
BUDONGO-BUGOMA LANDSCAPE REDD+ PROJECT: FEASIBILITY ASSESSMENT



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PROJECT OVERVIEW

Project Name: Budongo-Bugoma REDD+ project

Country/Location: Uganda – Hoima, Kibaale, Kyenjojo (and Masindi) districts

Lead Organization: Jane Goodall Institute

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Other Potential Partner Organizations: Wildlife Conservation Society, Nature Harness Initiative, Community Development and Conservation Agency (formerly BUCODO), National Forestry Authority, EcoTrust

Summary

This potential REDD+ project aims to reduce deforestation and degradation and to promote regeneration of forests in the Budongo-Bugoma landscape in Western Uganda. It would mainly focus on a mosaic of private and community forests in 3 districts (Hoima, Kibaale, and Kyenjojo). Approximately 90,000 ha of high forest and 120,000 ha of woodland remain in the landscape outside protected areas, predominantly in small patches of up to several 100 ha. The region is characterized by rapid conversion of these remaining forest fragments to subsistence and small-scale commercial agriculture (including sugar cane and tobacco). In addition, forests are being severely degraded through increasingly indiscriminate unsustainable logging, wood pole harvest and sub-canopy agriculture. These activities also prevent forest recovery.

Underlying deforestation and degradation drivers are low productivity agriculture, population growth, a scarcity of timber in Uganda and adjacent countries. Agents of land-use change are resident small-scale farmers who frequently engage immigrants in forest clearing on their lands. The project intends to provide a mix of incentives to forest land-owners, including assistance with land-titling, enhancing agricultural productivity, reforestation using timber and fruit tree species, promoting other alternative income-generating activities, and direct payments.

Most quantitative parameters used in projecting carbon benefits are uncertain at present and estimates are based on the best available data. It is assumed that the large majority of forests in the landscape are severely degraded and that average carbon stocks of high forests (excluding woodlands) are 60 tC/ha. Deforestation rates outside protected areas are assumed to be 3.5% annually (based on a conservative interpretation of historical data).

Baseline emissions from deforestation on 27,000 ha of potential project area are estimated at 150,000 tCO₂ annually during the first 10 years. Project benefits from avoided deforestation are adjusted by a leakage discount of 30%. Main leakage risks include activity shifting by local farmers and displaced timber harvest from converted forest areas. In addition, project effectiveness is estimated at 60% initially, reaching 80% after 5 years. Net benefits from avoided deforestation alone are projected to be on average 88,000 tCO₂ annually during the first 10 years.

A relatively conservative forest growth model is used in projecting forest regeneration benefits. Potential benefits are adjusted for project performance; however, no leakage discount is applied because it is assumed that conservatively not accounting for avoided degradation benefits would cover any leakage risks. Net regeneration benefits across the project area, which are created by preventing degradation, are estimated at 59,000 tCO₂/y during the first 10 years. However, it is assumed that not all such benefits may be technically and statistically demonstrable and a discount of 30% is applied. Combined net creditable carbon benefits are projected at 140,000 tCO₂/y during the first 10 years.

For projecting the net carbon credit generation potential, a non-permanence risk discount of 30% is applied to total net benefits, taking into account mainly risks from insecure land tenure and population and immigration pressure. In addition, a 2-year time lag in measuring and verifying regeneration benefits is assumed. Net carbon credit generation is projected at a cumulative total of 1.01 million tCO₂ over the first 10 years and 3.01 million tCO₂ over a 30-year project lifetime.

Net revenues from carbon credit sales take into account transaction costs for project development, monitoring, validation and verification, registry and issuance fees. They do not include costs for developing or adapting a methodology to allow accounting for regeneration benefits. The commercialization model is assumed to be a broker-mediated sale of issued credits without any upfront payments.

At prices of 5 (10) USD/tCO₂, net revenues are estimated to reach a cumulative total of 1.1 million (2.8 million) USD after 5 years, 2.9 million (6.7 million) USD after 10 years, 7.7 million (17.1 million) USD after 20 years. If only avoided deforestation benefits can be credited, considering that an applicable methodology may not allow for both, these revenues would be approximately 1/3 lower during the first 10 years and 1/5 lower during the first 20 years. Under all scenarios, cumulative net revenues would be generated in year 3, after the first verification.

A number of risks related to carbon markets and the carbon project cycle may impinge on future revenues. Among these are uncertain demand for project-based credits in general and REDD credits in particular, a potential large supply of credits from other REDD projects, delays in establishing a regulatory framework that would attract pre-compliance buyers, and difficulties to achieve validation of the project, including accounting for regeneration benefits. Risks related to successful project implementation, however, may turn out to be at least as significant.

The above numbers indicate the net financing available for project implementation. Whether these would be sufficient to implement project activities, including compensation to landholders for opportunity costs, needs to be determined but seems questionable. In particular a scenario where regeneration benefits cannot be credited may struggle to generate sufficient revenues to finance the necessary underlying project activities. In the absence of additional finance, this would mean that the above carbon benefits and credits would not be generated. However, a number of key data gaps need to be resolved in order to draw more reliable conclusions.

The project would be eligible under the VCS and potentially other, less established standards. Current draft methodologies for unplanned deforestation are likely to be applicable to accounting for avoided deforestation benefits, as long as key data gaps can be closed. In contrast, most proposed REDD methodologies do not cover regeneration benefits across the project area. However, regeneration benefits are eligible in principle under REDD and a methodology amendment or new methodology could therefore be pursued. Alternatively, the project could only seek credit for its avoided deforestation benefits; however, the carbon finance feasibility would be questionable.

A number of important questions need to be resolved for a more confident assessment of project feasibility. Crucially, these need to include considerations of the viability of the underlying project and the likelihood that project activities will be able to effectively reduce deforestation and degradation in the short and medium term. It seems recommendable to use a share of any available upfront finance to field test approaches to, e.g., improve agricultural productivity and engage local landholders in this. On the carbon side, project boundaries, carbon stocks, recent deforestation rates in a representative reference area, actual regeneration rates, and leakage dynamics, among other aspects, would need to be determined. It may be advisable to conduct a

further, more in-depth feasibility assessment based on this information and based on an advanced project planning effort.

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1. Project Description

1.1 Project Context and Background

Budongo and Bugoma are forest reserves under central government protection, covering around 80,000 and 40,000 ha of land. They are situated in a landscape made up of patches of mainly degraded tropical high forest and woodland in the Masindi, Hoima, Kibaale and Kyenjojo districts. The topography is characterized by broad hills and valleys with average elevations of about 1,100 m above sea level. The vegetation comprises a mosaic of forest, woodland and grassland, intermixed with the cultivated fields of subsistence farmers and bush fallow. Valleys often have papyrus (*Cyperus papyrus*) swamps bounded by dense clumps of the wild date palm (*Phoenix reclinata*). In general, the landscape on the western side, bounded by Lake Albert, is drier with grassland at the escarpment of the western rift valley progressing eastwards into savanna woodland then tropical high forest patches. Climate conditions range from hot in the Albertine rift escarpment to moderate, with mean annual rainfall of about 1,500 mm (in March-May and September-December).

Budongo and Bugoma forests are classified as medium-altitude, moist, semi-deciduous (Eggeling 1947; Langdale-Brown *et al.* 1964). In total, the forest and woodland patches in the landscape outside protected areas make up about 350,000 ha¹ under private, communal (ranging in size from 4 ha to 3,400 ha) and government ownership, in addition to around 330,000 ha of forests and woodlands in protected areas (NFA/NEMA 2008²). Tropical high forest types outside government protected areas are highly degraded and exist predominantly in valleys along rivers such as the Waki, Wambabya, Rwamatonga, Hoima, and Kafu. Common tree species in these riparian forests include *Trilepisium madagascariensis*, *Antiaris toxicaria*, *Funtumia africana* and *Pseudospondias microcarpa*.

Between 2000 and 2005, annual deforestation, in Hoima, Kibaale, and Kyenjojo district appears to have averaged 4.5%, or 6,200 ha, annually (WCS and MUIENR 2008³), although the relative figure is almost certainly higher for forestlands outside of protected areas. Masindi district appears to have only witnessed marginal loss of forest area (50ha) (in contrast to earlier years). The key deforestation drivers are subsistence and commercial agricultural expansion into land under natural vegetation that is perceived to be idle or 'unclaimed'. Forest habitats are also removed to control crop-raiding animals. Degradation drivers include timber, charcoal and firewood extraction.

Human population is high and growing slightly faster than the national rate of 3.2% (UBOS 2007). Average household size is about seven persons. A significant proportion of the population is made up of recent immigrants and war refugees from the Democratic Republic of Congo, Rwanda and

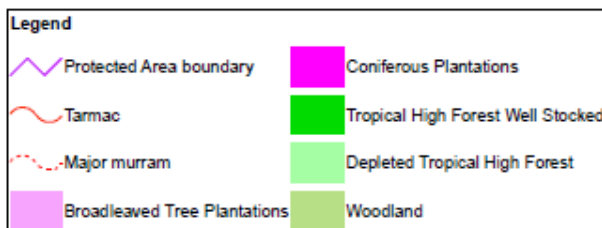
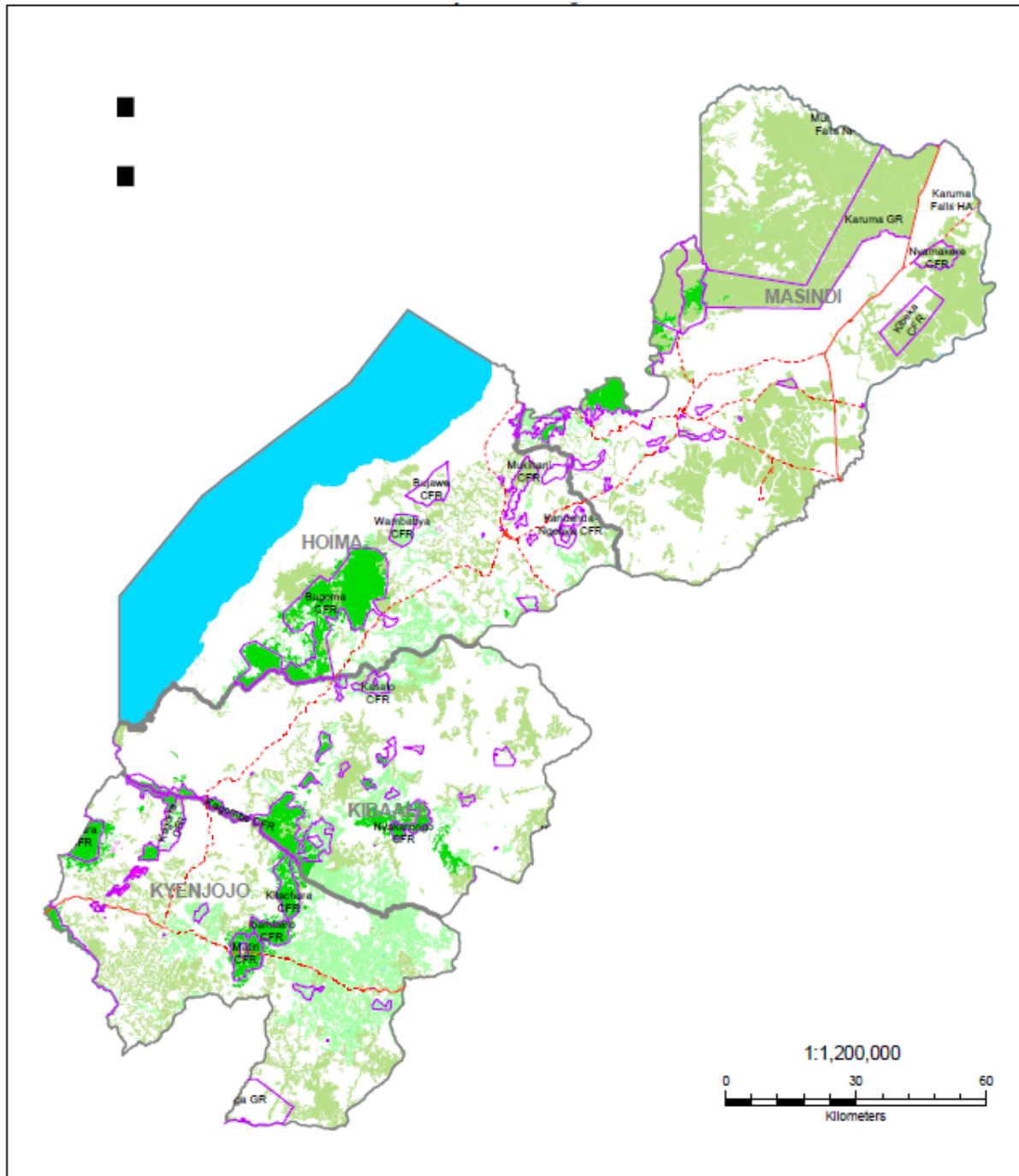
¹ This number may be an overestimate by up to 30,000 ha given that NFA data for Kyenjojo district indicates much higher forest cover there in 2005 than 1990, which may point to a mix-up in figures.

² NEMA 2008, State of Environment Report Uganda.

³ WCS and MUIENR 2008, Productive Resources Investment for Managing the Environment. PRIME-West Biodiversity Impact Monitoring Report.

northern Uganda. Poverty levels are high. The most widespread land tenure regime is customary, mostly acquired through inheritance and with no formal titles. The main economic activity is subsistence agriculture using hand hoes, pangas (machetes), and fire. Crops grown include sugarcane, tobacco, cotton, maize, rice, beans and potatoes. All households cook with locally gathered firewood (UBOS 2007) openly accessed from existing forests.

Figure 1: Forest Cover in Budongo-Bugoma Region - Masindi, Hoima, Kibaale, and Kyenjojo Districts



Datum: WGS1984 UTM Zone 36N
 Projection: Transverse Mercator
 False Easting: 500000.000000
 False Northing: 0.000000
 Centre Meridian: 33.000000
 Scale Factor: 0.999600
 Latitude Of Origin: 0.000000
 Linear Unit: Meter

(Source: NFA National Biomass Unit, 2010 based on 2005 data).

1.2 Main Project Objectives and Outcomes

For the purposes of this feasibility analysis, we assume that a REDD-plus project would seek to use carbon incentives to implement activities that slow down the rate of conversion of forested patches to agricultural land uses. The land-use change drivers tackled would mainly be land/tree tenure uncertainty, demand for agricultural land due to low productivity, and unsustainable timber harvest. The project is assumed to mainly focus on private forest patches.

In principle, threatened forest reserves under jurisdiction of the National Forestry Authority (NFA) in the various districts could also be taken into consideration – although deforestation risks and associated carbon revenues would be lower, transaction and implementation costs may also be reduced. Further methodological challenges may arise due to a different set of deforestation and degradation drivers and associated requirements for determining leakage risks and reference areas. These forest reserve areas are therefore not included in the present preliminary analysis.

The desired project outcome is that project activities in addition to direct carbon payments will create sufficient incentive for individual landholders and communities to engage in conserving their remaining forest areas. This is expected to result in an overall reduction in deforestation and forest degradation, as well as regeneration of currently degraded forests.

This analysis assesses the potential of a, so far, hypothetical project to generate carbon revenues from reducing deforestation and, possibly, from carbon stock enhancements via assisted natural regeneration (enabled through reducing degradation pressures). The results are intended to form a useful starting point for a potential REDD project led by the Jane Goodall Institute, in partnership with American Electric Power and the Katoomba Incubator, as well as for a planned REDD feasibility study for the Albertine Rift landscape to be undertaken under the lead of the Wildlife Conservation Society.

1.3 Project Activities

The project would seek to support individual and community forest owners outside protected areas to access carbon payments in exchange for reducing deforestation within the Budongo-Bugoma landscape. A key ingredient will be the formation of networks among forest owners in partnership with the Jane Goodall Institute. Through partnership with other local partner(s) yet to be identified and building on the forest owner network, the project may, among other things, support acquiring land titles for forest owners, support improved agricultural practices to increase production on existing land, promote woodlot establishment, agroforestry and forest-based. The project may also partner with Wildlife Conservation Society, Nature Harness Initiative (NAHI), the National Forestry Authority and CODECA in implementing these and further activities. See Table 1 for an overview of proposed potential activities.

Although a number of initiatives have been recently undertaken by various organizations to address the high deforestation rates within the landscape, none has been structured to generate carbon revenues and to top up the project-implementation benefits with direct REDD carbon payments to forest owners. The only exception is the Abarinda Ebihangwa (460 ha) in Hoima

district, which is being supported by Uganda Carbon Bureau. In addition, an emphasis on agriculture as a key project activity has been missing in most efforts so far. The project is intended to build onto on-going community based forest management work by various partners in the rest of the landscape by adding a carbon credit generation and carbon-payment component. It will also need to focus and extend activities in order to effectively address deforestation drivers, particularly related to agriculture.

A number of organizations are already pursuing activities in the landscape: In the River Wambabya catchment in Hoima district, NAHI is actively linking forest owners with private sector firms (e.g., British American Tobacco Uganda - BATU) to manage and/or offset their biodiversity footprint. The National Environment Management Authority (NEMA) supported by the Global Environment Facility will be conducting a randomised approach to test the effectiveness of PES for financing biodiversity conservation outside protected areas. It will operate in Hoima district (Kitooba, Kyabigambire and Munteme sub-counties), targeting 800 forest owners on an aggregate area of up to 1,200 ha. A major activity of the CARE REPA II programme co-implemented by CODECA is the development of incentives for sustainable management of private forests in Masindi and Kibale districts.

Table 1 - Potential Project Activities to Reduce Deforestation and Degradation

Activity	Potential key implementing partner(s)	Stakeholders
Promoting improved agricultural practices to lessen the need to expand farmland	District NAADS and FIEFOC programs; others tbd	Farmers expanding farm area and new settlers looking for land
Support registration of private forests, community forests and communal land associations	Tbc: CODECA, NAHI, FSSD-FIEFOC	Private forest owners; district land boards
Implement forest management plans addressing DD drivers through: <ul style="list-style-type: none"> • Diversifying income sources for farmers by supporting forest-based enterprises such as apiary management, tree nursery management, timber production and crafts • Promoting agroforestry • Promoting establishment of woodlots for firewood 	Tbc: NFA, FSSD-FIEFOC, ECOTRUST, CODECA /CARE	Private and communal forest owners
Organizing forest patches and owners into a networks for implementing project activities and channeling incentive payments	JGI	Private and communal forest owners
Building governance and administrative capacity of local and community institutions especially to ensure good accountability, transparent and equitable sharing of benefits.	CODECA /CARE, NAHI	Private and communal forest owners
Integrating project activities into the national REDD process	NFA	

Other ongoing interventions include:

- District Forestry Services in Hoima and Kyenjojo districts are encouraging tree planting through the provision of free seedlings to the communities.
- ECOTRUST is implementing a Plan Vivo reforestation program in several sub-counties in Masindi district and is planning to expand to Hoima. It has also supported the restoration of degraded forest patches and facilitated the CFM process in Masindi and Hoima districts.
- Forest Sector Support Department through the Farm Income Enhancement and Forest Conservation Project is also focusing on assisting private forest owners with developing management plans as a step towards land titling.

1.4 Land Tenure and Policy Context

1.4.1 Tenure Regimes in Project Area and Relevance for REDD

All land in Uganda is owned as either government or private land. The following land tenure systems exist:

- Customary;
- Freehold;
- Mailo; and
- Leasehold.⁴

Land tenure is formally governed by the Constitution of Uganda 1995, the Land Act 1998, the Registration of Titles Act, and Customary Land law. The Constitution lays down the fundamental principles with regard to land ownership; the Land Act governs land ownership, land administration and resolution of land disputes, while the Registration of Titles Act deals with the registration and transfer of titles to land. Land is defined as land and all that grows on it. Therefore a landowner is the tree owner except in situations where additional arrangements such as leases and licenses have been made.

Customary tenure is the most common tenure type in the project landscape. It is a form of land tenure applicable to a specific area of land and a specific class of persons, and is governed by rules generally accepted as binding by the latter. It is applicable to any persons acquiring land in that area in accordance with those rules. Most forests on customary land in Uganda are communally owned by traditional institutions on behalf of the communities.⁵ Communities can convert these forests to Community Forests by complying with the provisions of section 17 of the Forest and Tree Planting Act, 2003.

⁴ Article 237 of the Constitution and s. 2 of the Land Act, 1998.

⁵ Ibid.

Freehold tenure is a form of private tenure that involves the holding of registered land in perpetuity. It enables the holder to exercise full powers of using and developing the land or taking and using produce from the land. It also allows the title holder to enter into any transaction in connection with the land, including selling, leasing, mortgaging or pledging, and subdividing.⁶ This form of landholding is not very common in the project site except on large commercial farms owned by companies.

Mailo tenure is another form of tenure which involves the holding of registered land in perpetuity. It differs from freehold in that it permits the separation of ownership of land from the ownership of developments on land made by a lawful or *bona fide* occupant (lived on land for 12 years or more). It enables the holder, subject to the customary and statutory rights of those persons lawful or *bona fide* in occupation of the land, to exercise all the powers of ownership of land as that under a freehold title.⁷

Leasehold tenure is a form of tenure created by contractual agreement reached when the landlord or leaser grants the tenant or lessee exclusive possession of land, usually for a defined period in return for a rent or premium. Under this form of land tenure the determination of carbon rights will depend on the conditions of the lease. On expiry of the lease land tenure reverts to the leaser/landlord.

Under customary tenure, the use of forests and woodlands is virtually open-access. As such, expected profits from woodlands are low and there are strong benefits from conversion to private tenure and agriculture. The tenure security seems to be dependent on active agriculture or settlement. In the Budongo-Bugoma landscape, an average household may own 1-5 hectares (but some own significantly more). Land is generally not officially registered or even properly surveyed. Boundaries often demarcate only the utilized (agriculture and settlement) part of the land and are mutually known among neighbors.

In contrast, individual land rights are strong and owners have both incentives and capacity to manage land and tree resources intensively (Place and Otsuka 2000). The mailo tenure system also preserves woodlands or forests better than the customary system by restricting access through leasing/renting, especially where landlords are resident. Mailo tenure has no negative implication for REDD except in areas where there are *bonafide* occupants or settled squatters whose claims to land overlap with those of the landlord. In case of forests located on such land, ownership of carbon rights could be contested. Mailo land tenure is common in Kibaale district. In situations of absentee landlords (e.g. in the counties of Buyaga and Bugangizi in Kibaale district), mailo tenants also have strong planting rights with the exception of a few high-value timber trees.

Forest conversion on private land is legal. According to the law, there is no requirement for private owners to seek authorization for cutting a few trees from their own land. For clear cutting a large area, however, a private forest owner needs authorization from the district forest officer. Private trees are cut by registered tree cutters who obtain an annual license by the District Forest

⁶ Ibid.

⁷ Ibid.

Officer. A District Forest Officer can restrict harvesting of trees from private land via a Directive (letter) stating reasons for the restriction. Owners of forest produce must pay tax and be issued a permit by the Forest Officer of the originating district in order to move and sell their produce. The permit is given after verification of the stumps. No formal proof of land ownership is required.

1.4.2 National Policy Context Relevant to the Project

The National Environment Management Policy (NEMP) from 1994 provides for sustainable management of forest resources in protected areas, private and public land.⁸ It adopts the strategy of using incentives including sharing of benefits from conservation as a means of encouraging private sector and community participation in forest conservation.

The 2001 National Forestry Policy promotes public participation and partnership between governments and private companies in forest management. It provides for pursuance of new financing opportunities to enhance forest management including through carbon credits.⁹ It also emphasizes storage of carbon through forestry in compliance with the UN Framework Convention on Climate Change (UNFCCC).¹⁰

Regulation of forests on private land has suffered from the institutional reforms of 2003, which placed these under two newly formed institutions: the District Forest Services and the National Agricultural Advisory Services. Recruitment, financing and planning for activities under these new institutions has been very slow at the district level. Although Section 24 of the 2003 National Forestry and Tree Planting Act provides for registration of private forests with the local government District Forestry Services and the District Land Board, none has been registered yet.

Especially for private forests (all forests outside government-protected areas), which are the main focus in the project area, the 2001 National Forestry Policy and 2003 National Forestry and Tree Planting Act seem relevant in the carbon context. These vest tree tenure in the land owner and give him/her the right to enter into a contractual relationship or any other arrangement with any person to purchase, harvest or manage any forest produce.

The Uganda government draft Vision 2035 is explicit on carbon trading as a means of conserving forests for climate change mitigation.¹¹ It provides that Uganda will promote carbon trade that will increase forest cover, as well as incomes of the rural communities. It further provides for promotion of conservation programs that will not only restore but also sustain an optimum level of forest cover in the country.

Uganda is also beginning to draft the Readiness Preparation Proposal (R-PP) under the Forest Carbon Partnership Facility (FCPF) of the World Bank. The proposed activities in this assessment

⁸ The Republic of Uganda, The National Environment Management Policy 1994, p. 31.

⁹ The Republic of Uganda 2001. The National Forest Policy, Section 4, page 25.

¹⁰ Ibid. page 25.

¹¹ The Republic of Uganda Vision 2035. Toward a Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years, para.126-127, p. 14.

report should be able to inform the readiness strategy at the level of sub-national demonstration or implementation activities.

1.5 Carbon Rights

No explicit legislation on carbon property rights, including for forests, exists in Uganda at present. It might be possible to infer a certain right for private forest landholders to produce and trade carbon credits from the national forestry legislation. However, this would need to be ascertained, and it would need to be clarified whether any rights only refer to land that is formally titled or also land under customary ownership.

A definitive assessment of who holds forest carbon rights in the context of the Budongo-Bugoma project and how these depend on land ownership structures can therefore not yet been carried out. Nevertheless, it is important to address this question early on because carbon rights are likely to become a crucial aspect regarding the project's ability to lawfully generate and commercialize carbon credits, as well as regarding the scope that project proponents and managers will have to distribute and utilize carbon revenues according to investment needs and agreements between stakeholders. It could also prove very useful to have some kind of official government support for the project, such as a 'letter of non-objection', common in CDM projects, at a minimum. Ideal, but probably unrealistic to achieve at this stage, would be an explicit formal acknowledgement by the central government of carbon rights held by private and community landholders (including those without formal title) and their unrestricted right to enter into commercial transactions on the basis of these rights.

