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Scoping of Opportunities and Institutional Assessment for Malawi's Engagement in the Carbon Markets

Opportunity Assessment and Institutional Capacity Report

Walker, SM, Burns, S, Chirwa, M, Utila, H, Goslee, K, and Chilima, C.

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swalker@winrock.org

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EXECUTIVE SUMMARY

Overview of activity

The government of Malawi seeks to develop programs that will enhance Malawi's ability to attract investment in climate change mitigation and adaptation activities. The government has already initiated a number of actions and seeks to expand the scope and impact of climate change mitigation finance within Malawi.

To assist with these efforts, the World Bank has commissioned technical assistance on the identification of potential opportunities for Malawi's engagement in carbon markets, as well as an institutional assessment of the country's capacity to effectively secure those opportunities. This report provides the results of this assessment, focused on the following:

- Priority carbon market sectors, opportunities, and projects
- Potential measurement and monitoring systems
- Institutional capacity assessment
- Capacity development plan

This executive summary provides an overview of the findings detailed in the complete Opportunity Assessment.

Overview of Carbon Market

Carbon market opportunities include both voluntary or pre-compliance markets and regulated/compliance markets, such as those created by the United Nations Framework Convention on Climate Change (UNFCCC). Voluntary markets—including standards such as the American Carbon Registry (ACR), Verified Carbon Standard (VCS) and the Gold Standard (GS)—can be effective means of attracting outside capital to specific projects in Malawi. However, for reasons described below, we expect that most offset investment will be driven by compliance mechanisms, such as the EU ETS, through its recognition of CDM projects and potential development of REDD+ frameworks. "Least Developed Countries" (LDCs - such as Malawi) are likely to soon become the target destination of Clean Development Mechanism (CDM) project investment, as starting in 2013, only CDM credits registered from projects in LDCs will be eligible for use offsetting compliance obligations under the EU Emissions Trading Scheme. This will likely mean that global project developers are likely to shift their focus to Africa, in search of countries where they can quickly and efficiently develop projects. The CDM is also viewed as imposing the most stringent standards in the carbon world, thus projects developed with CDM methodologies will likely also be eligible for crediting under other voluntary protocols. As current voluntary programs offer more accessibility and less somewhat less rigor, Malawi would be at a disadvantage by not building capacity around UNFCCC mechanisms. Furthermore, the international climate regime is beginning to shift from solely focusing on project-specific mitigation (i.e. Clean Development Mechanism (CDM) offset) mechanisms to a greater incorporation of national adaptation measures and to national frameworks to reduce emissions from deforestation and degradation (REDD+). International investments, such as funds from the Green Climate Fund, will almost certainly adhere to crediting standards found in the CDM. In the AFOLU sector, current UNFCCC compliance opportunities are limited. The CDM only allows afforestation/reforestation project

types and in addition, the major compliance regime in which CDM offset credits can be used – the EU ETS, doesn't recognize forestry protocol credits. Accordingly, it is recommended that in non-forestry sectors Malawian developers pursue pilot projects that follow regulations under the UNFCCC, to take advantage of larger investment flows and the optionality that CDM project methodologies offer. In the land use sector, it is recommended that Malawi pursue projects that are implemented at a very high standard for either the CDM and/or voluntary market. As UNFCCC mechanisms evolve, it may become possible to adapt such land use sector projects into future regulatory mechanisms.

Overview of GoM in Carbon Market

The Environmental Affairs Department (EAD) in the Ministry of Natural Resources, Energy and Environment is the CDM designated national authority (DNA) in Malawi. The DNA has been operational since 2007. The EAD has progressed in building its CDM promotion and regulation infrastructure:

- Developing draft approval guidelines for CDM projects
- Developing draft sustainable development criteria for CDM projects
- Screening several CDM Project Identification Notes (PIN)s
- Setting up aAdvisory Committee. The committee is composed of relevant government departments, private sector organizations, research institutions and academia.
- Training key policy makers and potential project developers, in order to sensitize them of opportunities available under CDM. Currently, EAD is implementing a four year (2010- 2013) capacity building programme with technical and financial support from United Nations Environmental Programme (UNEP) Riso Centre (URC). The project focuses on institutional and project development support.

Carbon Market Opportunities

The consultants reviewed existing information relating to the aforementioned potential mitigation project activities. In addition, additional data was compiled from over two dozen stakeholder interviews and three Lilongwe-based workshops. Based on this assessment, priority project types were identified to be the most suitable for Malawi, given current economic and institutional barriers along with other unique characteristics. Based on this assessment, several project types were identified that would be most suitable for Malawi, given current economic and institutional barriers along with other unique characteristics. These project types were then assessed by their conformance Malawi's Growth and Development Strategy ("MGDS"), the number of precedent projects in Africa, Development Feasibility, and Cost. Malawi's most promising abatement potential lies with the dissemination of **cooking stoves**, landfill gas projects, **avoided deforestation** and **degradation**, and **afforestation/reforestation** of non-cropland.

Measurement and Monitoring Systems

The systems across the various standards available for different project activity types within the carbon market share a number of common elements. The following fundamental concepts must be addressed for a project to produce real offsets: **Additionality, Baseline, Permanence, and Leakage**.

In addition, certain elements are required or recommended for all carbon projects, regardless of the system used. Though the names may differ for different measurement and monitoring systems, these

elements include: **Project idea note (PIN), Project design document (PDD), Monitoring plan, and Validation/verification**.

After the project has begun, ongoing measurement and monitoring must occur that tracks all changes in carbon stocks that occur within the project boundary as well as any leakage emissions that occur as a result of project implementation.

While all of the above elements must be addressed for all projects, the requirements for how these elements are addressed differ by standard. An assessment of the following standards was conducted relative to the potential AFOLU project activity types and the existing potential projects: CDM, Gold Standard, VCS, ACR, Climate Action Reserve (CAR), CarbonFix, Plan Vivo, and Climate Community and Biodiversity Standard (CCB). The two most widely recognized offset standards are CDM and VCS. Their respective units, CERs (Certified Emissions Reductions) and VERs (Voluntary Emissions Reductions) are traded in the largest volumes of any offset types. For their liquidity and price benefits, Malawi should consider encouraging developers to execute offsets projects under these standards. A Summary of the characteristics of each standard is shown in Table ES-1.

Table ES-1 Overview of Measurement Standards[1]

Credit	Unit	Typical Project Types	Market Volume: Value Traded Yearly	2011 Average Price
CDM	CER	All energy types	Primary CDM: $3,320m (2011) Secondary CDM: $23,250m (2011) Pre-2013: 91 MtCO2e Post 2012: 173 MtCO2e Total: 263 MtCO2e	EUR 4.3
VCS	VCU	Energy Methane, AFOLU	41 MtCO2e transacted in 2011 USD 191 M	USD 3.7
ACR		AFOLU Methane And other	4 MtCO2e in 2011	USD 5.8
Gold Standard	VER	Renewable Energy Supply from non-fossil and non-depletable sources End-use Energy Efficiency Improvement	Approx 8.5 MtCO2e (per Ecosystems) 8 MtCO2e (per World Bank) USD 86 m	USD 10.4
CCB		Forestry	Low	Cobenefit Standard –

1 "Ecosystem Marketplace ""Developing Dimension: State of the Voluntary Carbon Markets 2012, http://www.forest-trends.org/documents/files/doc_3164.pdf

State and Trends of Carbon Market Place 2012,

http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_2012_Web_Optimized_19035_Cvr&Txt_LR.pdf

Credit	Unit	Typical Project Types	Market Volume: Value Traded Yearly	2011 Average Price
		Agriculture LULUC		USD 4.7
				CCB + VCS - USD 13.0
				CCB + ISO - USD 7.0
Plan Vivo	VER	AFOLU	0.5 MtCO2e	USD 7.0

Carbon Offset Projects in Malawi

Based on research, stakeholder surveys, and stakeholder meetings, consultants conducted a review to identify several projects activity types that could be implemented in Malawi within the next 1-3 years.

The selected priority activities have been assessed according to criteria required for successful project implementation. These criteria include additionality, permanence, and low risk of leakage. Other elements, such as community impact, project developer's track record, and technical requirements, while not mandatory, are important for gaining community support and avoiding unintended consequences as a result of the carbon project.

Energy Sector Projects

Although a wide range of carbon financing mechanisms currently exist, current offset trading conditions hinder the development of offset projects in Malawi. Furthermore, for a host of reasons largely related to Malawi's perceived CDM market immaturity and commercial riskiness, investors may be reluctant to sponsor projects in the country.

Malawi has the opportunity to overcome the obstacles posed by its inexperience in carbon markets. It will require both ingenuity and perseverance on the part of private developers and targeted support from the Government. Malawi's most promising abatement potential lies with the dissemination of efficient cooking stoves, enhanced brick production and landfill gas capture and combustion. A more comprehensive overview of non-forestry sector project types, opportunities and obstacles in provided in Table ES-2.

Table ES-2 Overview of selected energy sector offset sectors (shaded projects of primary interest)

					Submitted Precedent Projects	
SECTOR	**PROJECT ACTIVITY**	**DESCRIPTION (as per EAD)**	**Potential Opportunity**	**Potential Obstacles**	**Africa (to UN)**	**Malawi (to DNA)**
Energy Efficiency	Efficient energy technologies	Use of energy saving bulbs	One PDD in sector approved, in registration	Project development expensive, challenging	**11**	**9**
	Efficient energy technologies	Use of efficient firewood cooking stoves	Many precedents; potential to join wider regional POAs and lower local development costs	Project development expensive, challenging		
	Increase ethanol to petrol blending ratios	Increase ethanol blend from to 20%	Greater mix would also help ease Malawi fuel supply constraints.	Vehicles may not be ready for higher blends; scale potentially limited	**0**	**0**
Renewable energy options	Wind power generation	Wind power along the lake shore and Likoma Island		Transmission and siting approval costly- note national difficulties in power development; non-grid baseline emission factors will be costly to establish	**39**	**0**
	Geothermal power generation	Electricity generation in the Northern and Central Regions of Malawi. Potential of using ground source heat pumps for space heating and cooling in buildings.			**4**	**1**
	Solar energy (heating and lighting)	Electricity from solar panels for domestic uses. Use of solar water heaters in household and service sectors.			**11**	**0**
	Mini hydro power generation	Mini hydro power generation	Significant hydropower production potential	Lack of baseline information, PDD costs are high	**12**	**0**
Cement Industry / Other Industrial Efficiency	Changing Blending/Mix of Cement	Increase in the proportion of additives, such as limestone, pozzolana and fly ash in the line grinding process thereby reducing the clinker content	Malawi cement production capacity: 260kt / year	Potential limited: clinker substitution at all national cement facilities likely to only yield about 30ktCO2e in emissions reductions	**3**	**0**
	Alternative Fuels	Use of renewable resources for less resource-intensive processes such as grinding -In pyro-processing, fossil fuels can be partly replaced by	Existing successful precedents, including BERL (developed as voluntary standard credit project)	Very expensive on gross abatement unit basis.	**14**	**0**

					Submitted Precedent Projects	
SECTOR	**PROJECT ACTIVITY**	**DESCRIPTION (as per EAD)**	**Potential Opportunity**	**Potential Obstacles**	**Africa (to UN)**	**Malawi (to DNA)**
		alternative fuels such as gas or unconventional masses (tires, plastics, textiles or rubber, etc.)				
	Energy Efficiency	Multi-technology options including: upgrading of preheaters, upgrading clinker coolers, optimization of grinding media, automatic controls, variable speed drives, efficient motors, etc.		Potentially limited scale	**25**	**1**
	Waste Heat Recovery	-Capture of waste heat vented at the pre-calciner and/or cooler end of kilns and use to preheat raw materials and fuel -Heat recovery at boilers and generation units and production of electricity		Potentially limited scale		
Sugar Industry / Other Industrial Own Generation	Co-generation (Combined Heat and Power)	Combustion of sugar cane biomass residues (bagasse) to produce steam and electricity. The electricity to be fed into grid to supplement the generation capacity and reduce private fossil generation.	Sugarcane production managers may be well-equipped to develop projects	Scale potentially modest-emissions yield estimate for entire country (~2.5m tons sugarcane / year) under 120ktCO2e, based on African biomass CDM PDDs; requires custom baseline	23	0
Timber Industry / Bio-residue own generation	Co-generation (Combined Heat and Power)	Use of timber waste (thinnings, cuttings and saw dust) in boilers for electricity production	Co-benefits: protecting the frequent bush fires emitting CO2 into the atmosphere through uncontrolled burning or decomposition.	Scale uncertain; Requires custom baseline design	**4**	**1**
Waste Management	Composting	Composting		High unit abatement costs	**42**	**1**
	Mechanical biological treatment	Biogas generation from human and animal waste	Unit abatement costs of projects typically attractive	Limited scale		**0**

					Submitted Precedent Projects	
SECTOR	**PROJECT ACTIVITY**	**DESCRIPTION (as per EAD)**	**Potential Opportunity**	**Potential Obstacles**	**Africa (to UN)**	**Malawi (to DNA)**
	Disposal of waste in sanitary landfill	Methane capture and electricity generation from municipal landfills	Project under investigation; local precedent in Tanzania; supportive municipal government	Estimated abatement scale only around 34ktCO2e p.a.		**1**
Building materials	Housing redevelopment/ development	Use of stabilised cement blocks, efficient bricks and/or timber and grass	Large potential impact scale (over 1,000ktCO2e p.a.); local projects in development	Few local precedents	**1**	**0**

Sources: Malawian Environmental Affairs Department, Wuppertal and Hamburg 2011, Various PDD documents, DNV KEMA data

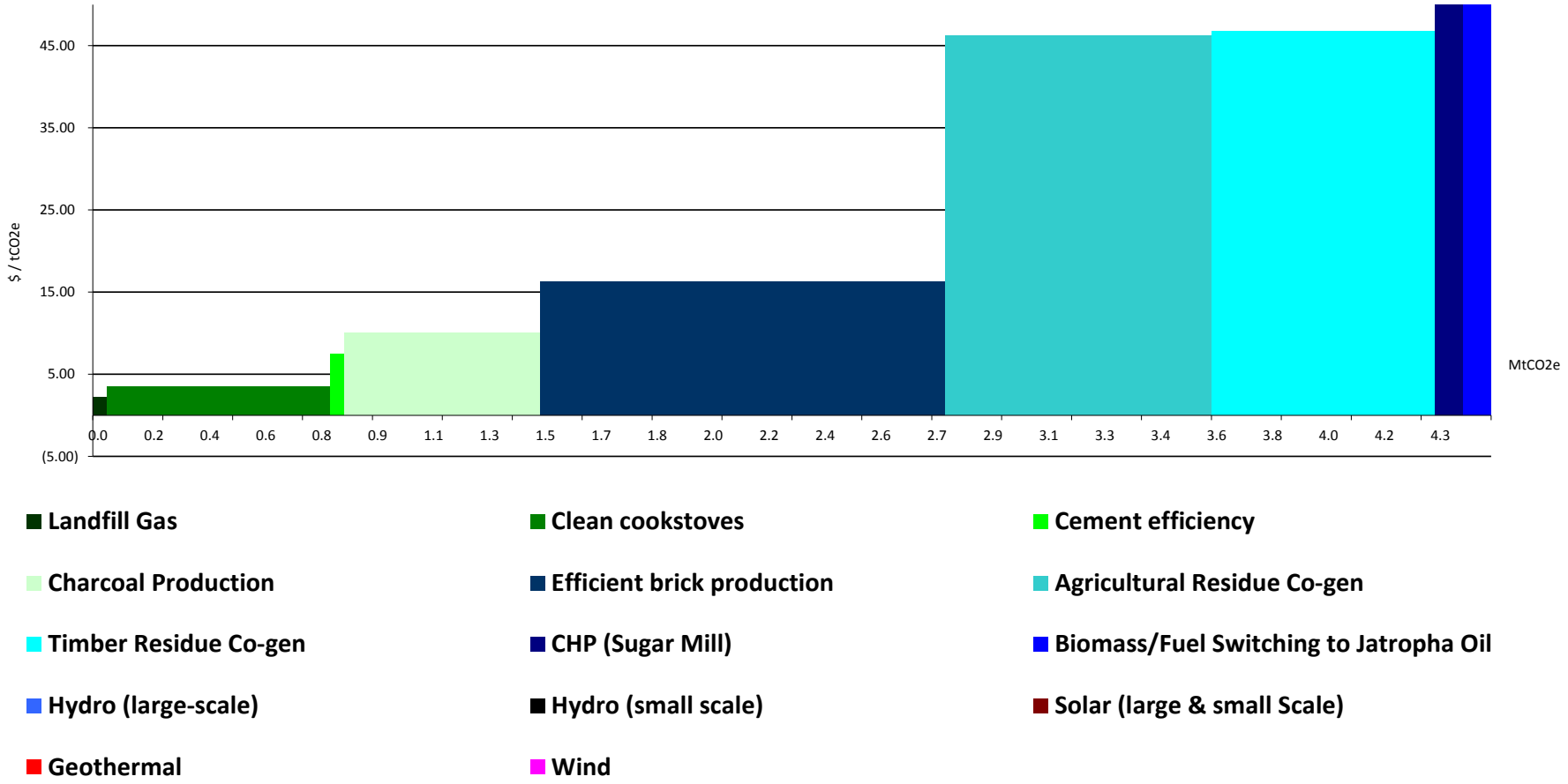

Figure EC-1 Indicative Marginal Abatement Cost Curve (MACC) for selected Malawian energy projects

Note: costs calculated on "gross" basis. Revenues from project execution (such as brick sales) not incorporated. Input sources: de Gouvello 2008, Wuppertal and Hamburg 2011, various project design documents, internal calculations

Land Use Sector – AFOLU

In Malawi, the majority of the population is dependent on the land and forest resources for their livelihoods. The forests cover 2,562,000 hectares, representing 27% of the total land area of Malawi[2]. Forest resources are declining, with annual deforestation rates between 0.9% and 2.8%[3]. The UNFCCC National Communication lists the main deforestation and degradation drivers as agricultural expansion, high population growth, increased woodfuel demands, and forest fires[4]. In addition, deforestation and degradation through various drivers accounts for the vast majority of emissions in Malawi. Carbon finance has the potential to allow for an improvement of such land management while also reducing the net carbon dioxide emissions in Malawi.

