in the R-PP for Uganda
Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	**Draft Target** 1.1: By 2020, biodiversity issues have been integrated into the National Development Plan, Budget Framework papers, Ministerial Policy Statements and District Development Plans.	• REDD+ activities should be undertaken in accordance with national development priorities, objectives and circumstances • Safeguard (e): REDD+ actions are to be consistent with conservation of biodiversity and are to enhance other social and environmental benefits	
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.		• *Reducing emissions from deforestation* • *Reducing emissions from forest degradation* • *Conservation of forest carbon stocks*	• Agricultural intensification to minimize size of land under agricultural use • Increasing timber stocks countrywide to reduce pressure to current stock, especially in natural forests
Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	**Draft Target 3.7:** By 2020, management plans are in place for areas under agriculture, aquaculture and forestry to ensure sustainable biodiversity conservation.	• *Sustainable management of forests* • Safeguard (e): REDD+ actions are to be consistent with conservation of natural forests and biological diversity and are to incentivize the protection and conservation of natural forests and their ecosystem services	• Forest management planning that would zone and project for timber production to meet demand whilst restocking for future needs • Increasing biomass/trees on farmland • Improvement in forest timber harvesting and utilization technologies • Increase forestry resources competitiveness to attract investments in forestry development.
Target 11: By 2020, at least 17% of terrestrial areas are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas.	**Draft Target 3.1:** By 2020, at least 17% of terrestrial and inland water ecosystems in Uganda are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas for socio-economic benefit of the population	• *Conservation of forest carbon stocks* • REDD+ activities should be consistent with the objective of environmental integrity and take into account the multiple functions of forests and other ecosystems	• Strengthening partnerships with Communities as neighbours to protected forest areas

Continued on the next page

Table 1: Synergies between the Aichi Biodiversity Targets and REDD+ (continued)

Aichi Biodiversity Targets (CBD Decision X/2)	Targets from Uganda draft NBSAP	REDD+ elements - *activities*, guidance and safeguards (UNFCC Decision 1/CP.16)	Examples of relevant REDD+ interventions identified in the R-PP for Uganda
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	**Draft Target 3.2:** By 2020, at least 10% of identified fragile and degraded ecosystems outside protected areas are being effectively managed for biodiversity conservation and for socio-economic benefit of the population.	• *Conservation of forest carbon stocks* • *Enhancement of forest carbon stocks* • Safeguard (d): REDD+ activities should promote and support full and effective participation of relevant stakeholders, in particular indigenous peoples and local communities • Safeguard (e): Enhancement of other social and environmental benefits	• Developing procedures and capacities for ensuring equitable and transparent implementation of REDD+ in partnership with CSOs.
Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	**Draft Target 8.1:** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	• *Reducing emissions from deforestation* • *Reducing emissions from forest degradation* • *Conservation of forest carbon stocks* • *Sustainable management of forests* • *Enhancement of forest carbon stocks*	• Increasing timber stocks countrywide to reduce pressure to current stocks, especially in natural forests

4. How spatial analysis and maps can support REDD+ planning for achieving multiple benefits in Uganda

The benefits that REDD+ can deliver vary spatially, as do the drivers of deforestation and forest degradation, due to the variation in relevant biophysical, geographic and cultural factors from one location to another. Spatial information can therefore help to answer questions such as 'what are the combinations of drivers and potential benefits within different areas?' and 'in which areas is there most potential for REDD+ to deliver multiple benefits?' They can thus facilitate the consideration of benefits and safeguards in the design and implementation of REDD+ interventions.

Maps similar to those presented in this report can be used for awareness-raising with stakeholders as well as within participatory planning processes. They can be used to distinguish between different stakeholders' valuation of biodiversity and ecosystem services and identify pressures on the multiple values of forests. Maps are versatile decision-making tools that may be developed rapidly, depending on the availability of revelant data. They are also easily customizable and often cost-effective.

Spatial analysis can also support the development of a country approach to safeguards. Maps of the status of safeguard-relevant parameters predating REDD+ can function as a baseline for a Safeguards Information System (SIS), and help to identify or develop data collection procedures as necessary.

4.1 Reducing emission from deforestation and forest degradation

4.1.1. Carbon stocks and pressures

The starting point for REDD+ is the reduction of emissions from the forest sector. The levels of emissions within a location will depend on the extent of deforestation and degradation, and the level of carbon present. Activities to reduce emissions from deforestation and forest degradation are likely to have the largest impact when targeting high carbon areas that are under high threat. Therefore, understanding both the distribution of current carbon stocks and pressures on them is important for spatial planning for REDD+. Agricultural expansion is the major driver of deforestation and forest degradation in Uganda, especially in high population areas, and has also contributed to wide-spread illegal encroachment to central forest reserves (Mugumya et al. 2011; NFA 2011). Livestock grazing, timber production and human settlement and urbanisation are further significant drivers of deforestation and forest degradation in the Ugandan context (Mugumya et al. 2011).

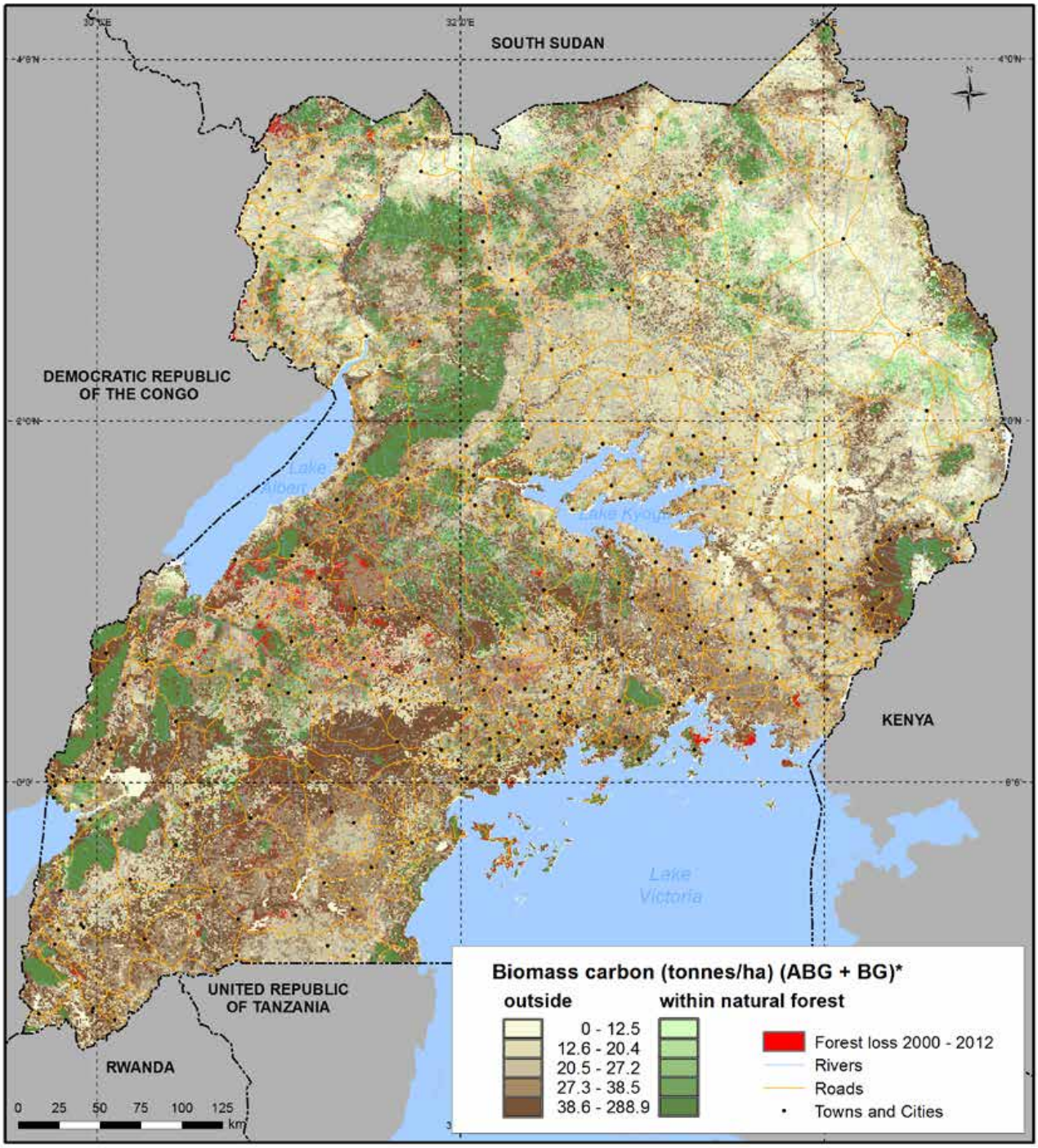
View over Lake Albert: ©Edgar Luce 2013.