In the absence of explicit formal legislation on forest carbon property rights in most of the world's countries, carbon ownership has commonly been linked to (a) ownership of the land (whether formal or customary) and (b) use-rights of the forest resource on this land. For projects involving active planting this can infer a strong case for private ownership of forest carbon even when the afforestation or reforestation has been implemented on state-owned land (the trees are considered to be 'industrial fruits'). In contrast, the rights to carbon protected by projects in existing forests (REDD) would be more tightly linked to land ownership (the trees are considered to be 'natural fruits'). This means that implementing such projects on lands owned by other stakeholders (e.g. in the case of an NGO implementing a REDD project in state forests) may not infer any legal rights to project proponents. The Budongo-Bugoma project will probably involve both aspects (creation and protection of carbon stocks) if it wants to claim avoided deforestation and regeneration benefits.

Even in the case of relatively 'clear' ownership, the state may claim a right to regulate the sale of carbon or the transfer of carbon rights. This could take the form of requiring a license to be issued or a tax to be paid. These questions have not yet been explicitly addressed in the regulatory framework of almost all countries, including Uganda, which means that the legal basis of any carbon rights 'acquired' or 'held' by a project or land-owners may not be very strong. It is entirely possible that new, formal legislation redefines the carbon ownership rules in a country, regardless of previous interpretations or precedence. Considering the increasingly politicized field of forest carbon (REDD and beyond) this is a distinct possibility in many countries.

The Budongo-Bugoma project is probably unable to establish a clear legal basis for carbon rights held by the various project participants at present. However, it could be useful to analyze potential implications of the existing land-tenure regimes in the project area, as well as the broader legal framework in Uganda in this context (tenure rights, *usufruct* rights). It will be particularly important to acquire a good understanding of the tenure status of many areas for which no formal land title exists, including those defined by customary ownership.

2. The Project's Carbon Benefits

This chapter provides a projection of carbon benefits that could potentially be generated through the project activities (as described above). In order to do so, a baseline scenario of emissions is developed, taking into account the drivers and agents of deforestation and the carbon stocks affected. In a second step, a project scenario is constructed, taking into account likely project performance in reducing deforestation, the potential for assisted natural regeneration, probably leakage discounts, and possible impacts of applying forthcoming carbon methodologies. Based on the baseline and project scenario, the overall potential and timing of the project's carbon benefits are projected. All quantitative assumptions used in these calculations are introduced in the respective sections and summarized in Table 5.

2.1 Project Boundaries

The geographic scale of the project intervention, along with the project boundaries, is yet to be determined. In the broader landscape there appear to be around 90,000 ha of remaining tropical high forests *outside of protected* areas in the 3 Districts Hoima, Kibaale and Kyenjojo), as of 2005 (NFA).¹² This number includes forests in various states of degradation but does not include woodlands (of which there are another 120,000 ha). Another 2,000 ha of high forest (and close to 100,000 ha of woodland) remain outside protected areas in Masindi district; however, these may be of less relevance to a REDD project because of the much lower recent deforestation pressures (see below).

The distribution of patch sizes is unclear at present and appears to be highly variable, ranging from below 1 ha to 3,400 ha. The sizes of individual forest properties, as estimated by forest owners themselves, range from less than 1 up to around 683 ha for individual land owners. Many of these individual properties are clustered into the above forest patches. In order to limit transaction costs and reduce edge effects during project implementation it would seem most promising to focus primarily on integrating the larger forest properties and patches into a REDD project.

How many and which patches would eventually be included in an on-the-ground REDD project will depend on

- Interest of land-owners (private and community) in participating in the scheme;
- Severity and types of threats facing these forest patches;
- Clarity over land tenure and carbon rights, including any perceived risk of legal or social conflicts in this regard;
- Strategic importance of specific patches for other project aims, e.g. habitat connectivity;

¹² This estimate accounts for a probable data error in figures available from NFA, which indicate an increase of 30,000 ha in forest outside protected areas from 1990 to 2005. Area figures for the two years probably need to be reversed, leaving 90,000 ha outside protected areas, instead of an indicated 120,000 ha.

- Resource and capacity constraints of implementing partners;
- Minimum area of individual patches determined as feasible for participation in order to limit transaction costs.

Depending on the specifications of an eventual REDD methodology, the formal project boundaries may nonetheless include all forest patches of a certain kind in the delimited landscape. In that case, overall ‘project performance’ may appear to be reduced because not all forest patches do indeed participate in project efforts; however, project benefits would only be shared between participating landowners. It yet needs to be determined whether the respective requirements of having “control over the project area” and of “planning to implement activities across the project area”, as stipulated by draft VCS guidelines, would allow for this approach.

For modeling purposes, it is assumed that around 30% of the remaining high forests outside protected areas in Hoima, Kibaale, and Kyenjojo districts, i.e. 27,000 ha, would participate in the project initially.¹³ It is too early to say how many households this area figure would represent. If the project prioritizes engaging with the largest landholders then this would be much less than 30% of the total. Nevertheless, the figure would most likely be in the thousands. Whether it is realistic to reach agreements with this many landowners and integrate them in incentive structures and project activities, and in what form, is an important question that will need to be thoroughly explored during the implementation planning phase.

The deforestation and degradation pressures below affect primarily forests on private and communal land in the Budongo-Bugoma landscape. In the Budongo and Bugoma Reserves themselves, no conversion for agriculture and no significant degradation (except for occasional incidences of illegal logging) appear to have occurred in recent years. In contrast, patches of the Central Forest Reserve located in the corridor area appear to be similarly affected by land-use change pressures. In principle, these reserve lands could therefore be included in the analysis. However, deforestation and degradation drivers and agents are likely to be different, leading to methodological challenges regarding the modeling of a reference scenario and the management of leakage risk. The project implementation strategy is also likely to be different concerning these forest areas. All protected areas are therefore excluded at this preliminary stage of analysis. This question should be revisited at a later stage, also taking into account methodological and practical questions regarding leakage management and reference area definition.

2.2 Baseline Scenario

This section develops a baseline or reference scenario of emissions based on an analysis of deforestation and degradation drivers and agents, the historical deforestation trend, and forest carbon stocks affected across different carbon pools. The resulting baseline emissions will then be compared to the project scenario in the following section, to calculate net carbon benefits of a potential project. For the analysis, guidance from the Voluntary Carbon Standard (including draft

¹³ Some parts of the extensive woodland areas may potentially also qualify as forests and could then be included into the project, but this analysis would yet need to be carried out.

methodological guidance) is used wherever appropriate, assuming this to be the most advanced standard's framework currently available (see section 4.1 for further context).

2.2.1 Main Deforestation Drivers

2.2.1.1 Proximate Deforestation Drivers

The primary proximate drivers of deforestation over the past years have been conversion to small- and medium-sized agriculture for commercial production and small-scale subsistence farming. Among **commercial** uses, in Masindi District the expansion of sugar cane plantations in particular has consumed large areas of forest. In Hoima, tobacco plantations have played a similar role. Maize and rice are also planted for market-driven production as well as local use, rice being rotated with tobacco in some cases. The general situation is similar in Kibaale and Kyonjojo. The above land-uses have usually led to a complete clearing of all forest vegetation with virtually no trees remaining on the affected areas. Apart from agricultural drivers, extensive logging is also driving forest clearance in some areas.

On the **subsistence** side, a variety of crops are grown, in particular maize, rice, sorghum, beans, and vegetables. These subsistence agricultural systems do in many cases contain some trees, although there are no generally established traditional agro-forestry systems. Both of these types of deforestation are not illegal as such as long as they occur with the consent of the formal or customary owners; no conversion permit is required by the authorities. During the past years, there does not seem to have been any encroachment into the Budongo Reserve, although such encroachment did occur at a point in the past (before transitioning of the reserve under NFA management and control).

2.2.1.2 Underlying Deforestation Drivers

Underlying deforestation drivers for **commercial** agriculture have been the demand for land for sugar (e.g. Masindi) and tobacco (e.g. Hoima) production aimed at national and international markets coupled with unsustainable farming practices. These practices result partly from misconceptions about optimal productivity-maximizing planting and fertilization approaches, as well as incentive schemes by agro-businesses. For example, there is a common perception among local farmers that tobacco can only be grown on virgin forest soils, which is not the case according to local experts, and forest is also cleared for tobacco nurseries. Sugar companies also seem to promote the liberal application of fertilizers, which is provided to farmers on credit. The over-application of fertilizers appears to exhaust soils during initial years of plantation. At the same time, the need to pay back credits necessitates an expansion in area and continuous cultivation without crop rotation.

The main buyers for sugar and tobacco (Kinyara Sugar Works, British American Tobacco and International Leaf) have also provided bulldozers to open up new land, supplied planting materials and fertilizer, and facilitated barn construction.

Finally, heavy degradation to satisfy growing timber demand (mainly from southern Sudan) may at times cause outright deforestation.

Regarding deforestation for **subsistence** agriculture, one underlying driver is a general lack of available land for small-scale farming in Western Uganda (and neighboring countries) which leads

to migration to the project region where land is 'available' to be converted. This also facilitates a growing influx of immigrants from war-disturbed areas of northern Uganda and DR Congo who convert the forest patches, which are considered to be unclaimed, to agricultural production. In addition, population growth in the area itself puts pressure on land for subsistence farming.

It is furthermore possible that traditional production practices (e.g. regarding crop rotation, crop types and combinations, spacing, organic fertilization) do not optimally use and promote the fertility of the land. However, there is a lack of systematic and locally applicable research into optimal practices in this regard. Soils are generally naturally very fertile and there are generally no soil degradation and productivity decreases apparent in subsistence farming systems in the region.

2.2.1.3 Land Tenure and Institutional Aspects

Institutional aspects around land tenure rights play an important role in this context. Private forests are mostly on land under customary tenure. As elaborated in section 1.4, under customary tenure the use of forests and woodlands is virtually open-access. There are therefore strong incentives for conversion to agriculture, which infers a stronger basis for claims to private tenure. Another aspect appears to be that private forestland owners are frequently not aware of the exact boundaries of their properties. In other cases, agricultural conversion through immigrants is permitted or encouraged in order to secure tenure claims by the owners who enter into an informal lease agreement with these immigrants. A limited number of forest patches, especially in Kibaale district, on land under Mailo tenure, which is more secure especially if landlords are resident.

2.2.2 Main Degradation Drivers

The main **proximate driver** for the degradation of remaining forests outside protected areas is unsustainable harvesting for timber. Although logging used to target only a few species in the past, it has become increasingly indiscriminate and affects a wide range of species and tree age classes. Logging has therefore become severe enough to cause ongoing degradation and prevent forest recovery, even in terms of standing biomass, as forests in Uganda and neighboring states have been disappearing.

Depending on the forest definition being used, the other main degradation driver is small-scale agriculture on plots too small to be classified as deforestation in land-cover change analyses carried out to date (or taking the form of sub-canopy agriculture). Access for these farmers is often facilitated through previous timber removals. In addition, pole cutting appears to be extensive enough to further prevent regeneration of logged-over forests.

Many remaining forests have been largely depleted of commercial timber and have suffered from various forms of degradation. They can therefore be assumed to have significantly reduced carbon stocks. The timber harvest satisfies mainly regional and national timber markets and, to a lesser extent, local needs for construction materials. The harvest is not strictly illegal because there is no requirement to have management plans for these private and communal forests. 'Movement permits' would be required, however, for any timber to be sold, and these are frequently not acquired. The situation is of course different in the case of illegal logging in state forests and protected areas (not analyzed here).

In contrast, charcoal production and brick making do not appear to be major drivers for the degradation of high forests in the landscape. This is partly because they affect mostly woodlands and not high forests, and partly because wood supply for both processes is still relatively abundant because of ongoing logging and forest conversion.

The **underlying driver** for degradation through logging is an insufficient supply of sustainably produced timber. The situation is similar in southern Sudan and this creates an additional strong demand for timber from the proposed project region. There are no sizeable plantations in the project region and no established practice of managing private forests sustainably. The only areas with existing forest management plans are those under collaborative forest management (CFM) in the Budongo Reserve. However, the timber harvested in these is property of the NFA and therefore not directly available to communities. Only small patches of woodlots exist on private land (often only individual trees), in addition to border plantations around the Budongo Reserve for which communities are foreseen to have use rights, as well as parts of very small areas of plantations within the Budongo Reserve for which communities acquire use rights through participating in planting efforts.

Degradation and deforestation do not appear to be directly linked in that the decision to convert forests to agriculture does not usually depend on whether these have been aggressively exploited for timber previously. More importantly, upon conversion of a forest patch wood for timber and fuel is extracted before the felled biomass is burnt.

2.2.3 Main Deforestation and Degradation Agents

There are two groups of agents directly involved in deforestation activities, namely resident community members and immigrants. In addition, locally active agribusinesses (sugar, tobacco) are encouraging the expansion of farmland. **Local community** members are either clearing forest on their individually owned land themselves or allowing newly arriving **immigrants** to clear and cultivate parts of their land.

Immigrants are involved in the deforestation dynamics in several ways. Firstly, they are hired as laborers by resident forest landowners to clear forests for agriculture. Secondly, they are encouraged to clear forests and thereby acquire a temporary right for cultivation on these lands. They may also pay an annual rent and landowners grant them the right to plant crops, usually for subsistence. They are not allowed to plant perennial crops or plant trees, however, as this could eventually infer customary land-ownership to them (see section 1.4.1 on land tenure regimes). Immigrants are attracted to the Budongo-Bugoma landscape precisely because of the existence of land under natural vegetation (forests, bush lands, grasslands, wetlands) which is 'not used' and available for conversion. There are comparatively less such lands available in other parts of Uganda.

2.2.4 Baseline Deforestation and Degradation Trend

In the absence of any clear indication of significant recent or future changes in land-use dynamics in the region, the historical trend of land use and land-use change is assumed to continue in the project areas. The validity of this claim has to be confirmed, however, as it is possible that deforestation trends have slowed down or picked up in different areas in recent years. The

eventually chosen REDD methodology may also stipulate an analysis of factors that may constrain future deforestation or a monitoring of key variables that may change the baseline deforestation trend. At present, it seems plausible that recent historical land-use change rates would continue because the general dynamics and incentive patterns around agricultural expansion remain largely in place.

Based on available data on forest cover change from two studies (NEMA 2008¹⁴, WCS & MUIENR 2008¹⁵) either 1990-2005 or 2000-2005 could be chosen as a **historical reference period** for a preliminary analysis. Should a decision be made to formally develop this carbon project more recent land-cover change data would need to be acquired and analyzed. (According to recent draft methodological guidance, this should include at least 3 points in time, covering a maximum of 12 years, with the latest date no more than 2 years before project start.) Both existing analyses of forest change show high forest loss for the districts under consideration (see Table 2 and Table 3). It is important to note that both assessments include protected forests along with private and communal forestlands in total area estimates. Relative deforestation rates are likely to be significantly higher for forests outside protected areas.

According to NEMA (2008), significant forest loss seems to have occurred across Hoima, Kibaale, and Kyenjojo districts during the period of 1990-2005. The highest annual rates were observed in Kibaale (3.3 % or 3,700 ha annually), followed by Kyenjojo (2.4 % or roughly 2,000 ha), Hoima (1.4 % or 1,100 ha).¹⁶ The average rate across all 3 districts was 2.5% or 6,800 ha annually. For Masindi, the figures are 0.8 % or 300 ha. If one were to assume that most or all of the forest loss occurred outside of protected areas, then the relative rate across the 3 districts could be as high as 3.6 %.

WCS & MUIENR (2008) provide roughly similar figures for the period of 2000-2005. Most forest cover loss appears to have occurred in Kyenjojo (5.9 % or 3,400 ha annually), Kibaale (3.8 % or 2,000 ha), and Hoima (1.2 % or 700 ha). Again, only a very small decrease was observed in Masindi (0.1 % or 50 ha). Average total forest loss in the 3 districts according to this analysis was 4.5 % or 6,200 ha annually. If one were to assume that most or all of the forest loss occurred outside of protected areas, then the relative rate across the 3 districts could be as high as 5.1 %.

The difference in relative deforestation rates between both studies could at least partially be due to a different underlying total forestry area base (i.e. different data sources or underlying forest and land-use classifications), with NEMA assuming a higher remaining forest cover in 2005. If comparable land-use classification were to have been used in both studies deforestation trends in some districts under consideration would appear to have changed significantly between 1990-2000 and 2000-2005. Most importantly, large relative and absolute changes in deforestation trends would have occurred in Kyenjojo (accelerating deforestation) and Kibaale (slowing deforestation). However, it is too early to speculate on any implications for baseline projections,

¹⁴ NEMA 2008, State of Environment Report Uganda.

¹⁵ WCS and MUIENR 2008, Productive Resources Investment for Managing the Environment. PRIME-West Biodiversity Impact Monitoring Report.

¹⁶ These calculations also correct for an assumed mix-up in Kyenjojo area numbers, which according to the source were 30,000 ha higher in 2005 than in 1990 (see above).

and a thorough analysis of at least 3 points in time (e.g. for 2000, 2005, and 2010) would first need to be carried out, based on appropriate remote sensing imagery.

It should be noted that there exists some controversy around deforestation figures for Masindi. Some observers point to significant recent deforestation events. However, there appears to be a general consensus that deforestation rates have fallen in the district because most of the forest outside protected areas has in fact disappeared. This question would merit some further investigation based on an improved land-cover change analysis. For the purpose of this analysis, it seems appropriate to not consider Masindi regarding potential REDD project areas. In any case, the remaining area of high forest outside protected areas seems small with around 2,500 ha (in 2005).

Table 2: Forest Cover Change in Selected Districts 1990-2005¹⁷

District	1990 Forest Cover (ha)	2005 Forest Cover (ha)	F2005 forest Area outside PAs	Annual Change (%)	Annual Forest area Change (ha)	Maximum Annual Change outside PAs (%)
Kyenjojo	54.242	84.676	29.776	-2,40%	-2.029	-3,37%
Kibaale	114.103	58.268	36.555	-3,26%	-3.722	-4,03%
Hoima	75.144	58.889	23.139	-1,44%	-1.084	-2,75%
<i>Masindi</i>	<i>36.373</i>	<i>31.933</i>	<i>2.480</i>	<i>-0,81%</i>	<i>-296</i>	<i>-4,28%</i>
Total	310.296	203.332	91.950	-2,30%	-7.131	-3,58%
Total w/o Masindi	273.923	171.399	89.471	-2,50%	-6.835	-3,56%

Source: Adapted from NEMA 2008.

Note: Area numbers have been corrected for Kyenjojo district.

Table 3: Forest Cover Change in Selected Districts 2000-2005¹⁸

District	1990 Forest Cover (ha)	2005 Forest Cover (ha)	F2005 forest Area outside PAs	Annual Change (%)	Annual Forest area Change (ha)	Maximum Annual Change outside PAs (%)
Kyenjojo	40.211	6.139	29.776	-5,94%	-3.400	-7,27%
Kibale	43.442	978	36.555	-3,80%	-2.040	-4,36%
Hoima	54.895	14.048	23.139	-1,24%	-729	-2,72%
<i>Masindi</i>	<i>39.186</i>	<i>17.491</i>	<i>2.480</i>	<i>-0,12%</i>	<i>-49</i>	<i>-1,79%</i>
Total	177.734	38.655	91.950	-2,98%	-6.217	-5,05%
Total w/o Masindi	138.548	21.164	89.471	-4,45%	-6.169	-5,13%

Source: Adapted from WCS and MUIENR 2008.

For the purpose of this assessment report, an annual deforestation rate of 3.5 % is assumed, based on a conservative interpretation of the WCS/MUIENR data for 2000-2005 (excluding Masindi district) and accounting for potential decreases in deforestation rates due to constraining

¹⁷ Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

¹⁸ Ibid.

factors (e.g. suitability for agriculture). As discussed above, deforestation rates outside protected areas may be even higher. It is also important to note that the project would likely not focus on forests on a district level but rather would select a project boundary and individual forest patches based on deforestation threat, ecological function (mainly habitat connectivity), and other factors. In this regard, district-level forest area change data will eventually be less decisive than projections regarding forests within actual project boundaries.

It is more difficult to give a useful estimate regarding **degradation rates** or biomass losses. Historical timber and wood extraction rates are not known considering that logging did not follow forest management plans. Legal transport permits certainly do not reflect timber volumes actually removed from these forests and, moreover, wood consumed locally (e.g. for construction, fence poles, fuel) does not feature in these. Data for degradation caused by small-scale agriculture and other drivers is similarly not available at present.

However, it seems reasonable to assume that harvesting and other degradation pressures on the shrinking remaining forests would in all likelihood increase, or, at a minimum, stay the same future years. This is because fewer forests remain that could supply wood products for growing populations. Although it is likely that some **regeneration** would occur locally in patches opened by wood extraction or micro-scale agriculture, the net effect is almost certainly not a recovery of biomass stocks in the baseline scenario but rather a further decline. It should therefore be conservative to assume that forest carbon stocks in remaining forests, at the very least, would not increase in the absence of a REDD project. This scenario has been confirmed by additional consultations with local experts.

These observations regarding degradation and suppressed regeneration are potentially very significant and will be taken up again in section 3.5 regarding potential regeneration benefits created by the project. For the purpose of this assessment, potentially avoided emissions from degradation itself will be conservatively neglected. This is because (1) accounting from them may not be economical or technically feasible and because (2) not accounting for avoided degradation benefits should also circumvent certain problems potentially posed by leakage accounting (see section 3.2). This does not preclude, however, seeking credit for carbon gains from assisted natural regeneration which could be enabled by suppressing degradation pressures.

2.2.5 Carbon Pools Considered

The carbon pools in a REDD project that could potentially be accounted for are above and below ground biomass, lying and standing deadwood, litter, soil carbon, and harvested wood products. Any of these pools needs to be accounted for if baseline emissions are lower or baseline stocks or sequestration rates are higher than in the project case. In the inverse case, they can generally be conservatively neglected (i.e. if their exclusion leads to lower numbers of carbon credits generated).

- **Above-ground biomass** is the main carbon pool affected by baseline deforestation and project-induced regeneration and will be accounted for.
- **Below-ground** biomass in converted areas would only decay slowly over time after trees are cut and this would be very difficult to monitor; excluding this pool is conservative.

- **Deadwood** would be removed or burnt in the baseline conversion scenario when the cleared areas are claimed for agriculture. Nevertheless, deadwood may represent a significant, albeit temporary, carbon stock if left on new fields. A more in-depth study would need to assess if this pool can be conservatively neglected (deadwood also exists in the conserved forests in the project case and this may trump the baseline carbon pool). For the purpose of this assessment, it is considered that it is conservative to neglect the deadwood pool.
- Carbon in **litter** would increase in the project scenario but is considered as insignificant; excluding this pool is conservative.
- **Soil** carbon would similarly be higher in the project than in the baseline scenario considering generally higher soil carbon in natural forests compared to agricultural areas. Excluding this pool is conservative.
- Finally, carbon in long-lived harvested **wood products** would likely be higher in the baseline case because of timber extraction, at least temporarily until stocks are exhausted. However, the project could supply similar amounts of timber, at least in the longer run, through sustainable forest management activities and small-scale timber plantations. This pool is likely to be small or insignificant and is not considered in this assessment (although it is briefly discussed in the leakage section). A dedicated assessment would need to be carried out at a more advanced stage of project preparation.

In summary, this project assessment only considers above-ground biomass; it conservatively excludes below-ground biomass, litter, and soil carbon; and it does not consider deadwood and harvested wood products, both of which would need to be revisited at a later stage.

2.2.6 Carbon Stocks Affected

Carbon stock measurements have neither been carried out on the proposed project sites themselves nor in similarly affected, degraded forests in the region. However, it is possible to infer very approximate carbon values from Uganda's National Biomass Study¹⁹ which indicates average carbon stocks of undisturbed forests of the type found in the project area ('normally stocked' 'Tropical High Forest', which seem to include several classes of low- medium- and high biomass forests) of 112 tC/ha (within a range of 23-303 tC/ha). For comparison, the IPCC default value for undisturbed 'Tropical moist deciduous forest' in Africa is 130 tC/ha (within a range of 80-215 tC/ha) (IPCC 2003). Significantly, it is assumed that riverine forests, which form an important part of remaining forests, are well-represented in the THF category.²⁰

¹⁹ MWLE 2003. National Biomass Study. Technical Report. Forest Department, Ministry of Water Lands and Environment.

²⁰ In principle, and depending on the forest definition used, some of the potential project area may fall in the 'Woodland' category for which the same study indicates an average stock of 17 tC/ha (within a range of 0-82 tC/ha). The upper end of the biomass range for the woodland category (82 tC/ha) indicate that some of these could potentially qualify as forest, depending on the definition used. However, woodlands are not considered at this stage of the analysis.

Considering the poor state of many of the project forests which have been degraded by logging and other activities, the value for 'depleted' or 'degraded' or 'encroached Tropical High Forest' from the same study may be more representative for a large part of the project area. This value is given as a mean of 47 tC/ha (within a range of 7-103 tC/ha) and a relative decrease in stocks in this range is judged as realistic by local experts.

The relative distribution of normally stocked versus degraded high forests in the potential project area cannot be determined at present. The preliminary assumption for this assessment, backed by local expert opinion, is that at least 70% of high forests in the landscape may count as significantly degraded. In the absence of more site-specific data, this value is conservatively assumed to be 80%, resulting in average carbon stocks of 60 tC/ha is therefore chosen for this assessment.

This relatively low carbon stock value limits the carbon credit potential from avoided deforestation (RED/REDD), i.e. the emission factor from land-use conversion is fairly low because of the degraded state of project forests. However, a reduced carbon stock at project start increases the potential gains from regeneration (REDD+), which is further analyzed below. Should a higher or lower proportion of project forests be found to be degraded in a comprehensive field assessment then this would greatly affect the balance between avoided deforestation and regeneration benefits. If the actual current and potential carbon stock in the remaining forest patches is lower than assumed, e.g. because of a high prevalence of lower biomass riverine forests, then this would reduce potential carbon benefits on both ends.

The post-conversion land-use system in the project area is a mix of open croplands and agroforestry systems with isolated trees. In terms of relative area, open croplands appear to occupy by far the largest part of former forestland. Estimates for farmlands in Uganda indicate an average carbon stock of 6 tC/ha for subsistence farmlands and 2 tC/ha for commercial mono-crop farmland (NFA). In order to be conservative and to account for possibly existing isolated trees in the farming landscape, a slightly higher value of 10 tC/ha is used to calculate the conversion emission factor for this study. The average avoided baseline emissions for the project area are therefore assumed to be: 60 tC/ha - 10 tC/ha = 50 tC/ha, or 183.5 tCO₂/ha. A better approximation of true baseline carbon stocks in the project area should be established through field measurements in order to allow for more robust projections. A higher-end value could be applicable if many areas contain interspersed trees or regenerating bush or tree vegetation (e.g. on fallow).