Within the carbon market, activities taking place in the Forest sector are generally divided into the following project activity types: Avoided conversion or degradation (such as reduced emission from deforestation and degradation (REDD) and avoided conversion or degradation of grass/shrublands); Afforestation and Reforestation, Revegetation; Improved Forest Management; Agricultural Land Management. An assessment is provided of the advantages and disadvantages of various carbon project types that could potentially take place and those that are already in existence. Table ES-2 presents a summary of the recommended project types for Malawi.

Table ES-3 Overview of Recommended AFOLU Project Types

Project type	Recommended Land Type	Advantages	Disadvantages
REDD – unplanned deforestation	Forest Reserves Forested communal lands	Credit potential: high Cobenefits: high	Tech. capacity requirements – high Leakage risk: high Non-permanence risk: medium
ARR - Plantations (fuelwood	Degraded and sloped lands (non-agricultural land)	Cobenefits: high Tech capacity requirements: low Leakage risk: low	Non-permanence risk: high
ARR – Agroforestry and boundary planting	Farmer fields	Cobenefits: high Tech capacity requirements: low Leakage risk: low Replicability: high	Credit potential: low per unit area Transaction Costs: high Training Costs: high
Improved Forest Management	Gov't owned plantations	Transaction Costs: low Leakage risk: low	Credit potential: low per unit area Non-permanence risk: high

[2] http://earthtrends.wri.org/pdf_library/country_profiles/for_cou_454.pdf

[3] http://rmportal.net/library/content/tools/compass-ii/redd-credits-boost-community-partnerships-for-biodiversity-conservation-in-malawi/view

[4] Ministry of Natural Resources, Energy, and the Environment. 2011. The Second National Communication of the Republic of Malawi to the Conferences of the Parties (COP) of the UNFCCC. http://unfccc.int/resource/docs/natc/mwinc2.pdf

Institutional Capacity Assessment

Institutional Overview

Malawi has established a strong foundation for attracting carbon market investment. The government has created a Designated Operating Entity- the Environmental Affairs Department, allowing development of Clean Development Mechanism (CDM) projects – the single largest global channel for carbon offset financing. The DNA has established a portal on the National Climate Change Programme website, is collecting CDM Project Idea Notes and Project Design Documents and has produced an approval letter for one offset project. It has implemented power sector reforms which allow the establishment of independent power producers (in 2003's Malawi Energy Sector Reform Program) – an essential component of energy sector offset development. The Department of Forestry and affiliated institutions have implemented several projects which might have qualified for offset crediting. The government has also established Sustainable Development Criteria and incorporated Climate Change as one of its Malawi Growth and Development Strategy focus areas.[5] Additionally, most of the critical government agencies and departments have specified at least one staff member responsible for climate change/carbon markets and participate on the CDM technical committee. National REDD+ Strategy and Climate Change Policies are in planning phases, with several REDD+ pilot project outline documents to be released soon. REDD+ consultative meetings have been held with stakeholders, especially development partners and those from key departments. Raising of awareness amongst forestry department staff, concerning technical aspects of REDD+, has been made. Further awareness on REDD+ is to be made amongst the other stakeholders outside the forestry sector. A national workshop on the REDD Strategy is also to be convened to identify gaps and map the way forward for the country.

While these achievements can help facilitate carbon offset project development and the government shows signs of keen enthusiasm for the sector, many features of the current institutional structure which could be improved in order to accelerate offset investment inflows.

Capacity Needs

Malawian government agencies have clearly benefited from previous capacity building workshops. Within units primarily responsible for offset project regulation and promotion, consultants found that staff clearly understood key offset project principles and most key factors inhibiting private sector project development. While other groups in the government demonstrated more limited understanding of offsets and the impact that regulatory policies have on project development, in some cases, specific carbon market knowledge may not threaten segment growth in Malawi.

We suggest that the most critical remaining gaps in **technical capacity** relate to:

- Specific financing and sectoral knowledge for entities which are promoting project growth through marketing initiatives;

[5] Sustainable Development Criteria Available at http://www.nccpmw.org/index.php?option=com_filecabinet&view=files&id=18&Itemid=2

- General awareness of carbon market opportunities for private entities which could, directly, design and execute offset transactions;
- Project development techniques for private entities expressing interest in offset development opportunities; and
- Retention of acquired carbon market knowledge, keeping sector experts in relevant positions and consistently allowing them exposure to developments in the field and relevant transactions in the region.

For the **energy sector**, the most critical information gaps include:

- Household emission energy consumption emission factors, incorporating suppressed demand
- Templates for industrial emission factors in key Malawian economic sectors, including Tobacco, Tea, Forest processing, Sugar, Bottling and others, which could be adapted easily with in-house data by managers at processing facilities for efficiency and fuel-switching projects
- Population and settlement data to be critical for justifying Programme of Activity (POA) emissions impact

The priority data gaps that would assist **land use sector** project development include:

- Deforestation and forest degradation agent analysis
- Forest degradation analyses
- Carbon Stock Inventory Database and Field Measurement Method Standards
- Carbon Stock Accumulation Rates
- State of Forest Plantations
- 'Best Practice Guides' for the implementation of various types of implementation activities and carbon project development.
- Submit Forest Definition to UNFCCC
- Finalize land cover maps to determine locations and spatial extent of existing forest and non-forest areas
- Stratify existing forest areas into carbon stock strata
- Create default estimates of rates of activities and associated emissions per unit of activity
- Identify spatial locations under expected high deforestation and degradation threat
- Link results of Integrated Assessment of Land Use Options with spatial locations identified as high risk for deforestation

Climate Change Mitigation Road Map

Climate Change Mitigation Finance Development

During their research and meetings with Malawian policy-makers, project developers and civil society representatives, consultants perceived strong local interest in carbon markets, climate change mitigation and climate change adaptation. On all three issues officials demonstrated enthusiasm and discussed initiatives being undertaken to address them. At the same time, it seems that institutions which could underpin carbon finance development in Malawi are occasionally being structured for objectives tangential to attracting offset investment. Consultants felt that to some extent, enthusiasm for climate change objectives enshrined in the revised MGDS has somehow led to a lack of focus in addressing carbon market development. Having been assigned to scope the opportunities for carbon development in Malawi, we offer an overall strategy which envisions a more streamlined set of institutions targeting sector development. Discussions focus on steps that can be initiated immediately and completed within 6-12 months.

We offer the following suggestions for enhancing the **DNA**'s impact:

1. Continue efforts to streamline the national CDM project approval process, potentially revising specific public announcement requirements and setting approval application fees proportional to the resources required by the DNA for determining project eligibility,

2. Assume lead role as coordinating entity in the carbon market development process, using its inter-ministerial contacts via the Technical Committee to smooth regulatory hurdles in various agencies for eligible offset project proponents,

3. Provide guidance on market-building data gathering and dissemination activities for critical departments, such as Forestry and Energy Affairs,

4. Expand promotional activities currently undertaken, offering more detailed "investor guide" materials, pre-approval submitted PINs and PDDs on the group website and directories of potential project contributors (developers, investors and ancillary service providers), possibly in coordination with the Malawian Investment and Trade Center, and

5. Direct capacity building efforts with potential project developers in the private sector, both general carbon market discussions and on-site detailed project development seminars

The **Malawian Investment and Trade Center** (MITC) has already started playing a key role in marketing domestic carbon market opportunities. It helped the DNA to produce an investor guide which was recently shared with market participants at Carbon Expo- the world's largest offset-related trade event. Ideas for MITC largely relate to initiatives recommended for the DNA, including:

1. Enhancing Malawi-focused offset investment marketing materials
2. Convening national carbon finance opportunity events for private sector entities
3. Advocating on behalf of project developers within the government for policy support and financial incentives

Malawi has developed a strategic framework to address national environmental objectives as part of its broader national development policy. The government has been developing its **National Climate Change Programme** (NCCP) with support from international partners. We recommend that **the NCCP Technical Committee** appoint a coordinator to coordinate climate mitigation, climate change adaptation, REDD+, and National Communications actions, including contributions from international development agencies. This coordinator should also be tasked to ensure efficient and targeted capacity building programs and maintain knowledge of finance opportunities. This will help create a transparent process that will aim to reduce redundancy of donor funded programing while also encouraging effective distribution of donor funds within the government. It is also recommended that the CCP TC direct the creation of a Carbon Unit and ensure that financing is provided for its implementation and maintenance.

It is highly recommended that the **Carbon Unit** be established within the Department of Forestry, and include select staff from other sectors, specifically: Land Resource & Conservation Department, Department of Agricultural Extension Services, Surveys Department, and National Spatial Data Centre. Select number of staff (~3) should be given full time responsibility as the technical research staff of the Carbon Unit. It is recommended that the Carbon Unit have the following mandate:

- Create strategic vision of climate change mitigation opportunities for Malawi
- Encourage and facilitate carbon finance within Malawi
- Serve as the technical research experts in GoM on climate change mitigation related to land cover management
- Formulate and direct a Climate Change Consortium of staff from other sectors whose technical expertise is required for implementation activities

Recommended Capacity Building Initiatives

Carbon markets are new institutions. Few people globally understand how they function and fewer know how to participate in them. As might be expected, few Malawian officials have a comprehensive knowledge of the opportunities they have to access related investment channels. Wider (across ministries) and deeper (individual) understanding of carbon finance within the Malawian government would certainly help the country benefit from the sector. However, as officials face extensive challenges and are limited in time and resources, we recognize that capacity building should be targeted to maximize its impact on actual carbon market development. Appropriate capacity building activities may focus on:

- Cultivating a larger pool of potential project developers with offset project benefits awareness programs;
- Specific learning objectives essential to the project development process, aimed at potential local project developers and financiers;
- Educating regulators and market promoters on critical new instruments for Malawi's participation in carbon markets, including PoA development and Suppressed Demand baseline development;
- Retaining trained personnel and ensuring their continued involvement in promotional activities; and
- Ensuring sufficient resources and incentives are provided to personnel executing regulatory and promotional activities for them to be successful

The report outlines specific training sessions which address objectives 1 to 3 above and potential institutional changes addressing objectives 4 and 5.

Rapid Implementation Steps

<u>Priority actions within DNA</u>

To augment its current carbon market promotion campaigns, the Malawian DNA should consider focusing on the following priority actions

Next 3 Months:

1. Increase content available to potential project developers on the DNA web portal (part of the National Climate Change and Environment Programmes site), including the project pipeline information available in its Investor Guide materials (suggested content in 8.2.3)
2. Oversee execution of 3 "offset awareness" seminars (outlined in 8.3.1)
3. Continue streamlining approval process; look to move 2 PINs from pipeline to PDD stage

Before end of 2012:

1. Coordinate at least 2 "on-site project development" (outlined in 8.3.2) sessions with private firms

2. Complete at least one "advanced carbon market promotion workshop" (8.3.6), covering new energy baseline emission factor design
3. Build and distribute for potential project developers at least one key energy sector baseline incorporating household biomass emissions factors and/or off-grid fossil fuel power generation (estimated 20 work-days)

Between now and mid-2013:

1. Develop at least three key public baseline emission factor estimates applicable to the most common submitted offset project types (for example, in cookstove distribution, landfill gas and efficient brick production - estimated 30 work-days)
2. Add to DNA web portal documents including
   a. Directory of potential project investors and developers
   b. All submitted PINs and PDDs
   c. Offset project sector analyses
3. Facilitate at least one capacity building summit with neighboring countries' DNAs to promote regional PoA development
4. Complete at least one additional "advanced carbon market promotion workshop"

<u>Priority actions for Department of Forestry</u>

The top recommended action for DoF is to initiate the creation of the Carbon Unit. The steps to development include:

Next 3 Months:

1. Formalize staffing, mandate, and responsibilities of Carbon Unit based on above recommendations into a proposed Carbon Unit Terms of Reference
2. Submit Carbon Unit ToR to CCP TC
3. DoF, CCP TC, and other entities will need to negotiate budget structure for CU
4. Assign permanent staff to Carbon Unit

Before end of 2012:

1. Assess expertise gaps within Carbon Unit members
2. Implement training program for Carbon Unit members
3. Actively seek gov't-private sector agreements to initiate pilot carbon projects
   a. As stated, it is recommended that the government promote the private sector or NGO community to be the lead project proponent.
4. Write proposal to international funding agencies to develop REDD+ readiness and carbon project data

Between now and mid-2013:

1. Initiate database creation using existing programs and data
2. Initiate 'Best Practice' guidance documents
3. Initiate gov't-private sector pilot carbon projects

These activities would be implemented with the DoF providing data development support and implementation through the extension officers and the private sector organization serving as the main project proponent and carbon project documentation developer.

1 OVERVIEW OF ACTIVITY

The government of Malawi seeks to develop programs that will enhance Malawi's ability to attract investment in climate change mitigation and adaptation activities. The government has already initiated a number of actions and seeks to expand the scope and impact of climate change mitigation finance within Malawi.

We suggest that now is a propitious time for Malawi to aggressively promote carbon finance. As we explain later in the report, "Least Developed Countries" (LDCs - such as Malawi) are likely to soon become the primary target of new Clean Development Mechanism (CDM) project investment, the largest channel of global carbon financing, facilitating a total project volume of US$149 billion in 2011. Starting in 2013, only CDM credits registered from projects in LDCs will be eligible for use offsetting compliance obligations under the EU Emissions Trading Scheme. This will likely mean that global project developers are likely to shift their focus to Africa, in search of countries where they can quickly and efficiently develop projects. By boosting national readiness to facilitate these projects, Malawi has the opportunity to harness the potential waves of incoming offset project capital and profit from the many co-benefits which CDM project investments provide, which may include technology transfer, natural resource asset preservation and public health, among others. This opportunity also comes at a time when traditional donors face increasing pressure to scale back their funding commitments for development, and could help curb the impact of resultant reductions of official assistance to Malawi.

To assist with these efforts, the World Bank has commissioned technical assistance on the identification of potential opportunities for Malawi's engagement in carbon markets, as well as an institutional assessment of the country's capacity to effectively secure those opportunities. This report provides the results of this assessment, focused on the following:

- Priority carbon market sectors, opportunities, and projects
- Potential measurement and monitoring systems
- Institutional capacity assessment
- Capacity development plan

To guide this work, priority sectors for potential carbon finance opportunities have been selected by reviewing the objectives outlined in Malawi's Growth and Development Strategy ("MGDS ") (Table 1). The MGDS is a comprehensive medium-term strategy to which seeks to create wealth through sustainable economic growth and infrastructure development. The scope of the MGDS has recently been updated to include Climate Change, Natural Resources and Environmental Management. The inclusion of Climate Change as a priority in the MGDS attests to the government's interest in the sector and suggests it could be willing to mobilize its resources in pursuit of carbon market development objectives.