Map 1 shows biomass carbon stocks inside and outside natural forest, and areas that have been recently deforested.[6] This map can provide a first assessment of high carbon forests that are in proximity to recently deforested areas. While past deforestation does not perfectly indicate future deforestation, past trends can provide an indication of current frontiers. Roads, allowing access to forest areas, are another indicator of deforestation frontiers and are also included in Map 1, together with towns and cities.

6 Time period considered was between 2000 and 2012.

Map 1: Carbon stocks and forest loss inside and outside natural forest

Understanding the distribution of current carbon sticks and pressures on them is important for spatial planning for REDD+. Here natural forest is defined as 'Tropical High Forest' and 'Woodland'.



* (ABG + BG) = Above ground + below ground biomass carbon

Sources:
Biomass Carbon: Saatchi, S et al. "Benchmark map of forest carbon stocks in tropical regions across three continents", PNAS, 108. 24 (2011): 9899-904. http://carbon.jpl.nasa.gov/
Forest Cover Loss: Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53. Data available on-line from: http://earthenginepartners.appspot.com/science-2013-global-forest.
Natural Forest: 'Tropical High Forest' from classes 3 and 4 and 'Woodland' from class 5 of the Generalised National Biomass study (NBS) dataset.

Projection: Lambert_Azimuthal_Equal_Area; Central Meridian 31.5, Latitude Of Origin 1.5.

Map prepared by: UNEP-WCMC. Date June 2014

Edge of Biwindi Forest: ©Josh Levinger 2013 (CC BY 2.0) www.flickr.com/photos/jlevinger/10694118074/in/photostream/.

Forest degradation is an important mode of forest loss in Uganda, notably from activities such as charcoal production and fuel wood extraction, in particular for small and medium scale industry and urban households (Mugumya et al. 2011). Compared to deforestation, forest degradation is more difficult to measure and its drivers are often difficult to regulate. Understanding the dynamics and spatial distribution of the drivers can be of great help when designing REDD+ actions. Fire is a source of pressure that threatens areas in northern Uganda, dominated by woodland, shrubland and mosaic forest or cropland with open woody vegetation. Map 2 shows fire incidence during 2013 in relation to natural forest and biomass carbon stocks. Understanding the spatial distribution of fire intensity helps to analyse causes of fire and target REDD+ interventions in the right places to address the underlying drivers. Addressing wildfires is also a priority in Uganda's draft NBSAP document. One of the draft targets in relation to Aichi Biodiversity Target 15[7] includes monitoring and controlling bush burning in fire prone areas as a key activity.

Further spatial information indicating other types of pressures can complement Maps 1 and 2. Potentially useful information includes population density and growth, grazing pressure, and areas of current agricultural expansion and projections of future agricultural expansion. Timber and mining concessions as well as oil and gas exploration areas are further potentially relevant data layers for REDD+ planning for tackling pressures of deforestation and forest degradation.

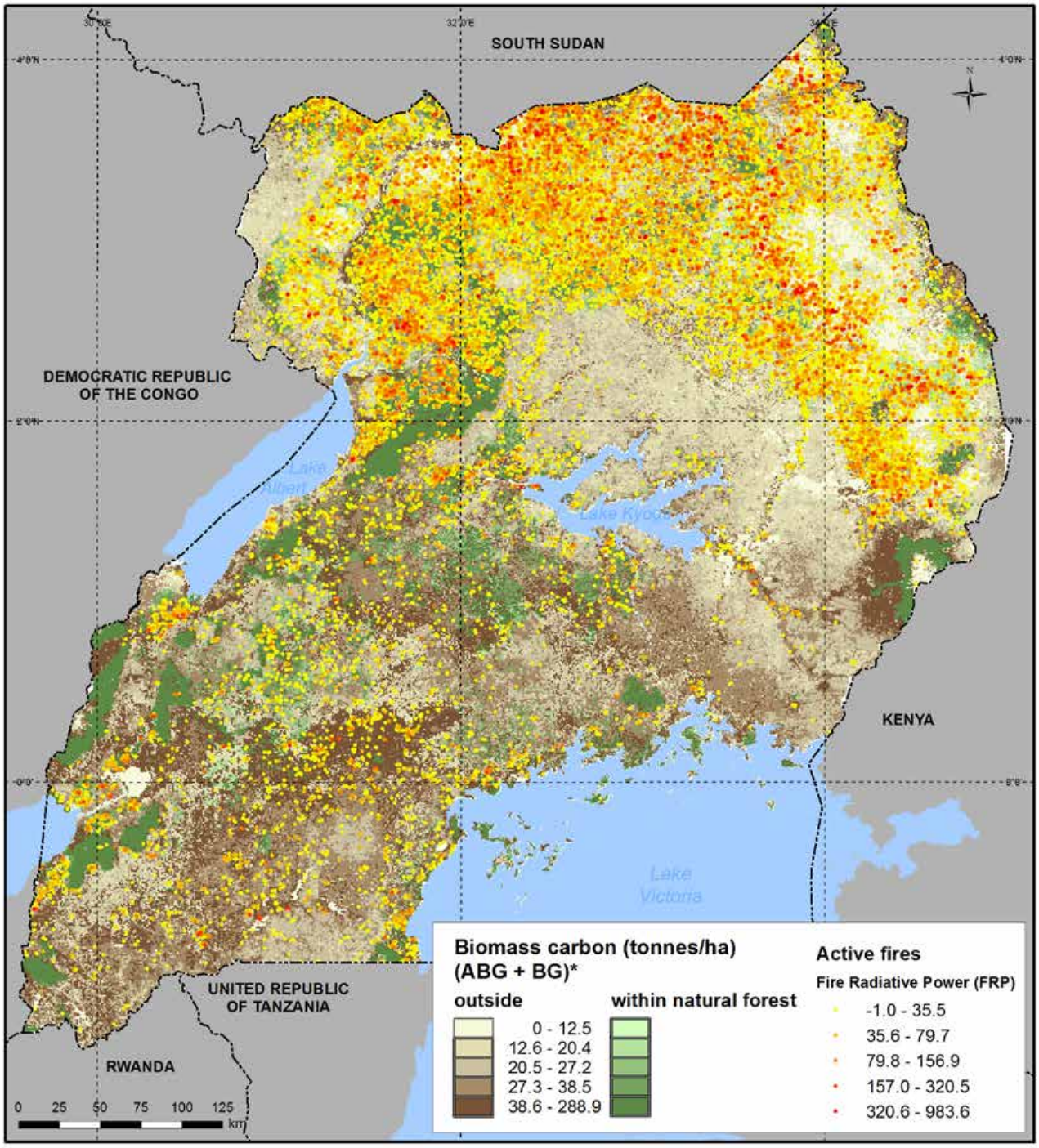
There is a strong link between reducing emissions from deforestation and degradation and Aichi Biodiversity Target 5[8], particularly for its objectives of reducing loss of natural forest and reducing degradation and fragmentation where forests are concerned. Meeting both Aichi Biodiversity Target 5 and REDD+ objectives will require addressing the drivers of habitat loss, degradation and fragmentation. Reducing drivers is especially important for Aichi Biodiversity Target 5 as it covers all types of natural habitat including low carbon habitats. If drivers of land-use change are not addressed, there is a risk that processes such as agricultural expansion may shift to forests that are not included in REDD+ activities or to other natural habitats.