For comparison, IPCC default values for agricultural systems in Africa are 6 tC/ha in 1-year fallow systems, and 21 tC/ha for agroforestry systems. A study (Swallow et al. 2007²¹) for tropical agricultural systems in various parts of the world gives estimates of 3, 8, and 16 tC/ha for maize, cassava and plantains, respectively, 5 tC/ha for short fallow and 12 tC/ha for sugarcane.

²¹ Swallow, B., et al. 2007. Opportunities for Avoided Deforestation with Sustainable Benefits. Alternatives to Slash and Burn Partnership (ICRAF, CIFOR, et al.)

2.2.7 Overall Baseline Emissions

The parameters and assumptions for a projection of baseline carbon emissions, as introduced and discussed above are:

- Emission factor for land-use change (degraded forest to farmland): 183.5 tCO₂/ha
- Project area: 27,000 ha
- Deforestation rate: 3.5 %/year (945 ha/year in year 1)
- Degradation emissions: not accounted for
- Regeneration of carbon stocks: none

Based on these assumptions, total baseline emissions are projected to be roughly 173,000 tCO₂/year in year 1, falling linearly to 126,000 tCO₂/year in year 10 and 88,000 tCO₂/year in year 20. Baseline emissions are assumed to decrease as less forest area remains and the relative rate of loss is assumed to remain stable. These baseline emissions cannot be directly translated into project emission reductions, as discussed in the following. Most importantly, potential emission reductions need to be adjusted by project performance and leakage risks.

3. Project Scenario and Net Carbon Benefits

In order to arrive at a projection of potential carbon benefits of project activities, it is important to account for the fact that project performance is unlikely to be optimal, especially in early years. In addition, there are several risks of leakage²² that could potentially reduce net carbon benefits, e.g. through displacing agricultural activities. Finally, some project activities might increase emissions directly, e.g. through use of machinery or fertilizer. These aspects are addressed in turn in the following sections before projecting potential net benefits of the various project activities.

The primary project aim is to halt or reduce baseline deforestation. Ideally, however, the project would not only prevent deforestation but also forest degradation by addressing the related specific drivers. Although it is proposed not to claim benefits from reducing degradation, it may be possible to quantify and claim credits for forest regeneration that is currently prevented through ongoing degradation pressures. These three aspects are discussed in this order, and net carbon benefits of their combined potential impacts are calculated through a modeling approach.

3.1 Project Performance Risk

It is likely that a REDD project would not be 100% successful in preventing deforestation and degradation. This is because it may take some time to fully implement the various project activities and provide the envisioned incentives to local land-owners and deforestation agents. Also, the eventual incentives may prove not to be sufficient to compensate (perceived) opportunity costs incurred by some potential participants, or they may choose not to alter their baseline behavior for other reasons. Finally, some of the risks outlined in section 5.3 in the context of the non-permanence risk assessment (e.g. high population growth, unclear land tenure) could also negatively affect the performance of the project throughout its implementation (rather than just being a threat to the permanence of carbon benefits).

In this assessment, it is assumed that project activities would only be 60% effective at preventing deforestation initially and would gradually reach 80% effectiveness after 5 years and thereafter. All of the projects projected gross carbon benefits (from avoided deforestation and from regeneration) are therefore adjusted by these factors in the analysis.

3.2 Leakage

Gross emission reductions need to also be adjusted for potential leakage. Potential sources of leakage in the project context are **activity shifting** (displaced deforestation) by local **residents** and land-owners, activity shifting by **immigrants**, as well as **displaced timber harvest** and displaced **woodfuel production**. Suppressing illegal logging could cause leakage by reducing the supply of

²² Leakage occurs when activities implemented by a carbon project directly or indirectly lead to an increase in emissions (or a decrease in carbon stocks) outside the project boundary.

long-lived **harvested wood products**. There are no significant grazing activities in the project area which could cause leakage. As will be discussed below, most of these potential sources of leakage only concern the avoided deforestation component of the project and should not affect benefits from regeneration because no carbon credits are claimed for avoided degradation.

3.2.1 Leakage from Activity Shifting

Local residents currently engaged in forest degradation and conversion usually hold customary rights to these forests (see section 1.4.1). The expansion of their agricultural lands, both for subsistence and commercial production (e.g. tobacco), is limited to the forests on their property, and they do not colonize or exploit lands elsewhere. Therefore, as long as all of the forestlands owned by the individuals participating in the project are 'engaged', one could assume zero leakage from this potential source. In order to be cautious, however, it is assumed that 20% of the deforestation caused by participating farmers and communities will be displaced to 'non-engaged' forests. It is possible that even 'non-engaged' forests will be included in the formal project boundaries. In this case, what is considered leakage here would then be monitored and accounted for as reduced project performance within the project boundaries.

During project implementation, depending on the applicable methodology, a leakage belt will most likely have to be defined to monitor if participating farmers are in fact not shifting agricultural expansion towards forests on other (parts of their) lands which may not be covered by the project. This leakage belt may cover all or most forests in the project landscape, depending on eventual methodological specifications (it may be more limited if it is assumed that baseline deforestation agents have limited mobility in their activities). The only case where no leakage belt may be required would be a situation where it can be conclusively demonstrated that leakage prevention measures are in place, covering all project participants and fully replacing income, product generation, and livelihood.

The picture is less clear, at first sight, regarding **immigrants** who are granted rights to cut down forests and cultivate land (at least temporarily) by the owners of these lands. As laid out above, immigrants are attracted to this part of Uganda because of the perception of land being available for conversion and cultivation, compared to most other parts of the country. It would then depend on how applicable methodologies treat potential leakage through non-resident farmers, the main difficulty being that such leakage could hardly be monitored through a leakage belt.

However, there seems to be a consensus among local experts that local residents do, in fact, fully control deforestation dynamics on forestlands outside protected areas in the project landscape. This is because even where immigrants are the proximate deforestation agents these are directly engaged by local landowners to clear forests for the latter's agricultural needs. Although immigrants may be allowed to temporarily grow crops on lands they cleared, this is done under an effective agreement that they do not permanently settle there. In this way, virtually all deforestation on private lands is in fact ultimately driven by demand for agricultural lands by local resident landowners. Encroachment in forests with unclear land tenure seems to occur only in isolated and spatially very limited cases. In order to confirm these assumptions, however, project proponents will have to conduct a participatory rural appraisal (PRA) at a later stage.

It could be argued that there is nonetheless a risk that these immigrants that are now ‘denied’ forestlands for conversion by landowners participating in a REDD project would increase deforestation pressures in other areas. However, land-use conversion is ultimately driven by landowners wishing to increase croplands (or affirm land tenure) and a REDD project would not increase this need in areas outside the project boundary or in non-participating areas. Forests not on private lands, i.e. in forest reserves, appear to be effectively protected. Significant alternative forested lands to be converted to agriculture therefore do not exist – which is why immigrants are attracted to the Budongo-Bugoma landscape in the first place – and immigrants would have to contend with already deforested areas or other livelihood options.

Therefore, no further leakage discount for activity shifting is applied in the below projection in addition to that for resident landowners. However, there is a real possibility that future applicable approved REDD methodologies may not accommodate the above reasoning or that a validator may not find sufficient evidence to support it. This methodology risk should be closely monitored when proceeding to formal project development.

The total leakage discount for activity shifting /activity displacement is thus estimated at 20% for carbon benefits from avoided deforestation. In the medium to long-term, leakage mitigation strategies, in particular agricultural improvements, should allow for a further reduction of activity shifting.

Importantly, carbon benefits from regeneration are not affected by this discount, because it is assumed that forests in the leakage areas are not regenerating either under the baseline scenario (see following section). However, it is not certain whether this approach of applying two distinct leakage discounts to different project activities in the same area is acceptable under eventually applied methodologies.

3.2.2 Leakage from Displaced Wood Harvest

By engaging forest owners to protect remaining forests on private land, the project would aim at preventing deforestation, as well as reducing the ongoing degradation of remaining forests. An important additional outcome of preventing degradation would be the stimulation of regeneration in the protected forests.

However, both avoiding deforestation and avoiding degradation could lead to leakage from displaced timber and wood harvests:

- (1) **Avoiding degradation** by reducing unsustainable logging and other degradation sources could create leakage from displaced timber harvest (as well as displaced woodfuel production). This leakage could manifest itself in increased degradation or suppressed regeneration in other non-project areas.
- (2) In addition, **avoiding deforestation** could suppress a supply of wood that is created under business-as-usual practices when forests are cut and converted to farmland. In this process, a certain volume of wood is extracted from the felled logs and used for timber and other wood products.

3.2.2.1 Displaced Timber Harvest due to Avoided Degradation

Regarding the leakage risk (1), created from displaced timber harvest due to avoided degradation: In principle, this risk could be effectively avoided, in carbon accounting terms, by not claiming any credit for avoided degradation itself. It could be argued that degradation occurs in a similar way both in project forests and in non-participating forests (i.e. in a potential leakage belt). In this case, even if all of the degradation pressure is displaced from project forests to other areas – i.e. in a case of 100% leakage of this type – these carbon losses would not exceed the gains made by preventing degradation in the project area (see Table 4). In this way, conservatively neglecting direct benefits from avoided degradation would effectively cancel any leakage created from this activity (and would realistically lead to significant actual – but not credited – benefits).

By suppressing degradation which is currently preventing regeneration the project could enable ‘assisted’ natural regeneration. If no net carbon losses are created through leakage from avoiding degradation – because avoided degradation benefits are conservatively neglected – any regeneration enabled by the project should represent a net carbon gain. Regeneration benefits should therefore not be subject to any leakage discount.

However, whether this combined degradation and regeneration scenario is true depends on the overall dynamics of land-use change in the project area, as well as in a potential leakage belt. At least 4 scenarios are possible in principle (see Table 4 for illustration), in various combinations:

- **Scenario 1:** The affected forest areas – both forests within project boundaries and non-participating forests – are in a continuous state of degradation. The project would then in fact stop this ongoing decline in carbon stocks within project boundaries. As long as it is true that forests in leakage areas are in fact either further degrading or remain in a ‘steady state’ of low carbon stocks, i.e. as long as leakage is not leading to suppressed regeneration elsewhere, *no net leakage* is created. A further condition is that degradation pressures are not displaced to forests with significantly higher biomass stocks than the project forests. Simply not accounting for avoided degradation would then be conservative and no leakage discount would have to be applied to regeneration benefits.

It seems unlikely that leakage would occur in areas of regenerating forests given the overall consensus (see section 2.2) that forests across the landscape are degraded and further degrading. Similarly, it is unlikely that leakage areas would have higher biomass forests given that most of the forest cover in the project landscape has already disappeared and that deforestation and degradation rates are high throughout the area. In addition, past deforestation and degradation pressure has been at least as severe in other parts of Uganda (overall tropical high forest cover in Uganda has declined to a mere 3%).

- **Scenario 2:** Logging and other forms of degradation are ongoing but only to the extent that a ‘steady state’ is maintained in the already degraded forests. Regrowing commercial timber is removed and other wood is harvested but no further degradation of carbon stocks takes place. This would mean that further logging is in fact sustainable, although taking place in degraded forests. In this case, the project could in fact create *net leakage*

because harvesting pressures that are shifted away from project forests may lead to additionally extracted volumes in leakage areas. If these leakage areas are in a similar fragile steady state, formerly 'sustainable' wood extraction would now become unsustainable and lead to net carbon losses.

However, it seems highly unlikely that such a delicate 'steady state' would exist at present and would continue under business as usual, requiring in fact that a 'sustainable logging' regime exists and be maintained. Local expert opinion also rejects this scenario. However, it is not impossible that these dynamics partially apply to some of the forest patches, and a dedicated assessment should ascertain this in the future.

- **Scenario 3:** Forests are already so logged out that no further logging would be commercially attractive. No further harvest would take place, and these forest patches would be left to regenerate even in the absence of the project. In this case, *no leakage* would be created (no logging would be suppressed); however, much fewer, or *no regeneration benefits* could not legitimately be claimed by the project as they may similarly occur under the baseline scenario.

Again, this scenario does not seem to apply to the project landscape. In fact, remaining forests are thought to be in a state of continuous degradation through ongoing increasingly indiscriminate logging and wood harvest and increasing demand for these products (see section 2.2.2). However, it is not impossible that the scenario could partially apply to some of the forest patches, and a dedicated assessment should ascertain this in the future.

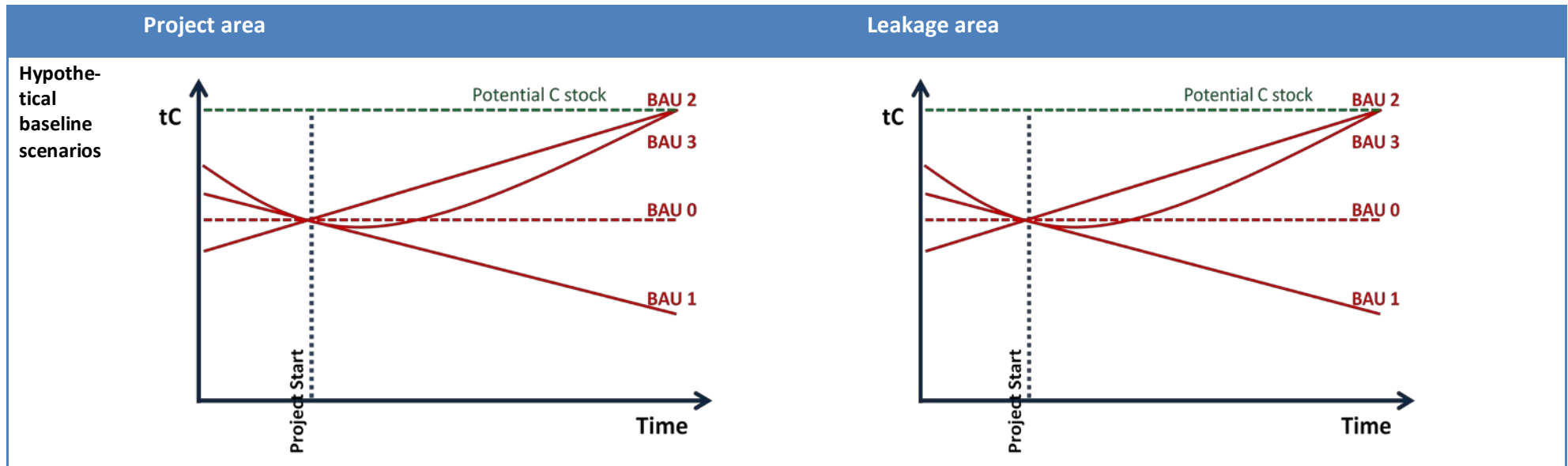
- **Scenario 4:** The degraded forests are 'doomed' for conversion. If past degradation is a pre-cursor to forest conversion, or if such conversion is impending in any case, then no regeneration or timber regrowth occurs in the baseline after the hypothetical date of conversion. In this case, degradation is actually only suppressed for a limited time and it is rather the complete conversion of these forests that is prevented. *No leakage* from avoided degradation itself would be created project. However, local farmers or the market could be deprived of wood originating from forest conversion which could indeed generate leakage (see below).

This scenario certainly applies to parts of the project area, namely those areas deforested in the baseline scenario. Most project forests are assumed to be degraded.

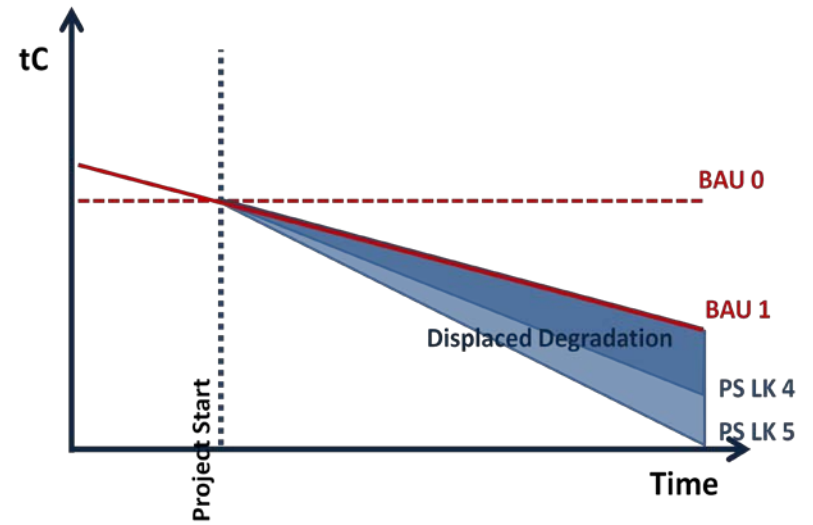
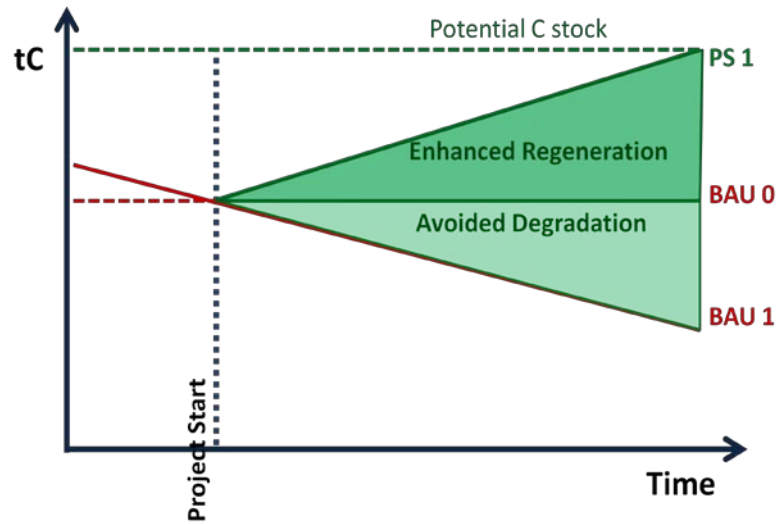
Scenarios 1 (continuing degradation) and 4 (impending conversion) seem to be the most likely for the majority of forests in the project region. Some very limited regeneration and harvesting of regrowing stocks (scenarios 2 and 3) may occur in some forest patches but this is unlikely to change the overall picture. This would imply that the only potential source of significant leakage from displaced wood harvest would be from depriving timber markets of their traditional supply from converted areas, which would be created either just before or after clearing occurs. This is discussed in the following section.

Table 4: Scenarios of Degradation and Regeneration Dynamics and Leakage Risks.

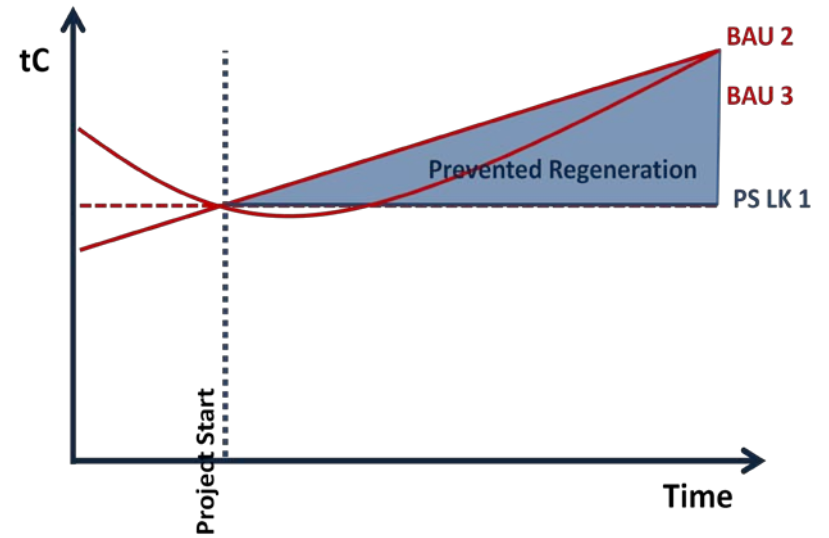
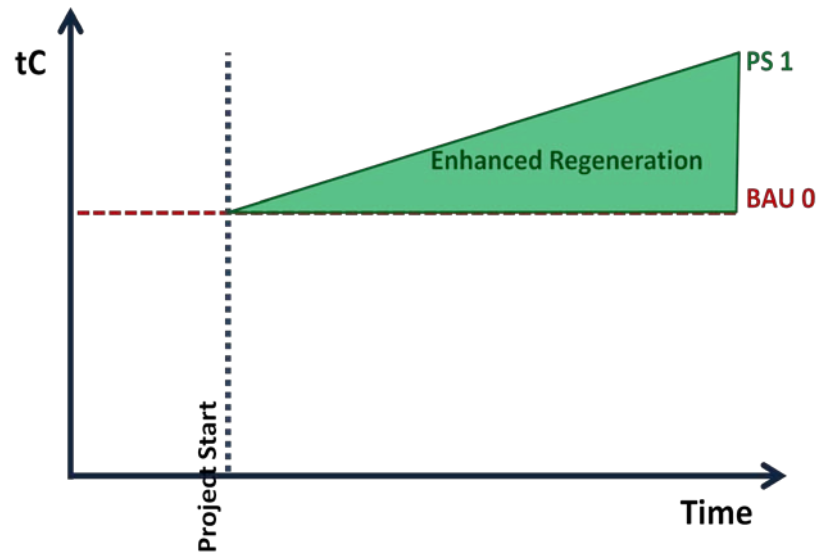
(Different combinations are possible - see text for details).



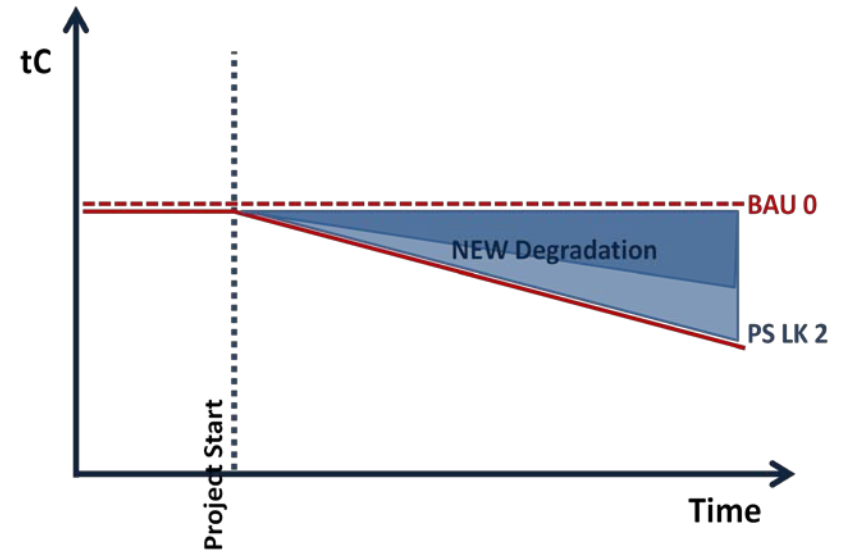
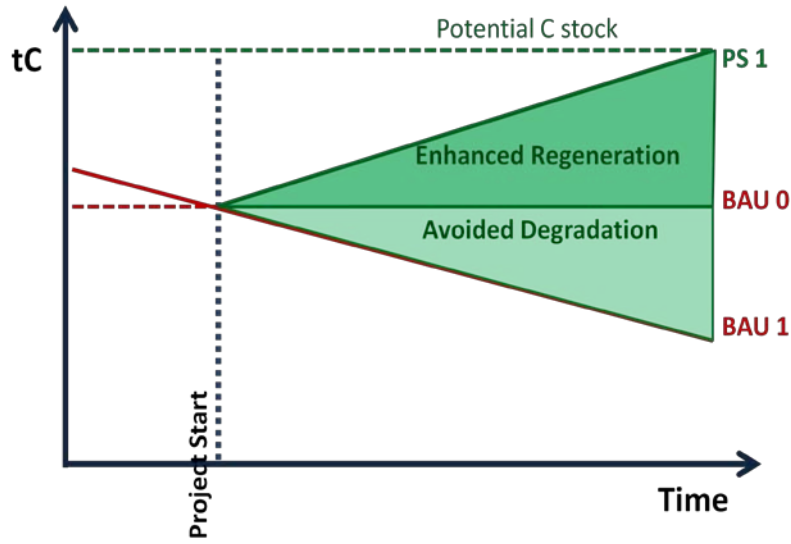
Scenario 1
A



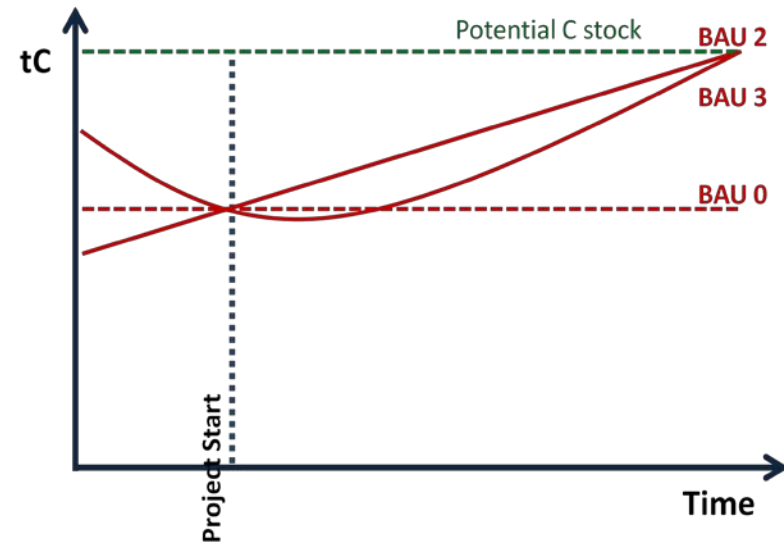
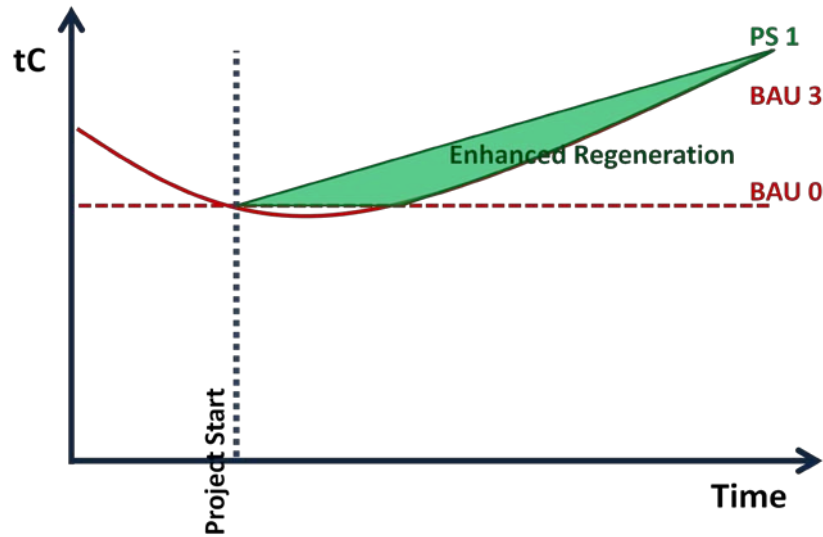
Scenario 1
B