Table 1 Malawi Growth and Development Strategy areas and main activities

Focus Area	"Main Activities"
Agriculture and Food Security	• Increased Crop Production • Enhanced Irrigation • Increased Crop Diversification • Drought Resistance
Infrastructure Development	• Improving Access • Increase Waterway as Transport Mode
Energy Generation and Supply	• Increased Interconnection • Electrification of key sectors—mining, tourism, and manufacturing • Rural Electrification
Irrigation and Water Development	• Construction of Multi-purpose dams. • Improve access to clean water
Integrated Rural Development	• Growth and development of rural growth centers • Implementing rural electrification programme • Promoting and implementing economic empowerment programs • Improving the process of providing title to land in order to encourage investment through ownership of land
Green Belt Irrigation and Water Development	• Developing irrigation infrastructure; • Enhancing technical and administrative capacities in irrigated agriculture; • Rehabilitating irrigation schemes and dams; • Promoting research in irrigation technology; • Developing potential groundwater resources; • Establishing piped water systems; • Rehabilitating water facilities throughout the country; and • Promoting user friendly technologies for water resource conservation and utilization
Child Development, Youth Development and Empowerment	• Promoting early childhood development and pre-primary education; • Protecting children against abuse; • Eliminating harmful cultural practices; • Improving youth's technical, vocational, entrepreneurial and life skills; and • Improving youth's access to credit facilities for entrepreneurship
Climate Change, Natural Resources and Environmental Management	• developing adaptation and mitigation measures to climate change related impacts; • Improving coordination of environment and natural resource programmes; • Promoting bio-diversity conservation programs; • Promoting development and implementation of Clean Development Mechanism (CDM) projects; • Promoting projects on waste management and air pollution and other environmentally friendly technologies and practices; and • Developing, conserving and protecting forest plantations and natural woodlands

2 OVERVIEW OF CARBON MARKET

When discussing carbon market opportunities, it is important to distinguish between voluntary or pre-compliance markets and regulated/compliance markets arising out of the United Nations Framework Convention on Climate Change (UNFCCC). Below is a quick overview of the UNFCCC and related mechanisms, which represent the largest and most influential institutions regulating and crediting offset projects. A review of the voluntary markets—comprised of standards such as the American Carbon Registry (ACR), Verified Carbon Standard (VCS) and the Gold Standard (GS)— is also presented as they can also be effective means of attracting outside capital to specific projects in Malawi.

2.1 The United Nations Framework Convention on Climate Change (UNFCCC)

The UN Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, however it does not create binding reduction targets or carbon markets. The UNFCCC is fundamentally an agreement that lays the foundation for further agreements on climate change. Unlike protocols that are negotiated under the UNFCCC, the Convention never expires. Each year, the countries that have ratified the convention convene in for a Conference of the Parties (COP). The 2011 COP was the 17th conference and was held in Durban, South Africa.

2.1.1 The Kyoto Protocol

The Kyoto Protocol was adopted in 1997, and by March 1999, 84 countries had signed the Protocol, including a commitment by signatory industrialised countries (Annex I countries) to reduce their collective greenhouse gas emissions by at least 5% compared to 1990 levels by the period 2008 – 2012[6]. It entered into force on 16 February 2005. To date, 191 parties have ratified the protocol. Of these, 39 developed countries, plus the EU as a party in its own right, are required to reduce greenhouse gas emissions to the levels specified for each country in the treaty. One-hundred-fifty-two (152) developing countries have ratified the protocol, including Brazil, China and India, but they have no obligation beyond monitoring and reporting emissions.

Key elements of the Kyoto Protocol include:

- **Annex I and Non-Annex I Countries**: Governments are separated into two general categories: developed countries, referred to as Annex I countries (who have accepted greenhouse gas emission reduction obligations and must submit an annual greenhouse gas inventory); and developing countries, referred to as Non-Annex I countries (who have no greenhouse gas emission reduction obligations but may participate in the Clean Development Mechanism).
- **Reduction Targets**: From 2008-2012, Annex I countries have to reduce their greenhouse gas emissions by a collective average of 5% below their 1990 levels (for many countries, such as the EU

[6] http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php

member states, this corresponds to some 15% below their expected greenhouse gas emissions in 2008).

  - Any Annex I country that fails to meet its Kyoto obligation will be penalized by having to submit 1.3 emission allowances in a second commitment period for every ton of greenhouse gas emissions exceeded beyond their cap in the first commitment period (i.e., 2008-2012).

- **Flexible Mechanisms**: The Kyoto Protocol includes "flexible mechanisms" which allow Annex I economies to meet their greenhouse gas emission limitation by purchasing GHG emission reductions from elsewhere. These can be bought from projects which reduce emissions in non-Annex I economies under the Clean Development Mechanism (CDM), from other Annex I countries under a program called Joint Implementation, or from Annex I countries with excess allowances.

  - In practice this means that Non-Annex I economies have no GHG emission restrictions, but when a greenhouse gas emission reduction project (an "offset") is implemented in these countries, the project will receive Carbon Credits, which can then be sold to Annex I buyers.

2.1.2 Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO_2, which can be counted towards meeting Kyoto targets.

A CDM project activity might involve, for example, a rural electrification project using solar panels or the installation of more energy-efficient boilers. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction or limitation targets.

The mechanism is overseen by the CDM Executive Board, which answers ultimately to the countries that have ratified the Kyoto Protocol. A CDM project must provide emission reductions that are additional to what would otherwise have occurred. The projects must qualify through a rigorous and public registration and issuance process. Approval is given by the designated national authority (DNA) in each country. Public funding for CDM project activities must not result in the diversion of official development assistance.

2.1.3 Status of the UNFCCC & the Kyoto Protocol:

At the most recent Conference of the Parties, COP 17 in Durban, the following was agreed:

- **AGREEMENT BY 2015:** An agreement with "legal force" has to be adopted at the latest by 2015. Under this agreement all countries will tackle climate change. Work to achieve it will begin immediately under a new group called the *Ad Hoc Working Group on the Durban Platform for Enhanced Action*. The implementation of this new agreement should begin in 2012. For the first

time, no distinction is made between developing/emerging and developed country for this negotiation process and the principle of future commitments.

- **KYOTO EXTENDED:** A second commitment period of the Kyoto Protocol begins from January 1, 2013, for five years (ends 31/12/2017). Parties to this second period (the 37 developed countries having commitments in the present Kyoto Protocol period) will turn their economy-wide targets into quantified emission limitation or reduction objectives and submit them for review by May 1, 2012.

- **GREEN CLIMATE FUND:** The set of measures to support developing nations, agreed in 2010 in Cancun, Mexico is implemented. The package includes the Green Climate Fund, an Adaptation Committee designed to improve the coordination of adaptation actions on a global scale, and a Technology Mechanism, which are to become fully operational in 2012

2.2 Voluntary Markets

In addition to the mandatory market created by the UNFCCC and its subsequent protocols, various voluntary programs exist. These programs, although voluntary, meet a demand for mitigation projects (i.e offsets) from corporations and individuals driven by corporate social responsibility or other environmental concerns. In some cases, projects under these standards are considered pre-compliance in that it may be possible to use them in a future compliance market. Similar to the CDM, GHG emission reduction projects from a voluntary standard receive a unique serial number which is unique to the program and can be monitored and tracked in a program's registry system. Existing voluntary programs include:

- **Verified Carbon Standard (VCS):** The VCS is a globally recognized greenhouse gas accounting system for issuing and verifying carbon offset credits in the voluntary carbon market. VCS was founded in 2005 by leaders in environmental and business sectors.

- **American Carbon Registry (ACR):** The ACR was founded in 1996 by the Environmental Resources Trust and is a globally recognized GHG accounting system that issues, verifies, and registers offset credits in the voluntary market.

- **The Gold Standard (GS):** The Gold Standard certifies renewable energy and end-use energy efficiency and waste handling and disposal carbon offset projects to ensure that they all demonstrate real and permanent greenhouse gas (GHG) reductions, as well as, sustainable development benefits.

- **CarbonFix Standard:** CarbonFix is a standard that can be followed to produce carbon credits through forest activities that have social and ecological co-benefits.

- **Plan Vivo:** is a standard for designing and certifying community-based payments for ecosystem services programmes. Activities are focused on the land use and forestry sectors.

2.3 Current Economic Realities of the Carbon Market

Given CERs traditionally stronger market value in the energy sector, it has historically been better to develop projects to pursue approval under the UNFCCC. If projects are unable to be registered with the

CDM Board, they may be able to be approved by a voluntary standard. Yet, it is important to factor in key economic realities and institutional barriers to implementation. Economically, with CERs currently valued at less than US$5, project sponsors are not likely to expect significant monetary returns to offset credit issuance. Even at higher prices (US$25-45 per ton), carbon finance would not typically be a singular means of project financing. However, forward sales of CERs—in the form of an Emission Reductions Purchase Agreements ("ERPAs")—can be utilized as collateral by both private sector and governmental stakeholders to secure loans.

Moreover, the international climate regime is beginning to shift from solely focusing on project-specific mitigation (i.e. CDM offset) mechanisms to a greater incorporation of national adaptation measures. Although current voluntary programs offer more accessibility and less somewhat less rigor, Malawi would be at a disadvantage by not building capacity around UNFCCC mechanisms. International investments, such as funds from the Green Climate Fund, will almost certainly adhere to procedural aspects of the CDM. Accordingly, if Malawi is to participate in the next era of UNFCCC climate mechanism, it is recommended to build capacity for CDM project development, not focusing only on voluntary standards.

Currently the CDM only allows afforestation/reforestation project types and in addition, the major compliance regime in which CDM offset credits can be used – the EU ETS, doesn't recognize forestry protocol credits. Therefore in the land use sector, it is recommended that Malawi pursue projects that are implemented at a very high standard for either the CDM and/or voluntary market. As UNFCCC mechanisms evolve, it may become possible to adapt such land use sector projects into future regulatory mechanisms.

As discussed in the introduction, another major development in the CDM could generate substantial carbon financing opportunities for Malawi. Starting January 1st, 2013, only CERs issued from projects in Least Developed Countries will be valid for use as offsets against EU emissions compliance obligations. Currently project developers in traditionally prominent project host countries, such as China, Brazil and India are aggressively promoting current projects in these states, trying to ensure their projects are registered before the December 31st deadline. However, many market observers expect that starting around the end of this year, developers will shift their current geographic focus toward Africa, where they can find post-2012 viable project hosts[7]. Historically, African projects have represented 2-4% of total CDM applicant volume, averaging just under 50 total initiated projects per year since 2007. 33 projects have already been launched in Africa through April 2012, foreshadowing a likely marked expansion in regional activity late this year and beyond.

3 OVERVIEW OF GOM IN CARBON MARKET

The Environmental Affairs Department (EAD) in the Ministry of Natural Resources, Energy and Environment is the CDM designated national authority (DNA) in Malawi. The DNA has been operational since 2007. Its establishment was facilitated by the Miombo Network. In 2005 Malawi received technical support from the EcoSecurities firm in Europe and South-South North of South Africa on the formation of a CDM DNA. A

[7] Interview with experienced DNV lead validator, May 31, 2012

number of concepts that would be considered for further development under the CDM were selected through a national stakeholder's workshop.

Malawi has made some progress in planning for CDM projects as follows:

- Development of draft approval guidelines for CDM projects
- Development of draft sustainable development criteria for CDM projects
- Initial screening of CDM Project Identification Note (PIN)
- Setting up of Advisory Committee by the Government of Malawi (GoM). The committee is composed of relevant government departments, private sector organizations, research institutions and academia.
- Training of key policy makers and potential project developers in order to sensitize them of opportunities available under CDM. Currently, EAD is implementing a four year (2010- 2013) capacity building programme with technical and financial support from United Nations Environmental Programme (UNEP) Riso Centre (URC). The project focuses on institutional and project development support.

4 CARBON MARKET OPPORTUNITIES

A large number of activities can be implemented that result in carbon credit creation. These activities have been implemented by projects worldwide and span a large range of sectors. The potential of the various activities will be examined for implementation within Malawi and assessment made on how such activities will contribute to Malawi's Growth and Development Strategy.

Pairing the "main activities" of the MGDS (Table 1) with existing CDM Methodologies—as well as methodologies from voluntary programs (Annex II)—allowed for a list of potential project types within Malawi (Table 2).

Table 2. Potential Project Activity Types, as recognized by Malawian DNA

SECTOR	PROJECT ACTIVITY
Energy Efficiency	Efficient energy technologies
	Efficient energy technologies
	Increase ethanol to petrol blending ratios
Renewable energy options	Wind power generation
	Geothermal power generation
	Solar energy (heating and lighting)
	Mini hydro power generation
Cement Industry / Other Industrial Efficiency	Changing Blending/Mix of Cement
	Alternative Fuels
	Energy Efficiency
	Waste Heat Recovery
Industrial own generation	Co-generation (Combined Heat and Power)
Bio-residue own generation	Co-generation (Combined Heat and Power)
Waste Management	Composting
	Mechanical biological treatment
	Disposal of waste in sanitary landfill
Building materials	Housing redevelopment/ development

AFOLU	Agriculture
	Forestry

A review was conducted of existing information relating to the aforementioned potential mitigation project activities. In addition, additional data was compiled from over two dozen stakeholder interviews and three Lilongwe-based workshops. Based on this assessment, priority project types were identified to be the most suitable for Malawi, given current economic and institutional barriers along with other unique characteristics. These project types were then assessed looking at how they match the following criteria:

- **Malawi's Growth and Development Strategy ("MGDS").** The MGDS is a comprehensive medium term strategy to create wealth through sustainable economic growth and infrastructure development. It contains five key focus areas with several main activities (Table 1).
- **Precedent projects in Africa**: Whether informative efforts have previously been undertaken in the region . A list of successfully registered CDM projects by sector are highlighted in Figure 1;
- **Development feasibility:** Whether the project can be executed given existing data availability, regulatory institutions, related industry structures and local capacity;
- **Cost and Credit potential:** The cost, per unit of CO2e reduced, of implementing a project and credit generation potential

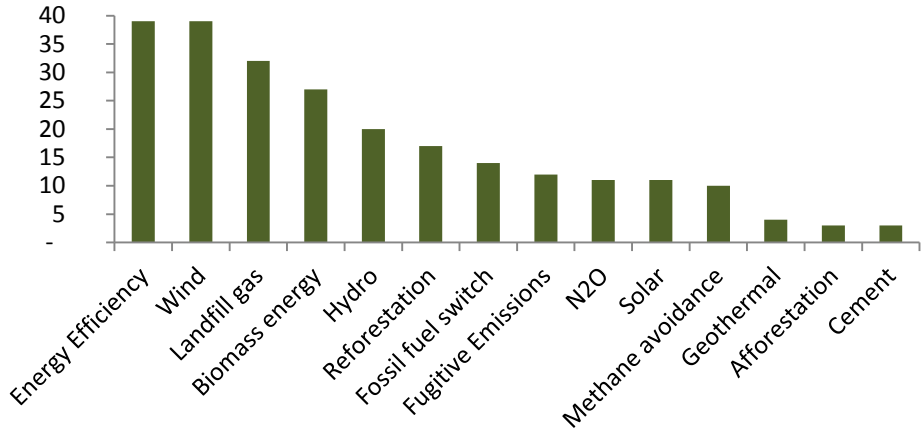

Figure 1. Number of CDM Carbon Offset Projects in Africa, by type

5 MEASUREMENT AND MONITORING SYSTEMS

As discussed above, across the carbon market there are various standards available for different project activity types. These systems share a number of common elements. The following fundamental concepts must be addressed for a project to produce real offsets.

- **Additionality:** Project activities must be additional to what would have occurred in the absence of the potential for the generation and sale of carbon credits.
- **Baseline:** The baseline scenario describes the net GHG emissions and removals that would have occurred in the absence of the proposed project activity.
- **Permanence:** Net GHG emission reductions and/or removals by a project must be guaranteed not to re-enter the atmosphere prior to the end of the emission reduction agreement.
- **Leakage:** Projects activities have the potential to lead to an increase in emissions outside of the project boundary, if project activities are displaced to another area or if a substitution is made for market goods that would have been produced in the baseline scenario.