7 Aichi Biodiversity Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

8 Aichi Biodiversity Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Map 2: Areas exposed to fire in 2013

Fires that result from human activities cause forest degradation in Uganda, and many natural forests and protected areas are affected by this problem. This map facilitates spatial planning for actions to reduce human-caused fire incidence.



* (ABG + BG) = Above ground + below ground biomass carbon.
Carbon stocks inside and outside natural forest. Natural Forest is 'Tropical High Forest' from classes 3 and 4 and 'Woodland' from class 5 of the Generalised National Biomass study (NBS) dataset.

This map is based on satellite estimates of radiant heat output from fire using the AMESD Modis Active Fire Product

Sources:
Biomass Carbon: Saatchi, S et al. "Benchmark map of forest carbon stocks in tropical regions across three continents", PNAS, 108. 24 (2011): 9899-904. http://carbon.jpl.nasa.gov/
Forest: Tropical High Forest' from classes 3 and 4 and 'Woodland' from class 5 of the Generalised National Biomass study (NBS) dataset.
Active Fires: AMESD, 2012. Modis Active Fire product.

Projection: Lambert_Azimuthal_Equal_Area: Central Meridian 31.5, Latitude Of Origin 1.5,

Map prepared by: UNEP-WCMC. Date June 2014.

Forest landscape, Uganda: ©Douglas Sheil (CIFOR) 2008 (CC BY-NC-ND 2.0) www.flickr.com/photos/cifor/5711675969.

4.1.2. Defining natural forest

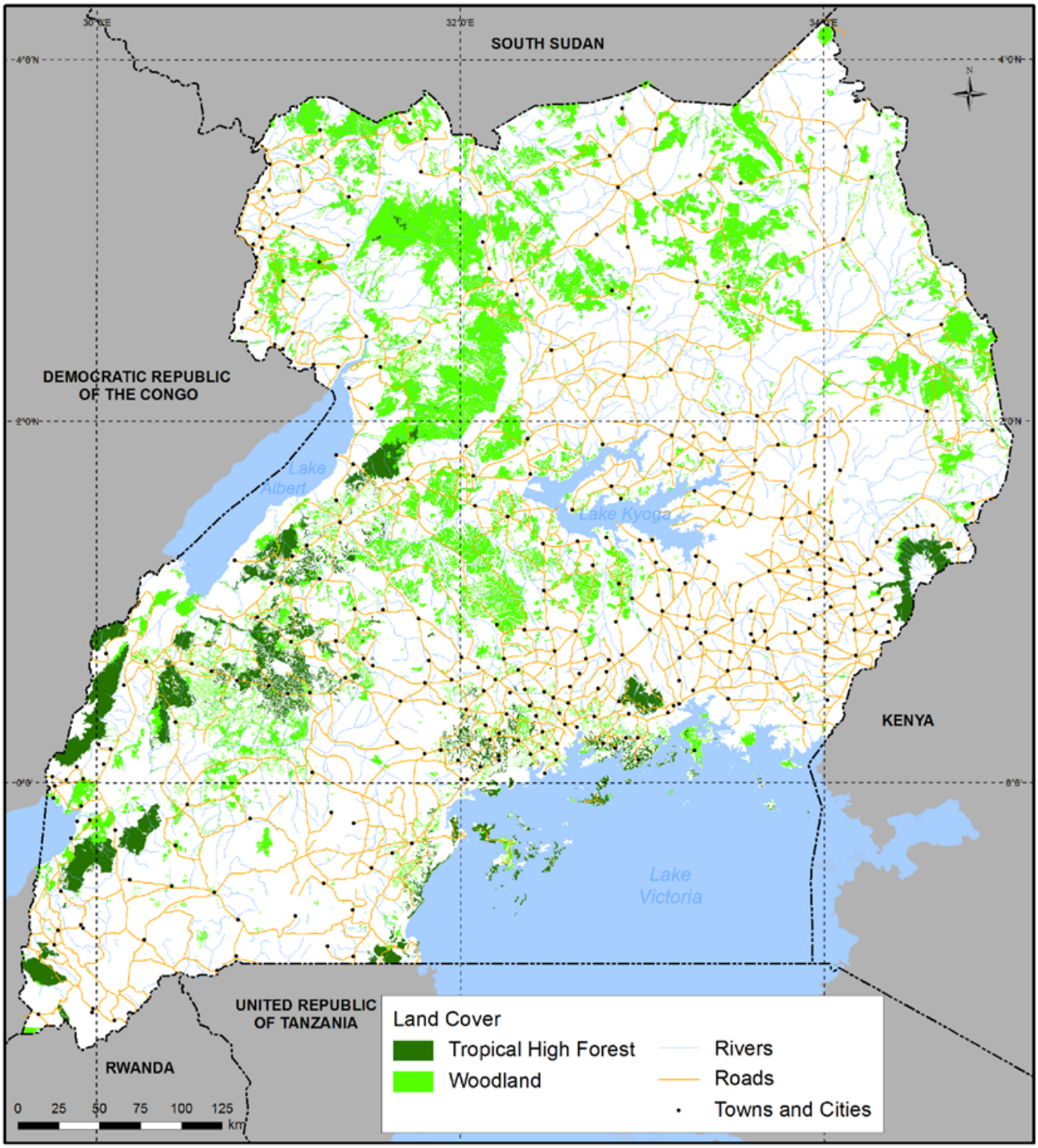
Due to its national commitments and the Cancun safeguards, Uganda may want to identify the distribution of natural forests in REDD+ planning. Safeguard (e) of the Cancun safeguards specifically states that REDD+ actions are not to cause the conversion of natural forests. In order to promote and support the Cancun safeguards, it is thus necessary to define natural forest.