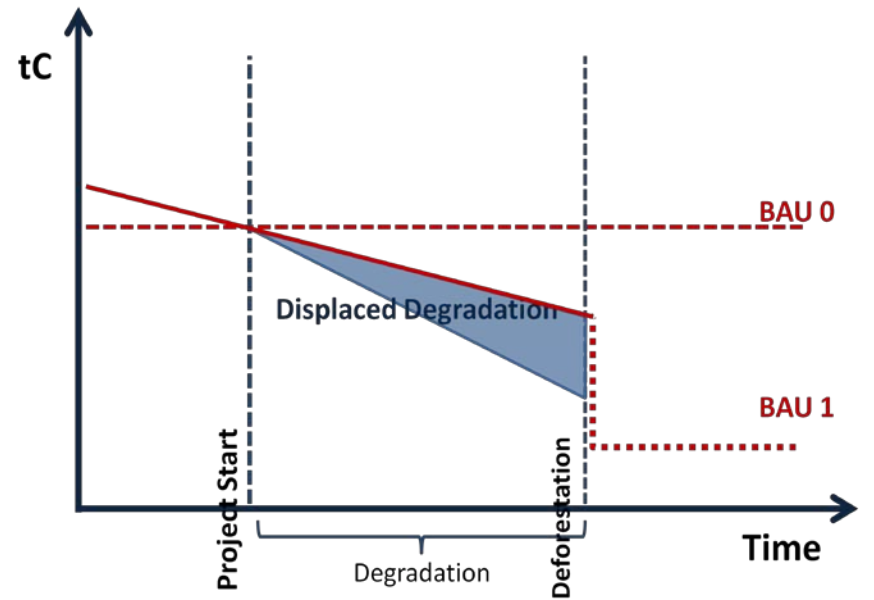
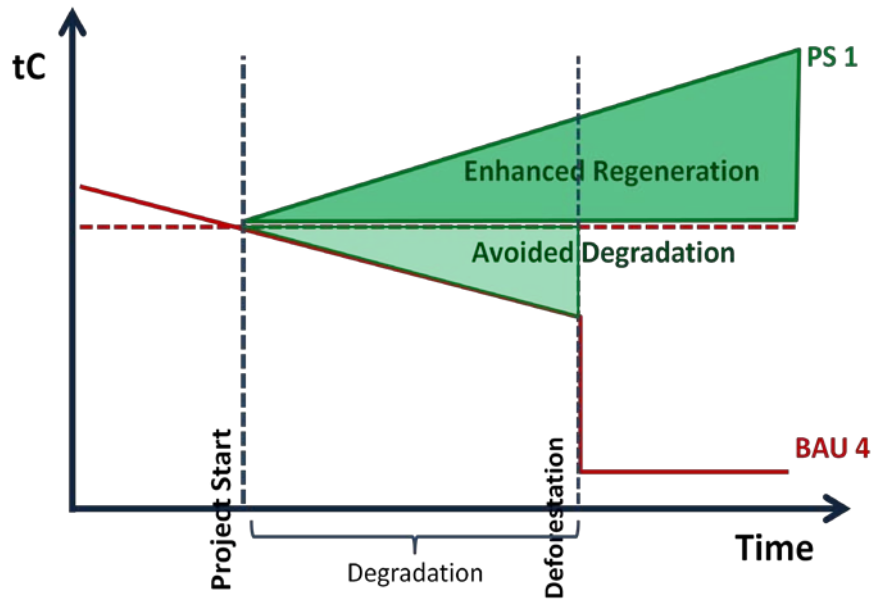
Scenario 2



Scenario 3



Scenario 4



3.2.2.2 *Displaced Timber Harvest due to Avoided Deforestation*

The second, and more likely, source of leakage could be created by **suppressing wood supply from converted areas** (market leakage). The argument would be that by preventing deforestation, the project is reducing the supply of timber or wood products (incl. woodfuel) from areas that would otherwise be clear-felled in order to be turned into agricultural lands. This is almost certainly the case in a REDD project in the given landscape. Different outcomes could occur to varying degrees:

- The reduced supply leads to higher harvesting pressures in remaining forests, leading, in the worst case to an increase in unsustainable harvests by the same volume that is prevented from entering the market. Matters could be made even worse if extensive logging damage is created.
- The reduced wood supply does not lead to any increased harvesting pressures because supply of wood from converted areas elsewhere is still so ample that demand can be satisfied.
- Forest owners participating in the REDD project do in fact continue to supply some timber (or even the same amount), e.g. through improved sustainable harvesting practices in remaining forests (while still allowing for regeneration), or by creating woodlots or conducting enrichment planting with attractive timber species.

It is likely, that a combination of the first two outcomes would occur. At least in the short term, it is unlikely that equivalent amounts of timber or wood could be supplied from planted trees or improved sustainable harvesting techniques. In the medium term, however, these practices could form an important part of a leakage prevention – and livelihood creation – strategy.

In order to estimate leakage from suppressed timber harvest, the timber volume typically extracted from conversion area would have to be estimated, as well as the harvestable timber stocks in areas to where timber extraction may be displaced.²³ At present, neither of these parameters is known. Most forests in the landscape, including those being converted, are heavily degraded and may have been depleted of much of their attractive timber. However, because of increasing scarcity of supply, logging appears to be increasingly indiscriminate and include a wide range of species.

On the basis of field and PRA assessments it should be possible to derive approximate volumes of extracted timber volumes per ha converted. One could also conservatively assume that all of the standing timber (of commonly harvested species) would be harvested upon conversion and sold on national markets. Assuming similar carbon densities of forests in leakage areas, under VCS draft methodologies a 40% leakage factor would be applied to the harvestable volume and this would be multiplied by a logging damage factor (LDF) and a logging infrastructure factor (LIF).²⁴

²³ The approach would be analogous for woodfuels and other wood products produced as significant by-products of forest conversion.

²⁴ The default given for tropical forests in the Avoided Deforestation Partners REDD draft methodology (LK-ME module) is 0.37 tC (LDF) and 0.29 tC (LIF) per m³ of harvested timber.

A leakage discount computed in this way would most likely be an over-estimation because not all commercial timber volume is usually extracted upon forest conversion, and not all of this is sold on regional or national markets. However, much of this extraction and commercialization currently occurs illegally, i.e., it is neither captured by forest management plans or timber movement permits. Therefore, producing a lower estimate would encounter methodological challenges and could probably not be defended under standards such as the VCS.²⁵

Further, this leakage discount should arguably be reduced because if it is assumed (see above) that the project does create some activity shifting, i.e. displaced deforestation, which would generate some wood supply of this sort elsewhere. Furthermore, the leakage discount could potentially be lowered if it could be demonstrated that most of the timber leaves the country (estimates seem to indicate substantial exports to Sudan) because international leakage is not accounted for under the VCS and Kyoto. It is similarly unclear, however, if the necessary data could be produced.

In the absence of almost any data on the various parameters outlined above, an additional leakage factor of 10% from displaced wood harvest is applied to carbon benefits from avoided deforestation.²⁶ This value is highly uncertain.

Importantly, this market should only be applied to carbon benefits from avoided deforestation since it is forest conversion which creates this timber supply. Regeneration benefits, in contrast, should not be subject to a leakage discount from this source. However, it is not certain whether this approach of applying two distinct leakage discounts to different project activities in the same area is acceptable under eventually applied methodologies.

3.2.3 Leakage from Reducing Harvested Wood Products

Strict leakage accounting would include a consideration of suppressed supply of long-lived **harvested wood products**. The argument is that preventing deforestation and degradation could deprive the market of wood products (by reducing the supply of wood as a by-product of forest conversion as well as by reducing logging), including some such products that may store carbon for a long time (e.g. in buildings or paper products).

Following the logic of the above discussion, it is assumed that only suppressed supply of wood products from converted forests would need to be accounted for as leakage. Displaced degradation pressures from avoided degradation, for which no credits are claimed, would continue to supply similar wood products (the conservative assumption being that up to 100% of avoided degradation is displaced).

²⁵ At present, there is only official data from timber movement permits issued by the respective District Forest Offices. This could be put into relation with commercial timber volumes likely available from converted areas in order to arrive at a percentage of how much of the latter is actually commercialised on markets. However, the legal permits are unlikely to capture all (or even the majority) of all commercialised timber, they include timber from logging not tied to conversion, and it will never be possible to reliably quantify timber becoming available from converted forests.

²⁶ Assuming about 30% of felled wood volume being used or usable, some of this being supplied through displaced deforestation, a 40% discount factor for market leakage, no additional infrastructure damage.

Once again, volumes of commercially exploitable wood for the production of long-lived wood products are not known for the project area. Furthermore, the share of various products (e.g. roundwood, sawnwood, paper products) is not known. However, following available draft guidance, only a small percentage of harvested volumes would be assumed to persist in long-lived wood products. The resulting leakage is considered to be insignificant at this stage of the project assessment but would need to be evaluated in more detail in the future.

3.2.4 Leakage from Displaced Woodfuel Production

Finally, preventing forest degradation and deforestation could create leakage through **displaced fuelwood and charcoal production**. Again, not claiming avoided degradation credits should also result in very conservative accounting in this case, and no net leakage in this category should occur. In addition, woodfuel production is not considered to be a significant degradation driver in the project landscape with supply being created mainly through deadwood, clear-cut areas, and from woodlands. Furthermore, increased regeneration in the project scenario should create larger amounts of deadwood which would be available for fuelwood and charcoal production.

Regarding reduced supply of wood from converted areas that could be used as fuel, volumes are arguably so small that they could easily be supplied from nearby ongoing conversion. No additional leakage discount is therefore applied. In addition, creating woodlots for fuelwood supply would further attenuate this problem.

3.2.5 Project Emissions

Potential emissions from project implementation include fossil fuel emissions from transport and machinery use during project implementation activities, fertilizer application (e.g. to boost agricultural productivity), and, in the case of tree planting activities (implemented as part of leakage prevention measures or as an incentive to communities) soil disturbance (erosion) and removal of pre-project vegetation. Depending on the location of their occurrence (within or outside of the formal carbon project area) these emissions could be classified as project emissions or leakage.

All of these emissions are likely to be either insignificant or they can be neglected under applicable methodologies. Under the VCS, emission sources that in their sum account for less than 5% of the total carbon benefits generated by the project are considered insignificant, or '*de minimus*'. In addition, several recent CDM Executive Board (EB) decisions declared some sources as insignificant *per se*:

- Emissions from **transport** and machinery use are likely to be very small. Furthermore, fossil fuel emissions can be neglected under the CDM according to a recent decision by the CDM Executive Board (EB 44) and so it is likely that this thinking will also be applied under the VCS.
- **Fertilizer application** could increase in the project scenario due to tree planting and agricultural intensification. However, due to the generally fertile soils in the region and the significant potential for increasing yields through other means (e.g. crop rotations,

agroforestry, organic fertilizer), N₂O and CH₄ emissions due to the increased application of fertilizers are very likely to be the '*de minimus*' range.²⁷

- **Soil disturbance** through tree planting activities is likely to be negligible because site preparation efforts would be minimal (CDM A/R methodologies usually set a threshold of 10% of the project area before this factor has to be considered) and the landscape is generally rather flat (reducing potential erosion). Agricultural project activities would likely not increase the total area of crop production and may in fact promote reduced soil disturbance (e.g. conservation tilling or no-till practices).
- **Removal of pre-project vegetation** for tree planting is also likely to be insignificant given that such planting would mainly occur on agricultural land (agroforestry) or on land where woody vegetation is regularly removed in the baseline. Non-woody vegetation also does not need to be considered (see CDM EB 50 decision).
- The discount of project carbon benefits due to potential sources of project emissions is therefore assumed to be zero.
- Summing up all of the above potential leakage sources, the leakage discount applied to avoided deforestation benefits in this assessment is 30%. No leakage discount is applied to carbon benefits from assisted natural regeneration.

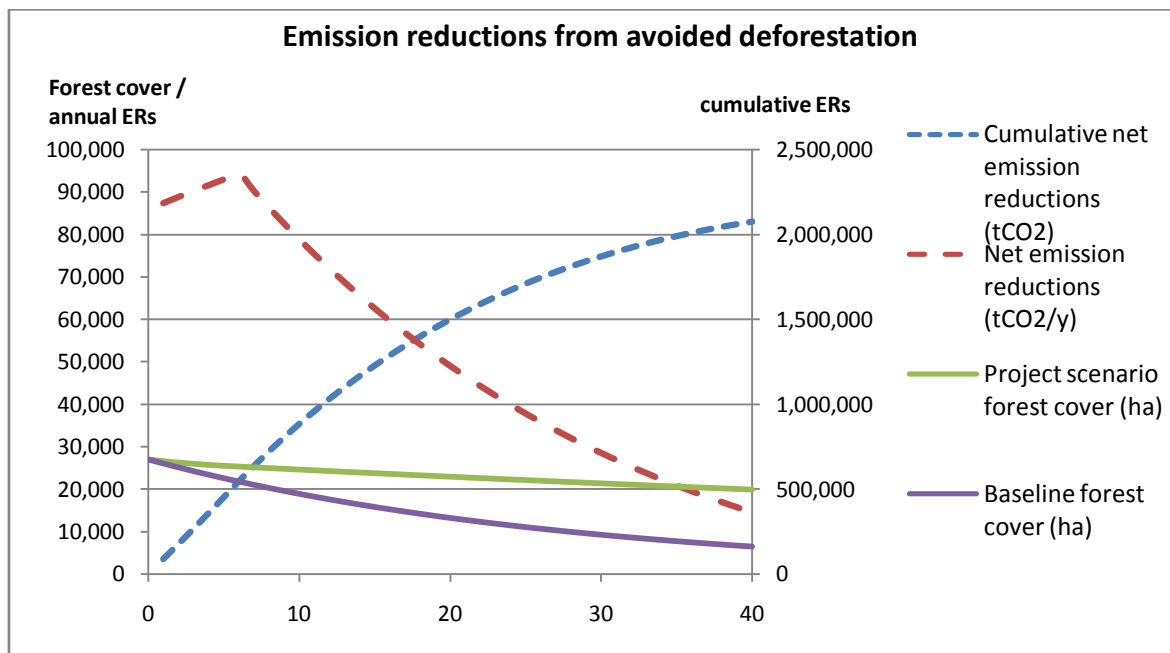
3.3 Carbon Benefits from Avoided Deforestation

The maximum carbon benefits that could be generated directly from avoiding deforestation in the project area would equal the assumed baseline emissions from deforestation. However, as elaborated in the preceding sections, it is likely that carbon benefits would be discounted to take into account potential leakage and suboptimal project performance. Project performance is unlikely to be 100% effective, particularly in the early years of implementation (see above). The overall leakage discount for avoided deforestation benefits is assumed to be 30%. The project performance discount is assumed to be 40% initially and 20% from year 5 of project implementation.

Under these assumptions, avoided deforestation could generate average net benefits of 88,000 tCO₂ annually during the first 10 years, and on average 75,000 tCO₂ annually during the first 20 years (see Figure 2). Note that these carbon benefits cannot yet be equated with carbon credits that would be issued because a further discount for non-permanence risks will be applied. See section 6.1 for a projection of carbon credit generation.

²⁷ Furthermore, according to VCS guidance, avoiding the conversion of forests to cropland or pasture can reduce similar non-CO₂ emissions that may have been associated with baseline fertilizer use in newly converted agricultural areas. Whether the balance could be quantitatively evaluated seems questionable, however.

Figure 2: Net Annual and Cumulative Carbon Benefits from Avoiding Deforestation (after Accounting for Leakage and Project-Performance Risks)²⁸²⁹



3.4 Carbon Benefits from Avoided Degradation

By engaging forest owners to protect remaining forests on private land, the project would address not only avoided deforestation but would ideally also prevent further degradation of these forests. This would be achieved primarily by suppressing ongoing unsustainable harvest and small-scale agricultural conversion and by providing alternative sources for timber, woodfuel and other products. Reducing degradation could lead to 3 types of potential carbon benefits:

- (1) Reduced emissions from avoided degradation itself;
- (2) Preventing discounts to avoided deforestation benefits due to decreasing carbon stocks in baseline deforestation areas; and
- (3) Allowing for regeneration which is suppressed under baseline conditions.

Although it would in principle be possible to attempt to quantify and claim credit for **avoided degradation benefits**, there are at least two significant hurdles to doing so. Firstly, there are almost certainly significant methodological difficulties in establishing a baseline of degradation (in the absence of any quantifiable knowledge of past net losses in forest biomass, as well as ongoing harvesting levels), and these are unlikely to be overcome. Secondly, any such benefits may be cancelled out – or significantly reduced - by leakage dynamics of displaced timber and wood

²⁸ Note that annual emission reductions are decreasing over time because the total forest area and the deforested area are assumed to be decreasing in the baseline scenario. Emissions to be avoided therefore become smaller year on year. The initial annual increase is due to an assumed improvement in project performance after project start.

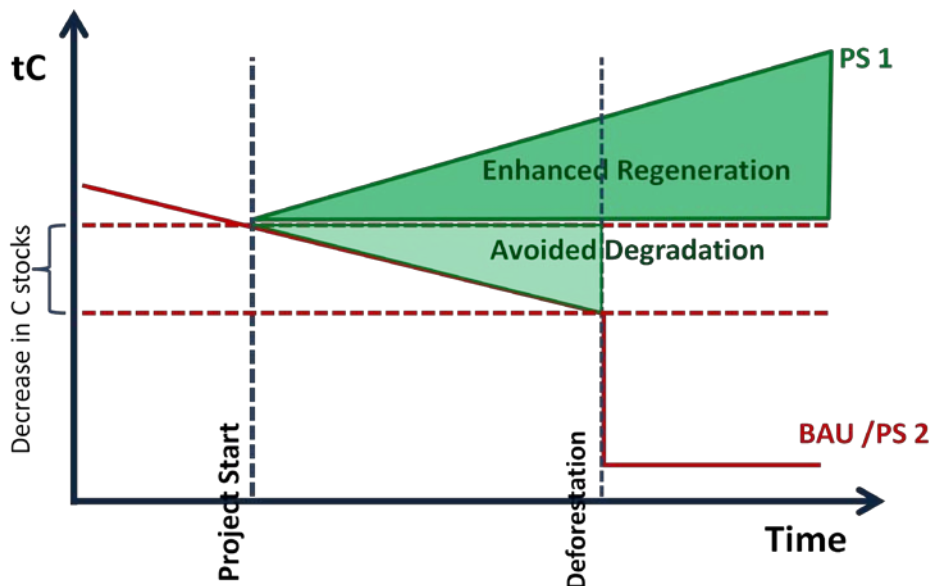
²⁹ Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

harvest (discussed above). Even with potentially improved future data, the conservative assumption of 100% leakage from suppressed degradation may have to be made. Therefore, a realistic approach would be to conservatively neglect, and not claim credit for, reduced degradation.

In contrast, suppressing degradation in project forests would directly benefit the project’s carbon credit generation potential because it would avoid possible **discounts to avoided deforestation benefits** themselves. As illustrated in Figure 3, if significant degradation occurs in the project scenario then carbon stocks on areas where deforestation is avoided are in fact continuously decreasing. Therefore, if degradation were to still take place under the project scenario, it would have to be rigorously monitored, and the actual decrease in carbon stocks would result in a discounting of avoided deforestation credits.

Finally, successfully suppressing ongoing degradation in the project forests should create the conditions for a recovery in carbon stocks, i.e. natural **regeneration**. Despite some localized regeneration in logging gaps, the net effect of the various degradation drivers appears to be a definite decrease in average carbon stocks in private forests across the entire landscape. As it would be conservative to assume stable, i.e. non-declining, carbon stocks in the baseline scenario, any net regeneration benefit should be attributable to project activities. In practice, the fact that degradation is ongoing and that carbon stocks outside the project area are, on average, not regenerating would probably need to be demonstrated through measurements in permanent sampling plots.

Figure 3: Carbon Benefits from Avoided Deforestation & Impacts of Ongoing vs. Avoided Degradation



3.5 Carbon Benefits from Regeneration

As discussed above (sections 2.2 and 3.2), forests on private lands across the Budongo-Bugoma landscape seem to be subject to heavy ongoing degradation pressures. Despite the occurrence of some regeneration in logging gaps, the overall trend seems to be a definite decline in forest biomass, mainly due to increasingly indiscriminate logging, pole cutting, sub-canopy agriculture etc. If this assumption can be confirmed through field measurements, it would certainly be conservative to assume stable, non-declining carbon stocks in all the remaining forests, which are not subject to conversion in a given year.

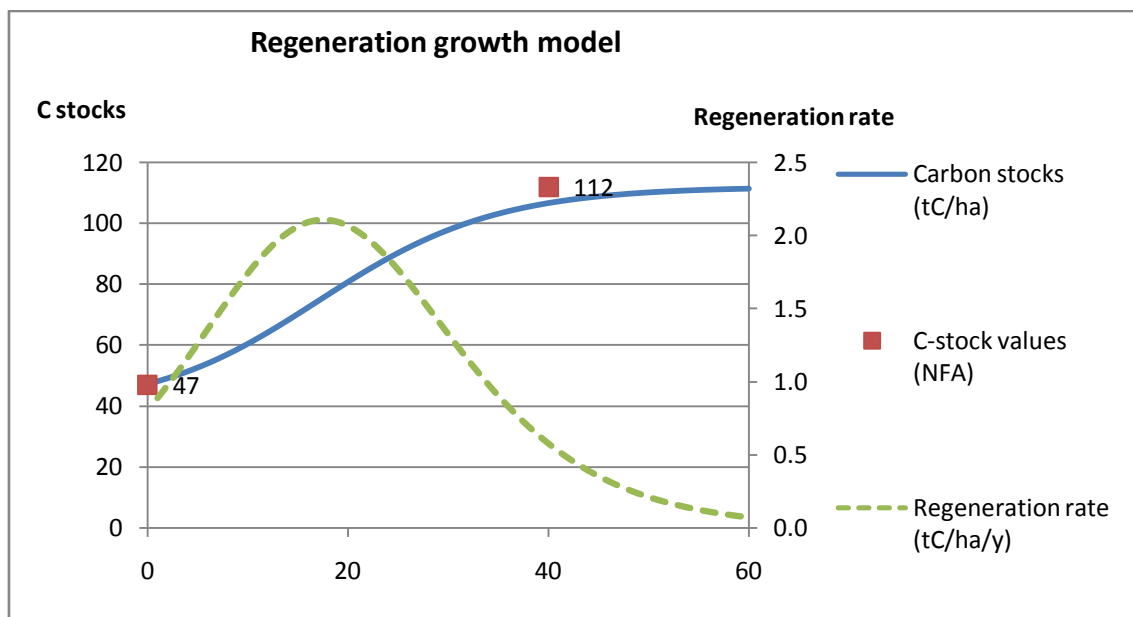
However, preventing degradation would allow for the regeneration of carbon stocks in the remaining forest which in most areas are currently far below their full potential. This means that any carbon stock increases through regeneration which can be demonstrated ex post under an approved methodology could be claimed by the project. Depending on the eventual methodology, it is possible that such measurements would need to include permanent sample plots within and outside of the project area in order to ascertain the degradation baseline trend or detect any regeneration occurring after all, in the absence of the project. Only the differential in regeneration that can be technically and statistically verified would be able to be claimed as carbon benefits by the project.

The assumed average carbon stock of 60 tC/ha for the project area (see above) takes into account the heavily degraded state of many forest patches. The potential carbon stocks of undisturbed forests in the area (normally-stocked 'Tropical High Forest') may reach an average of 112 tC/ha according to NEMA estimates. In the long run, assisted natural regeneration (i.e. through preventing ongoing degrading activities – not active restoration) could potentially allow degraded project forests to attain the carbon stocks of undisturbed forests. Regeneration rates for 'Tropical High Forest' in Uganda have been estimated at 6-7.5 tC/ha/y (MWLE 2003³⁰); however, such high rates seem questionable.

A much more cautious growth model is chosen here with initial increments of 0.9 tC/ha/y, peaking at 2.1 tC/ha/y after 15 years and then dropping steadily, the average for the first 20 years being 1.7 tC/ha/y (see Figure 4). For comparison, the IPCC guidance for regenerating 'Tropical moist deciduous forest' in Africa is a default linear value of 2.5 tC/ha/y for forests of <20 years of age and 0.7 tC/ha/y thereafter (IPCC 2003).

³⁰ MWLE 2003. Forest Department, Ministry of Water Lands and Environment. National Biomass Study. Technical Report. ISBN: 9970 863 002.

Figure 4: Regeneration Growth Model for Degraded Forest Patches



A key uncertainty in this regard is how the current degraded status of forests may interfere with their potential to regenerate. It is not impossible that degradation is so severe and has persisted for long enough in some areas for important ecological changes to have taken place regarding the composition of plant species and the physical structure of the ecosystem that could inhibit regeneration. For example, in some large gaps, vines and other light-loving plant types may have become locally dominant and may prevent the establishment and growth of many tree species or shade-loving seedlings. Although this is unlikely to permanently inhibit forest recovery, it could slow down the process considerably. In this case, even the regeneration rates chosen above may not be conservative enough or there may be a delay in reaching them.