In addition, certain elements are required or recommended for all carbon projects, regardless of the system used. Though the names may differ for different measurement and monitoring systems, these elements include:

- Project idea note (PIN) – a formal project proposal which describes the basic elements of the project;
- Project design document (PDD) – the formal project write up, including a description of the methodology, baseline, emission reductions, and overall project impacts;
- Monitoring plan – detailed description of how monitoring will be conducted, including data collection methods and frequency; may be included in PDD.
- Validation/verification – a third party assessment to ensure that the project is following standard protocols and that emission reductions are real and additional.

These documents are recognized by Malawian officials promoting carbon markets and required for CDM project approval at the national level prior to submission to the UNFCCC Executive Board. As noted in chapter 7, the Malawian CDM approval process is two-staged: in the optional first stage, a project proponent submits a Project Idea Note, on which the DNA focal point will offer feedback and guidance to inform the final PDD design. In the mandatory second stage, a proponent must provide a final PDD. The DNA (in the form of the Environmental Affairs Department) also often requires a draft validation report for

project approval.[8] Although formal national government approval is not a required by the voluntary market standards, projects must follow all national and regional laws and regulations.

While all of the above elements must be addressed for all projects, the requirements for *how* these elements are addressed differ by standard. An assessment of the following standards was conducted relative to the potential AFOLU project activity types and the existing potential projects: CDM, Gold Standard, VCS, ACR, Climate Action Reserve (CAR), CarbonFix, Plan Vivo, and Climate Community and Biodiversity Standard (CCB). See Annex II for a table showing all relevant methodologies.

The standards were evaluated based on:

- Applicability to existing projects; existence of relevant methodologies
- Applicability to potential project activities, and adaptations that may be required
- Technical capacity requirements to implement
- Technical equipment requirements (field measurement equipment, computing hardware and software)
- Financial requirements for implementation
- Expected project investment opportunities
- Expected market potential for credits produced

5.1 Offset Standards

5.1.1 Clean Development Mechanism - CDM

CDM is currently the only offset standard used as part of a compliance regime, with certified emission reduction credits which can be used to meet targets for emission reduction under the Kyoto protocol. As a result, CDM markets have typically been the most liquid, and the CDM traded unit, the CER (certified emission reduction) has typically been priced at a substantial premium to voluntary credits. Currently, however, uncertainty regarding the future of the Kyoto Protocol and CDM is suppressing investor interest in CDM credits. This uncertainty has caused the price to fall from EUR20 in 2008 to around EUR3.50 in early 2012. While the current low price is an impediment to investor interest in projects, we recommend that Malawian officials remain aware of developments in the CDM market and promote projects in such a manner that they could be verified under this UNFCCC system. Our reasons are outlined below:

1. CDM methodologies will be recognized on the voluntary market: CDM requirements for issuance are typically the strictest and their crediting guidelines the most conservative. Thus any project being prepared under a CDM standard will not likely have problems issuing credits under a voluntary standard. Developing a project by these standards gives the sponsor an option to issue credits under other standards in case it later chooses to do so.

2. CERs are becoming the standard accepted offset unit on global compliance regimes: The EU ETS- home of the world's largest emissions compliance market recognizes only CERs (and ERUs – the

8 Conversation with Aloysius Kamperewera, Chief Environmental Officer and Shamiso Najira, Deputy Director in the Environmental Affairs Department, June 15, 2012

offset unit for CDM Joint Implementation projects) among all offset standards. The Australia / New Zealand trading system, which is scheduled to go into force in 2015, will be accepting CERs as valid compliance units. Other countries planning compliance markets have also stated intention to recognize CERs under their regimes. Any future NAMA crediting mechanism is likely to require offset methodologies of similar rigor as that incorporated in CDM, and may allow crediting of these projects directly.

3. CER supply will soon be restricted, potentially buoying prices: New CER issuance will be restricted only to projects in LDC (least-developed) countries, which represent around 1% of historical CDM credit volumes. As an LDC Malawi may take advantage of their position as one of the few countries able to issue CERs.

For these reasons, and the fact that generally, markets driven by compliance obligation should enjoy stronger, steadier demand than those driven by preference, Malawi should look to promote CDM projects in the energy sector. In land-use sectors, the answer is slightly different, as the EU ETS doesn't allow CERs issued from Forestry projects as valid compliance offsets.

In regards to AFOLU projects, AR is the only forest project type recognized by the CDM. There are 20 existing approved AR methodologies, though only 8 have been used for validated projects. There are a number of conditions which much be met for all methodologies, namely that vegetation cover on the project land must have been below the forest threshold since 1990 and carbon stocks must be demonstrably increased as a direct result of the intervention of the carbon project. The forest threshold is defined by each country, but must have a minimum crown cover between 10 and 30%, a minimum tree height of 2-5 metres, and a minimum land area of 0.05-1 hectare. AR methodologies are designated as either small or large scale, with the requirement that small scale projects must remove less than 16,000 tCO_2 per year and must be developed by low-income communities and individuals. Each methodology is designed for specific pre-project and project scenarios, though some projects may be able to choose from multiple methodologies. Given the range of methodologies available, it is likely that any AR project activity type to be implemented in Malawi would be able to use an existing approved AR CDM methodology.

All credits issued for AR projects expire and must be replaced at the end of either the commitment period or the crediting period, and as such they generally command lower prices than credits from other standards. In addition, the validation process has been quite long for CDM projects, and longer still for forestry projects, taking nearly two years to complete. CERs issued from AR projects are not accepted for use under the EU ETS.

5.1.2 Verified Carbon Standard - VCS

VCS is the one of the most commonly used voluntary standards, particularly for AFOLU projects, and VCS issuance volumes are likely to increase in the near future. This is due largely to the international application of VCS, their adoption of REDD+ methodologies, and the flexibility that the standards present while also providing scientific rigor. Projects can use methodologies developed and approved by VCS as well as other standards, including CDM and Climate Action Reserve (CAR).

VCS recognizes a number of AFOLU project types including Afforestation, Reforestation and Revegetation[9] (ARR), Improved Forest Management (IFM), and Reduced Emissions from Deforestation and Degradation (REDD). The baseline for all projects must be established using internationally accepted protocols, such as the IPCC 2006 Guidelines for National GHG Inventories. For all AFOLU projects, native ecosystems cannot be converted, the baseline must be reassessed every 10 years, and a percentage of a project's credits must be set aside in a buffer pool based on the determination of non-permanence risk.

All potential project types in Malawi could be verified under VCS methodologies. There is currently high confidence and interest in VCS internationally[10], increasing the likelihood of attracting investment interest for VCS projects in Malawi, and finding a market for offsets generated under VCS. While there is not a high level of familiarity with VCS methodologies within Malawi, it is possible to engage consultants with technical expertise in AFOLU and measurement, reporting, and verification (MRV) systems to provide trainings and assist in establishment of baseline and project projections.

VCS credits (Verified Emission Reductions – VERs) from REDD+ projects were trading for USD8.80[11] in 2011, at a premium to CERs. In the future, nested REDD+ will be permitted under VCS, making it easier to scale up involvement in the carbon market.

5.1.3 American Carbon Registry – ACR

The ACR[12] was the first private voluntary greenhouse gas registry in the United States, and it accepts projects worldwide. ACR accepts projects that meet all ACR standards and use CDM methodologies or apply another ACR-approved methodology. Project developers can work with ACR to develop new methodologies in the event that existing methodologies are not appropriate. ACR has published a Forest Carbon Project Standard and is currently developing Nested REDD+ Requirements. It has also published methodologies on Afforestation and Reforestation of Degraded Lands and REDD - Avoiding Planned Deforestation, as well as IFM methodologies applicable to the U.S. Other REDD methodology modules are currently being developed. Therefore, Malawi could pursue projects under existing ACR-approved methodologies or could develop new methodologies. Projects may include multiple eligible activities, and may be aggregated across multiple ownerships.

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[9] Afforestation refers to forestation of land that has not been forested for at least 50 years. Reforestation refers to forestation of land that had been forested but was converted to non-forest. Many standards do not differentiate between afforestation and reforestation in practice, as they allow both. Revegetation refers to the establishment of vegetation that does not meet the definitions of afforestation or reforestation.

[10] Diaz, D, K. Hamilton, E. Johnson. 2011. State of the Forest Carbon Markets 2011. Ecosystem Marketplace.

[11] Peters-Stanley, M. and Hamilton, K. 2012. Developing Dimension: State of the Voluntary Carbon Markets 2012. A Report by Ecosystem Marketplace & Bloomberg New Energy Finance

[12] The American Carbon Registry is owned and operated by Winrock International, a nonprofit organization

ACR improved forest management and AR credits traded at an average of UDS 7.30[13] in 2011. The ACR includes several options for managing the risk of non-permanence, hence providing more flexibility than the VCS. The ACR is also developing nested REDD+ requirements.

5.1.4 Climate Action Reserve - CAR

CAR is a pre-compliance offset program that includes protocols on reforestation, improved forest management, and avoided conversion. At present it only includes projects located in the U.S., Mexico, and Canada, and so is not applicable to Malawi.

5.1.5 Gold Standard

The Gold Standard is focused on renewable energy end-use energy efficiency and waste handling and disposal projects in voluntary markets. It is not relevant for forest projects.

5.1.6 Plan Vivo

Plan Vivo is a standard specifically for community-based payments for ecosystem services programs, and as such is only relevant to AFOLU projects, not energy. Eligible project types are afforestation, agroforestry, forest conservation, restoration, and avoided deforestation. Project proponents – community groups – develop a land management plan and enter into a written payment for ecosystem services (PES) agreement with the project coordinator, who makes payments when monitoring targets are met. Seven projects have been registered on Plan Vivo, with three verified; an additional nine projects have had PINs approved.

Producers of Plan Vivo projects must be community-based organizations of small-scale farmers or land users with confirmed land tenure rights. They must work with an in-country project coordinator. Projects are required to focus on promoting sustainable livelihoods in addition to generating carbon offsets. Projects generally start small, with a pilot phase, and scale up over time; they must undergo third-party verification within five years of inception.

Because of the focus on sustainable livelihoods and the opportunity to scale up from pilot projects, Plan Vivo presents a viable option for Malawi to build capacity in developing forest carbon projects. The country already has familiarity and experience with Plan Vivo through the Trees of Hope afforestation and the Mkuwazi and Nyika REDD projects. Because Plan Vivo is focused on community development, it may fit well with the MGDS, and could be a good option if there is an upfront buyer for credits generated. However, the future market potential of Plan Vivo may be very limited, and its use is not recommended without an upfront buyer.

5.1.7 CarbonFix

Similar to Plan Vivo, CarbonFix is focused solely on forestry projects which have a commitment to both social and ecological responsibility. CarbonFix, however, is only applicable for tree planting projects.

[13] Diaz et al 2011.

Projects must demonstrate the use of sustainable forestry practices, and as with all other standards, they must show that they are additional in carbon terms to what would have occurred in the absence of the project. This standard is not widely used and the future market potential is likely lower than other standards. Therefore, the development of CarbonFix projects is not recommended without a secure upfront buyer.

5.1.8 Climate, Community, and Biodiversity – CCB

CCB is a standard intended to address co-benefits of carbon projects, rather than verifying actual carbon offsets. The standards evaluate the climate, community, and biodiversity impacts of AFOLU projects. To generate carbon credits, projects must use a carbon standard such as the ones described above in conjunction with CCB. Because most of those standards address only the climate impacts of the project, it is becoming increasing common to pair verification under carbon standards with verification under CCB. In 2010 nearly half of all AFOLU projects used CCB. Most often, VCS projects are paired with CCB, but Plan Vivo, CarbonFix, and CDM projects have also paired with CCB.

These projects may be more attractive to potential investors, but to date they have not yielded a higher price for offsets, nor is it clear that they have gained a higher market share than projects without CCB. The use of CCB should be based on the type of buyer the project hopes to attract; buyers with an interest in projects that have environmental and social benefits additional to GHG reduction will be more attracted to carbon projects which also have CCB verification.

5.2 Selecting Measurement Systems

The two most widely recognized offset standards are CDM and VCS. Their respective units, CERs and VERs are traded in the largest volumes of any offset types. For their liquidity and price benefits, Malawi should consider encouraging developers to execute offsets projects under these standards. In the Energy sector, CDM projects are likely to provide Malawian developers better sale options. In the Forestry sector, VCS or ACR may be preferable as the standard covers a greater range of REDD project types and has been used in many significant precedent transactions globally.

Table 3 Overview of Measurement Standards[14]

Credit	Unit	Typical Project Types	Market Volume: Value Traded Yearly	2011 Average Price
CDM	CER	All energy types	Primary CDM: $3,320m (2011) Secondary CDM: $23,250m (2011) Pre-2013: 91 MtCO2e Post 2012: 173 MtCO2e Total: 263 MtCO2e	EUR 4.3

[14] "Ecosystem Marketplace ""Developing Dimension: State of the Voluntary Carbon Markets 2012, http://www.forest-trends.org/documents/files/doc_3164.pdf
State and Trends of Carbon Market Place 2012, http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_2012_Web_Optimized_19035_Cvr&Txt_LR.pdf

VCS	VCU	Energy Methane, AFOLU	41 MtCO2e transacted in 2011 USD 191 M	USD 3.7
ACR		AFOLU Methane And other	4 MtCO2e in 2011	USD 5.8
Gold Standard	VER	Renewable Energy Supply from non-fossil and non-depletable sources End-use Energy Efficiency Improvement	Approx 8.5 MtCO2e (per Ecosystems) 8 MtCO2e (per World Bank) USD 86 m	USD 10.4
CCB		Forestry Agriculture LULUC	Low	Cobenefit Standard – USD 4.7
				CCB + VCS - USD 13.0
				CCB + ISO - USD 7.0
Plan Vivo	VER	AFOLU	0.5 MtCO2e	USD 7.0

Table 4. Summary of characteristics of standards applicable to AFOLU projects

Standard	Applicable Project Types[15]	Permanence	Crediting period	Market share
CDM	Only ARR	Credits expire or are cancelled and must be replaced	20 or 30 years	Minimal
VCS	All	Non-permanence risk tool – 10-60% to buffer pool	20-100 years	High
ACR	All	Buffer pool or risk mitigation insurance; risk tool	Minimum 40 years	Moderate
Plan Vivo	ARR, REDD	At least 10% of certificates go to buffer pool	Varies by project	Minimal
CarbonFix	ARR	30% of certificates go to buffer pool	Maximum of 50 years	Minimal

5.3 Technical Aspects of Forest Carbon Measurement and Monitoring

This section provides an overview of the technical requirements for measuring and monitoring forest carbon, regardless of which system/registry/protocol is used. However, the specific implementation will differ based on the requirements of the Standard, so prior to developing any project it is highly

[15] See Annex II for complete list.

recommended to determine the standard and the standard's approved methodology that will be used and consult the guidelines and requirements of that Standard.

5.3.1 Overall components in Project Development

Project development and creation include similar steps, regardless of the standard and methodology used. Projects must use a methodology that is applicable to the project and is approved by the Standard being used. The overarching steps can be summarized as:

- Creation of a project proposal or project idea note (PIN) (optional)
    - This document can assist the project developer to secure additional financing and to better understand the credit creation potential of the proposed project
    - Two example PINs are presented in Annex II
- Project Feasibility study (optional)
    - For some project types and locations it is advisable to conduct a more in-depth feasibility study beyond the needs of PIN. This will assist the project developer to have more assurance that the project will meet additionality criteria and to better understand the potential amount of create creation. This is especially recommended for avoided deforestation project types where the deforestation rates and potential leakage rates will be more clearly understood through a feasibility study.
- Creation of project documentation, such as Project Design Document (PDD)
    - This document will have similar components across standards. The PDD document should be seen as the summary document. There will be many 'supplementary documents' that will describe in more detail the steps that were used to implement the project.
- Validation of project by standard-approved third-party entity
- Registration of validated project
- Project implementation
    - Project shall initiate the activities described in PDD. Activities may take place prior to validation of the project under most standards
- Monitoring Event(s)
    - Project Proponent must implement the monitoring plan to estimate the net emission reductions that have taken place since the start of the project
- Credit verification and certification by a third party validator
- Credit issuance

5.3.2 Additionality and eligibility

The project proponent must demonstrate what the most likely land use management would have been in the absence of the project, referred to as the baseline scenario and then demonstrate that the project activities are additional to those that would have taken place in the absence of the project. Each standard and methodology will provide a step-wise approach for determining the most likely baseline scenario and demonstrating additionality.