Uganda's R-PP does not provide a clear natural forest definition, even though it often distinguishes between natural forest, woodlands and bush land. This suggests that the R-PP excludes woodland and bush land from the definition (Mugumya et al. 2011, p. 81). On the other hand, the National Biomass Study (2005) categorizes Uganda's *natural forest vegetation* into three broad types: Tropical High Forest (THF) well stocked, Tropical High Forest low stocked, and Woodland. In the view of the National Biomass Study, woodlands are thus included in natural forest. Map 3 illustrates the divergence between the two approaches.[9] If woodland is indeed included in the definition, the forest area classified as natural forest is 350% larger than under a more restrictive definition. This has implications on where and how different REDD+ interventions can be implemented. Spatial information on the extent of natural forest may also be particularly relevant for developing indicators for a Safeguards Information System (SIS) to provide information on how safeguard (e) is being addressed and respected.

9 In Map 3, Tropical High Forest is class 3 (Tropical High Forest well stocked) and class 4 (Tropical High Forest low stock) of the Generalised National Biomass study (NBS) dataset. 'Woodland' is class 5 (Woodland) of the NBS dataset.

Map 3: Natural Forest with forest and woodland in different shades of green

The definition of natural forest is important for promoting and supporting safeguard (e). Here natural forest is defined as 'Tropical High Forest well stocked' (class 3); Tropical High Forest low stock' (class 4); and 'Woodland' (class 5) of the Generalised National Biomass Study (NBS) dataset.



Sources:
Forest Cover Loss:Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53. Data available on-line from: http://earthenginepartners.appspot.com/science-2013-global-forest.
Elevation: Jarvis, A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled SRTM for the globe Version 4, available from the CGIAR-CSI SRTM 90m Database (http://srtm.csi.cgiar.org).
Natural Forest:"Tropical High Forest' is class 3 (Tropical High Forest well stocked) and class 4 (Tropical High Forest low stock) of the Generalised National Biomass study (NBS) dataset.
'Woodland' is class 5 (Woodland) of the Generalised National Biomass study (NBS) dataset.

Projection: Lambert_Azimuthal_Equal_Area: Central Meridian 31.5, Latitude Of Origin 1.5,

Map prepared by: UNEP-WCMC. Date June 2014.

4.1.3. Biodiversity and ecosystem services: multiple benefits beyond carbon

While assessment of carbon stocks is key to planning for emissions reductions from REDD+, Uganda wants REDD+ to yield multiple benefits beyond climate change mitigation. Uganda is currently in the process of identifying goals, or benefits, that REDD+ will be designed to achieve in the country. It has not yet defined what those benefits are, but it is likely that some aspects of biodiversity and ecosystem services will be among the priorities. One of the guiding principles of Uganda's Forestry Policy (2001) states: "the forest sector's development should safeguard the nation's forest biodiversity and environmental services through effective conservation strategies" (Ministry of Water, Land and Environment 2001, p. 13). While REDD+ actions are always expected to contribute to reductions in carbon emission or increases in carbon sinks, the outcomes for biodiversity and ecosystem services may vary, depending on the types of activities, the prior ecosystem state and the wider landscape context (Kapos et al. 2012). Understanding the spatial distribution of priority aspects of biodiversity and ecosystem services can thus be critical for planning for REDD+ interventions.

Map 4 presents the distribution of threatened animal species richness for mammals, birds and amphibians, combined with woody biomass carbon and protected areas. This map allows identification of areas that are high in both carbon and threatened animal species richness. Identifying which of these areas are also under pressure can be important for planning for interventions that both reduce emissions and conserve threatened species. Interventions to conserve forest in areas that are high in threatened species hold particular relevance for synergies with the Aichi Biodiversity Targets, as they could contribute towards preventing extinction of known threatened species and improving species conservation status as under Aichi Biodiversity Target 12[10]. Further potentially relevant spatial information on multiple benefits to complement Map 4 include information on priority areas for biodiversity conservation (such as Key Biodiversity Areas[11]), important areas for plant diversity, and location of ecosystem services.

Map 5 shows forest[12] contribution to soil erosion prevention, with high altitude, slope and rainfall as key factors in determining contribution. Soil erosion can cause significant problems in increasing sediment loads on important downstream infrastructure such as dams. Supporting ecosystem services such as soil erosion, also relates to Aichi Biodiversity Target 14 on ecosystems and ecosystem services. There is a clear link between Aichi Biodiversity Target 14 and REDD+ safeguard (e) on incentivizing the protection and conservation of natural forests and their ecosystem services.

Maps 4 and 5 and other relevant spatial data can help in answering important land-use planning questions. For example, one might use such maps to identify which interventions are most appropriate in areas with different combinations of carbon, biodiversity, livelihood values and pressures. This information could also be used to determine which areas, if conserved, would yield the greatest benefits in terms of natural forest, carbon, biodiversity and ecosystem services.

L'Hoest's monkey (vulnerable on the ICUN red list), Bwindi Impenetrable National Park: ©Douglas Sheil, CIFOR 2008 www.flickr.com/photos/cifor/5711408567.

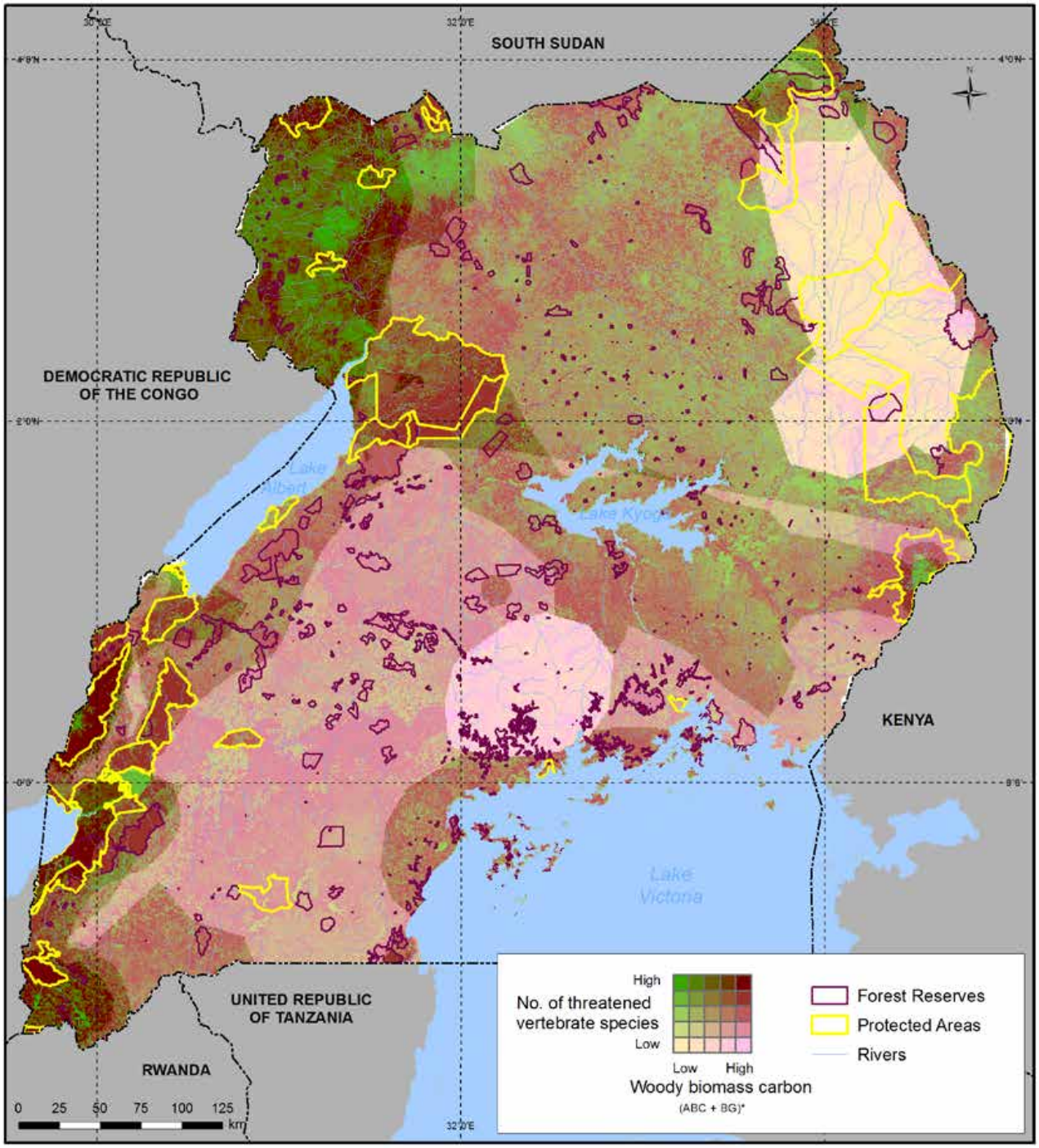
10 Aichi Biodiversity Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