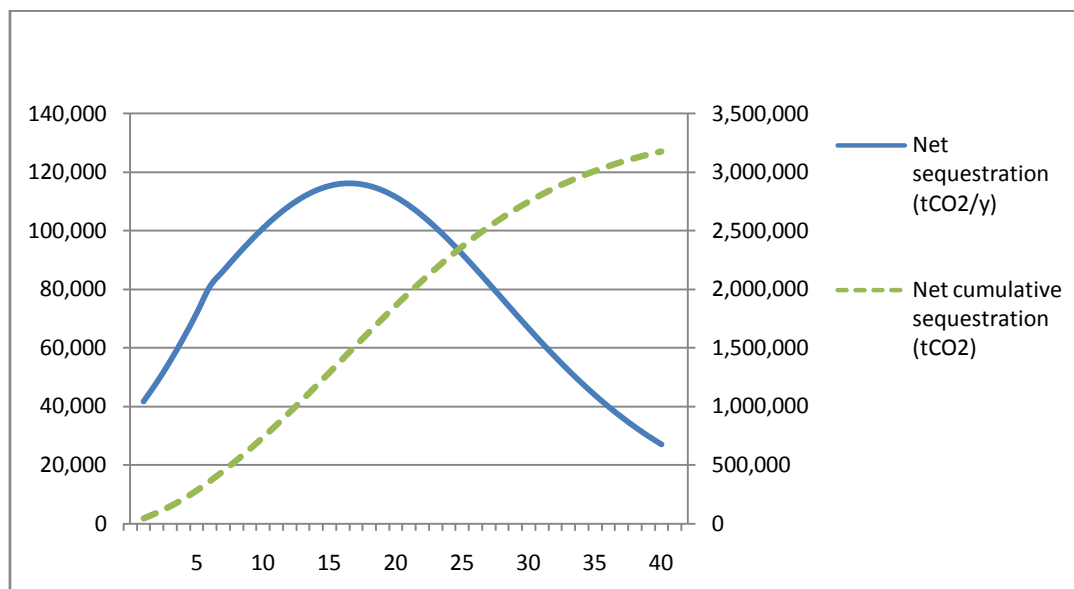
On the other hand, it is entirely possible that forests are in a good enough condition for regeneration to occur much more vigorously than assumed in the above projections. At least one in-depth study (of forest patches adjacent to Budongo Forest Reserve) indicates that a forest structure conducive for regeneration may exist.³¹ However, it is not clear whether this finding is representative of the larger project landscape.

The potential maximum regeneration benefits are adjusted for project performance risks (see section 3.1) and potential leakage (see section 3.2). Following these adjustment, across the entire initial project area of 27,000 ha, assisted natural regeneration could therefore add an average of 59,000 tCO₂ annually to the carbon benefits from avoided deforestation during the first 10 years, and on average 74,000 tCO₂ annually during the first 20 years (see Figure 5). (Note that these carbon benefits cannot yet be equated with carbon credits that would be issued (see section 6.1)).

³¹ Biryahwaho, B. 2000. The condition of forest patches adjacent to Budongo Forest Reserve, Western Uganda. MSc Thesis in Environment and Natural Resources. Makerere University.

Figure 5: Total Net Carbon Benefits from Regeneration

(Adjusted for project performance and leakage risks, not adjusted for measurement and non-permanence risks).³²



This means that by simply creating the right conditions for natural regeneration to occur, rather than through active planting, the project could generate very substantial annual carbon benefits—as well as significant additional biodiversity benefits. It will therefore be of paramount importance whether a future applicable methodology will allow for the crediting of sequestration benefits from regeneration, in addition to emission reductions from avoided deforestation (see section 4.2). No enrichment planting is foreseen in the project design at present, and such active planting could furthermore create problems in applying existing draft REDD methodologies (mainly because active planting would formally fall in the IFM, improved forest management, project category).

An intermediary finding, and before taking into account further adjustments, is that potential carbon benefits from regeneration created by the project could rival benefits from avoided deforestation alone over the course of the project lifetime. The true potential for regeneration depends on the condition of carbon stocks in affected forests and is inversely related to emission reductions from avoided deforestation – lower carbon stock values would increase potential regeneration gains but limit potential emission reductions and vice versa. It needs to be re-emphasized, however, that although conservative assumptions were used in these projections, (a) actual regeneration dynamics may turn out to be lower than expected, and (b) statistically demonstrating the full biomass differential compared to the baseline case may prove challenging.

An additional significant risk is that some or even all of the actually occurring regrowth may not be statistically demonstrable. When comparing actual regeneration rates in permanent sampling plots within and outside of the project area, it is possible that confidence intervals in both cases are

³² Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

relatively large, especially if there is a high variability among different plots. Because of the conservativeness approach, the lower bound of the with-project and the upper bounds of the without-project measurements may have to be used. Even if regeneration does occur, it is possible that these confidence intervals overlap and that no regeneration benefits can thus be proven under a conservative accounting approach. A large differential in regeneration (or degradation rates) would lessen this risk. These considerations are taken up in the form of a further risk adjustment factor below for the calculation of overall net creditable project benefits.

3.5.2 Carbon Benefits from Active Planting Efforts

At the present stage of project design, active tree planting outside of forested areas is mainly envisioned as an incentive to participating landholders (primarily for fruit and timber production) and potentially as a leakage prevention activity (to counter the displacement of timber and woodfuel production). In principle, the carbon sequestered could be claimed as an additional project benefit. However, it is not yet clear at what scale planting could be undertaken and whether it would be worth incurring the resulting transaction costs and the sustained planning effort. It is likely that such active tree planting would need to be treated as a separate project component under the VCS, applying an A/R methodology.

An alternative could be to include these trees in an expanded Plan Vivo scheme as it is already practiced in parts of Masindi and Hoima Districts by EcoTrust. This approach should be further explored as it could provide some welcome additional and early-on payments to farmers (Plan Vivo credits are issued ex-ante and upfront payments are made).

3.6 Net Carbon Benefits of Project Activities

Net project carbon benefits for which credits can be claimed are the result of adding up avoided baseline emissions from deforestation and carbon sequestration through assisted natural regeneration. The following adjustments were made in order to generate more conservative projections:

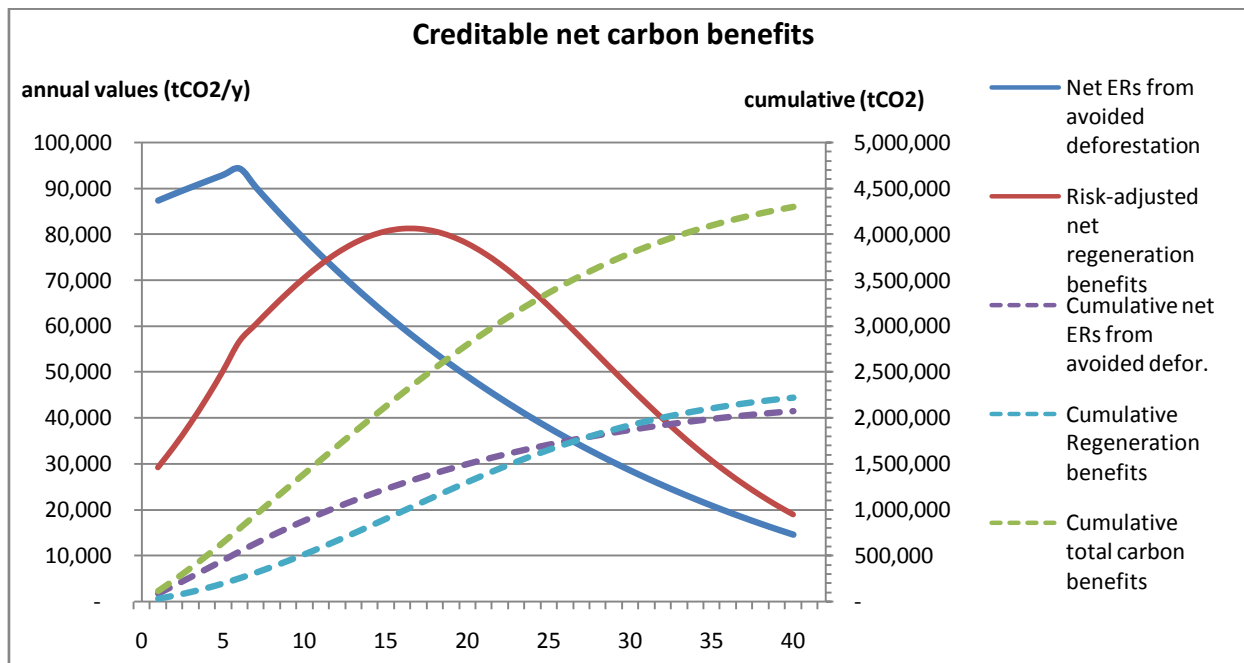
- Both avoided deforestation and enhanced regenerations have been adjusted to account for project performance and leakage risks, as discussed in the preceding sections.
- Furthermore, creditable regeneration benefits were adjusted for a 'measurement risk' in order to take into account the risk that it may not be technically or statistically possible to demonstrate 100% of the carbon benefits created through enhanced regeneration (see preceding section). The assumption used here is that only 70% of these benefits would be able to be translated into carbon credits, even if an applicable methodology existed that allowed for crediting of such benefits. It needs to be stressed, however, that no sound basis exists at present for quantifying this risk.
- For projecting credit issuance (section 6.1) a 2-year delay of being able to verify these regeneration benefits will be assumed. This additional adjustment does not impact total carbon credit generation but the timing of credit issuance (with a consequent potential impact on financial feasibility).

- Project emissions were considered insignificant (section 3.2.5).
- Note that the non-permanence buffer discount is not applied to the project carbon benefits but, rather, is considered in the projection of potentially tradable carbon credits (section 5.3).

Total net project carbon benefits across the project area of 27,000 ha are projected to be 140,000 tCO₂ annually during the first 10 years (or 5.2 tCO₂/ha/y) and the first 20 years (see Figure 6). This would total 1.4 m tCO₂ during the first 10 years.

Figure 6:- Net Carbon Benefits from Avoided Deforestation and Assisted Natural Regeneration

(Adjusted for leakage and project performance risks; regeneration benefits adjusted for measurement risk).³³



³³ Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

Table 5: Assumptions Related to Carbon Benefits, as Used in Modeling Projections*(See text for details).³⁴*

Variable	Value	Explanation
total forest area outside PAs (ha)	90.000	Area of high forests outside of protected areas in 3 districts (Hoima, Kibaale, Kyenjojo) (woodlands not considered) (adjusted NFA figures)
% of engaged forests	30%	share of total forests participating in project
total project area (ha)	27.000	(function of above)
project start	2011	first year of project implementation (preparations will start in previous year 0)
Baseline deforestation rate (%/yr)	3,5%	2000-2005 average (WCS & MUIENR) for 3 districts is 4.5%; up to 5.1% outside PAs /1990-2005 average (NEMA) is 2.5%; up to 3.1% outside PAs
Project performance in year 1	60%	Assumed sub-optimal performance of project in avoiding deforestation and degradation (impacting regeneration)
Project performance after year 5	80%	Assumed improved but sub-optimal project performance (gradual transition from performance in year 1)
Projected deforestation rate in year 1 of project implementation (%/yr)	1,4%	(function of above)
Projected deforestation rate after year 5 (%/yr)	0,7%	(function of above)
Average carbon stock in fully stocked tropical high forest (tC/ha)	112	Above-ground biomass only (NFA)
Average carbon stock in degraded high forest (tC/ha)	47	Above-ground biomass only (NFA)
Share of degraded forests in overall high private forests	80%	No data available, local expert estimate.
Average carbon stock in high forests in the project area - degraded & dense - (tC/ha)	60	Calculated average of fully stocked and degraded high forests in the landscape (function of above assumptions)
Average carbon stock of land after conversion (tC/ha)	10	Carbon stocks on agricultural land (baseline land sue) (NFA indicates 5.5 tC for subsistence and 1.8 tC for commercial farmland)
Emission factor for baseline land-use change (tCO ₂ /ha)	184	CO ₂ emissions resulting from a conversion of forests to agricultural land in the project landscape (function of above)
Regeneration rate of degraded forest (first 20 years) (tC/ha/y)	1,67	assumed sequestration rate for degraded parts of the forest area averaged over first 20 years, using logistic growth model
Creditable regeneration benefits (%)	70%	Risk adjustment to account for measurement uncertainties (statistically verifiable differential)
Verification delay for regeneration benefits (years)	2	Delay in generating credits because of need to monitor regeneration in reference areas
Project Lifetime (years)	30	tbd - the minimum allowable under VCS is 20 years
Leakage discount avoided emissions from deforestation	30%	Discount for leakage risk of displacing deforestation and timber harvest to non-project forests
Leakage discount C sequestered	0%	Discount for leakage risks from regeneration (assuming any leakage from suppressing degradation is accounted for by not crediting avoided degradation)
Project emissions (tCO ₂ /y)	0	Considered to be negligible or not applicable
Non-permanence buffer (%)	30%	medium VCS risk default for reforestation projects – somewhat lower for REDD but taking into account significant regeneration potential (akin to AR)
Buffer recovery (every 5 years)	15%	Share of carbon credits being released from non-permanence buffer assuming a non-increasing risk

³⁴ Ibid.

4 Fit with Carbon Standards and Methodologies

In order to generate carbon credits, the project will have to be certified under a carbon standard and will need to use an applicable methodology which has been approved by the standard setting body. Not all existing carbon standards include REDD projects as an eligible project type and not all that do accept projects from anywhere in the world. For example, only afforestation and reforestation projects are eligible under the Clean Development Mechanism (CDM) and the Carbon Fix standard, no forestry projects are eligible under the Gold Standard, and only projects in North America can be certified under the Climate Action Reserve (CAR).

4.1 Applicable Standards in the Project Context

Two applicable standards for the proposed project would be the Plan Vivo standard and the Voluntary Carbon Standard (VCS). An advantage of the former is that it is comparatively less complex and that a methodology ('technical specification') can be developed in a relatively straightforward fashion for a particular project context. The VCS, in turn, has two key advantages. Firstly, it is the most rigorous and widely accepted standard in the voluntary market, which means that its credits (Voluntary Carbon Units, or VCUs) are attractive for a wide range of buyers, including large corporate. Secondly, the VCS has become a popular standard for 'pre-compliance buyers', i.e. for buyers hoping to be able to use VCUs under forthcoming climate legislation, particularly in the USA but potentially also a post-2012 UNFCCC climate regime. For these reasons, this feasibility assessment assumes and recommends that the project design follows the VCS guidelines for forestry projects.³⁵

The Climate Community and Biodiversity Standards (CCBS) are intended to certify especially non-carbon benefits of land-use based projects, i.e. social and environmental co-benefits. It has become a popular 'add-on' standard for rigorous 'carbon-only' standards like the CDM or the VCS and goes a long way in assuring buyers and other stakeholders of the overall sustainability of a project. Although the CCBS is not systematically incorporated in this assessment, it would be highly applicable to the project and useful in terms of assuring better market access as well as ensuring a sound and adaptive project design and to minimize non-permanence risks.

Finally, specific standards are likely to be developed under a future post-2012 UNFCCC climate regime that incorporates REDD. These may lay down accounting rules for REDD activities at the national level and/or at the sub-national or project level. At present, there is no indication as to the design of these standards except for the fact that they will most likely follow existing IPCC guidance. Furthermore, it is likely that much of the thinking and many general approaches that have been incorporated into the VCS and its forthcoming REDD methodologies would be drawn upon for any potential future UNFCCC compliance standards at a project level. This is yet another reason why it is recommendable for the project to follow existing VCS guidance and draft methodologies. In the case of only national-level accounting under an international REDD scheme,

³⁵ The American Carbon Registry (ACR) may fulfill a similar role as the VCS in the future but is currently not established on international markets and, furthermore, largely follows the VCS approach, e.g. regarding accepted methodologies.

governments may lay out rules that specify how project-level activities may participate in benefits received and generated at the national level. Such rules may or may not follow approaches developed under the VCS but will unlikely be more rigorous than the VCS.

4.2 Applicable Methodologies

No REDD methodologies have been approved under the VCS as of today. However, several have been submitted for validation under the standard and are currently in the process of being revised and adapted. Although their final form is not yet known, the following draft methodologies would appear to be applicable to the project context, even though they may not cover all of its components:

- The set of methodological modules submitted by Avoided Deforestation Partners referring to unplanned deforestation (baseline modules and associated leakage and monitoring modules)³⁶;
- The methodology submitted by the World Bank BioCarbon Fund for estimating emission reductions from mosaic deforestation; and
- The methodology submitted by Terra Global Capital, covering avoided deforestation and degradation of the mosaic type.

All of these methodologies cover baseline deforestation that is unplanned and of the mosaic type, which would match the project situation. Although it cannot be stated with certainty yet that the project situation would fit all the requirements of being defined as the mosaic configuration, this seems nonetheless much more likely than a classification as frontier type.

Not all of these methodologies cover all forms of avoided degradation – for example, the AD Partners methodology does not cover avoided logging. This would not pose a problem as avoided degradation benefits would not be claimed by the project if it follows the approach of this assessment. The types of leakage and project emissions that may have to be accounted for in the project would be covered by these methodologies.

Importantly, however, neither the AD Partners nor the BioCF methodologies include a module or component to account for carbon benefits from forest regeneration across the project landscape. Rather, they only allow for accounting for regeneration in those parts of the forest that would be deforested under the baseline scenario, and only from the year on when this is projected to occur. See the right-hand part of Figure 3 (regeneration after the deforestation event that is avoided) for illustration.

Assisted natural regeneration, as envisioned in this report, would fall into the VCS REDD category – in contrast to active restoration, such as enrichment planting, which would fall into the standard's Improved Forest Management (IFM) category. Given that many potential REDD forests worldwide are severely degraded, it is possible that a methodology covering regeneration will be developed by another project proponent in the near future. It would also be possible to develop an additional

³⁶ http://v-c-s.org/public_comment.html; http://adpartners.org/initiatives_redd.html

module covering this component and linking up with the other AD Partners modules, or to submit an amendment to the BioCF methodology.

Interestingly, the Terra Global Capital methodology does include a component of accounting for assisted natural regeneration, which is an adaptation from an existing CDM AR methodology (AR-ACM0001). However, the current draft methodology differs substantially from other, more 'established' submissions and forestry methodologies approved in the past in form and approach. It seems therefore more uncertain whether it will be approved under the VCS in a similar form, and it would probably present a greater risk to rely on it for designing and assessing the project.

A different question is whether regeneration accounting – both in the baseline and project scenario – is technically and statistically feasible in the project context and could be demonstrated in a way required by a future methodology that would be acceptable to the VCS (see above). On the other hand, the methodological challenges may be less stringent under a potential future sub-national accounting approach in a future UNFCCC scheme. Similarly, some of the existing and forthcoming REDD pilot funds may be more accommodating in this regard. In general, given the very significant potential benefits from regeneration in this project setting, it would be highly recommendable to choose or amend a methodology to cover the regeneration component – or to consider aiming for a non-carbon market project accounting approach. The project may also be economically much less feasible without crediting these benefits (see below).

4.3 Additionality of Project Activities

Additionality of carbon benefits, i.e. the fact that they would not have been created in the absence of carbon finance, is at the heart of carbon offsets. The standard approach of demonstrating additionality has been developed under the CDM and is used in the same form by the VCS. Two basic principles exist, and project activities are seen as additional either if they would have been financially less attractive than a realistic alternative (financial additionality), or if they would have faced insurmountable barriers that would have prevented their implementation under normal circumstances. A project can also be 'first of its kind', meaning that no precedence exists that would have paved the way for a comparable undertaking in the particular region or industry. For example, a conservation concession would typically be financially much less attractive than a logging concession, and a community reforestation project on degraded land may have faced significant cultural, investment, and organizational barriers.

The proposed REDD project in the Budongo-Bugoma corridor would likely meet all of the above criteria. In the absence of carbon finance, converting forests to agriculture presents the most economically attractive land-use, and this course of action is not prevented by any existing barriers (neither practical nor legal). Protecting forests on private land would also be a first-of-its-kind activity and meet a number of barriers, e.g. social and organizational ones. (Even sustainable timber harvest, although possibly more economically attractive in the long term, evidently faces social and cultural barriers and is not financially attractive when applying common discount rates). It is therefore virtually certain that the project, as analyzed in this assessment, would be viewed as additional under the VCS or other standards.

4.4 Data Challenges

Several particular aspects of this project may pose challenges in terms of producing verifiable quantitative data. Different baseline and monitoring methodologies will require somewhat different data items for carbon accounting; however, many of them are likely to be needed in some form by any methodology chosen in the future. They have been considered in the chapters on projected carbon benefits and risks of this assessment, and assumptions and existing data sources used in this report are cited throughout the text. Most of the data used in this assessment will still need to be confirmed or generated. While existing data gaps are taken up in sections 8.1 and 8.3 on future development needs, the following aspects may prove challenging to resolve and will require dedicated investigation:

- Project boundaries may be difficult to determine for two reasons. Firstly, the exact delimitation of individual forest properties is not clear at present even to many landowners themselves and this will have to be resolved. Secondly, demonstrating 'control over the project area' may be challenging if the process of further landowners joining 'the project' is a fluid and dynamic one.
- Forest carbon stocks across the project landscape are potentially highly variable considering the substantial historical and current degradation, as well as the different forest types (e.g. high and riverine forests, potentially some classes of woodlands). This may pose significant measurement and monitoring challenges. Also, default factors cannot be used if regeneration benefits are to be accounted for.
- Regeneration dynamics may need to be compared to an evolving baseline, i.e. it may be necessary to measure and monitor comparable non-project forests and establish the net differential in regeneration of biomass.
- Unless conclusive evidence exists that denying immigrants access to forestland does not create leakage, the proportion of deforestation caused by immigrants will need to be quantified for leakage estimations.
- There may be few comparable forests left in the region that are not participating in the project and that may represent a good reference area (for the determination and periodic adjustment of the baseline deforestation rate). This is especially the case if current VCS draft guidance prevails, which may require proportionally very large reference areas for a project of this size.

5. Risks to Generating Carbon Benefits and Revenues

A number of risks can potentially undermine the short and long-term success of a forest conservation or REDD project. It is important to understand these risks in order to ensure that the project can achieve its aims and successfully tackle the existing land-use change dynamics. It is also crucial to be well aware and manage risks that could challenge the long-term success of the project, i.e. the risk that the conservation and climatic benefits it appears to generate are only of an impermanent nature and do not lead to permanent emission reductions. For example, there is a risk that credits are issued for the successful protection of a threatened forest which is then cut down the following year. There is an argument that such credits would present nothing more than 'hot air'.

To contain this risk, the CDM issues only temporary credits (tCERs) to forestry projects, whereas the VCS retains a certain percentage of issued credits in a risk buffer. This percentage depends on an external assessment of a number of risks that may commonly exist by a verifier. It is therefore important to devise a transparent plan to manage and contain any existing or apparent risks in order to limit this buffer discount. In addition, a certain part of buffer credits can be subsequently reclaimed during future verifications if it can be demonstrated that risks have not materialized or have been well-contained.

In the following, risks to the project's near and long-term success are evaluated through considering how well the project design fits the land-use change trends it aims to address, how much buy in exists by stakeholders whose support is critical for the project's implementation, and how the project may score against the pre-defined list of VCS non-permanence risk categories. Given the very preliminary state of project design and development, a risk assessment is difficult to conduct at present. Therefore, the below considerations should rather be seen as highlighting key areas to keep in mind while advancing in project planning and implementation. Importantly, all of these risks are likely to be crucial to the success of any conservation project in this context, even if not implemented to generate carbon finance.

5.1 Fit of Project Design to Land-Use Trends

The project design, in its current preliminary state, attempts to tackle the various deforestation drivers through distinct activities, e.g. titling for land tenure security, improving agriculture to lessen demand for land, promoting sustainable timber harvest to draw revenue from standing forests. It is too early at this stage to tell whether the concrete activities – which still need to be elaborated – and capacity of the project proponents will fulfill this aim. There is an obvious risk, that operationalizing the various activities may prove much more challenging than apparent at present, especially since the project would need to work with thousands of individual landowners (albeit potentially organized in associations).

This project would seek to form a network among private forest owners, and incentivize them through a number of activities to protect their land. Among other things, the project intends to facilitate them to register their land in order to develop and implement a joint forest management plan aimed at addressing drivers and agents of deforestation and degradation.

Land titling: Formally demarcating, registering and protecting forested land may, in the short run, not fit comfortably in the traditional and more flexible systems of allocating land for agriculture and settlement. The reduced access to 'idle' land by immigrants from the Republic of Congo, Rwanda, West Nile and internally displaced people's camps may need to be addressed by government – and this is outside the control of the project.

If the process of registering private forests takes too long, as has been the case in the past, owners may find adherence to project activities too costly in the long run. This risk is real, and the project will have to work with local government forest and land officers to develop ways of quickening the process or designing interim measures for establishing land ownership. However, interim documents also have their own risks and can result in having multiple claimants for the same piece of land.

Agricultural improvements: There seems to be a real risk that the project design and proponents will not sufficiently focus on enhancing and securing agricultural productivity. The primary driver for forest conversion (by immigrants and residents) is agricultural expansion. Agriculture is culturally as well as economically the most important activity for local people and this is unlikely to change in the short term, even if forestry and other activities are promoted. The degraded status of many forests makes viable forestry enterprises more challenging, at least in the near term. Finally, there seems to be a significant potential to enhance agricultural yields and introduce commercially attractive crops and varieties.

Crop-raiding animals: Part of the reason why local people are willing to deforest by allocating land to immigrants for agriculture is to lessen the problem of crop-destruction by vermin (e.g. monkeys). Therefore, it would be realistic to work not only with forest owners, but with adjacent communities who are likely to be affected by the protected forest. Some form of benefit sharing arrangement needs to be developed either with these communities or the local government. The option of changing the present agricultural crops to less vermin-prone kinds needs to be carefully considered but may prove challenging since the choice of crops is based mainly on culture and market forces. An option that seems to have been successful in other projects is to plant hedges of *Jatropha* which, partly because of its taste, seems to deter many crop-raiding animals.

Forestry activities: Several of the organizations involved in promoting this project have a strong basis in forestry and forest conservation and, as such, may choose to prominently rely on forestry-based activities to create income incentives for landowners. However, it will probably take a significant amount of time until the necessary forest management or planting techniques have been acquired and, more importantly, until sufficient trees have grown in woodlots or regenerating forests to produce products to create significant revenues. Such activities will certainly have their merit, especially by assigning a value directly to the forest resource itself. However, implementation efforts and investments will have to be well balanced as forestry activities may struggle to directly address underlying causes of conversion rooted in agriculture and to be adopted by landowners who primarily see themselves as farmers.

5.2 Stakeholder Buy-in

The project is currently in a very preliminary planning and design phase. As such, many stakeholders, particularly local farmers, have not been consulted extensively yet. However, some first observations can be made regarding the likelihood of buy-in from various stakeholders. This will of course depend both on the design and choice of project activities, as well as on the strategy employed by project proponents to win the support of landowners.