Project eligibility must be shown as required by the chosen standard and methodology. Generally, eligibility requirements refer to the types of baseline and project activities that can take place and a demonstration that the land use and cover within the proposed project area has not been altered due to expected implementation of a future carbon project. The CDM has very specific eligibility requirements that the vegetation cover on the project land must have been below the threshold of the country's definition of a forest since 31 December 1989. The forest definition defines thresholds for crown area, tree

height and land area and must be submitted to the CDM. Currently, no forest definition is listed for Malawi[16]. Evidence for the historical land cover generally can come from land cover maps, medium-resolution imagery such as Landsat, and/or other types of historical land management plans and data.

5.3.3 Estimation of net baseline and project emissions

The net greenhouse gas emissions or removals taking place as a result of the project will be dependent on the difference between the emissions/removals taking place in the baseline and the emissions/removals taking place under the project and emissions from leakage. This can be summarized as:

Net Emissions/Reductions = Net Baseline Emissions – Net Project Emissions – Net Leakage Emissions

Or, for example, a more specific equation would be:

$$\text{Net Emissions or Reductions} = \left(\sum_{\text{Strata}} \text{Baseline Emissions from Sources} - \text{Baseline Reductions from Sinks} \right) + \left(\sum_{\text{strata}} \text{Leakage Emissions from Sources} \right) + \left(\sum_{\text{strata}} \text{Project Emissions from Sources} - \text{Project Reductions from Sinks} \right)$$

Greenhouse gases can be emitted from a variety of sources and removed from a variety of sinks. Carbon is also stored in a variety of organic stocks. One step in applying the applicable chosen approved methodology will be to identify all the sources and sinks that will take place within the baseline scenario and within the project scenario. Sources and sinks include:

- Fossil fuel use
- Livestock (direct and manure/urine)
- Fertilizers
- Water inundation
- Biomass burning
- Decomposition
- Vegetation Growth

Depending on the land use and land cover types found within the baseline and project scenario, different carbon pools will be measured and monitored to estimate changes in emissions. The chosen methodology will provide steps for determining which pools are required to measured and those that are optional. The groupings of pools is dependent on the standard, but can be summarized as:

- Live biomass
  - Aboveground live tree biomass
  - Belowground live tree biomass
  - Aboveground live non-tree biomass
  - Belowground live non-tree biomass
- Dead wood
- Forest floor (litter)
- Soil organic carbon

[16] http://cdm.unfccc.int/DNA/allCountriesARInfos.html

- Harvested Wood Products (not accounted for under CDM)

Based on the methodology used, for each activity that takes place under the baseline, project, and leakage the amount of each source or sink and the associated emissions for each of these sources and sinks will need to be estimated. For most sources and sinks, this is based on two main key technical components: the quantity of an activity (such as land use management or land cover change) and the emissions or removals resulting from that activity.

The quantity of an activity (referred to as Activity Data under the IPCC) component of the baseline, project, or leakage emissions estimate relates to the quantity of the activity that would have taken place or did take place over a certain amount of time. For example, if the expected baseline activity is deforestation, the Activity Data would refer to the forest area within the project boundary that would have been converted to non-forest within a certain timeframe. If the most likely baseline activity is the continuation of agricultural production on non-forested land, the Activity Data would refer to the area within the project boundary expected to continue be under agriculture production.

The quantity of GHG emissions or sequestration resulting from the baseline activity must then be estimated. Often this is estimated as the emissions or removals per unit of the activity, referred to as an Emission Factor under the IPCC. For example, if the project activity was the planting of trees within an area, the project removal factor could be estimated based on the increase in biomass per year within the trees planted.

Combining the 'activity data' with the 'emission factor' for each activity will provide an estimate of the net GHG emissions resulting from that activity per year. Therefore, it will be imperative to have precise estimates of both the area where activities take place per year (or if the activity is not area based, the quantity of the activity per year) and the net emissions/removals per year for each of these activities. This will be required for baseline activities, project activities, and leakage activities (although leakage estimation methods vary within methodologies).

For afforestation, reforestation, and revegetation projects in Malawi, the baseline scenario will most often be the continuation of cropland. In this instance, ground measurements with a GPS must be taken to delineate the boundaries of each parcel of land where the project will take place. These GSP measurements are then uploaded into a GIS database to estimate the total project area. The estimated emissions/removals per year within cropland will then be based on which GHG sources and sinks must be accounted for using the approved methodology. Under the CDM, GHG emissions from fertilizers can be ignored in the baseline. The change in emissions per year in such a baseline are then simply any increase in carbon stocks projected to take place within any trees or woody shrubs existing within the project area.

Under the project scenario, any GHG sources will need to be monitored and emissions estimated, such as the use of fertilizer. In addition, the emission removals as a result of ARR project activities can then be estimated by measuring the increase in carbon stocks per year within the trees or other vegetation planted by project activities.

Detailed guidance on the steps to developing and implementing AFOLU carbon projects can be found in a variety of existing guidebooks.[17]

A summary of the types of data that the GoM can develop to assist project developers to develop carbon projects is presented in section 7.2.3.

Box 1. Remote Sensing Imagery

Earth observation satellites have been orbiting the Earth, providing continuous coverage since the 1970s. Numerous satellites are currently observing the Earth on a regular basis, collecting information at spatial scales ranging from <1 meter to hundreds of kilometers and at wavelengths ranging from visible to microwave. More than 10 countries[18] have developed satellite systems that providing a huge amount of historical and current remote sensing data. Given these ranges (spatial, spectral and temporal), not all satellite images are appropriate for forest monitoring at a project level (Table 6).

Box Table 1. Review of optical sensors according to their spatial resolution and their appropriateness to project-level forest monitoring

Spatial resolution	Examples of current sensors	Appropriateness for project-level forest monitoring	Cost
Coarse (250-1000 m)	SPOT-VGT, Terra-MODIS, Envisat-MERIS	Appropriate only for identifying large clearings and locating "hotspots" at global and continental scales	Low or free
Medium (10-60 m)	Landsat TM or ETM+, Terra-ASTER, IRS AWiFs or LISS III, CBERS HRCCD, DMC, SPOT HRV	Proven appropriateness for mapping land cover and land cover change at project, sub-national and national scales	Free to low for historical data; Low to medium ($0.02/km² to $0.5/km2) for recent data
High (Fine) (<5 m)	IKONOS, QuickBird, Aerial photos	Appropriate for validating results from coarser resolution analyses and training remote sensing algorithms	very high $2 -30 /km²

[17] Olander, J. Ebeling, J. 2010 Building Forest Carbon Projects: A Step-by-Step Guide. Forest Trends. http://www.forest-trends.org/documents/files/doc_2555.pdf
Pearson, TRH, Walker, S., Chalmers, J., Swails, E., and Brown, S. 2009. Guidebook for The Formulation Of Afforestation / Reforestation And Bioenergy Projects In The Regulatory Carbon Market. Winrock International. http://www.winrock.org/Ecosystems/files/AR_CDM_Guide_BOOK.pdf
Pearson, TRH, Walker, SM, and Brown, S. 2005. Sourcebook for Land Use, Land-Use Change and Forestry Projects. http://www.winrock.org/Ecosystems/files/Winrock-BioCarbon_Fund_Sourcebook-compressed.pdf

[18] Countries with satellite systems in place are: USA, France, Belgium, Sweden, Japan, India, Brazil, China, Italy, Germany and Russia

Medium- or high-resolution remote sensing imagery combined with ground validation is ideal for demonstrating the eligibility of the carbon project boundary, because imagery can be interpreted to create a land cover map that delineates forest from non-forest areas based on user-defined criteria. Provided that they fall into the time window of the historical reference period, land cover maps that are generated to demonstrate project eligibility can also be used to estimate the rate of historical deforestation, which is a key step in developing the baseline emissions estimate.

Another evolving technique for forest monitoring is radar. Cloud cover prevents frequent observations of cloudy areas (such as tropical forests) using multispectral optical satellite images (Landsat or SPOT), so the use of radar imagery is a promising method for monitoring forests that are under perpetual cloud cover. Combining different types of imagery (optical, lidar, radar) can enhance the accuracy of resulting land cover maps and, in some cases, estimates of biomass carbon stocks[19]. Radar imagery (e.g. JERS) is available only for recent years (since about 2006). Because deforestation baselines typically require imagery to be at least 3 years apart, radar imagery is useful for documenting recent land cover changes but optical data will still be necessary for documenting land cover pre-2006.

Light Detection And Ranging (LiDAR) remote sensing technology has evolved in the last few decades as a tool for measuring and understanding forest structure. The advantage of using LiDAR imagery for forestry applications is that it can provide information about three dimensional forest structure, and can therefore characterize features such as vegetation height, vertical distribution of the canopy, and crown volume. The use of LiDAR data by itself is not typically used for creating land cover maps, but combining forest structure characteristics with other data can be useful for distinguishing among different forest types. These features can also be used to map forest biomass across large areas[20].

5.3.4 Ongoing measurement and monitoring

After the project has begun, ongoing measurement and monitoring must occur that tracks all changes in carbon stocks that occur within the project boundary as well as any leakage emissions that occur as a result of project implementation.

A good monitoring plan includes the following:

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[19] Treuhaft R N, Law B E, Asner G P. 2004. Forest Attributes from Radar Interferometric Structure and its Fusion with Optical Remote Sensing. BioScience. (56):6

[20] Asner, G P. 2009. Tropical forest carbon assessment: integrated satellite and airborne mapping approach. Environmental Research Letters. (4):034009. Available online at: http://iopscience.iop.org/1748-9326/4/3/034009/fulltext

- Technical description of the monitoring component
- Data to be collected
- Overview of data collection procedures
- Quality control and quality assurance procedures
- Data archiving
- Organization and responsibilities of the parties involved

There are many specific elements that must be monitored. Prior to any verification event, the following monitoring activities must be conducted.

- A summary of all project activities must be developed.
- Using remote sensing or ground measurements, the project boundaries must be re-delineated.
- The area where land use management change has taken will need to be estimated using GPS field measurements, or for some activities, remote sensing in combination with field verification. Any non-CO_2 emissions, such as fossil fuel use, biomass burning, or fertilizer use will also need to be calculated and summarized.
- Changes in carbon stocks due to either growth of trees or degradation activities will need to estimated using field measurement methods.
- Market effects leakage and activity displacement leakage must be monitored to the extent required by the chosen project type and methodology.

6 CARBON OFFSET PROJECTS IN MALAWI

Based on research, stakeholder surveys, and stakeholder meetings, consultants conducted a review to identify several projects activity types that could be implemented in Malawi within the next 1-3 years.

The selected priority activities have been assessed according to criteria required for successful project implementation. These criteria include additionality, permanence, and low risk of leakage. Other elements, such as community impact, project developer's track record, and technical requirements, while not mandatory, are important for gaining community support and avoiding unintended consequences as a result of the carbon project.

Critical project attributes have been considered for existing projects and selected priority activities:

- **Additionality**: Some existing projects may be taking place regardless of carbon markets and thus may not be considered 'additional'. We note that the CDM Executive Board EB provides some flexibility to LDC countries when it comes to demonstrating additionality.**Technical capacity requirements** and potential need for external consultants: The ability to implement some project activities will be dependent on the expertise currently existing in Malawi. Recommendations will be made.
- Track record of project activity **implementation**: It is critical that project developers have shown the capacity to both implement and monitor project activities. While this does not necessitate that a full project has been successfully completed, project activities with little or no known success rate will likely be more risky.

- **Non-permanence risk**: The voluntary market standards have explicit criteria to assess non-permanence that will be evaluated for each project activity type.
- **Leakage risk**: Leakage occurs when the reduction of emissions in the project area leads to an increase in emissions elsewhere. Leakage potential will be projected based on expected project activities.
- **Carbon credit generation potential**: An overview of credit generation potential will be presented for the project types considered.
- **Financial requirements and expected financial flows** over time: Financial impacts include both direct project costs and returns, as well as lost opportunity costs. For instance, in the case of a REDD project, there may be few direct project costs, but there may be significant lost opportunity costs due to the reduction in available land for other purposes.
- **Impact on communities** within and surrounding project area: Many forest carbon projects lead to co-benefits above and beyond the offsets generated. However, projects can also have a negative impact on surrounding communities by leading to a change in lifestyle, a decrease in land available for cultivation, and a reduction in available jobs such as logging or road-building.
- **Income generation potential** beyond carbon credit creation: Because the sale of carbon offsets rarely pays entirely for a project, it is useful, and often necessary for a project to have other means by which it generates income or revenue.
- Assessment of **repeatability** of current project activities, structures, and designs for other projects in Malawi: While repeatability is not necessary for an individual project to be successful, it is often much easier to replicate a project, thereby creating economies of scale and increasing opportunities for participation in the carbon market throughout Malawi.

6.1 Energy Sector Projects

Although a wide range of carbon financing mechanisms currently exist, current offset trading conditions hinder the development of offset projects in Malawi. Currently with carbon prices at historically low levels, potential developers may be reluctant to undertake the complex and challenging process of offset project design and execution. Trading prices are held down in large part by the current glut of credits for EU ETS compliance and by the uncertainty regarding the CDM regime after 2020. But several international carbon market developments are about to boost the value of CERs. After 2012, the supply of credits from new projects will be restricted to those hosted by LDC countries, as discussed in section 2.3. European regulators are also now reducing planned EUA credit offering volumes, which may generate greater need for offsets among covered European entities.

Another critical project challenge relates to the drafting of a PDD, which is expensive, typically unfamiliar for most would be project proponents and may require extensive data collection and analysis. Malawi has the opportunity to overcome the obstacles posed by the PDD creation process. Local developers can seek support for their efforts drawing on resources becoming available through international funding mechanisms and a wealth of project data granted through PDD content sharing.

Two critical new PDD resources for project developers include the **UNFCCC Loan Scheme for CDM** and open source document templates such as CarbonSoft's *Open Source PoA, LED lighting distribution: Pan-Africa* (its presentation of default baselines is discussed in in more detail in section 7.2.2). The Loan

Scheme for CDM offers interest-free loans for potential project developers looking to initiate promising projects in countries where fewer than 10 CDM projects have been registered with the UNFCCC (which includes Malawi)[21]. The loan is intended to cover the hire of CDM-experienced consultants to aid in the design of CDM documents and can be applied for via a streamlined, online process. Public documents such as the PoA produced by CarbonSoft for LED lighting distribution projects also represent a rich source of critical inputs for developers. Having the document structure in place along with specified default values greatly reduces the strain on developers who would otherwise be forced to start from scratch and tailor a document to strict UNFCCC standards. Both resources should be noted by the DNA in its promotion efforts and with capacity building sessions for the private sector (see 8.3.1 and 8.3.2). Other resources for LDC project developers are included in the table below.

Table 5: CDM Project Development Resources[22]

Entity	Program	Resources Provided
UNFCCC / UNEP	**Loan Scheme for CDM**	• Interest-free loans for PDD design
CarbonSoft	Open source PoAs	• Template document for use in LED PoA design- may be easily adapted for cookstove distribution projects
UNEP / GIZ	AFRICA CARBON ASSET DEVELOPMENT INITIATIVE	• Targeted grants for early stage costs • Technical assistance for local project developers • Carbon finance training for local financial institutions
AFRICAN DEVELOPMENT BANK (AfDB)	AFRICAN CARBON SUPPORT PROGRAMME (ACSP)	• Technical assistance for local project developers • PIN/PDD design support • Funding to cover project transaction costs
UNDP	MILLENNIUM DEVELOPMENT GOALS (MDG) CARBON FACILITY	• Project development services • Technical assistance for the approval process • Assistance in monitoring and reporting during a project's first year of operation • Financial support

21 http://cdmloanscheme.org/

22 UNFCCC 2012, *CDM in Africa: Finance and Support* http://unfccc.int/resource/docs/publications/pub_cdm_africa_finance_2012.pdf

World Bank (Carbon Funds)	Carbon Partnership Facility	• POA support
	Carbon Initiative for Development	• Funding and technical assistance for capacity building and methodology and project development
World Bank Institute	Training Seminars	• Technical capacity building
German KfW	KfW Carbon Fund	• PoA design and financing support

While perseverance will always be required on the part of private project developers, targeted Government support and effective use of international support can help reduce barriers preventing developer interest and project success. By pushing forward with offset development now, Malawi will also be well positioned to pioneer opportunities related to emerging crediting systems such as next generation PoAs, and National Appropriate Mitigation Actions (NAMAs). A current list of CDM-focused offset projects under evaluation by the Malawian DNA are featured below.