11 Key Biodiversity Areas (KBAs) are nationally identified sites of global significance using the two standard criteria of vulnerability and irreplaceability. They comprise an 'umbrella' for different taxa and realms, including Important Bird Areas (IBAs); Important Plant Areas (IPAs); Important Sites for Freshwater Biodiversity; and Alliance for Zero Extinction (AZE) sites.

12 In Map 5, forest includes all forest types (Natural Forest and Woodland, as described in footnote 9) and plantations. These are 'Broad leaved plantations' (class 1) and 'Needle leaved plantations' (class 2) of the Generalised National Biomass study (NBS) dataset.

Map 4: Threatened animal species (mammals, birds, reptiles and amphibians) richness in relation to above-ground woody biomass carbon

This map allows identification of areas that are high in both carbon and threatened animal species richness.



* (ABG + BG) = Above ground + below ground biomass carbon.

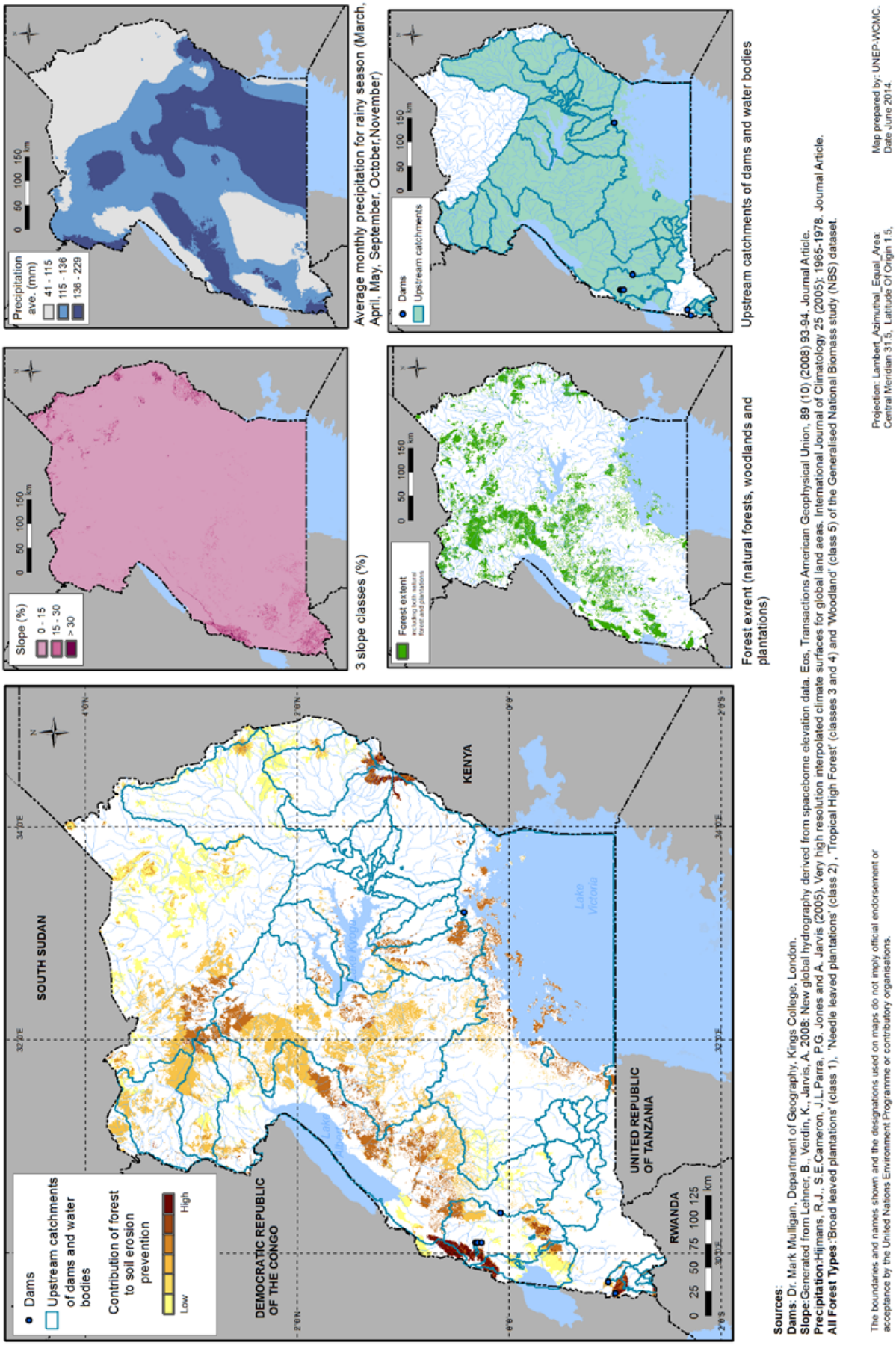
Sources:
Biomass Carbon: Saatchi, S et al. "Benchmark map of forest carbon stocks in tropical regions across three continents", PNAS, 108. 24 (2011): 9899-904. http://carbon.jpl.nasa.gov/
Vertebrates: IUCN, 2014. The IUCN Red List of Threatened Species. Version 2014.1. Downloaded between February and June 2014 at http://www.iucnredlist.org

Projection: Lambert_Azimuthal_Equal_Area; Central Meridian 31.5, Latitude Of Origin 1.5.

Map prepared by: UNEP-WCMC. Date June 2014.

Map 5: Importance of forests for limiting soil erosion

This map shows areas where forests are particularly important for limiting soil erosion that might cause sedimentation problems for dams in Uganda. The methodology is based on four parameters: slope, precipitation, location of dams and water bodies and their catchments, and forests.



Sources:
Dams: Dr. Mark Mulligan, Department of Geography, Kings College, London.
Slope:Generated from Lehner, B., Verdin, K., Jarvis, A. 2008: New global hydrography derived from spaceborne elevation data. Eos, Transactions American Geophysical Union, 89 (10) (2008) 93-94. Journal Article.
Precipitation:Hijmans, R.J., S.E.Cameron, J.L.Parra, P.G. Jones and A. Jarvis (2005). Very high resolution interpolated climate surfaces for global land aeas. International Journal of Climatology 25 (2005): 1965-1978. Journal Article.
All Forest Types:'Broad leaved plantations' (class 1), 'Needle leaved plantations' (class 2) , 'Tropical High Forest' (classes 3 and 4) and 'Woodland' (class 5) of the Generalised National Biomass study (NBS) dataset.