The existence of initiatives such as the Kitara Green Associates network and processes to register community and private forests in the area shows that many forest owners are willing to participate in such a program. Initial impressions collected by the project proponents also indicate positive views towards assistance in formalising, and thereby securing, land tenure. The project will facilitate linkages with local government develop structures, equipment and skills among private forest owners to protect their forests. Land registration will address this to a large extent. The reluctance of government to formalize community forests, however, may have reduced the trust communities have in receiving government backing in managing forests outside protected areas.

On the other hand, some private forest owners may not accept the project or key aspects of its implementation such as forming networks, or developing and implementing joint forest management plans. Cooperatives were dissolved in the 1990s and the legal structures to govern these are currently not operational. The alternative of dealing with each patch owner individually could lead to escalation of costs. In order to mitigate this risk, the project will use lessons from other landscape approaches to develop coordination, rules, governance and benefit sharing structures that communities can believe in. Within Masindi alone, four Communal Land Associations (CLAs) have been formed and demarcated for forest management as provided for in the Land Act, but pending government approval.

Other stakeholders are the National Forestry Authority and local governments who own some of the non-private forest patches in the landscape. Local government authorities, who are also responsible for providing advisory support to the private forest owners, are positive about the project. The national Forestry Authority, which is leading the national REDD Readiness process regards this project as a demonstration activity. Inclusion of the reserved patches in the project design is likely to be welcomed – although benefit sharing mechanisms will need to be negotiated.

Government buy-in especially as regards the REDD Readiness Strategy development is high as the Budongo-Bugoma project is seen as a potential demonstration project to inform the process. Linkages with the district local government structures will be crucial in achieving any significant changes in the project area.

5.3 Non-Permanence Risk Assessment and VCS Buffer Discount

In the following, the main non-permanence risks to the project are outlined. Although these risks mainly refer to the risk of a future reversal of carbon benefits achieved through the project, it is important to realize that they represent, at the same time, key risks to project performance and success. For further perspective, the standard screen for the VCS non-permanence risk rating is provided. At the current stage of development, many of the relevant questions cannot yet be

conclusively answered and will depend on the eventual project design and implementation. However, the below risks can guide these future development steps.

- **Land tenure:** The area is somewhat of a hotspot for land wrangles between local communities and immigrants or absentee landlords. It is hoped that the in facilitating registration of forested land, the project will help address this, but it might also fuel the latent conflicts. At present, very few landowners have formally recognized land titles, and this may negatively impact a formal risk assessment because it points to potential conflicts and contestations of tenure. On the other hand, in a customary sense, most land tenure seems clear and non-conflictual among local residents.
- **Opportunity costs** of not expanding agriculture. Clearing forests to cultivate sugarcane, tobacco, rice and maize growing and the tenure/ownership rights that come with it is an economically attractive venture. The project may struggle to meet opportunity costs in some cases, e.g. if compensation payments cannot be realized swiftly enough or if non-monetary benefits (e.g. training in improved agricultural practices) are not perceived as real or sufficient. On the other hands, however, agriculture as currently practiced is not very productive and profitable.
- **High-value natural resources:** The project is located in the Albertine Rift where there seems to be potential for oil exploration in the near term. Although there is not expected to be any drilling within the project boundaries, there is nonetheless a clear risk of indirect impacts, such as infrastructure and road construction and new settlements.
- **Infrastructure construction:** See above, oil exploration could lead to new roads being built in the area which might lead to an influx of immigrants and increased pressure o remaining forests.
- **Population growth and density:** Population growth is relatively high in the region, although population density is probably medium. There is a potential that this will translate into increased agricultural conversion pressure in the future. Furthermore, there is, at present, an influx of refugees from DR Congo and other areas which may lead to further land pressure.

Table 6: - Non-Permanence Risk Assessment Template for VCS REDD Projects

Note: ignore middle column, referring to planned deforestation

Risk factor	Risk rating for APD	Risk rating for AFUDD and AUMDD
Land ownership / land management type		
Land owned by private or public forest conservation organization with a good track record in forest conservation activities and able to obtain and enforce nationally recognized legal protection of the land	Very low	Very low
Privately owned land	Low-Medium	Low-Medium
Uncertain land tenure	Not applicable	Medium-High
Land legally protected	Not applicable	Low-Medium
Land not protected by laws or protected with weak enforcement	Medium	Medium-High
Technical capability of project developer/implementer		
Proven capacity to design and successfully implement activities that are likely to ensure the longevity of carbon benefits (e.g., creating sustainable livelihood alternatives and/or effectively managing protected areas)	Very low	Very low
No previous experience in the design and implementation of activities that may ensure the longevity of carbon benefits	Medium	Medium-High

Net revenues/financial returns from the project to ALL relevant stakeholders (e.g., project developer, deforestation agents, national to local governments)		
Lower than pre-project or lower than alternative land-uses	<ul style="list-style-type: none"> • Low if project developer a conservation group • Medium to high for other developer types 	<ul style="list-style-type: none"> • Low if project developer a conservation group • Medium to high for other developer types
Similar to pre-project or similar to alternative land-uses	<ul style="list-style-type: none"> • Low if project developer a conservation group • Medium for other developer types 	<ul style="list-style-type: none"> • Low if project developer a conservation group • Medium for other developer types
Higher than pre-project or higher than alternative land-uses	Very low	Very low
Infrastructure and natural resources		
High likelihood of new road(s)/rails being built near the REDD project boundary	Low-Medium	Medium-High
Low likelihood of new road(s)/rails being built near the REDD project boundary	Very low	Low
High-value non-forest related natural resources (oil, minerals, etc.) known to exist within REDD project area	Low to High depending on who owns the project lands and their mission (private company or conservation organization) and who owns (or is likely to own in the future) the mining right if separate from land ownership	Low to High depending on who the project developer is and their mission (private company, indigenous group, conservation organization) and who owns (or is likely to own in the future) the mining rights
High hydroelectric potential within REDD project area?	Same as above	Same as above
Population surrounding the project area		
Decreasing or increasing, but with low population density (e.g., <50 people/km ²)	Very low	Low
Stable and medium-high population density (e.g., 50-150 people/km ²)	Very low	Low
Increasing and high population density (e.g., >150 people/km ²)	Low to medium	Medium to High
Incidence of crop failure on surrounding lands from severe droughts, flooding and/or pests/diseases		
Infrequent (<1 in 10 years)	Very low	Low
Frequent (>1 in 10 years)	Low	Medium-High
Project financial plan		
Credible long-term financial strategy in place (e.g., endowment, annuity-paying investments, and the like)	Low	Low
Credible long-term financial strategy absent	Medium	High
Legal easement for ongoing protection tied to land title in place	Very low	Very low

At the current preliminary planning stage, the project, if assessed, would likely score medium to high in several risk categories. However, it is assumed that some of the key critical questions will be addressed during project design and preparation, e.g. with regards to land tenure questions and opportunity cost compensation. It should be pointed out that the assessment of non-permanence risks will not only take into account the manifest level of a risk of a certain type but similarly the projects response strategy. This means that even if some risks cannot be resolved by the project, e.g. high population densities or the presence of mineral resources, the project developers can demonstrate through good planning and a successful track record that they are able to effectively handle this.

When assigning a buffer discount for the presumed risk, one may need to distinguish between avoided deforestation and regeneration benefits. Reforestation projects and other stock enhancing activities have an intrinsically higher non-permanence risk than REDD because carbon stocks are created rather than emissions being reduced. For a medium-level overall risk profile the VCS prescribes a discount of around 20% in the case of REDD and about 30% for AR projects. For the purpose of this assessment, a buffer discount of 30% is applied to all credits generated by the project. It is hoped that this prove to be a conservative estimate. Furthermore, it is assumed that the risk as assessed by an auditor would not increase in the future but remain stable. This is important for the release of buffer credits (see below) and would be a conservative assumption if the project design and management addresses and reacts to risks in a resilient way.

6. Financial Feasibility

The financial feasibility of the project eventually needs to be determined by evaluating its carbon finance potential (net carbon revenues) and comparing this to implementation costs and opportunity costs incurred during the project lifetime. Here, several scenarios of net carbon revenues (taking into account transaction costs) are elaborated. However, there is not enough is known yet about implementation and opportunity costs to conduct a sound quantitative assessment of the project's overall economic viability. In a next step, the question of carbon property rights is assessed, followed by an evaluation of the likely attractiveness of the project to potential carbon buyers. All quantitative assumptions used in this modeling exercise are summarized in Table 7.

Before delving into the analysis, it seems important to stress the fact that the project would likely have to rely heavily on direct carbon revenues for its viability. At present, there seems to be limited scope for generating significant additional non-carbon revenues. The degraded status of most of the remaining forests makes near-term timber exploitation challenging (apart from potentially causing methodological complications). Alternative income generating activities such as honey production appear unlikely to change this picture dramatically. This highlights the importance of supporting existing and potential agricultural revenues, e.g. through improving productivity and introducing commercially attractive crops and varieties.

Revenues from tree planting and associated timber and fruit production may at some stage become significant. In this context, it should also be assessed whether the Plan Vivo scheme implemented by EcoTrust in parts of Hoima and Masindi could be scaled up and used to encourage more reforestation that can generate early (carbon) revenues, due to the upfront payment provisions of the Plan Vivo approach.

Project feasibility in terms of its carbon finance potential is determined by

- projecting the net carbon credit generation potential,
- computing carbon revenues that can be generated from this, and
- subtracting carbon-cycle related transaction costs.

Table 7: Financial Assumptions for Project Development, Implementation, and Commercialization³⁷

Note: empty fields indicate insufficient information at this pre-implementation stage, to be included in future full economic modeling

Variable	USD	Explanation
PDD development costs	(235.000)	includes establishing quantified baseline scenario, C-stock measurements, social & environmental impact assessment, stakeholder consultation, PDD writing
monitoring costs (periodical with verification)	(60.000)	costs per monitoring event, i.e. tied to frequency of verification including REDD and Regeneration benefits (i.e. higher estimate), could eventually assume a per ha cost
validation costs	(60.000)	including REDD and Regeneration benefits (i.e. higher estimate)
verification costs (periodical)	(45.000)	regularly occurring costs, tied to verification trigger (below); including REDD and Regeneration benefits (i.e. higher estimate)
social impact monitoring (periodical with verification)		if CCBS certification is sought - not currently in model
environmental impact monitoring (periodical with verification)		if CCBS certification is sought - not currently in model
verification trigger (tCO2)	100.000	minimum amount of credits for verification to be sought (to minimize transaction costs while realizing revenues)
registry fees (USD/tCO2)	(0,05)	APX, TZ1, CdD
certification fee (USD/tCO2)	(0,10)	VCSA (increased from 0.06USD after June 2010)
brokerage fee	5%	depends on commercialization model, alternatively price discount under an ERPA
Sales Tax (%)	0%	not currently established for carbon sales in Uganda
Tax on net income (%)	0%	not currently established for carbon revenues in Uganda
carbon price 1	\$2,00	low price for bulk credits by non-distinguishing buyers, not considered in revenue scenarios
carbon price 2	\$5,00	approximate recent average of VCS voluntary credits
carbon price 3	\$10,00	prices paid by some voluntary market buyers, also price floor in latest US climate bill
discount rate (%)		possible discount rate for a private investment in Uganda
Costs of land titling support (one-time)		function of area /number of individual plots
Costs of core project activities (annual)		annual cost of other activities to reduce deforestation (and allow regeneration), probably area dependent
Other implementation costs (annual)		other annual implementation costs, e.g. compensation for opportunity costs
Approval fees in host country (one-time)		e.g. for granting formal endorsement or certifying non-objection to a carbon project & credit sales
Legal advice to project (one-time)		external legal advice regarding carbon rights, financial and legal structure of carbon association etc
Marketing costs (one-time)		costs of introducing projects to buyers and investors

³⁷ Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

6.1 Carbon Credits Generated for Trading

The net creditable carbon benefits generated by the project, as presented in section 3.6 (see discussion there), have already been adjusted to incorporate

- a leakage discount (considering that leakage would reduce the project's net climatic benefits)
- a discount taking into account potential measurement challenges in demonstrating the full regeneration achieved by the project
- a discount for likely sub-optimal performance of the project both in terms of avoiding deforestation and enhancing regeneration.

Two further adjustments are made here in order to generate a more realistic projection of tradable carbon credits generated.

- Firstly, it is assumed that baseline regeneration benefits may need to be monitored in comparable forests outside the project area in order to compare actual project performance in this regard. This means that carbon benefits could only be verified and credits issued with a certain time lag. This delay in crediting the project's regeneration benefits is assumed to be 2 years, after which time the regeneration in baseline and project sampling plots can be measured reliably.
- Secondly, not all issued credits are available for trading. Rather a percentage corresponding to the non-permanence risk discount is issued to a risk buffer under the VCS. 15% of all credits retained in the risk buffer can be reclaimed by the project every 5 years upon the subsequent verification if the verifier establishes that non-permanence risks to the project's carbon benefits have decreased or remained stable. It is assumed here that non-permanence risks would not increase.

Finally, project proponents need to make a strategic decision about when to seek verification of the project's carbon benefits. This implies substantial costs for an external auditor and also necessitates a detailed monitoring effort to generate the necessary data. Key considerations in this regard are likely to be the net sales revenue after deducting transaction costs (for the external verifier and the internal monitoring) incurred at each verification event, as well as the need to generate cash flows for operating the project. In this assessment, the 'verification trigger' is set at 100,000 tCO₂ of creditable carbon benefits. Under current assumptions, this results in verification every 2 years.

This verification and monitoring approach assumes that credits are sold upon issuance, i.e. that no forward-sale of credits takes place (which would de-couple credit issuance and sales to a certain extent, depending on the timing of potential delivery obligations to the buyers).

The projected net generation of tradable carbon credits under these assumptions is presented in Figure 7. The balance of buffer credits withheld from trading and released at the various verifications is plotted in Figure 8. The potential of the project to generate tradable carbon credits is estimated at a net cumulative total of approximately 1,010,000 tCO₂ after 10 years, 2,150,000 tCO₂ after 20 years, and 3,000,000 tCO₂ after 30 years. The corresponding annual average credit generation would be approximately 101,000 tCO₂ during years 1 to 10 and 108,000 tCO₂ during years 1 to 20.

Figure 7: Generation of Tradable Carbon Credits from Avoided Deforestation and Regeneration ³⁸

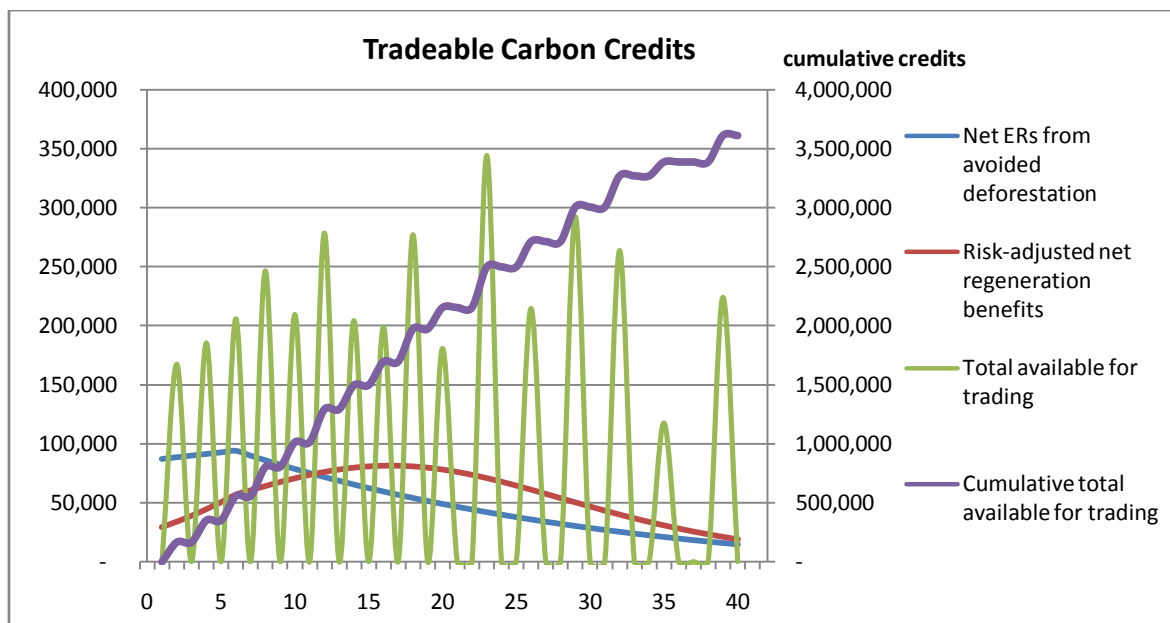
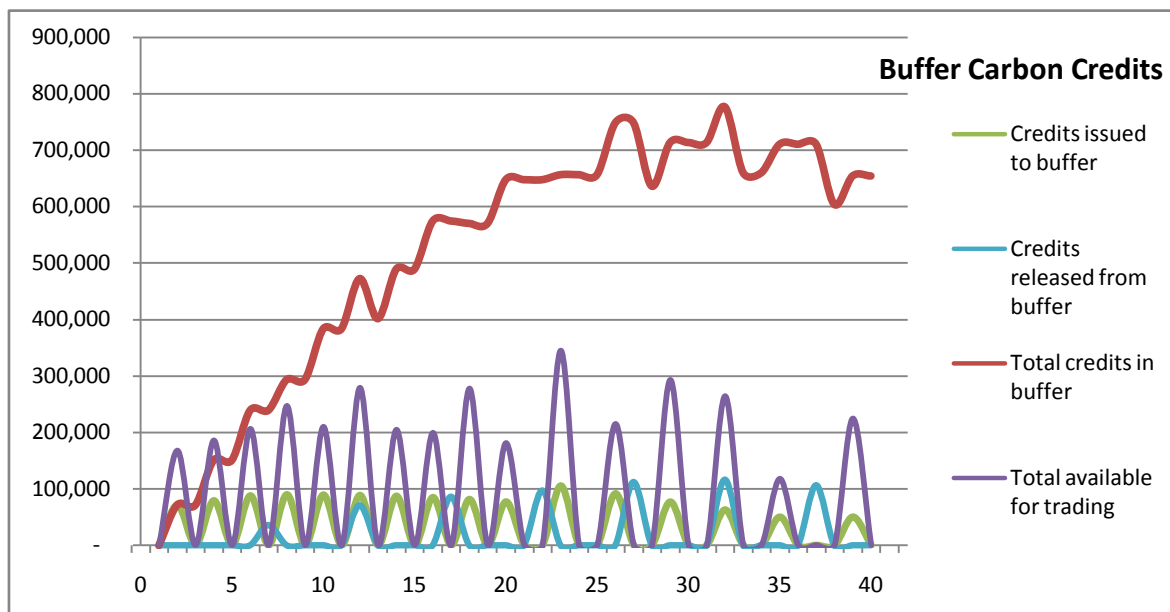


Figure 8: Balance of Credits Held in Non-Permanence Buffer ³⁹

Note: Credits released from buffer become available for trading at subsequent verification.



³⁸ Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

³⁹ Ibid.

6.2 Carbon Revenues Generated

Carbon revenues are a function of carbon credits generated, transaction costs, the commercialization model adopted by the project, and carbon prices on the target markets. It is assumed here that all carbon credits can in fact be sold upon issuance. This may be considered a highly uncertain assumption considering the multitude of factors influencing demand on future markets (buyer motivations and preferences, regulatory drivers, economic context etc). During future financial planning assessments, it might therefore be prudent to assume that only a certain share or a certain maximum volume of credits can be sold in a given time-span.

1.5.1 Transaction Costs

The main transaction costs for the project are likely to be related to

- Elaboration of a spatially explicit, quantified baseline scenario,
- Measurement of carbon stocks at time zero (at project start),
- Stakeholder consultation,
- Environmental and social impact assessment and biodiversity assessment (if applicable),
- Elaboration of the PDD itself, including the monitoring plan,
- Validation of the PDD by an external auditor,
- Initial and periodic verification by an external auditor,
- Periodic monitoring of deforestation rates /deforested areas and carbon stock increases through regeneration,
- Periodic leakage monitoring,
- Registry fees (commercial registry), and certification fees (VCS),
- (Costs of developing a new methodology or adapting an existing one to account for regeneration).

In addition, though not carbon project transaction costs in the strict sense, costs not related to project implementation may arise from:

- Government project approval fees (if applicable),
- Local sales and income tax (if applicable), ongoing,
- Legal advisory fees,
- Brokerage fees (if applicable), ongoing,
- Costs of project marketing efforts.

The estimated values of the various costs are presented in Table 7. The cost items in the second category (government approval fees etc) may or may not be applicable in the project context and cannot be determined at present. They are therefore not included in the present financial modeling.

Importantly, the projections here do not include any costs for developing a **new methodology** to account for regeneration benefits. They similarly do not include costs of adapting any existing forthcoming methodologies. If no applicable methodology exists in the near future that allows for crediting regeneration benefits then the project proponents should consider developing or

adapting a methodology. This could be done and financed jointly with other organizations worldwide that are likely to face similar situations with projects that include many degraded forests.

Some of these transaction costs are relatively fixed and depend on external service providers, e.g. costs of validation and verification, registry fees, certification fees, and brokerage fees. However, the project can determine, for example, the interval of verification events. Other cost items are specific to the project context, such as determining the baseline scenario, measuring carbon stocks, monitoring carbon stock changes, and consulting with communities. The elaboration of the PDD could be done by project participants themselves, by external consultants, or, depending on the commercialization model chosen, by a commercial project developer with whom an ERPA has been signed. Such a commercial developer could potentially also take on other transaction costs, such as validation, verification, and issuance fees.

With regards to the Budongo-Bugoma project, it is likely that several transaction cost items may become quite expensive. This is partly due to the patchy project landscape (many individual forest patches which may be relatively heterogeneous, including different forest types and degradation conditions) and the fact that avoided deforestation but also regeneration benefits are to be included in the project design. In particular the baseline study (reference scenario and carbon stocks in various strata) may prove to be costly. It is unlikely that default values can be used for baseline (or time 0) carbon estimations given that the project aims to claim regeneration benefits, which necessitates a relatively accurate and precise knowledge of current carbon stocks, which are influenced by forest type and condition (degradation).

Furthermore, monitoring is likely to be complex and potentially expensive. This is again largely due to the patchy and heterogeneous nature of the landscape which will make remote-sensing-based analysis of current deforestation rates more challenging. More importantly, however, determining regeneration benefits across the project landscape will necessitate extensive field surveys, possibly with a high sampling rate and the setting up of permanent sampling plots inside and outside the project boundaries. The potential costs of a new methodology would need to be added to this.

6.2.1 Commercialization Models

Different commercialization models can be chosen by the project, and these will determine the timing of carbon revenues, their overall magnitude, the likelihood of finding buyers, and costs incurred for marketing etc. The first important question is to choose between

- a sales strategy based on an Emission Reduction Purchase Agreement (ERPA) with a large buyer or carbon credit aggregator (intermediary), or
- engaging a broker to negotiate individual sales contracts.

Secondly, the timing of revenues but also their price will be influenced by choosing either

- to sell credits upon issuance, i.e. once emission reductions have been verified, or
- to sell credits on a forward basis before they are issued, either with or without upfront payments.

Thirdly, the payment model for credits will influence cash-flow for the project, either by

- seeking purchase contracts with payment on delivery of credits (i.e. when issued credits are transferred to the buyer), or
- negotiating upfront payments for credits sold on a forward basis.

Selling credits forward can generate upfront payments for the project, or at least guarantee the future price and an off-taker for its credits. However, prices in such a model will certainly be lower, especially where upfront payments are sought, where credits are sold at a very early project development stage, or where they are sold far into the future (distant vintages).

Because of the complexity of options involved, a simple model of selling credits upon issuance via a broker is chosen. This implies that there is no price discounts on the market price of credits but means incurring a brokerage fee. This fee is assumed to be 5 % of generated gross sales revenues.

6.2.2 Upfront Financing Costs

Selling credits after they are issued leaves an upfront financing gap arising from all carbon project cycle related costs (and implementation costs). This is true under a brokerage agreement, as assumed here, or under an ERPA. In principle, a commercial project developer could assume at least some of these costs as part of a deal structure. In some cases, project proponents may have means to invest into the project themselves.

However, if this is not the case and if no upfront payments for credits are assumed, the project will need to seek other kinds of external finance to cover this negative cash flow period. This could be in the form of debt finance which, however, would imply additional costs of capital (interest). It could also be in the form of private equity investment which, however, would most likely be tied to some credit ownership or preferential prices in the future. All of these models would imply some reduction of future net revenues. The only source of upfront finance without attached costs would be grants and donations.

In this assessment, cost of capital for upfront finance is not incorporated into projections. Rather, upfront financing needs are incorporated as a simple negative cash flow. This means negative revenues until the first credits are verified and sold (assumed to occur in the following year). Net revenues remain negative until upfront costs are recovered through carbon sales revenues.

The project proponents may succeed in finding sources of soft money for covering transaction costs, whether public grants or philanthropic donations. Net positive revenues could then obviously be generated much faster, and this would change the below carbon revenue projections. However, all of this leaves the question of upfront finance for *implementation* costs fundamentally open. Where grants and other sources leave them a choice, project proponents should therefore consider wisely whether investing into carbon project transaction costs is the best use of available funding. Most importantly, if money used for subsidizing transaction costs reduces the amount available for financing implementation activities, then a careful overall analysis should consider whether sufficient implementation finance remains to protect forests and generate any carbon credits.

6.2.3 Carbon Prices

Finally, several carbon price scenarios can be applied in order to capture the uncertain future development of voluntary and regulatory carbon markets (as well as potential price impacts of decisions regarding the project's commercialization strategy). Achievable prices are influenced by the target market chosen (voluntary, pre-compliance, future regulatory), the carbon standard, and the project type, among other factors.

Many of these aspects related to the projects attractiveness to future buyers are discussed below (Section 6.3). Importantly, the project may benefit from its location because African carbon credits may achieve a price premium because of perceived high co-benefits and lower regulatory risks in terms of market access. The assumed chosen standard (VCS) may also secure higher prices due to its wide-spread acceptance and potential pre-compliance value. However, the project type has unclear impacts on price because of highly variable buyers' perceptions and a potentially large flux of credits from REDD projects awaiting validation and verification elsewhere.