Table 6: CDM Projects Submitted to Malawian DNA

	Project Name	Project Status	Developer	Estimated GHG reduction p.a., tCO2e	Estimated start date
1	Kayelekera Steam Turbine Project	PIN	Paladin Energy Ltd,	10,348	Sep-13
2	Promotion of Efficient Cook Stoves in Malawi	PIN submitted, pending review	SADC Regional Carbon Facility & IViulanje Renewable Energy Agency (MuREA)	37,072	Sep-13
3	Distillery effluent (vinasse) management at EthCo Ltd.. Dwangwa, Malawi	PIN	Hestian Innovation Limited	40,000	Apr-13
4	Improved cook stoves for Malawi	PIN	CO2balance UK Ltd.	52,000	Sep-13
5	CarbonSoft Open Source PoA. LED lighting distribution: Pan Africa	PDD submitted, LoA issued, pending registration	CarbonSoft Corporation UK and Solar Solutions Malawi	49,187	Oct-11
6	PoA for Landfill Gas Capture Project	PIN	Malawi City Councils Environment Consortium	130,000	June-13
7	PoA for the Reduction of Emissions from Non-renewable fuel from Cooking at household level	PIN	Green development AS	100,000	April-12

	Project Name	Project Status	Developer	Estimated GHG reduction p.a., tCO2e	Estimated start date
8	Off-Grid Rural Electrification Project For Malawi and Mozambique (using suppressed demand methodology)	PIN	Chinansi Foundation	284,000	Dec-12
9	International Water Purification Programme	PIN	South Pole Carbon asset Management	60,000	Feb-12
10	Blantyre City CDM Compost making project from MSW	PIN	Active Youth initiative for Soda/ Enhancement (AYISE)	50,000	Oct-13
11	Malawi Sustainable Urban Energy Protect (Promotion of efficient alternative energy sources in Malawi using Save80 cookstoves)	PIN	Initiative for Climate Change Management Ltd	970,300	Jan-14
12	Improved Cooking stoves for rural households In Malawi	PIN	Chinansi Foundation and Getec Climate Group	38,410	June-12
13	Nkhotakota Geothermal Power Project	PIN	Department of Energy Studies, Mzuzu University	205,530	Jan-17
15	Efficient lighting programme – CFL lights in pilot areas in Malawi	PIN	Department of Energy Studies, Mzuzu University	9,843	Jan-17
	Total estimated			**2,036,690**	

Source: Malawian Environmental Affairs Department (EAD)

6.1.1 Barriers to Implementation

With Certified Emission Reductions (CERs) currently valued at less than US$6.00, offset revenue often does not fully address project financing needs. Even at higher prices (US$25-45 / ton), carbon finance is not a singular means of project financing. Forward sales of CERs—in the form of an Emission Reductions Purchase Agreements (ERPAs)—can be utilized as collateral by both private sector and governmental stakeholders to secure loans, but do not provide funding for an entire project.

Institutional barriers to the economic benefits of carbon financing are numerous. For example, although the MGDS cites the development of more biomass electric generation, basic capacity studies, emission factors (EFs) and reference baselines for must be completed in order to implement projects utilizing carbon finance.

Capital and operating costs of project implementation are also significant and vary by project type. We outline the potential costs (excluding transaction-related) on a unit abatement basis in the MACC figure. The values here are provided as rough estimates, drawing on offset project research from previous World Bank studies (de Gouvello 2008), a Wuppertal Institute study from 2011 and data from various offset project design documents. A more representative estimate of Malawian national abatement potentials and unit costs would require extensive data collection efforts to cover the relevant MACC inputs. While

this task would be difficult, Malawian officials and/or outside consultants might plausibly collect the necessary information on a set of 10 - 12 addressable project types within a 2 - 3 month timeline. Determinants of offset costs and potentials for specific project types can largely be covered through the acquisition of the energy sector reference data outlined in 7.2.2, including household and industrial emissions factors, baseline emissions estimates and projected energy consumption by relevant sectors. Other critical inputs would include offset project financing and operating cost estimates.

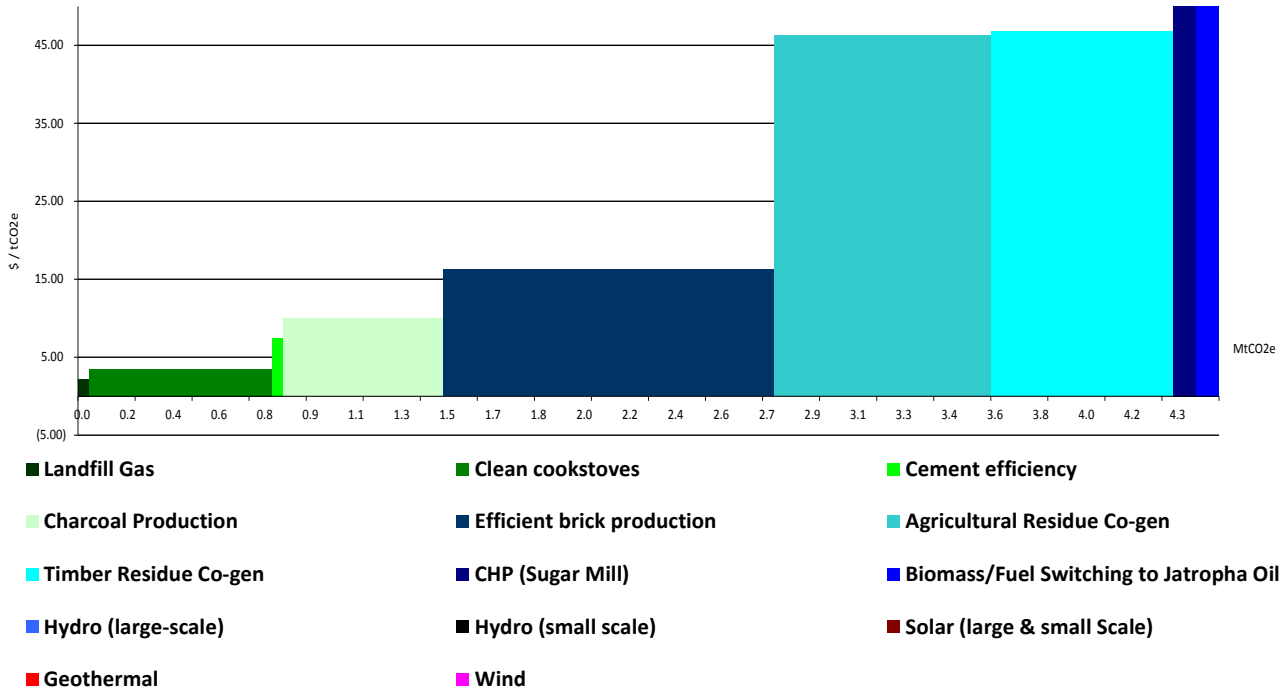

Figure 2 Indicative Marginal Abatement Cost Curve (MACC) for selected Malawian energy projects

Note: costs calculated on "gross" basis. Revenues from project execution (such as brick sales) not incorporated. Input sources: de Gouvello 2008, Wuppertal and Hamburg 2011, various project design documents, internal calculations

Table 7 Overview of selected energy sector offset sectors (shaded projects of primary interest)

					Submitted Precedent Projects	
SECTOR	**PROJECT ACTIVITY**	**DESCRIPTION (as per EAD)**	**Potential Opportunity**	**Potential Obstacles**	**Africa (to UN)**	**Malawi (to DNA)**
Energy Efficiency	Efficient energy technologies	Use of energy saving bulbs	One PDD in sector approved, in registration	Project development expensive, challenging	**11**	**9**
	Efficient energy technologies	Use of efficient firewood cooking stoves	Many precedents; potential to join wider regional POAs and lower local development costs	Project development expensive, challenging		
	Increase ethanol to petrol blending ratios	Increase ethanol blend from to 20%	Greater mix would also help ease Malawi fuel supply constraints.	Vehicles may not be ready for higher blends; scale potentially limited	**0**	**0**
Renewable energy options	Wind power generation	Wind power along the lake shore and Likoma Island		Transmission and siting approval costly- note national difficulties in power development; non-grid baseline emission factors will be costly to establish	**39**	**0**
	Geothermal power generation	Electricity generation in the Northern and Central Regions of Malawi. Potential of using ground source heat pumps for space heating and cooling in buildings.			**4**	**1**
	Solar energy (heating and lighting)	Electricity from solar panels for domestic uses. Use of solar water heaters in household and service sectors.			**11**	**0**
	Mini hydro power generation	Mini hydro power generation	Significant hydropower production potential	Lack of baseline information, PDD costs are high	**12**	**0**
Cement Industry / Other Industrial Efficiency	Changing Blending/Mix of Cement	Increase in the proportion of additives, such as limestone, pozzolana and fly ash in the line grinding process thereby reducing the clinker content	Malawi cement production capacity: 260kt / year	Potential limited: clinker substitution at all national cement facilities likely to only yield about 30ktCO2e in emissions reductions	**3**	**0**
	Alternative Fuels	Use of renewable resources for less resource-intensive processes such as grinding -In pyro-processing, fossil fuels can be partly replaced by alternative fuels such as gas or unconventional masses (tires, plastics, textiles or rubber, etc.)	Existing successful precedents, including BERL (developed as voluntary standard credit project)	Very expensive on gross abatement unit basis.	**14**	**0**
	Energy Efficiency	Multi-technology options including:		Potentially limited scale	**25**	**1**

					Submitted Precedent Projects	
SECTOR	**PROJECT ACTIVITY**	**DESCRIPTION (as per EAD)**	**Potential Opportunity**	**Potential Obstacles**	**Africa (to UN)**	**Malawi (to DNA)**
		upgrading of preheaters, upgrading clinker coolers, optimization of grinding media, automatic controls, variable speed drives, efficient motors, etc.				
	Waste Heat Recovery	-Capture of waste heat vented at the pre-calciner and/or cooler end of kilns and use to preheat raw materials and fuel - Heat recovery at boilers and generation units and production of electricity		Potentially limited scale		
Sugar Industry / Other Industrial Own Generation	Co-generation (Combined Heat and Power)	Combustion of sugar cane biomass residues (bagasse) to produce steam and electricity. The electricity to be fed into grid to supplement the generation capacity and reduce private fossil generation.	Sugarcane production managers may be well-equipped to develop projects	Scale potentially modest-emissions yield estimate for entire country (~2.5m tons sugarcane / year) under 120ktCO2e, based on African biomass CDM PDDs; requires custom baseline	23	0
Timber Industry / Bio-residue own generation	Co-generation (Combined Heat and Power)	Use of timber waste (thinnings, cuttings and saw dust) in boilers for electricity production	Co-benefits: protecting the frequent bush fires emitting CO2 into the atmosphere through uncontrolled burning or decomposition.	Scale uncertain; Requires custom baseline design	**4**	**1**
Waste Management	Composting	Composting		High unit abatement costs	**42**	**1**
	Mechanical biological treatment	Biogas generation from human and animal waste	Unit abatement costs of projects typically attractive	Limited scale		**0**
	Disposal of waste in sanitary landfill	Methane capture and electricity generation from municipal landfills	Project under investigation; local precedent in Tanzania; supportive municipal government	Estimated abatement scale only around 34ktCO2e p.a.		**1**
Building materials	Housing redevelopment/ development	Use of stabilised cement blocks, efficient bricks and/or timber and grass	Large potential impact scale (over 1,000ktCO2e p.a.); local projects in development	Few local precedents	**1**	**0**

Sources: Malawian Environmental Affairs Department, Wuppertal and Hamburg 2011, Various PDD documents, DNV KEMA data

Malawi's most promising abatement potential lies with the dissemination of clean cookstove distribution projects and landfill gas capture / combustion. Enhanced brick production is also a project sector with large abatement potential, but these projects are likely to be more expensive on an abatement unit basis and offer few regional precedents to ease development.

6.1.2 Cookstove Distribution Projects

Available Methodologies: The CDM-approved small-scale methodology AMS II.G "*Energy efficiency measures in thermal applications of non-renewable biomass*" and the Gold Standard approved large-scale methodology V.02 "*Improved cook-stoves and kitchen regimes*" are the most feasible methodologies for implementing cookstove projects in Malawi. Most other CDM and GS methodologies cannot be used as they only apply to projects introducing 100% renewable energy and zero emissions technologies such as solar or biogas cookers.

Current Projects: A number of improved cook stove projects are currently being developed in Malawi. Projects seeking CDM credits include 2, 4, 7, 11, 12 from table 7. Two other notable projects considering voluntary credit issuance are outlined below.

The *Integrated Biomass Energy Conservation Project* located in Malawi reduces GHG emissions from non-renewable biomass fuel by dissemination of improved household and institutional cook-stoves and fuel-efficient rocket barns to replace existing inefficient curing barns. The project is based on research and development relating to stoves and barns by the Programme for Biomass Energy Conservation (ProBec) located in Malawi. Hestian Rural Innovation Development, a company promoting fuel-efficient technologies, was founded on the basis of this pilot work in 2008 and serves as the implementing organization. The project is being implemented in all three regions of Malawi: Southern, Central and Northern.

The *Developing Innovative Solutions with Communities to Overcome Vulnerability through Enhance Resilience* (DISCOVER), was initiated in 2012 and is being implemented by a consortium of four groups (Concern Universal, COOPI, Goal, Self Help Africa) with funding from DFID, Irish Aid, and Norway. The group CLIOMA is assisting in linking credits produced with potential buyers and the project is working to produce credit under the Gold Standard. The project will start in the districts of Balaka, Dedza, Karonga, Nsanje and Salima but may scale up. The project is producing training materials and manuals, training extension workers and stove promoters, and creating monitoring systems.

Current Obstacles: Revenues from carbon credits can stimulate the production and dissemination of improved cooking stoves on a large scale. However, the methodologies utilized by the CDM and GS are complex and require substantial technical expertise. While monitoring can be conducted by tracking cookstoves through their serial number, this requires the coordination of implementing organizations and local communities in order to accurately assess usage. Moreover, the initial project planning phases are time-consuming and require high-levels of upfront capital. The crediting period and issuance of the first credits typically do not start until two years after the onset of a project. For that reason, a lack of up-start financing can be a significant barrier to entry. According to stakeholder engagements, local ground facilities for initial start-up are insufficient. Furthermore equipment for cookstoves can be expensive and difficult

to import. The DNA might consider efforts, potentially alongside the MTIC, to attract local stove component manufacturing, which may also present labor market co-benefits.

6.1.3 Landfill Gas Projects

Significant quantities of waste are disposed of in Malawi's major cities: Lilongwe and Blantyre. Solid waste is disposed of in Lilongwe's Area 38, to the south of the city. This waste disposal facility receives approximately 20,754 tonnes of waste per month—including 15% from industries; 25% from commercial areas; 20% hospitals; and 40% from residential areas. Moreover, the Lilongwe City Council recently provided another waste disposal site for tobacco by-products in Area 27, which is close to the tobacco industrial site. Chipeta and Binauli (2005) [23] reported that Blantyre alone generates 185,420 tons p.a. of solid waste but only 32% of the generated waste reaches the tipping site, the rest (68%) being disposed of (and often burned) elsewhere such as rubbish pits, along streets, rivers, and open places. Additional 5,889 tonnes of waste in Blantyre city is due to population increase every year. Of this composition approximately 50% is organic waste. The installation of a Landfill Gas (LFG) collection system could capture the methane gas that is being generated within Malawi's major towns and this could either be flared in a flaring facility or used to generate electricity. The availability of sewer treatment plants, could further harness the capture of LFG for power generation. However technical details would need to be worked out before this can be said with certainty as landfills in Malawi are technically dumpsites and considerable investment will go in to first develop a landfill facility .

[23] Chipeta, L. and Binauli, L. (2005). Domestic solid waste management problems in urban areas in Malawi: The case of Blantyre City. In Zeleza Manda (ed.): Physical planning in Malawi. Malawi Institute of Physical Planning, Lilongwe.