Projection: Lambert_Azimuthal_Equal_Area:
Central Meridian 31.5, Latitude Of Origin 1.5,

Map prepared by: UNEP-WCMC.
Date June 2014.

Establishing, enlarging and improving the management effectiveness of forested protected areas (PAs) may be, where socially and economically possible, an effective option for enhancing biodiversity conservation while reducing emissions from deforestation and forest degradation. This is why spatial information on the locations of PAs in relation to forests and pressures is useful for planning for REDD+. While protected area designation can confer some protection from deforestation, without sufficient investment in management, significant forest carbon loss can still occur (Scharlemann et al. 2010). In its draft NBSAP Target 3.1 for implementing Aichi Biodiversity Target 11[13], Uganda has chosen to emphasize the socio-economic benefits of protected areas to its population. This emphasis is well-aligned with the importance of protected area management effectiveness mentioned above, and Uganda's potential REDD+ intervention of strengthening partnerships with communities as neighbours to protected forest areas.

The bulk of Uganda's forests (64%) are found on private land, outside protected areas (Mugumya et al. 2011). While in many cases these forests harbour equally important biodiversity as those inside the forest reserves, Uganda's present policies and legislation for management of terrestrial biodiversity outside PAs and tenure insecurity under the existing tenure systems of land holdings, leasehold and customary holdings offer little incentive for protection and management of biodiversity outside PAs (Ministry of Water, Land and Environment 2001).[14] Even though a national tenure map is not readily available, taking into account land management and tenure is likely to be necessary for planning for multiple benefits from REDD+. Considering the significant proportion of private forest in Uganda, private land owners and communities could play a significant positive role in managing forest biodiversity in Uganda if given the right incentives to do so. REDD+ has great potential to facilitate this. For example, sustainable governance of non-timber forest products extraction could not only contribute to reducing forest degradation and deforestation, but also result in better conditions for biodiversity and provide alternatives to activities that deplete forest carbon stocks and harm biodiversity.

Crested cranes: ©Edgar Luce 2013.

13 Aichi Biodiversity Target 11: By 2020, at least 17% of terrestrial areas are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas

14 See Annex 2 for a summary of land tenure in Uganda and implications of deforestation and forest degradation.

4.2 Sustainable management of forests

Sustainable management of forests in areas that would otherwise be managed less carefully can be a useful strategy for REDD+ to minimise degradation. Several approaches can contribute to sustainable management of forests, including harvesting limits, designating 'buffer areas' so that trees are not cut in sensitive locations, supporting regeneration of forests after cutting by assisting natural regeneration or through enrichment planting, and implementing reduced-impact logging. Measuring the carbon gains or avoided losses of carbon from changes in forest management can however be more difficult than for REDD+ approaches based on forest conservation or restoration. The impacts of sustainable forest management are strongly dependent on the local situation – the biodiversity and carbon stocks of intact natural forests are in most cases negatively affected by introduction of logging, whereas the introduction of sustainable forestry practices in managed forests can improve the forest condition (Putz & Zuidema 2008).

Sustainable management of forests is an important REDD+ activity for Uganda's future REDD+ strategy as well as the existing National Forestry Policy. Uganda's R-PP identifies sustainable management of forests and forestry resources as a particularly pertinent policy area that needs to be further addressed. In addition, the objectives of the National Forestry Policy make several references to sustainable forest management.

Uganda's R-PP identifies sustainable management of forestry estates in protected areas (forest reserves and national parks), partnerships and stakeholder participation in management of PAs, and benefit sharing as options for sustainable forest management. These interventions are particularly relevant to forest reserves on government land.

Map 6 illustrates the distribution of biomass carbon in relation to forest reserves and protected areas in Uganda. According to the National Forestry Policy, Protected Areas are "all land gazetted and held in trust by government, such as Forest Reserves, National Parks and Wildlife Reserves" (Ministry of Water, Land and Environment 2001). Not all forests in protected areas are under a strict conservation regime, although some 840,100 ha (over 70 per cent of the total CFR area) have been categorised as areas of Ecological and Biodiversity Importance in the Forest Nature Conservation Master Plan (FNCMP), (Ministry of Water Land and Environment 2002). The FNCMP has further zoned them into 351,900 ha for production zones, 220,800 ha of strict nature reserve (SNR) zones for preservation of biodiversity, and 267,400 ha of buffer zones that are used to provide

Forest in over 3000 metres: © flöschen 2011 (CC BY-NC-SA 2.0) www.flickr.com/photos/floeschen/5471681818/in/photostream/.

Farm: ©Marieke Sassen, 2013.

non-timber forest products. Even though a map to distinguish between these different categories was not available for this report, distinguishing between them is important for assessing where to undertake sustainable management of forests, in order to maintain forest productivity, as well as environmental and socio-economic values over the long-term. Further spatial information on the current management of forest (land management plans and participatory forest management), level of degradation within forests, and current use of the forests (including logging, firewood and charcoal statistics), could also support planning for sustainable forest management. Carrying out spatial analysis to support sustainable forest management interventions beyond government forest reserves also requires detailed spatial information on land tenure.

Regarding private land, the National Forest Policy states that the "government will promote the sustainable management of natural forests on private lands as to maintain the existing national levels of such forest cover. These private forests would be managed within the context of wider integrated land-use and expanding agricultural needs for the sustainable production of forest resources" (Ministry of Water, Land and Environment 2001, p. 16). The National Forestry Policy and the R-PP also envision that the government will facilitate private land owners and local communities to invest in the carbon market. This might include developing collaborative partnerships with rural communities for the sustainable management of forestry estates in protected areas (forestry reserves and national parks) and supporting farm forestry to boost land productivity, increase farm incomes and alleviate pressures on natural forests. Increasing timber stocks countrywide to reduce pressure on current stock, especially in natural forests, is a further intervention relating to sustainable management of forests identified by the R-PP that holds relevance for both government and private land.

Sustainable forest management could be a key REDD+ activity for modified and planted forests but that it would be less appropriate in areas of intact or near-intact natural forest (Pistorius et al. 2010). Further spatial information on the distribution of natural forest and forest degradation could be relevant for planning for the most suitable locations for implementation. Furthermore, mapping sensitive areas for biodiversity and ecosystem services could ensure that sustainable forest management does not threaten important areas for endemic or threatened species.