- The following price points are chosen here: 5 USD, corresponding roughly to recent average voluntary market prices (VCUs) across various project types,
- 10 USD, corresponding to a higher-price segment of voluntary carbon markets but also the price-floor contained in recent draft US legislation and the outcome of some post-2012 REDD modeling exercises.^{40 41}

A further price scenario of 2 USD could be justified, corresponding to the lower end of voluntary carbon credit prices, especially under forward-sale contracts but also for what may be labeled 'commodity carbon'.

6.2.4 Carbon Revenue Scenarios

Projected net carbon revenues, after taking into account transaction costs and brokerage fees but *without* considering implementation costs or taxes, are presented in Table 8, Annex, and Figure 9 and Figure 10. At 5 (10) USD/tCO₂ and without discounting, these are estimated to reach a cumulative total of 1.1 million (2.8 million) USD after 5 years, 2.9 million (6.7 million) USD after 10 years, 7.7 million (17.1 million) USD after 20 years, and 12.2 million (26.4 million) USD after 30 years. Projections are laid out in some more detail in the Annex).

Note that the actual timing of sales revenues depends on a verification event which may not coincide with these time periods. Verification is assumed to occur whenever an additional 100,000 tons have been generated. In practice, external verification would be sought more frequently at higher carbon prices in order to generate positive cash-flows more quickly. Under the present assumptions, the first verification event would be scheduled at the end of year 2 of project implementation, and this would lead to credit issuance and sales in year 3, generating net revenues for the first time.

⁴⁰ The Waxman-Markey bill was passed by the US House of Representatives in June 2009; however, legislation is currently stalled.

⁴¹ For example, <http://www.maf.govt.nz/climatechange/international/redd-integration/page-04.htm>

As discussed, it is not certain that carbon benefits from regeneration will be able to be accounted for under an applicable methodology. Therefore, the below projections also include scenarios that assume that no carbon revenues can be generated from regeneration benefits (see Table 8, Annex, and Figure 11 and Figure 12). At 5 (10) USD/tCO₂ and without discounting, these are estimated to reach a cumulative total of 0.8 million (2.0 million) USD after 5 years, 1.9 million (4.4 million) USD after 10 years, 4.1 million (9.3 million) USD after 20 years, and 5.2 million (11.8 million) USD after 30 years.

The comparison also points to the relative benefits of both potential project components. It allows project proponents to better plan for a ‘worst-case’ outcome in this regard, where only avoided deforestation benefits can be translated into carbon revenues. The numbers indicate that the financial feasibility of the project might be severely impacted if no credits can be generated from enhanced regeneration. Net revenues would only be approximately 2/3 over 10 and 1/2 over 20 years compared to accounting for both project components.

Table 8: Scenarios of Cumulative Net Carbon Revenues (million USD)

*Note that revenue numbers do not take into account implementation costs. Also note that higher price scenarios lead to disproportionately higher net revenues because transaction costs remain unchanged.*⁴²

	5 years	10 years	20 years	30 years
5 USD/tCO₂	1,1	2,9	7,7	12,2
10 USD/tCO₂	2,8	6,7	17,1	26,4
Without regeneration @ 5 USD	0,8	1,9	4,1	5,2
Without regeneration @ 10 USD	2,0	4,4	9,3	11,8

⁴² Note: In all tables and figures commas denote decimals, periods mark 1,000 separators.

Figure 9: Projected Carbon Revenues and Transaction Costs @ 5 USD

(Cumulative values on right axis). Note that numbers do not take into account implementation costs.⁴³

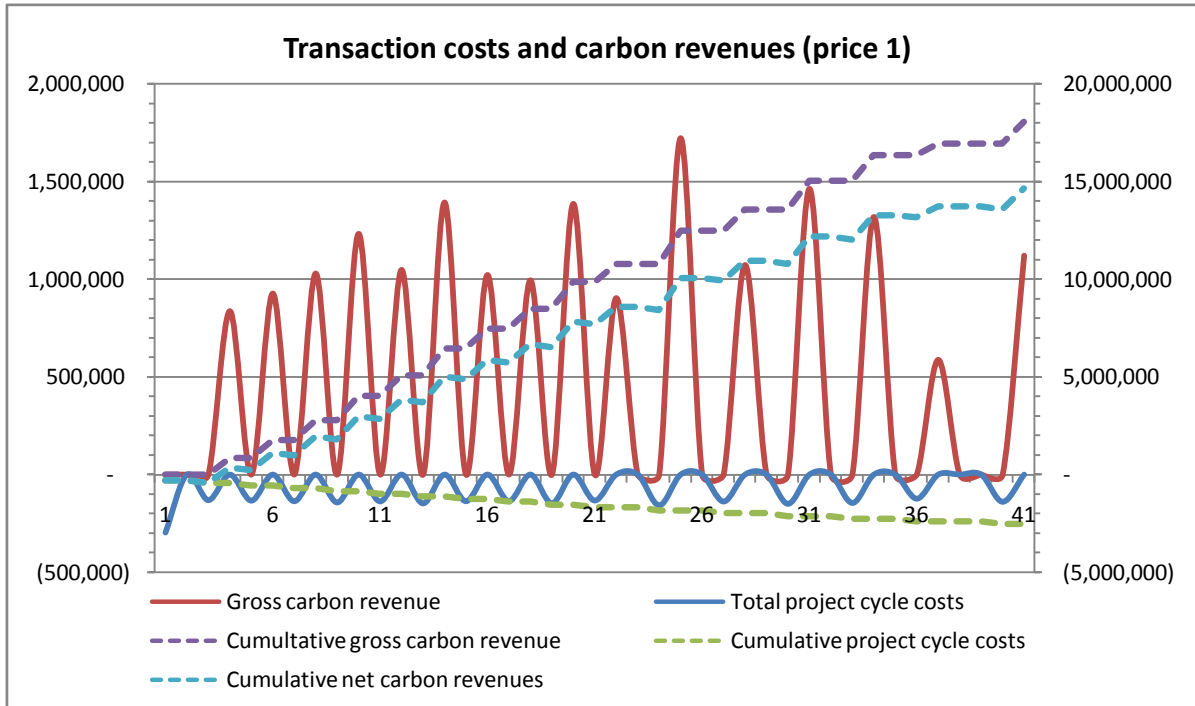
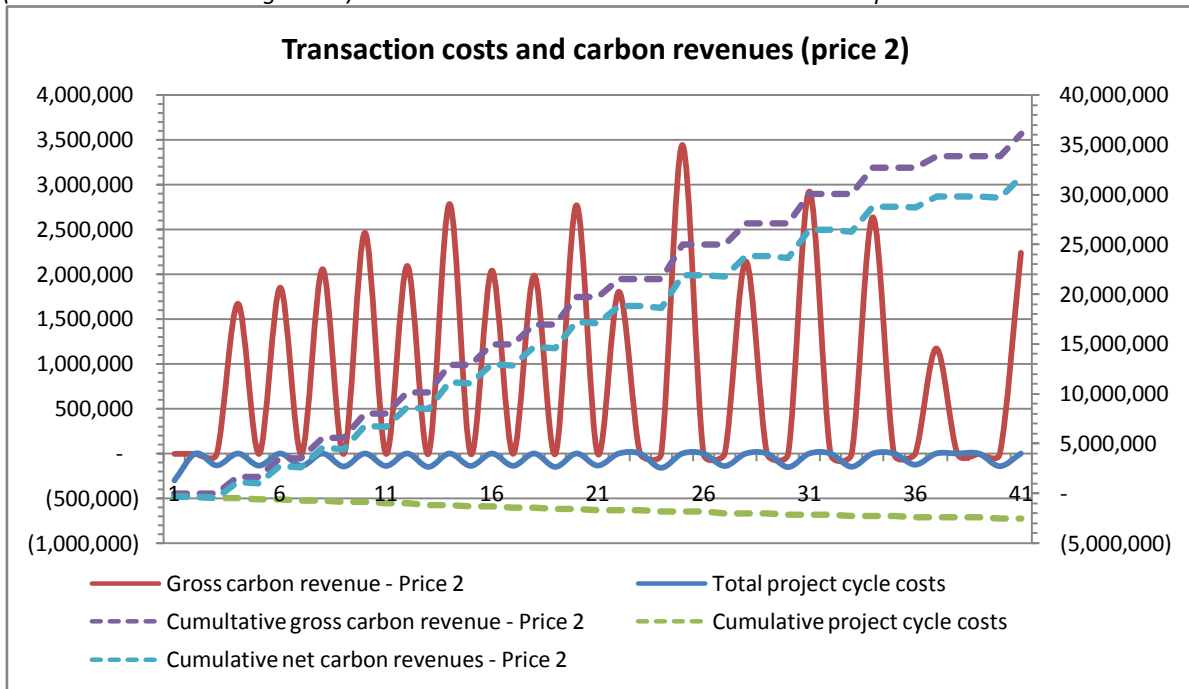


Figure 10: Projected Carbon Revenues and Transaction Costs @ 10 USD

(Cumulative values on right axis). Note that numbers do not take into account implementation costs.



⁴³ Ibid.

Figure 11: Projected Carbon Revenues and Transaction Costs @ 5 USD - Accounting for Avoided Deforestation Only

Note that numbers do not take into account implementation costs.

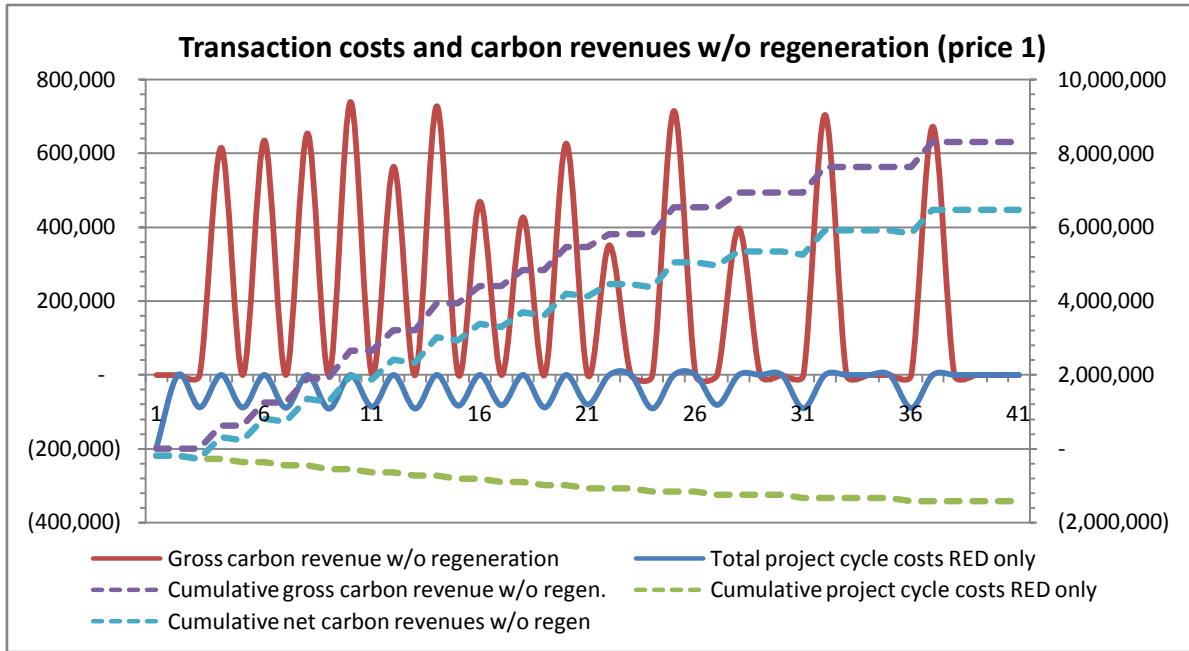
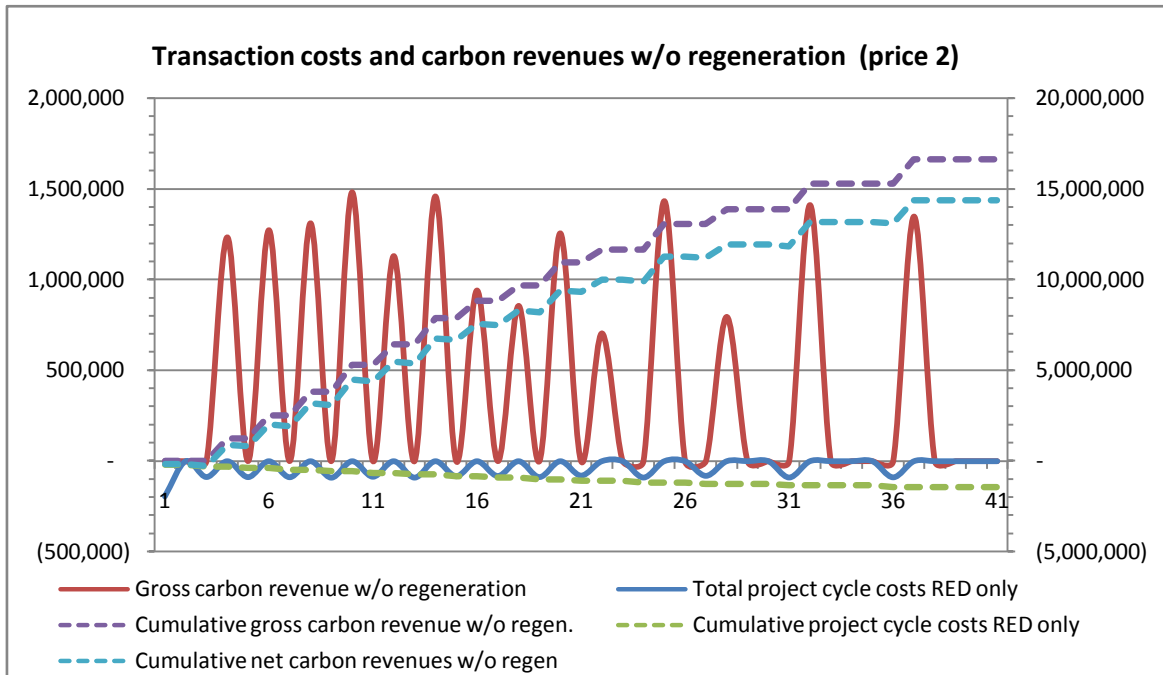


Figure 12: Projected Carbon Revenues and Transaction Costs @ 10 USD - Accounting for Avoided Deforestation Only

Note that numbers do not take into account implementation costs.



These net carbon revenue numbers can be taken to represent the amount that would be available to pay for the *implementation* of project activities, including potential direct payments as compensation for opportunity costs. In other words, *if* the underlying project performance can be achieved with the kind of financing projected from carbon revenues then the project will be viable without any additional subsidies or financial support. Conversely, if the sums potentially generated through carbon markets look unlikely to be able to pay for underlying project activities (i.e. to greatly reduce deforestation) then these revenues may never be generated because no credits may be produced. Negative numbers, in turn, would indicate that external financing would be needed to cover transaction costs of developing the project as a carbon project, before even considering costs of implementing the underlying project activities.

6.2.5 Risks to Carbon Revenues

A number of **risks** exist may impinge upon the project's ability to generate revenues, apart from the overall feasibility of project implementation and its timing. These **carbon-market** and carbon-project-cycle related risks include that

- considerable delays in generating credits may occur due to the absence of an applicable methodology,
- the project may not be approved by a validator,
- carbon prices on the target market may decrease in the future,
- regulatory markets for REDD and forestry credits may not be created (this may impact even voluntary carbon market projects as many potential buyers are in fact pre-compliance buyers),
- buyer preferences may change (e.g. regarding project type, standard) – see below-,
- the target market or market segment may already be saturated with high volumes of project-based credits (forestry or otherwise), and not all credits may be sold – this is a particular risk for REDD credits given that a number of projects are currently facing the same methodological bottlenecks and may produce large numbers of credits once these are cleared -,
- carbon markets for project-based credits may cease to exist (relevant for longer-term revenue projections), and
- project-level REDD activities in a given country may all be subsumed into a national scheme with an unclear potential to derive financial compensation for the project's carbon benefits.
- In addition, it is possible that no methodology may exist that allows for crediting regeneration benefits, and this may greatly reduce the project's viability.

Apart from the above carbon-market and project risks, **project implementation** may be less effective than envisioned or may be delayed for a number of reasons.

- At present, it is far from clear that the project activities which are being envisioned will produce the desired results in the project landscape.
- It is similarly unclear if the organizations likely to become project proponents have the capacity and experience to develop and implement the necessary activities and strategies.

6.3 Attractiveness to Potential Buyers or Investors

Although many aspects of the proposed projects are not clearly defined yet, several factors promise to make it potentially attractive to future buyers or investors. In going forward, the project proponents should try to consolidate these positive characteristics (unless there are significant drawbacks, such as higher costs or complexity), while working to minimize potentially negative ones. It should also be pro-actively evaluated whether buyers or investors could be engaged early on in project development and take on some of the carbon project development costs. This refers to costs in monetary terms and technical resource needs, e.g. external transaction costs, PDD development. Among the potentially negative factors especially the land tenure rights situation deserves attention, given its importance for effectively implementing the project and transferring carbon rights.

Positive aspects in the eyes of current market participants are likely to be:

- Established carbon **standard** - assuming that VCS (and potentially CCB) certification will be pursued and attained. Using the currently most trusted and universally known carbon standard will help to access the large market segment of risk-averse corporate buyers, along with many pre-compliance buyers, and others;
- Significant associated **co-benefits** - especially relating to local development (income for rural poor, diversification of economic activities), community involvement (participatory project design and implementation – which still needs to be ensured), and biodiversity value (corridor in threatened wildlife habitat);
- Attractive **location** – projects in poor countries are generally favored by voluntary buyers that attach value to the poverty alleviation potential of a project. In particular, projects in Africa seem to be generally perceived in this category and achieve above-average prices. In addition, Africa is very unlikely to face future restrictions on the import of offset credits into regulatory markets (the EU ETS is planning to put in place such restrictions for projects from some more developed host countries, and lower quotas or higher barriers may also exist in future US markets);
- **Pre-compliance value** – there is a distinct possibility of projects currently developed for the voluntary markets becoming eligible for future compliance schemes. The VCS has one of the highest likelihoods of being embraced by future US climate legislation, and REDD projects are generally well positioned in the international discussions. Standard and project type, along with location, suggest a high pre-compliance value of the project.

Some aspects are more **unclear** in terms of their impact on market attractiveness:

- **Forestry** projects still face much skepticism and controversy in the eyes of risk-averse buyers, sustained by an ideologized history of forestry in climate discussion and continuing NGO challenges to the science and permanence of their climate benefits;
- REDD projects have so far been slow to come to market because of persistent bottlenecks in methodology development and approval under the VCS. As these hurdles are cleared there may be a sudden large **supply of REDD credits** from ongoing projects seeking rapid validation and verification, putting pressure on prices and increasing competition among sellers.

Finally, **negative** aspects may exist in eyes of buyers regarding:

- **Complexity** of the project regarding the combination of diverse deforestation and degradation drivers and agents, as well as geographical patchiness;
- Currently unclear **institutional set-up** of the project in terms of roles and rights of the various actors and stakeholders, mandates for project development etc;
- Unresolved formal **land tenure** situation for most potential participants and unclear or uncertain tenure rights and property boundaries for others;
- Unclear **carbon property rights** and rights for their transfer (e.g. to project proponents who would commercialize credits);
- **Effectiveness** of the project's approach in addressing the various land-use change drivers and working with a large number of individual actors remains to be demonstrated. There may also be questions about the track record of the implementing organizations in demonstrably and effectively reducing high deforestation rates.

6.4 Implementation & Opportunity Costs

It is hardly possible to quantify **implementation costs** at this early stage of project planning. A more thorough analysis of the project's overall financial feasibility should therefore be conducted when various implementation strategies and activities are evaluated and designed. This would also include any other sources of non-carbon market finance that may be apparent at that point.

At a bare minimum, carbon revenues should largely surpass transaction costs, and a full financial assessment should consider the full range of risks that may impact the generation of these revenues. It is certainly worthwhile to keep in mind the experience of a number of carbon project proponents who have lost time and resources devoted to carbon project development based on overly optimistic carbon finance forecasts. This cautious note, however, is not intended to understate the substantial net financial benefits that carbon finance can play in encouraging more sustainable land-use practices.

Overall, implementation costs are likely to make up the majority of the project's expenses and will be a function of the various activities and incentives envisaged. Among other items, there will be costs associated with providing training in agricultural techniques as well as inputs such as seedlings or fertilizer, introducing sustainable forest management or planting techniques, supporting land surveys and legal titling, developing alternative income generating activities (such as beekeeping or eco-tourism), or putting in place a system of direct payments.

Given that participation of individual farmers in a potential REDD project would be largely voluntary (although there may be an element of enforcing existing legislation), the project would have to compensate real and perceived **opportunity costs** of individual land owners. In addition, it may be useful to consider in what way (existing) immigrants could be incorporated in order not to cause undue hardship or inequity. Such compensation could be achieved mainly in two ways.

- On the one hand, a range of implementation activities are envisaged to act as incentives, e.g. by increasing agricultural yields, generating timber sales revenues, or providing fruit trees. These may come partially in the form of monetary inputs (e.g. subsidized crop varieties or tree seedlings) or through non-monetary contributions (e.g. training in agricultural techniques, legal support in land titling).
- On the other hand, direct payments could be made to participating land-owners. Such payments should arguably consider both the opportunity costs incurred by forestland owners and the carbon revenues generated through their participation.

As already discussed in the section on project performance and non-permanence risks (sections 3.1 and 5), the project's benefits to participants (both monetary and non-monetary) will have to outcompete existing revenues from

- commercial crops, such as sugar cane or tobacco,
- timber production (even if unsustainable and mainly short-term), and
- non-market benefits of subsistence production.

It is not always clear at present how high these various benefits are, but there are indications that farmers frequently only derive relatively modest profits from commercial crop production (e.g. because of low market prices and of how out-grower schemes are structured by the large intermediaries and processing companies). Timber prices paid by intermediaries (if at all) are likely to be far below its potential value but may nevertheless be significant. Subsistence food production may not be affected greatly by the project. Opportunity costs for subsistence agriculture are likely to be low and, in any case, could hopefully be avoided through improved production techniques.

The fact that a future assessment may find relatively low monetary opportunity costs does not mean, however, that they will be easy to compensate in practical terms. Agricultural improvements and alternative income-generating activities will take time to become effective, and timber production will not likely be substantial in the near or medium term. Even setting up a system of direct payments to compensate farmers may take longer than expected due to the low level of formalisation of land tenure, uncertainties about forest property sizes etc. In addition, such a system would have to establish and find a good balance between threat levels of individual forest patches and perceived fairness of the payments.

6.5 Overall Financial Feasibility

The projection of potential net carbon revenues indicates that, under most of the scenarios analyzed, the net carbon finance potential of the project would be relatively modest. This is especially true in the case that regeneration benefits cannot be translated into carbon credits and revenues. The underlying modeling incorporates a wide range of fairly conservative assumptions and some key variables may turn out to be more beneficial from a carbon finance perspective. For example, regeneration rates may be higher than assumed, or the project may include a larger forest area. On the other hand, a number of risks exist (see above) that may well reduce actual carbon revenues.

Nevertheless, under all of the scenarios considered above, the project would generate net carbon revenues in the 3rd year of implementation already. Under the current assumptions, this occurs after the credits resulting from the first verification are sold. This is an encouraging result in itself. Carbon revenues continue to be generated at a relatively constant rate under current assumptions which should be another positive outcome. This is mainly a result of regeneration benefits increasing as avoided deforestation benefits are slowly diminishing. Without regeneration accounting, carbon revenues would steadily decrease after an initial high when the project becomes fully operational.

As discussed in the preceding section, it is not possible at present to establish implementation and opportunity costs that the project is likely to occur. In addition, the context of non-carbon market financing as well as related costs is not yet defined. As such, it is not possible to carry out a full financial and economic analysis of project feasibility.

All that can be said for now is that the net carbon revenue numbers can be taken to represent the amount that would be available to pay for the implementation of project activities, including potential direct payments as compensation for opportunity costs. In other words, *if* the underlying project performance can be achieved with the kind of financing projected from carbon revenues then the project will be viable without any additional subsidies or financial support. Conversely, if the sums potentially generated through carbon markets look unlikely to be able to pay for underlying project activities (i.e. to greatly reduce deforestation) then these revenues may never be generated because no credits may be produced.

A preliminary observation in this regard may be that revenue numbers for the first 5 or 10 years, particularly at the medium price scenario of 5 USD/tCO₂, seem unlikely to be able to finance all the activities needed to effectively reduce deforestation and degradation. If this is indeed the case, it would mean that the associated carbon credits may not be produced in the first place without additional, non-carbon market related funding. It should be noted that there may well be a case for external, non-carbon market related financial support for implementing the project, given its numerous additional benefits not related to mitigating global climate change. However, it would be questionable to use such external funding simply to subsidize transaction costs of a project which do not help to generate any net additional revenues.

7. Potential Project Partners and Near-Term Funding

7.1 Description of Lead Organizations

The **Jane Goodall Institute (JGI)** for Wildlife Research, Education and Conservation is a leader in the effort to protect chimpanzees and their habitats. Grounded in the legacy of Dr. Goodall's 40 years of chimpanzee research and advocacy, JGI is committed to addressing the complex issues that threaten chimpanzees in the wild, while also meeting the needs of the surrounding communities and affected stakeholders. The Institute's Africa Programs are focused on ensuring the long-term protection of wild ape populations and their habitat, while preserving biodiversity, cultural traditions and livelihoods. Guided by a detailed strategic plan, JGI's Africa Programs team manages a diverse portfolio of programs that work towards achieving this vital goal through research and training, capacity building, community development, and integrated community-centered conservation (CCC) projects. JGI programs include a wide range of educational initiatives in conjunction with the Institute's global Roots & Shoots program. These programs are implemented in close collaboration with the local and regional authorities to contribute towards policies and strategic goals set by the government,

Forest Trends has over 10 years of experience working to promote sustainable forest management and conservation. Forest Trends focuses its activities in three areas: accelerating the development of markets for forest ecosystem services; expanding markets and investments that encourage forest conservation; and promoting markets that improve livelihoods of forest communities. In addition to its core initiatives, Forest Trends has created and launched a set of pioneering initiatives—including Katoomba Group, Ecosystem Marketplace, EcoAgriculture Partners, and Rights & Resources Initiative – focused on these objectives. The Forest Trends network is extensive and includes leaders from the forest industry, environmental groups, finance, donors, and community conservation.