Figure 3 Landfill site for Blantyre's waste with all constituent matter in open and unsorted

Available Methodologies: There are several CDM and VCS methodologies that can be applied to a potential LFG project within Lilongwe. The methodology depends on quantities and composition of waste, as well as the depth and coverage of the landfill. One of the most typically used methodologies in CDM is ACM0001 ""Consolidated baseline methodology for landfill gas project activities", which was used in the *Landfill gas recovery and electricity generation at "Mtoni Dumpsite"* CDM project registered in Tanzania[24].

Current Projects: The Malawi City Councils Environment Consortium is currently promoting a landfill gas project and has submitted a CDM Project Idea Note to the Malawian government. Project proponents estimate that the project will reduce emissions by 130kt CO2e p.a., while independent studies suggest that the actual potential for reductions may be much lower (see Wuppertal and Hamburg, 2011[25]). The MTIC notes working with the City Councils for the promotion of the project.

Current Obstacles: The technical inputs for a LFG project are fairly complex and capital intensive. The Mtoni Dumpsite investment cost was about EUR 4m[26]. While the Mtoni dumpsite was able to ensure a short cash payback period from credit issuance alone, raising a similarly large sum of initial capital will be difficult in Malawi, particularly as CER prices have fallen substantially from their 2008 levels (when Mtoni

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[24] CDM PDD document for *Landfill gas recovery and electricity generation at "Mtoni Dumpsite", Dar Es Salaam, Tanzania* , 2007 http://cdm.unfccc.int/filestorage/P/J/3/PJ3O269J1V5NS4LBFNKKES91LUYP1G/PDD.pdf?t=Mkt8bTgxdDNifDAHL8BZCcV3vilIVfDiYGEX

[25] Wuppertal and Hamburg, 2011 *The CDM Project Potential in Sub-Saharan Africa with Focus on Selected Least Developed Countries*

[26] http://www.ideascentre.ch/documents/4.33_CaseStudyTanzania.pdf

was registered). Additionally, waste volumes at landfill sites must be largely organic in order to generate sufficient methane for projects and be sufficiently concentrated. Several project developers in Africa have noted that less-developed countries tend to have less organic waste in landfill. Also, World Bank research indicates that most African district waste sites gather scattered, unmanaged content. All the designated landfills in Malawi are in essence dump sites, and would need to be modified with equipment that could increase capital costs further. Licensing rights to recovered methane also frequently complicate these projects[27].

6.1.4 Efficient Brick Production

Available Methodologies: Efficient Brick Projects have been executed using AMS-II.D: *Energy efficiency and fuel switching measures for industrial facilities* and AMS-III.Z: *Energy management measures at brick works*.

Current Projects: There is currently a brick production efficiency project at the validation stage in South Africa, and several have been executed in Bangladesh, Nepal and India. None have yet been submitted to the Malawian DNA. Development Alternatives managers (associated with the Hestian Innovation team) are exploring opportunities to execute their efficient "Vertical-shaft Brick Kiln" projects, as executed in South Africa and South Asia.

Current Obstacles: Materials from Soumen Maity of Development Alternatives suggest that that capital costs are relatively modest, limiting related challenges. However, CDM approval has been complicated by the difficult of document design, baseline establishment and verification. These difficulties are not unique to the project type, but may be particularly onerous due to the limited project precedents in the region and the lack of available baseline data. Given the large project potential in the sector, this is a project type where the DNA could have a large impact via publicly distributing aggregate household data for the determination of baselines.

6.2 Land Use Sector – AFOLU

In Malawi, the majority of the population is dependent on the land and forest resources for their livelihoods. The forests cover 2,562,000 hectares, representing 27% of the total land area of Malawi[28]. Forest resources are declining, with annual deforestation rates between 0.9% and 2.8%[29]. The main deforestation and degradation drivers are widely acknowledged to be: i) uncontrolled tree felling for fuelwood for curing tobacco in the smallholder and estate sector ii) opening up of new gardens and farming areas iii) firewood for commercial purposes iv) infrastructure development and shifting cultivation where woodlands remain[30]. In addition, deforestation and degradation through various drivers accounts

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[27] De Gouvello et al, 2008 *Low-carbon Energy Projects for Development in Sub-Saharan Africa Unveiling the Potential, Addressing the Barriers*

[28] http://earthtrends.wri.org/pdf_library/country_profiles/for_cou_454.pdf

[29] http://rmportal.net/library/content/tools/compass-ii/redd-credits-boost-community-partnerships-for-biodiversity-conservation-in-malawi/view

[30] Chirwa, M. personal communication

for the vast majority of emissions in Malawi (Figure 3). Carbon finance has the potential to allow for an improvement of such land management while also reducing the net carbon dioxide emissions in Malawi.

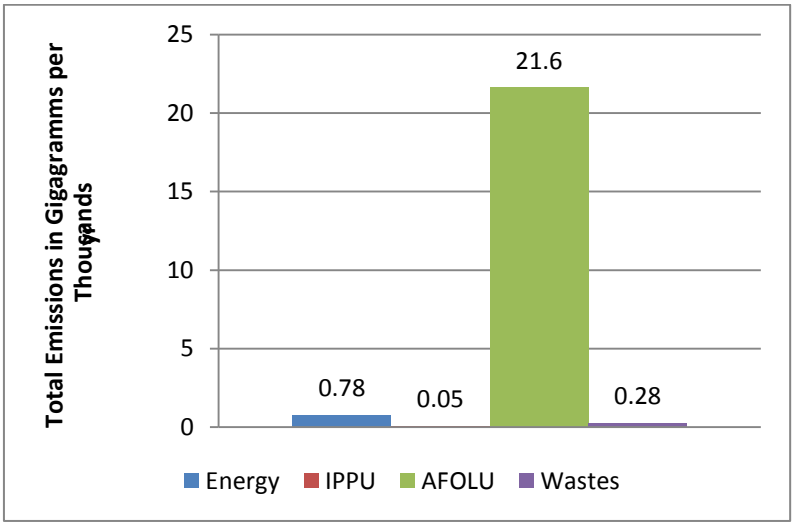

Figure 4. Total Emissions per year for Malawi (IPPU - Industrial Processes and other Product Use) (Data source: Government of Malawi. (2010). Malawi State of Environment and Outlook Report: Environment for Sustainable Economic Growth. Ministry of Natural Resources, Energy and Environment, Lilongwe).

Within the carbon market, activities taking place in the Forest sector are generally divided into the following project activity types: Avoided conversion or degradation (such as reduced emission from deforestation and degradation (REDD) and avoided conversion or degradation of grass/shrublands); Afforestation and Reforestation, Revegetation; Improved Forest Management; Agricultural Land Management. However, in Malawi, due to the common trajectories of land use, some potential project activities may be fit within one or more of these activity types. In addition, according to the CDM website[31], Malawi has not selected a forest definition. This definition may impact what category a given activity would be defined as. For example, depending on the forest definition, a tree planting activity could be considered reforestation (land moving from nonforest to forest) or improved forest management (improving low productivity forest). Similarly, depending on the forest definition, an activity that is reducing the amount of wood removed may be classified as reducing deforestation or as reducing degradation or as even afforestation if such reduction allows the tree cover to increase.

In the following discussion, potential project activities are delineated in the following groups: Reduced emissions from Deforestation and Degradation; Afforestation, Reforestation, and Revegetation; Improved Forest Management; and Agricultural Management. However, for a given location and proposed project activity it is recommended that an assessment take place of the regulatory or voluntary standard to be used and the existing approved methodologies within that standard. As stated above, some project activities that may appear to be, for example, improved forest management projects may actually be categorized as a REDD under a specific voluntary standard.

[31] http://cdm.unfccc.int/DNA/allCountriesARInfos.html

In addition, under the voluntary standards, various activities can take place within one overall project. For example, one project may entail avoiding deforestation; eucalyptus plantations; agroforestry; and boundary planting. Such a project would apply a number of different methodologies for each of the areas within the project.

Following the review of the different potential project activities, overall recommendations to the GoM are provided.

6.2.1 Reducing Emissions from Deforestation and Degradation

In the past, Malawi was heavily forested. Currently, forest remains primarily on protected areas such as National Parks and Wildlife Reserves, Forest Reserves, and protected hill slopes. Some forest does still also exist as natural woodland on customary land and in graveyards/sacred forests. *Brachystegia* species dominate in the forest reserves and natural woodlands. Unfortunately, these forests are now under severe threat of depletion as enforcement of their protection has been surpassed by the rate of deforestation. The total cover is estimated to be declining at the rate of 1.0 to 2.8% annually due to deforestation for fuelwood, charcoal and settlements. The Forest Resource Mapping and Biomass Assessment of 1991 showed that in 1973, *Brachystegia* forests occupied about 45% of the total land area of Malawi while in 1990/91 land under *Brachystegia* forest cover declined to 25.3, a decline of about 44%[32]. Malawi supports one of the highest population densities in Africa, its inhabitants numbering nearly 14 million[33], 85% of which is in rural areas, relying on forests for livelihoods. As the population increases (currently at a rate of more than 3% per year), forests are being rapidly cleared for settlement and energy supply. It is recognized that this high and rapidly growing human population is one of major causes of forest degradation in Malawi, leading to a retrogressive trend over the years due to deforestation.

Forested lands outside of national reserves allow the development of participatory social forestry where there can be the establishment of Village Forest Areas (VFAs), forest management agreements and/or authority of the minister responsible for forestry affairs to make rules and by-laws for Village Natural Resources Management Committees (VNRMCs) (Forestry Act, 1997[34]). Despite such provisions and initiatives, pressure on the available resource has never dwindled. The country's growing population will only put further pressure on the remaining forest land.

One project type in the land use sector which has potential for both production of offsets and funding is Reduced Emissions from Deforestation and Forest Degradation (REDD). Under the current CDM, projects based around avoided deforestation and degradation are not allowable project types. Therefore, all potential projects generating credits from REDD activities would need to operate in the voluntary market. However, in the coming years it is likely that a REDD+ structure will be developed within the UNFCCC to

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[32] Government of Malawi. (2010). Malawi State of Environment and Outlook Report. Ministry of Natural Resources, Energy and Environment, Lilongwe

[33] Government of Malawi. (2008). Malawi Housing and Population Census Report. National Statistical Office, Zomba.

[34] Government of Malawi. (1997). Forestry Act, Malawi Gazette Supplement No. 11. Ministry of Energy, Forestry, Fisheries and Environmental Affairs, Lilongwe.

allow for credit transfer from such project activities. REDD+ refers to deforestation, forest degradation, forest conservation, sustainable forest management, and enhancement of forest carbon stocks. It is recommended that Malawi start to examine how it will engage in REDD+ nationally and how site level projects will interact with any national, UN, or voluntary system that develops. While such a system is being considered, site level REDD projects can still be under development and creation. Preparatory projects to develop the REDD+ strategy have been initiated by FRIM and Forestry department together with LEAD. But follow-up to aid preparedness for the strategy is taking time. While such preliminary developments are as viewed as positive, there still remains a gap between building national capacity to implement a REDD+ and the trickle down of such information to other stakeholders in the country through localised training and extension staff. For example, REDD+ activities require greater collaboration than traditionally takes place between agencies such as the Ministry of Agriculture and Food Security and the Forestry Department.

6.2.1.1 Description of REDD Project Types

Avoiding planned deforestation

This refers to avoiding deforestation that has been legally authorized and where there is documented proof of expected deforestation. Such a project activity must take place on land area where there is documented evidence of the exact area that would have been deforested, the expected start date of deforestation, and the rate at which the area would have been deforested. It is unlikely many areas within Malawi would be meet the criteria needed for this type of project. This type of project activity requires there to have been some level of government authorization of this activity. Although planned deforestation does take place in Malawi, the majority is in the form of planned infrastructure developments-such as roads, hospitals, health clinics, schools, electricity leeway, etc. with a prescribed right of way for a particular use or area. There have also been cases of forest lands being excised from forest reserves to allow for expansion of urban areas. However, if there are privately held lands that have plans to be deforested and if such plans to deforest can be documented, this is a recommended project type as it reduces many of the issues and costs associated with REDD activities. For example, the risk of leakage and non-permanence is reduced, transaction costs are reduced since all agreements are made directly with the land owner, and the need for extensive alternative livelihood strategies is removed.

Nonetheless, this type of activity is only appropriate in select unique situations and is only recommended as a project where specific instances are known.

Avoided unplanned deforestation

This refers to reducing human-induced deforestation caused by actors not operating with government sanction. In Malawi this would include activities such shifting cultivation and subsistence farming. This would also include degradation by charcoal production leading to subsequent conversion to farmland. For such projects, developers must determine the drivers of deforestation and/or degradation in the area surrounding the project area and the rate and location where such deforestation and/or degradation is expected to take place. COMPASS II and Total Land Care provide examples of this project type.

Unplanned deforestation has already taken place within large portions of customary land. Unplanned deforestation of protected areas takes place by existing local populations surrounding such protected areas

and business people who come migrate and settle in such areas because there is a forest resource that can and which does give them a source of livelihood by producing charcoal and fuelwood for sale. Generally, forest degradation for charcoal occurs followed by subsistence farming.

Avoided unplanned forest degradation

This refers to reducing forest degradation caused by illegal collection of wood for firewood, charcoal production, and/or timber. Project activities could include reducing illegal timber and charcoal acquisition or implementing the management of such resources on government or community held lands.

Forest degradation is taking place within the protected areas of Malawi at a high rate as this is where a major proportion of trees and woodland remain. This is due to its protected nature and previous enforcement by forest guards and patrolmen prior to the multiparty system of government. In addition, most national parks and forest reserves contain the indigenous tree species most preferred by the general public. Currently, enforcement of protection is quite low and the penalties meted out by the courts are very small on cases of encroachment, illegal charcoal trade, and poaching. In addition, cases of encroachment, illegal charcoal production and poaching are most often suspended either deliberately or by using the old forest policy because magistrate courts have not been given the new forest policy/act (1996/1997).

Large areas of government and community held land may be applicable to this project type, however, this project activity may be very difficult to implement because of high risk of leakage. Further discussion is listed below.

6.2.1.2 Potential of REDD Projects in Malawi

Additionality:

To show **additionality**, a project must demonstrate that the project activities would not have occurred without financing resulting from the expected sale of carbon credits, although this does not have to be the sole means of funding a project. This can be achieved by providing evidence that the project activity is not financially possible without carbon financing and/or that a barrier would have prevented the activity from taking place in the absence of carbon financing. REDD project activities are generally easy to demonstrate as additional because such activities (e.g. stopping charcoal creation or crop production) generally do not result in net financial benefits. For example, if the project activity stops the conversion of a forest into agriculture, the financial benefits resulting from the sale of timber/charcoal and the crop that would have been produced will not occur. Therefore, stopping the deforestation is financially unattractive unless carbon credits can be sold in place of the potential lost revenue. It must be noted that that to be additional, the project activities cannot be already legally required and enforced.

On a national scale, additionality for REDD+ projects can be met by setting a national reference level (RL) that is at or below the country's business as usual emissions from the forest sector. To do this it is necessary to establish the historic and projected future emissions in the absence of involvement in the carbon market. Any reduction in emissions can then be defined as additional.

Technical Capacity:

Technical capacity requirements differ somewhat by specific REDD project type. The overall skill levels required include spatial analysis, forest inventory, community surveying, and community development skills.

Spatial Analysis

In general, the area, location, and extent of potential deforestation or degradation must be shown. For planned deforestation and forest degradation, intermediate GIS skills are required to map out previous deforestation or degradation and expected locations of future deforestation or degradation. This type of capacity exists in Malawi both within Dept. of Forestry, Surveys, academic institutions, and the private sector.

Unplanned deforestation project types require advanced spatial modeling technical skills. Data must exist or be developed on historic deforestation rates in the area surrounding the project. Highly-skilled GIS experts must then conduct a spatial analysis to estimate future deforestation potential in the project area. Based on an assessment of existing technical capacities, it is recommended that if only a limited number of unplanned project activities will take place in Malawi that consultants perform this analysis. Alternatively, if a large number of unplanned deforestation projects are projected to take place, it is recommended that a consultant train counterparts to perform such analysis within the Department of Forestry, FRIM, or Land Resource Department.

Forest Inventory and forest monitoring

To estimate the emissions resulting from deforestation, thorough forest inventories of existing forest carbon stocks must take place. In addition, the area and carbon stocks of the forested area must be monitored over time. The staff within the Department of Forestry and especially FRIM currently maintain experts in this area. Such experts may be able to conduct such field measurements and analysis directly or train community members to conduct needed measurements.