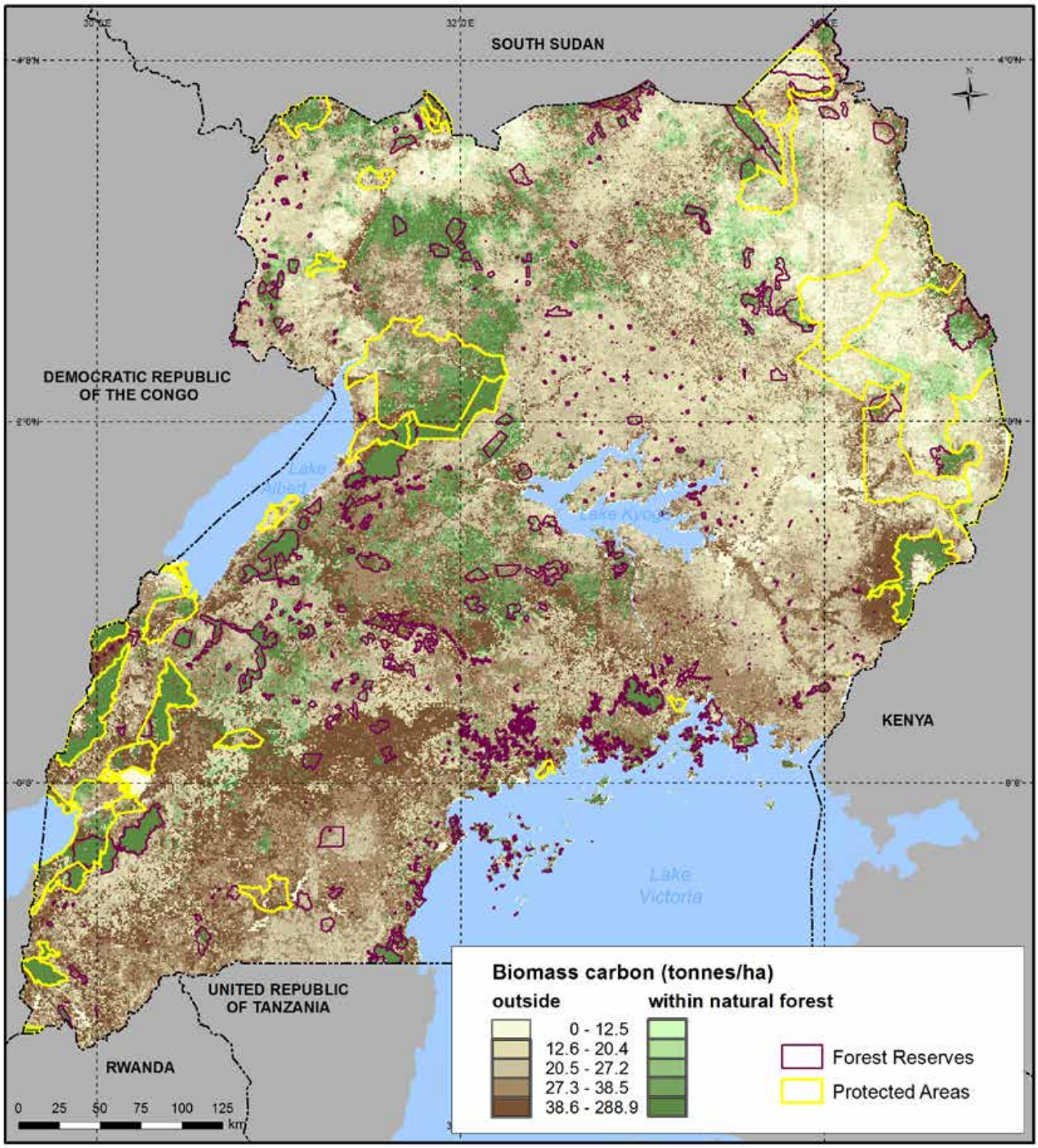
Interventions related to the sustainable management of forests are likely to work towards achieving sustainable management of forestry and agriculture under Aichi Biodiversity Target 7[15]. Several potential REDD+ interventions related to Target 7 have been identified in Uganda. Particularly relevant could be forest management planning that zones for timber production to meet demand whilst restocking for future needs, as well as the improvement in forest timber harvesting and utilization technologies.

Collecting wood, Mt Elgon National Park: ©Marieke Sassen, 2010.

15 Aichi Biodiversity Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Map 6: Forest Reserves and other Protected Areas

Land designation (including the location of forest reserves and protected areas and consideration of land-use within them) is important for REDD+ planning.



Sources:
Biomass Carbon: Saatchi, S et al. "Benchmark map of forest carbon stocks in tropical regions across three continents", PNAS, 108. 24 (2011): 9899-904. http://carbon.jpl.nasa.gov/
Forest Cover Loss: Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53. Data available on-line from: http://earthenginepartners.appspot.com/science-2013-global-forest.
Forest: Natural forest is defined as 'Tropical High Forest' from classes 3 and 4 and 'Woodland' from class 5 of the Generalised National Biomass study (NBS) dataset.
Forest Reserves and other Protected Areas: IUCN and UNEP-WCMC (2014), The World Database on Protected Areas (WDPA) [June, 2014]. Cambridge, UK: UNEP- WCMC

Projection: Lambert_Azimuthal_Equal_Area: Central Meridian 31.5, Latitude Of Origin 1.5,

Map prepared by: UNEP-WCMC. Date June 2014.

Research team on a farm in Uganda : ©Douglas Sheil, CIFOR 2008 (CC BY-NC-ND 2.0) www.flickr.com/photos/cifor/5711763789.

4.3 Enhancement of forest carbon stocks

REDD+ actions for enhancing forest carbon stocks entail creating a forest carbon sink, through restoring, rehabilitating or creating new forest or plantations. Actions can occur both through 'passive' and 'active' approaches and the most appropriate approach depends on the local conditions. 'Passive' approaches allow secondary forest development to proceed with minimal human input through assisted natural regeneration and by suppressing the causes of forest degradation (Kapos et al. 2012). 'Active' approaches include afforestation, planting trees or seeding to expand forest cover on non-forest lands, as well as reforestation, where forest cover is re-established on deforested or degraded forest lands (Kapos et al. 2012).

Restoration or rehabilitation is particularly relevant in forest areas where the vegetation and soil have been disturbed by human activities, such as logging and burning. Spatial information can be used to identify where these areas are. Restoration or rehabilitation of such areas involves re-establishing forest productivity and some of the plant and animal species that were originally present at the site. Identification of areas that can naturally re-generate requires information including on the proximity of seed sources and length and level of disturbance. Areas far from seed sources, or which have been heavily disturbed for extended periods of time, are far less likely to naturally recover. Spatial information on these issues, though useful for identification purposes, may however be challenging to source. Restoration will be more costly on severely degraded soils, but also may be more beneficial in terms of restoring ecosystem services and livelihood opportunities. Additional issues that need to be taken into account, and for which it is useful to have spatial information, include the competing demands on the land and local demand for forest products in different areas.

Depending on the management objectives, site conditions prior to planting and the planted species, all of the approaches mentioned can yield biodiversity benefits and enhance the provision of a range of ecosystem goods and services (Kapos et al. 2012). Information on the importance of the site for biodiversity and ecosystem services, including the regulation of water flows and water quality in downstream areas, can support planning and deciding on the most appropriate approach.

Road to Semliki: ©Sarahemcc 2006 (CC BY 2.0) www.flickr.com/photos/sarah_mccans/289949500.

In Uganda's R-PP suggested actions include increasing the biomass and number of trees on farmland, and restoration of prime conservation forests. One objective of Uganda's Forestry Policy is that watershed protection forest will be established, rehabilitated and conserved. Therefore, the government promotes the rehabilitation and conservation of forests that protect the soil and water in the country's key watersheds and river systems. Similar to Map 5 on the role of existing forest in preventing soil erosion, maps can also highlight areas with high soil erosion, and where reforestation could help control it. The R-PP and Forest Policy indicate that restoration would mainly take place on government land.

The Forest Policy and R-PP also says that tree growing on farms will be promoted in all farming systems, and innovative mechanisms for the delivery of forestry extension and advisory services will be developed. Farm forestry will be promoted and supported in order to boost land productivity, increase farm incomes, alleviate pressures on natural forests and improve food security. The government recognizes that there is a strong unmet demand for farm forestry advice across the country and a need for professional services to be developed within the national framework. Identifying areas of degraded private lands may help in channelling support to the areas which need it most. Achievements in watershed protection through forestry could also result from the adoption of appropriate farm forestry methods on degraded private lands, the improved management of natural forests on hilly private lands, and the restoration of degraded hills on government lands.