Katoomba Group, a member of the Forest Trends family of initiatives, is a global network of practitioners working to promote the use and improve capacity for developing ecosystem services payments. It seeks to achieve this goal through strategic partnerships for analysis, information-sharing, investment, market services and policy advocacy. The Katoomba Group includes over 180 experts and practitioners from around the world, representing a unique range of experience in business finance, policy, research and advocacy. It has held 10 major global conferences since 1999, published and contributed to a number of publications, and supported the development of a range of new PES schemes including the BioCarbon Fund at the World Bank and the Mexican PES Fund. The Katoomba Group has also advised national policy discussions on financial incentives for conservation in numerous countries including China, Brazil, India, and Colombia.

Wildlife conservation society (WCS) has supported Ugandan conservation since 1957 when it conducted biological surveys of Uganda's savanna parks. It pioneered studies on the impact of logging on primates, built the Makerere University Biological Field Station in Kibaale and led to the creation of Kibaale National Park in 1993. WCS works with the government and other partners across the northern and western parts of the country. It helped establish and manage the Institute for Tropical Forest Conservation in Bwindi Impenetrable National Park and Bwindi Trust; improved park management across Uganda through training and help with management planning; catalyzed cross-border collaboration; and supported numerous Ugandan students. Today WCS is helping

meet new challenges to the Greater Virunga Landscape, Murchison and Kidepo National Parks, including environmental sensitivity mapping for oil exploration and models of climate change impact.

Nature Harness Initiative (NAHI) is a Ugandan conservation and development not for profit organisation that promotes market based mechanisms for improved natural resources management. NAHI works with private businesses to better manage their environmental footprint and communities to derive sustained benefits from natural resources. It has conducted forest inventories on private land with support of British American Tobacco Uganda (BATU) as a baseline for managing and/or offsetting BATU's biodiversity footprint. NAHI conducted baseline survey in the Wambabya system as part of the PRESA work in the Albertine Rift towards designing a potential PES scheme. Today, NAHI is co-implementing a UNEP/GEF supported project: Developing an Experimental Methodology for Testing the Effectiveness of Payments for Ecosystem Services to Enhance Conservation in Productive Landscapes in Uganda coordinated by the National Environment Management Authority (NEMA).

7.2 Roles and Capacities of Participating Institutions

The **Jane Goodall Institute** will support network formation among forest owners to implement a series of coordinated forest management plans in critical chimpanzee habitats with high potential for carbon sequestration. Working with its partners, Wildlife Conservation Society and GIS units in the government agencies and academia, JGI will use remote sensing and GIS map analysis to assess carbon, land-cover and the value of forest patches for chimpanzees and habitat connectivity. It will use updated information to assess the feasibility of applying carbon incentives for conserving forest patches and biodiversity value within the project area. It will facilitate the use of GPS-enabled Google Android mobile phones using the Open Data Kit (ODK) data collection system, to collect carbon, forest, biodiversity, social and economic data within the context of community-based forest/carbon projects. JGI will also assist forest owners to acquire land titles, rehabilitate degraded forests, establish woodlots, introduce agroforestry and establish forest-based enterprises.

In addition, with support from other donors, JGI will expand ongoing projects such as promoting improved agricultural practices and spreading education and awareness amongst communities on the value of appropriate land-use practices. This is especially important since improving agriculture (in terms of productivity, diversification and commercialisation) is key in addressing deforestation and has more potential for generating income for farming households in the near term than forest-based approaches.

The **Katoomba Incubator** may provide technical support to JGI and its partners for the development of a Project Identification Note as well as start the process of consolidating information in a Project Design Document (PDD) that can provide rigorous justification for marketing of emissions reductions for market or fund-based mechanisms (under the VCS / CCB standards). Katoomba Incubator will also advise on building project-level/ sub-national efforts into national accounting.

Within Hoima district, JGI will coordinate with **Nature Harness Initiatives** to assist forest owners to form networks, register their land, develop forest management plans, rehabilitate degraded forests and monitor forest carbon.

WCS will identify key stakeholders involved in financing of conservation and their roles and responsibilities in the Northern Corridor Forests of the Albertine Rift in Uganda; identify possible financial instruments that provide positive incentives for encouraging conservation and sustainable use of forest diversity on public and private forest patches and suggest a plan of action to investigate and implement financing initiatives for the corridors. Among other things, WCS activities will include compilation of biological, socioeconomic, and carbon measurement data; building upon on-going GIS/mapping work with the latest 2010 satellite imagery with ground truthing.

7.3 Near-Term Funding Outlook/Seed-Funding

The key project partner, Jane Goodall Institute Uganda, will be supported financially by American Electric Power. JGI work will be complemented by the Wildlife Conservation Society (WCS) Albertine Rift Forest Corridor initiative in the Bugoma-Semiliki landscape under WWF-GEF sub-grant already secured. NAHI work is supported as part of the UNEP/GEF supported work under the National Environment Management Authority.

The involvement of the Katoomba Incubator has currently been supported by the Norwegian Agency for Development and UNDP/GEF. However, additional funding will be required in the future depending on the level of support partners will require.

Supporting agricultural improvement may also need to be strengthened among the partners. The project should link with district governments to join efforts with the two major government-supported initiatives: the National Agricultural Advisory Support, and the Farm Income Enhancement and Forest Conservation. In addition, further partnerships with organizations with a proven track record in smallholder agricultural should be explored with a view of either integrating such expertise into the project consortium or to develop it within one of the lead organizations, e.g., JGI. This may well require additional funding.

8. Current Status and Key Project Development Needs

The project is currently in a relatively initial scoping stage. Next steps in developing a carbon project approach will have to be conceived jointly with strategic implementing partners. This will also determine the role the Katoomba Incubator could usefully play. The potential next phases of (i) technical, (ii) organizational, and (iii) market-related project development are outlined below. A decision of whether or not to proceed and invest into these phases should probably be based on a more in-depth feasibility assessment at a point in time when this can also build on a more solid project design. Some elements of this assessment could of course also be undertaken in parallel in order to aid the decision-making process.

8.1 Next Steps for Better Assessing Feasibility

There are a number of key items for which better data would be necessary to conduct a more definite assessment of carbon project feasibility. It is important to stress that the feasibility of the underlying project activities and their ability to stop deforestation and degradation has to be scrutinized in a separate process. On the **implementation feasibility** side, a non-inclusive list of key activities includes:

- A thorough characterization of **drivers and agents** of deforestation and degradation;
- A clear definition of proposed **project activities** to address deforestation drivers and an evaluation of their realistic effectiveness in the near and mid-term;
- An exploration of partnerships or **capacity** building needs to effectively implement these activities tackling deforestation, e.g. regarding agricultural improvements;
- A review of **opportunity costs** for targeted forest holders;
- An exploration of strategies to and potential challenges in **organizing landholders** in order to implement agricultural and forestry activities and distribute payments;
- A frank assessment of whether the lead organizations will be able to implement the necessary activities with the kind of **budget** that might be created by carbon revenues and considering their institutional capacity.

It may be very recommendable to use a significant part of any available upfront finance for a REDD project to **test the effectiveness** of and adapt project activities that will be crucial to generate any carbon credits. For example, defining improved agricultural activities and finding ways to introduce these for a large number of farmers may prove challenging and time consuming.

Some key items of interest on the **carbon** side, meanwhile, include:

- **Project boundary:** It will be necessary to have a much clearer idea of the overall extent of the project area, the types of forests included, their average size and variability in size. It is likely that aspects of implementation feasibility, deforestation threat level and conservation priorities would be part of this definition of boundaries.
- **Carbon stocks:** As far as possible, carbon densities should be determined and stratified according to forest types (and area) and degradation status (and area). If non-degraded

(and therefore non-regenerating) forests are included in the project boundary, e.g. in reserve areas, it could be possible to work with default values for these. Carbon pools would be above-ground biomass and potentially deadwood.

- **Carbon pools and project emissions:** Establish if certain carbon pools and project emissions can indeed be neglected as conservative or insignificant (e.g. deadwood and litter in baseline deforestation areas, harvested wood products, emissions from fertilizer application).
- **Baseline data:** The most appropriate historical reference period should be determined in terms of being representative of likely future land-use change developments. This should follow the formal requirements of VCS methodologies (e.g. 3 time points in a 10-year-period before project start) but should also be defensible regarding any recent changes in deforestation trends and dynamics. The average rate of deforestation should be calculated for a larger reference area (which includes the project area). Ideally, deforestation dynamics should be made spatially explicit. Following the logic of this assessment it does not seem necessary to calculate any historical degradation rates given that no credits will be claimed for avoided degradation. However, any regeneration potentially occurring in the baseline scenario should also be assessed.
- **Regeneration rates:** Again, this should be available for different forest types and ideally for different degradation classes within each forest type. Carbon stocks should be determined for time zero (project start) as well as for a fully recovered forest of the respective type (to determine ex-ante maximum regeneration potential).
- **Leakage risk:** Determine the quantitative leakage risk from agricultural activity shifting and shifting timber harvest (may not be necessary if argumentation of this assessment holds). This includes data on the commercially harvestable volume of timber left in degraded forests at the time of conversion, the timber actually harvested upon conversion (just before or after), and, possibly ongoing harvesting in already degraded forests. If deforestation dynamics differ from what has been assumed in this report, this may also include determining the share of deforestation linked to immigrants versus deforestation directly implemented by local farmers – and if there is any way of reliably defining this.
- **Non-permanence risk:** Conduct a thorough screening against the indicators in the VCS methodological tool at a more advanced stage of project conception and planning. This should possibly include a screening following guidance for REDD as well as for ARR projects, given that both components would form part of a future (REDD+) project.
- **Methodology match:** Re-assess how well the project situation matches forthcoming or approved VCS methodologies or methodologies of other relevant standards. This concerns especially baseline and leakage aspects and the possibility to combine sequestration (i.e. regeneration) and emission reductions on the same project area.
- **External “pre-validation”:** It may be useful to run certain assumptions by a professional auditor or other expert with a track record in developing approved VCS REDD projects (which by then will hopefully exist).

8.2 Next Steps for Stakeholder Engagement

Due to the initial stage of project conception, there is currently not yet a clear set-up of the potentially participating actors and organizations. The following points are not based on any firm assessment of the participating organizations but may include some useful suggestions for engaging stakeholders and setting up a project consortium.

- A first step could be to map the landscape of potential participants, including NGOs, government institutions, community organizations, and even key individual landholders. This map could be regularly updated (possibly graphically, if this seems useful).
- A second step could then be to determine the lead organization in different areas, mainly community organization and consultation, institutional engagement with local and central government, technical project development, engagement with financial partners including commercial project developers, and overall coordination. This should obviously include a clear positioning of the Katoomba Incubator regarding all these aspects. At a certain stage a formal project consortium will need to be set up and will eventually handle financial and legal aspects of project development.
- Further, an efficient structure for communication, synchronization, and decision-making between the overall and 'sectoral' lead organizations should be established.
- A thorough consultation of community members and landholders should be conducted early on to determine sufficient and sustainable interest in this type of project. These discussions also need to establish the key determinants of the attractiveness of a potential project and identify immediate and long-term needs to alter their baseline behavior. The latter refers to direct deforestation and degradation activities, as well as indirect actions such as allowing immigrants to settle and intermediaries to log. Care should be taken to also assess how immigrant settlers themselves can be involved. This consultation process should continue throughout project design and implementation to adapt and improve project design and activities.

8.3 Next Steps for Formal Project Development

Essentially all data items quoted for the above advanced feasibility-assessment would be needed for formal project development, i.e. writing of a PDD or PD. Many of these would need to be more formally specific and precise (e.g. for spatially explicit baseline determination) while a similar level of detail would be sufficient for others (e.g. for parts of ex-ante estimations). There will also be additional components. The following items should be re-assessed and adapted once it is determined that an approved VCS methodology exists that is applicable to the project, and once a choice has been made in case of several existing applicable approved methodologies. A non-inclusive list would include:

- **Project boundary:** Precise GPS coordinates of all polygons to be included, i.e. all patches of forests participating formally in the project which will be monitored throughout project implementation and for which baseline data is needed. This would exclude all non-participating areas, such as roads, settlements, and agricultural areas.

- **Reference area:** An area needs to be defined that is similar to the project area in terms of forest types, deforestation rates, and deforestation drivers (including socio-economic characteristics, road access etc). This area should ideally be several times larger than the project area itself. It needs to be stratified at least regarding carbon stocks or forest type and deforestation dynamics. This will be used to develop a spatially explicit deforestation baseline which is representative of the project area (and which can also be used to redefine the baseline in the future). Precise GPS coordinates of boundaries and strata will be needed.
- **Leakage belt:** A leakage belt will most likely need to be defined around the project area, representing the area into which baseline deforestation agents may be displaced because of project implementation. The extent of this will mostly be a function of the deforestation driver and agent analysis and an assessment of the mobility of agents and available alternative forestlands. For the leakage belt, spatially explicit baseline deforestation rates also need to be established.
- **Carbon stocks** in project area, reference area and leakage belt: Accurately stratified and with precise GPS coordinates of individual strata, average carbon stocks and variability per stratum.
- **Baseline carbon stock losses:** Based on classified historical satellite imagery, ideally based on sensors that will be available for future monitoring, over the pre-determined baseline period. This needs to be spatially explicit throughout the reference area. In addition, a proxy deforestation driver map should be developed to determine the likelihood of future deforestation in time and space (deforestation risk map). Constraints on future deforestation rates would also need to be elaborated in order to determine whether historical deforestation rates can be sustained. It may be possible to not conduct a spatially explicit assessment; however, it may then need to be assumed that deforestation would first occur in the strata with the lowest carbon stocks.
- **Regeneration rates:** Same level of precision as above for feasibility assessment but now to be used for ex-ante modeling. Again, this should be specific for different forest types and ideally for different degradation classes. It would now be based on more precisely determined carbon stocks per stratum as a point of departure.
- **Leakage estimation:** Same logic as above for feasibility assessment but now to be used for ex-ante modeling. Higher demands will exist regarding carbon stocks and evidence of common practice regarding commercially harvestable timber left in degraded forests and ongoing harvest (as determined by methodology).
- **Non-permanence risk assessment:** This would need to elaborate on risk management approaches put in place or to be put in place in order to convince a validator of this self-assessment and the calculation of a buffer percentage.
- **Monitoring plan:** Elaboration of a monitoring plan for carbon stock changes in the different strata of the project area, the leakage belt, and, to some extent, the reference area. This would incorporate remotely-sensed and field-based data and would include SOPs for monitoring procedures, monitoring intervals, details of data storage and management systems to be put in place, along with quality control and assurance protocols (QC & QA). A

monitoring plan may also need to provide for monitoring of certain deforestation drivers or constraints, as well as sources of leakage that may change in the future. In addition, permanent sampling plots may need to be set up for monitoring regeneration in project and non-project areas, depending on an applicable methodology.

8.3.1 Timeline for Formal Project Development

In terms of a timeline for these activities, there would be certain 'no-lose' options for data collection items which could later be adapted as approved methodologies become available. The PDD or PD would then be elaborated following the chosen methodology. Validation should probably be sought separately from verification, although the VCS provides for the option of combining the two. The potential cost savings of combining both events may not justify the risk of uncovering problems regarding aspects such as applicability of the chosen methodology, specifications of the monitoring plan etc., which could generate long project delays and additional costs.

Project activities and strategies will need to be defined and prepared independently of any formal carbon project development. The steps defined above for better defining implementation feasibility may serve as a starting point.

Assuming a start of activities in late 2010, a potential timeline for next steps of developing the carbon project component could be:

- Collect carbon and baseline data (starting late 2010): These are likely to be no-lose data items which will be necessary in any case for future project development, regardless of the specific methodology chosen. This includes carbon stocks at present (at least in the project area if not the potential reference area), stratification of project area according to carbon stocks, project boundaries, and potential regeneration rates. Further, remote-sensing imagery could be acquired and classified for baseline calculations.
- Choose applicable methodology (early 2011): Assuming that several potentially applicable REDD methodologies will be approved under the VCS by then.
- Adapt data collection strategy (early 2011): Adapt data analysis and future collection following prescriptions by the chosen methodology.
- Elaborate formal PDD (mid 2011).
- Seek validation (end 2011): Taking into account likely requests for corrective actions validation might be achieved by end 2011 or early 2012.
- Seek first verification (early 2013): Assuming that project implementation will begin in 2011, will become effective relatively soon, and will therefore generate about 1 year of carbon benefits by this date. Verification should only be sought, however, if a sufficient amount of credits can be expected to be certified.
- Registration of 1st credit tranche (mid 2013): Credits can be registered with the chosen VCS registry at the time of the finalization of the 1st verification report.

8.4 Next Steps for Introducing Project to Market

The marketing strategy will have to be elaborated once a functional stakeholder consortium has been established. To some extent, this strategy also depends on the preferred commercialization model, although the latter could be adapted in a re-iterative process depending on results from efforts to find buyers and investors.

- A potential first step would be to elaborate a PIN and a more succinct project prospectus. With this, early-stage, risk-taking buyers may be approached with the possibility of entering into forward contracts for a certain volume of credits.
- Importantly, the former step could include approaching commercial project developers who could then take on substantial parts of formal project development including certain transaction costs.
- The project could then seek a non-exclusive brokerage framework agreement with a broker to have a good and flexible basis for forward-selling and establishing buyer base (unless an ERPA has already been signed with a project developer for the entire credit volume).
- Ongoing independent marketing could include presenting at key conferences (of the type of the recent Africa Carbon Forum), placing material on online platforms (including listing on sites such as www.forestcarbonportal.com), and generating media coverage (including carbon market newsletters). Certain preliminary project development steps or agreements could be used to generate media interest.
- The project could engage pro-actively in an ongoing independent search of buyers, including through the Katoomba network and also considering targeting companies involved in deforestation in Uganda (sugar, tobacco) as potential sponsors. Corporate buyers with known interest in forestry credits should be actively approached (possibly actively competing with their existing seller base).
- Eventually, the project may aim at a high-volume or total-volume ERPA with an established carbon aggregator (such as Terra Global Capital, EcoSecurities, Orbeo, Macquarie) or large individual buyer or sponsor (as in the Marriot-Juma model). Alternatively, a broker-based structure could continue to be pursued (potentially agreeing with brokers on exclusive rights for certain volumes or tranches, if this is advantageous).

9. Potential for Replicating or Up-Scaling the Project Activities

The project goal of bringing together owners of small forest fragments in a landscape of high biodiversity importance to conserve forest patches using REDD carbon incentives will build into a number of on-going initiatives to address the challenge of forest loss especially outside protected areas. Firstly, Uganda is now developing a Readiness Preparedness Proposal under the World Bank Forest Carbon Partnership Facility. The project will enhance local capacity for MRV both at the level of government, NGOs and institutions and among local communities. This opportunity to generate key lessons and demonstrate on the ground whether and how REDD might work in the Ugandan context will go a long way to inform the development of policy and positive incentives in the national REDD strategy.

Secondly, the project ambitiously tackles these key policy and institutional gaps, which have been contributing to the dwindling forest cover outside protected areas: insecure land tenure, community incentives and institutional support for the private forest estate. It will address land tenure, which is an underlying cause of deforestation and be able to demonstrate the extent to which formal land ownership supplemented with forest-carbon payments can motivate private forest conservation. It may develop recommendations for making land registration processes more accessible to poor communities in remote areas.

In Uganda, the institutional set up for forest management falls under three institutions: the National Forestry Authority (NFA), the Uganda Wildlife Authority (UWA) and the District Forest Services (DFS). These are overseen by the Forest Sector Support Department (FSSD). Unlike the NFA and UWA, which are well established, but are in charge of only 35% of the total forest estate, the DFS, which is in charge of forests outside protected areas (64% of total cover) was never properly operationalized. In dealing with the private forest estate under the poorly operationalized DFS, the project will highlight and test key approaches to inform institutional governance and support in order for the country to achieve effective and sustained emission reductions from deforestation and forest degradation.

The Forest Sector Support Department operating in Hoima, Masindi and twelve other districts under the Farm Income Enhancement and Forest Conservation program, supported by the African Development Bank is recording owners of forest patches of more than 500 ha (mostly woodland) with the objective of working with district governments to provide advisory support and incentives for forest management. By focusing on private forest owners who are mostly poor people with small landholdings, but who control over 2 million hectares (about 64%) of the total forest estate, the project is testing aggregation mechanisms that would enable such people not to be excluded from the REDD strategy. This will contribute not only to REDD, but other initiatives seeking to lower transaction costs and promote access of smallholder communities to advisory support and markets, thus contributing to the country's Prosperity for All program.

The project is being tested on 30,000 ha focusing on low-stock tropical high forests. There is potential to upscale the lessons generated to the highly threatened 191,694 ha of the low-stock tropical high forest countrywide, mostly on private land.

The project is implemented in the Albertine Rift landscape that has high biodiversity facing threats due to isolation as forests are getting cleared from private land separating protected areas. If this project demonstrates that REDD carbon and other ecosystem payments can sufficiently motivate local communities to manage forests better, lessons generated can be replicated to conserve or restore connectivity between key biodiversity habitats in similarly forested parts of the Albertine Rift e.g., Rwanda and the Democratic Republic of Congo.

For the Katoomba Ecosystem service incubator, this project will also enable testing and making recommendations for REDD methodologies to be relevant to mosaic forest landscapes, which would prevent exclusion of a sizeable proportion of highly threatened forests in Africa with the potential for generating benefits for poor communities. The high potential for forest carbon finances from regeneration is likely to generate key insights in REDD methodologies that enable accounting for and claiming credits from reduced forest degradation. The discussions around the REDD strategy seem to be looking at a mixture of both fund- and market based approaches.

Annex: Carbon Revenues and Costs

Table 9: More Detailed Carbon Revenue and Transaction Cost Projections @ 5 USD/tCO₂ with and without Regeneration Credits

(Note: commas denote decimals, periods mark 1,000 separators).

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Net benefits avoided deforestation	0	87.318	176.097	266.279	357.830	450.737	545.008	635.210	721.490	803.991	882.850	958.199	1.030.168	1.098.879	1.164.452	
Net benefits regeneration (adjusted)	0	29.187	33.762	38.797	44.297	50.256	56.658	60.364	63.960	67.380	70.559	73.430	75.930	78.003	79.599	
Transaction costs	-295.000	0	-130.100	0	-132.807	0	-135.880	0	-141.971	0	-136.426	0	-146.783	0	-135.648	
Tradable carbon credits	0	0	167.332	0	185.379	0	205.865	0	246.473	0	209.509	0	278.552	0	204.320	
Cumulative tradable credits	0	0	167.332	167.332	352.711	352.711	558.576	558.576	805.049	805.049	1.014.558	1.014.558	1.293.110	1.293.110	1.497.431	
Gross carbon revenues (@ 5 USD)	0	0	0	836.661	0	926.893	0	1.029.325	0	1.232.365	0	1.047.546	0	1.392.762	0	
Net carbon revenues	-295.000	0	-130.100	794.828	-132.807	880.548	-135.880	977.859	-141.971	1.170.747	-136.426	995.168	-146.783	1.323.124	-135.648	
Cumulative net revenues	-295.000	-295.000	-425.100	369.728	236.922	1.117.470	981.590	1.959.449	1.817.478	2.988.224	2.851.798	3.846.966	3.700.183	5.023.307	4.887.659	
Tradable carbon credits w/o regen	0	0	123.268	0	127.213	0	131.025	0	148.063	0	112.952	0	145.802	0	93.999	
Cumulative tradable credits w/o regen	0	0	123.268	123.268	250.481	250.481	381.506	381.506	529.569	529.569	642.520	642.520	788.322	788.322	882.321	
Gross carbon revenues (@ 5 USD)	0	0	0	616.340	0	636.064	0	655.125	0	740.313	0	564.758	0	729.008	0	
Net carbon revenues w/o regen	-196.667	0	-88.490	585.523	-89.082	604.261	-89.654	622.369	-92.209	703.298	-86.943	536.520	-91.870	692.558	-84.100	
Cumulative net revenues	-196.667	-196.667	-285.157	300.366	211.284	815.545	725.892	1.348.260	1.256.051	1.959.349	1.872.406	2.408.926	2.317.055	3.009.613	2.925.513	
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	1.227.002	1.286.639	1.343.471	1.397.601	1.449.128	1.498.149	1.544.756	1.589.038	1.631.082	1.670.971	1.708.784	1.744.601	1.778.494	1.810.536	1.840.797	1.869.343
	80.682	81.226	81.219	80.667	79.586	78.006	75.970	73.529	70.741	67.667	64.372	60.917	57.362	53.763	50.169	46.624
	0	-134.830	0	-146.574	0	-132.105	0	0	-156.653	0	0	-137.180	0	0	-148.874	0
	0	198.866	0	277.159	0	180.698	0	0	344.356	0	0	214.532	0	0	292.492	0
	1.497.431	1.696.297	1.696.297	1.973.455	1.973.455	2.154.153	2.154.153	2.498.509	2.498.509	2.498.509	2.713.041	2.713.041	2.713.041	3.005.532	3.005.532	
	1.021.602	0	994.330	0	1.385.794	0	903.488	0	0	1.721.779	0	0	1.072.659	0	0	1.462.459
	970.522	-134.830	944.614	-146.574	1.316.504	-132.105	858.314	0	-156.653	1.635.690	0	-137.180	1.019.026	0	-148.874	1.389.336
	5.858.181	5.723.351	6.667.965	6.521.391	7.837.895	7.705.790	8.564.104	8.564.104	8.407.451	10.043.141	10.043.141	9.905.961	10.924.987	10.924.987	10.776.113	12.165.449
	0	85.531	0	125.491	0	70.383	0	0	143.216	0	0	79.463	0	0	0	141.049
	882.321	967.852	967.852	1.093.343	1.093.343	1.163.727	1.163.727	1.163.727	1.306.943	1.306.943	1.306.943	1.386.406	1.386.406	1.386.406	1.386.406	1.527.455
	469.995	0	427.655	0	627.457	0	351.917	0	0	716.082	0	0	397.316	0	0	0
	446.495	-82.830	406.272	-88.824	596.084	-80.558	334.322	0	-91.482	680.278	0	-81.919	377.450	0	0	-91.157
	3.372.009	3.289.179	3.695.451	3.606.627	4.202.711	4.122.154	4.456.476	4.456.476	4.364.993	5.045.271	5.045.271	4.963.351	5.340.801	5.340.801	5.340.801	5.249.644