Enhancement of forest carbon stocks, including through restoring forest on farms and in important watersheds, can contribute to the quantitative target for ecosystem restoration within Aichi Biodiversity Target 15. The target also specifies the aim of increasing ecosystem resilience. The resilience of new forest carbon stocks to climate change and extreme events can be increased by selecting reforestation approaches that result in ecosystems with more natural features (such as diverse, mixed age stands in tropical forest), and selecting locations that connect to existing areas of natural forest. This connectivity could facilitate the movement of animal and plant species in line with shifting climatic conditions.

5. Conclusions

REDD+ has high potential to provide multiple social and environmental benefits. As identified in an initial brainstorming exercise for the Ugandan context, potentially significant benefits in addition to climate change mitigation may relate to biodiversity, ecosystem services, sustainable land-use and livelihoods, among others. The maps presented in this report illustrate that the achievement of such benefits can be enhanced through appropriate planning based on spatial information. Considerable spatial data on forests, biodiversity and ecosystem services already exist for Uganda or are in the process of being developed. Some of this data is presented in the maps in this report. An important next step is to gather this and additional data together and make it accessible for decision-makers and planners.

Planning for multiple benefits can also take into account the possible synergies between REDD+ and other policy objectives. For Uganda, biodiversity policies such as the Aichi Biodiversity Targets and their national implementation are a particularly relevant area for synergy. Uganda has a unique opportunity to enhance synergies between climate change and biodiversity policies in that the country's REDD+ strategy and NBSAP are being developed at the same time. The multiple complementarities between Uganda's draft NBSAP and REDD+ mean that joint planning for REDD+ implementation and achievement of the Aichi Biodiversity Targets has great scope to deliver coherent, complementary approaches to climate change mitigation, sustainable forest management and biodiversity conservation that achieve multiple benefits. .

The fact that Uganda has decided to set goals for REDD+ beyond carbon – to envision the multiple benefits that REDD+ could yield in the country – is an important step. Setting such goals as the foundation for REDD+ can help to ensure REDD+ implementation enhances benefits and avoids risks, and can also feed into developing a country approach to safeguards.

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Annex 1: Land tenure in Uganda and implications for deforestation and forest degradation

Land tenure in Uganda is regulated under the Constitution of Uganda 1995 (amended 2005), the 1998 Land Act, the Registration of Titles Act and the Customary Land law. The law provides for four forms of land tenure in Uganda:

1. *Customary* tenure is the most common form of land tenure where depending on the location, land is owned at a tribal level or at family lineage level. Holders of land under customary tenure do not have a formal title to the land they use, but generally have secure tenure (Kyomugisha 2008). Use of forests and woodlands is virtually open-access and there is little incentive to invest in sustainable practices, making customary tenure the most influential form of tenure in terms of deforestation and forest degradation (Mugumya et al. 2011).

2. *Freehold* tenure allows the holder to exercise full powers of ownership of that land, including use and development, selling, leasing and mortgaging. Enforcement of environmental policy and law to regulate the use of freehold land is often cumbersome and ineffective (Mugumya et al. 2011). Freehold tenure has a significant role in deforestation and forest degradation, as most privately owned forests and agricultural activities take place on freehold land.

3. *Mailo* tenure differs from freehold in permitting the separation of ownership of land from the ownership of developments on land, whereby much of the land is used by occupants. Enforcement of environmental policies and laws is cumbersome and incentives for forestry resources development and management are weak due to poor relationships between land owners and tenants over security of tenure. Mailo tenure has a significant role in deforestation and forest degradation trends, especially in the Central and Western regions where this tenure form is dominant (Mugumya et al. 2011)

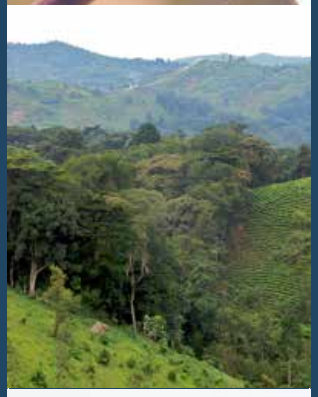
4. *Leasehold* tenure is a form of tenure under which the landlord grants a tenant exclusive possession of land for a defined period in return for rent. This form of tenure accounts for a very insignificant portion of land outside urban areas, as is thus least relevant for deforestation and forest degradation trends in Uganda.

The 1998 Land Act imposes a duty on land owners to manage land in accordance with other existing legislation. This means that land-use needs to recognize the National Environment Act, the Forest Act and other relevant environmental laws.

Annex 2: Forest tenure and management arrangements in Uganda

Tenure	Institution	Management arrangement	Main characteristics
Central Forest Reserves	National Forestry Authority (NFA)	Strict Nature Reserves and Sites of Special Scientific Interest	• Large forest blocks • Normally located inside forest reserves • Tree felling is prohibited
	NFA with other stakeholders	Buffer zones	• Large forest block • At least 500-1000 m belts around SNRs • Low-impact use
	NFA with private sector/communities	Aforestation/ reforestation of CFR production areas	• Mostly large forest blocks for supply of timber & firewood • Some is ear-marked for aforestation/reforestation • Large patches are licensed to the private sector • Small patches are licensed to individuals or local communities. • Licensees have tenure rights for trees they have planted
	NFA with communities	Collaborative Forest Management in CFR Production Areas	• Small patches in degraded central forest reserve sections adjacent to local communities. • Local communities have user rights negotiated via a Collaborative Forest Management Agreement.
Wildlife conservation areas	Uganda Wildlife Authority	Wildlife Protected Areas - National Parks (NP) and Wildlife Reserves (WRs)	• Adjacent local communities may have user rights negotiated via a MoU for Collaborative Resource Management (CRM) in zones not exceeding 20% of the PA.
	Local community committees under local governments with technical assistance from UWA	Community Wildlife Areas (CWAs)	• Can be large forest blocks
Local Forest Reserves	District or sub-county local governments	Local Forest Reserves	• Small < 500 ha highly degraded forests
Joint management	UWA and NFA	Joint Management Forest Reserves	• Large forest blocks
Private	Individuals or institutions outside government	Variable	• Mostly small fragmented forest patches. • None have been registered yet.
Community Forests	Potentially CBO, NGO, co-operative society, communal land association (CLA), company, farmers' group, or traditional/cultural institution	Forests on formerly public or government land that are completely under community control	• None have been declared by the minister yet.

Source: Mugumya et al. 2011



REDD+ aims to incentivise Reducing Emissions from Deforestation and forest Degradation, as well as the conservation of forest carbon stocks, sustainable management of forests and the enhancement of forest carbon stocks. Such activities have the potential to provide multiple social and environmental benefits, but there is also a need to avoid any risks of social and environmental harm from REDD+.

This report examines potential steps in the REDD+ planning process that can support the delivery of multiple benefits and reduce risks. We illustrate the importance of identifying potential benefits and risks in designing REDD+ interventions and country approaches to safeguards, and highlight the potential for synergies between REDD+ and the Aichi Biodiversity Targets of the Convention on Biological Diversity.

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Supported by:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
based on a decision of the German Bundestag