Community Surveys

To assess what behaviors would have occurred in the absence of a REDD project, surveys of the local populations are required. These types of community surveys have taken place repeatedly within Malawi for previous community development efforts and therefore a number of Malawian organizations, such as BERL, Clinton Development Initiative (CDI), FRIM/LEAD and Total Land Care (TLC), maintain expertise in this area. For example, the Lake Chilwa Climate Change Adaptation Project which is being spearheaded by FRIM, LEAD-SA and World Fish centre has conducted surveys to determine the drivers for deforestation related to charcoal production in the Lake Chilwa Basin. Studies continue to determine the rate of deforestation and general drivers in the Lake Chilwa Basin, the Thuma Forest Reserve and Forest Reserves in Chiradzulu District.

Project Activity Design and Implementation

For all projects where deforestation or degradation would have taken place by community members, activities must be implemented that will reduce the need for such events to take place. Therefore, a

detailed understanding of the causes, drivers, and potential alternatives to such deforestation and degradation is required. For more than half a century, various projects in Malawi have experimented with various systems to improve forest and community management. This deep cadre of experience, lessons learned, and associated experts must be used during the implementation of such projects. It will be imperative for a detailed assessment to be conducted to identify activities with a proven track record of success.

Carbon Project Management

The existing government and nongovernment efforts in carbon project development have led to the development of some capacity in carbon project development in select individuals. However, based on stakeholder consultations it is noted that there is a lack of understanding of what is required to complete a carbon project, the steps required to initiate such a project, and the technical capacity required to implement such activities. This also includes the need for collaboration across multiple agencies and organizations.

Risk of Non-permanence

There are a number of factors that could result in reversal or non-permanence of a project. These include project implementation failure; pest infestation, floods, drought, or fire, resulting in high levels of unexpected mortality; reduced funding making it difficult to enforce protection of the project area; political instability leading to an inability to enforce and/or monitor projects. To buffer against the likely non-permanence of some projects, different mechanisms have been developed by the various standards. In general, only a portion of the credits generated are allowed to be sold by a project. If the project is deemed at a higher risk, a greater proportion of the credits are withheld. At a certain 'risk' threshold, the project is not allowed to sell any credits. Therefore, it is important to conduct a risk assessment during the early phases of a project.

The main assessed non-permanence risk in Malawian REDD projects are likely to be: proven track record of project activities leading to long term reductions in deforestation and the track record of the implementing entity successfully maintaining previous activities.

Leakage

Deforestation and degradation in Malawi are largely a result of tree harvest for charcoal and/or shifting agriculture. As with the risk of non-permanence, the risk of leakage should be assessed early in the development of a project, and the project should be designed to minimize the chance of leakage.

Deforestation for agriculture is done by the populations currently residing in the area, as opposed to migrants moving from one area of the country to another. Therefore, it is possible to identify the overall areas that may be deforested along with the villages that would most likely be causing such deforestation. The future deforestation within the project area and other areas near to those villages can be monitored over time and leakage assessed. If a REDD project has sufficient enforcement, but does not incorporate a means by which to address the livelihood needs of the forest-dependent communities, there is a high risk of leakage, that the activities which lead to the baseline emissions will migrate to other areas, either protected reserves or unprotected forests that can provide similar resources.

For areas where the primary driver of deforestation and degradation is charcoal/woodfuel production, the risk of leakage is likely to be very high. Such selective logging has a high risk of both 'activity shifting' leakage (charcoal producers shift wood collection to another location) and 'market effects' leakage (reduction in supply of charcoal/wood in one location leads increase in supply in another location). Therefore, this type of project activity may be extremely difficult to implement. In addition, none of the currently approved VCS or ACR methodologies adequately addresses wood collection for charcoal. However, since charcoal production is the main degradation driver in Malawi it is strongly recommended that a thorough assessment take place of: potential project activities focused on charcoal production reduction, voluntary market methodology creation requirements for an avoided charcoal project, and methods to estimate both activity shifting and market effect leakage.

Credit Production

In comparison with other carbon project types, REDD projects have the potential to generate a large number of carbon credits per unit area of project. For example, the average carbon stocks of the forests of Malawi are around 132.85±54.24tC/ha[35]. However, this number will depend primarily on the forest type, its current degradation state, and the baseline activities: higher carbon forests with complete deforestation as the baseline activity will result in higher levels of carbon credits. In addition, if baseline deforestation rates are relatively high, a large number of credits will be generated early in the project lifetime. Forest degradation projects will generate a lower number of credits per hectare of project since only a portion of the trees are cut in the baseline and due to the likely high leakage rate.

Financial Requirements

The financial requirements for REDD projects can be quite high, though financial returns may also be significant. The establishment of the baseline scenario can be very costly for a REDD project, due to the need for remote sensing and spatial analysis. However, if the Government of Malawi produces nationally available field verified land cover maps for multiple points in time historically up to the present, the costs to a given project are greatly reduced. Initiatives have previously been undertaken like the 'Forest Resource Mapping and Biomass Assessment' in 1993 and recently the Government of Japan funded programme, 'Forest Preservation'. The latter seeks to develop a national forest monitoring system for REDD through which biomass and carbon in the country's forests will be periodically mapped. More similar efforts are however critical for reduction in costs of prospective REDD projects which should be formulated based on credible empirical data that also helps in determination of national emission reference levels and past drivers of deforestation at different points in time.

The primary direct costs of project implementation are the result of alternative livelihood activities and monitoring of implementation activities. If project activities are not designed properly, significant indirect costs include the opportunity costs of forgone timber and charcoal production and agriculture production. Reducing the total area of land in agricultural production may also lead to food security issues.

[35] Berry N.J. Clunas C.J., and Tipper R. (2008). Spectrum Media, Somerville, Massachusetts.

Since credits may be generated early in the project's lifetime, the length of time required prior to credit income generation will also be shorter than other project types.

Impact on Communities

A REDD project must alter the manner in which the community uses the forest land historically. In order for a REDD project to successfully produce a long term impact on forest cover, the activities that are implemented must result in a net positive impact on the local communities. If this is not true, it is likely that the project will not be sustainable and will eventually lead to non-permanence or complete leakage. Therefore, a properly designed REDD project will have a positive impact in the long term on the communities involved. This can include alternative livelihoods as well as technical assistance for farming and land management. For example, REDD funding could be used in part to increase the number of extension officers that are able to provide training on improved agricultural techniques to farmers.

Additional Income Generation

The potential of a REDD project to generate additional income beyond carbon credit sale will be dependent on the design of project activities. It is allowable for some selective logging to take place as a project activity. Although this will reduce the total number of credits able to be sold, it also provides an additional income source through the sale of timber and/or charcoal. Other income generation potentials include the sale of non-timber forest products (NTFP). There is also the potential to include additional payment for ecosystem services (PES) schemes such as water

Replicability

Due to the high rate of deforestation and forest degradation in Malawi, there is the potential to implement REDD projects in Malawi. The main locations for potential REDD programs are existing protected areas, and uncropped communal lands that are under threat of future forest degradation.

6.2.1.3 Existing Projects

Improved Forest Management for Sustainable Livelihoods (IFMSL)

In the past, the Department of Forestry was responsible for the management of all Forest Reserves. Under the IFMSL program, select Forest Reserves became co-managed by the Department of Forestry and the surrounding communities. The project was supported by the European Union and has been implemented by LTS International and the government in 12 districts.

Additionality: This program was not designed as a carbon project and therefore the activities implemented by it directly will not be additional. However, IFMSLP has demonstrated that by improving community management abilities, forest degradation is reduced.

Non-permanence and leakage risk: Attempts were made to reduce the risks of non-permanence and leakage through the design of the project, including the creation of community-derived forest management plans and forest management agreements. These included the continuation of harvesting, but at a managed and reduced rate. However, the risk of market effects leakage would still be seen as quite high.

The programme had varying degrees of success with some areas resulting in improved forest management while others degradation continued even during the programme.

The main strategy for improving project effectiveness, and thus reducing non-permanence risk, was promoting the collection, sale, and distribution of non-timber forest products (NTFP), especially honey and mushrooms. Since these two products require the maintenance of the forest, community members were heavily involved in protection from cutting and especially from fire.

Carbon credit and income generation potential: The carbon credit generation potential will be low in areas with less threat to forest degradation and in areas where forests have already been very degraded, but will be high in locations still maintaining high forest cover but with increased forest degradation and deforestation rates.

It is likely that spatial modelling will be required to implement this type of project along with compilation of existing data on the rates of wood extraction in existing forest reserves or other protected areas.

It is recommended that additional income streams from NTFP be developed as part of any program.

Financial requirements and impact on communities: The financial investments focus on the need for extensive community capacity building. There have been mixed views on how this program impacted communities. Some viewed this project as a successful way to allow communities to determine how resources will be used, while others saw this as a way for the government to pass responsibilities that used to be done by the government onto community members.

Repeatability and Recommendations: Currently, the Department of Forestry lacks sufficient resources to protect all the existing forest reserves from degradation. Additionally, surrounding communities have the opportunity to benefit in the short and long term from having such a forest resource nearby. Such communities are also positioned to monitor activities such as selective logging and fires that might be occurring in the forest reserve and it has been shown that if they have proper motivation, community members are very engaged in implementing protection measures.

There are many locations where this project type could be repeated, however, this project had very mixed results. It is recommended that a thorough review of lessons learned be conducted prior to replicating such a program elsewhere. This program worked best in locations where the forest reserve contained forest that was less degraded. The program did not work as well in forest reserves that were already heavily degraded. Another lesson learned was the real need for an integrated approach to land use management. For forest reserves to be protected, community members need to develop alternative income streams and reduce poverty. This will require the forestry and the agricultural sector work in collaboration to design and implement such projects.

Mkuwazi and Nyika REDD Scheme Attempt

Malawi has one pilot project to examine the potential for REDD, the Mkuwazi and Nyika REDD scheme attempt. The project was located in Mkuwazi Forest Reserve and Nyika National Park and received funding from the United States Agency for International Development as part of the COMPASS II program, from 2004-2009. These forests are at risk of overexploitation from the surrounding communities, and the pilot

projects sought to use a participatory approach to ensure continuous forest cover while providing alternative income-generating activities.

Mkuwazi Forest Reserve was gazetted in 1927 and covers a total area of 17.7 km^2. The reserve is located in Nkhata Bay district, one of the five districts in the Northern Region of Malawi. The forest area is dominated by *Brachystegia speciformis* and *B. longifolia* on the lower dryer slopes and evergreen forest comprised of *Afrosersalisia cerasifera, Erythrophloem saueolens, Pterocarpous stolzii and Chlorophora excelsa* along rivers and in damper areas (Chapman and White 1970). Customary land surrounding Mkuwazi Forest Reserve is primarily exploited by smallholder farmers. Nyika National Park lies astride tree districts in the Northern Region of Malawi: Rumphi, Chitipa and Karonga. The park was gazetted in 1965 and covers a total area of 3,134 km^2. During park establishment and expansion, people were evicted from their ancestral land and were resettled outside the park. Land cover within the park consists of Miombo woodland dominated by *Julbernardia globiflora, Brachystegia boehmii, B. bussei, B. speciformis, Isoberlina angolensis*, and *Monotes africanus*; grassland dominated by *Loudetia simplex, Andropogon schirensis, and Pleridium acquilium*; savannah; and evergreen forest.

Customary land surrounding Nyika National Park and Mkuwazi Forest Reserve is primarily exploited by smallholder farmers. The main crops cultivated are maize, beans, and ground nuts, with some commercial farmers on estate land producing tobacco. On the wetter slopes to the east of Nyika National Park coffee is also grown. Mkuwazi Forest Reserve is bordered to the north by the Vizara rubber plantation, the only plantation of its type in Malawi. The forest within Mkuwazi and Thazima (Nyika) areas is at a high risk of deforestation and degradation through encroachment and overexploitation. The project would benefit 14 villages around Thazima and 7 villages around Mkuwazi Forest Reserve.

The collaborative approach taken in implementing this proposed REDD project provided a concrete focus for multiple groups – the Malawi Environmental Endowment Trust (MEET), the government-funded Forestry Research Institute of Malawi (FRIM), and the Leadership for Environment and Development program (LEAD) – to work together with Bioclimate Research and Development in implementing Plan Vivo Foundation standards for designing and certifying community-based payments for ecosystem services (PES) programs. This included the establishment of community-based participatory methods of analysis, which are required in order to secure payments for the carbon sequestered under Plan Vivo. Local staff and field workers from the community were trained in skills such as mapping, forest surveying and participatory approaches to defining REDD baselines.

The project was designed to meet multiple objectives: preserve forest cover, biodiversity, and watershed integrity; ensure maintained supply of forest products; create alternate income generating activities; and provide stoves for improving fuelwood efficiency. Based on a participatory analysis the major degradation threats were identified as charcoal creation, canoe making, curio creation, agricultural expansion, and medicinal material collection.

As part of this project a toolkit was created titled "Avoiding Unplanned Mosaic and Degradation in Malawi"[36]. An application was made to Plan Vivo International through a UK based organization (Ecometrica) to register Mkuwazi and Nyika for the possible sale of carbon credits. The application was not successful because it failed to meet minimum requirements of Plan Vivo.

The group Total Land Care has begun to pursue the Mkuwazi and Nyika areas as a VCS applicable REDD project.

Criteria Assessment

Additionality: These projects were designed as carbon finance projects and therefore it is likely they will be assessed as additional regardless of what voluntary market standard will be used for validation.

Technical Capacity: This project has been instrumental in improving the capabilities of individuals within Malawi to implement REDD projects. Through this project staff at MEET, FRIM, and TLC have experience in the design and implementation of REDD projects. In addition, over 20 staff has been trained in participatory threat reduction analysis and sixty local community members have been trained on carbon stock assessment, climate change basics, beekeeping and ecotourism.

Risk of Non-permanence: A participatory analysis found the main risks of non-permanence to be members of the community or surrounding communities ceasing to participate in the projects activities. This would then lead to emissions from agricultural expansion and selective logging.

As a strategy to reduce non-permanence, project activities have been designed so that the maintenance of the forest has benefits beyond carbon. For example in Nyika National Park protection from fire is a project activity but is also an action supported by local community beekeepers. Such community members are highly motivated to prevent fires in order to protect their hives from fires (Kayambazinthu and Chiotha[37]).

Leakage: Based on a participatory process, it was determined that agricultural expansion and selective logging for charcoal, curios, canoes, and poles would be the main leakage risks. The risk of such activities is high and will require continued dedication to the project activities.

Credit Production: The carbon stock in Mkuwazi Forest Reserve was estimated to be 211,889 tonnes of Carbon (tC) ± 23,694 t C while in the Thazima region of Nyika National Park the forest carbon stocks were estimated to be 995,446 ± 120,385 t C. The annual payments from conserved forest were estimated to be 39.4000 and 141.888 for Mkuwazi and Thazima respectively[38].

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[36] Berry, N, Utila, H, Clunas, C, Viergever, K, Tipper, R. 2008. Avoiding Unplanned Mosaic and Degradation in Malawi. Plan Vivo Technical Specification. Econometrica. Report to Plan Vivo.

[37]Kayambazinthu, D. and Chiotha, S. (2oo4). Potential payment for ecosystem services in Malawi. Katoomba Group.

[38] Berry, N, Clunas, C, Tipper, R. 2008. Estimating Carbon Stocks: Toward Forest Conservation In Mkuwazi Forest Reserve And Thazima Region Of Nyika National Park In Malawi. Econometrica. Report to USAID and Government of Malawi.

Financial Requirements: Financial requirements for the Avoided Unplanned Mosaic deforestation in Mkuwazi and Nyika will be high due to need for detailed training in alternative livelihood options. This project will also require more detailed spatial modelling than other project types.

Impact on Communities*:* The conservation of the forest resources will positively impact the communities since water resources will remain more intact, and NTFP are available for collection. Community members that would have degraded and deforested the area will feel negatively impacted unless appropriate community livelihood interventions take place. If NTFP are promoted appropriately and sustainably, this will provide some additional income generation potential.

Replicability: This project activity type has a very large ability to be replicated throughout Malawi.

This project was initially designed under the Plan Vivo system, but has transitioned to the VCS. Due to the market potential of VCS credits in comparison with Plan Vivo credits, this is a recommended move and where possible, it is recommended that future projects work under the VCS or ACR system.

The existing unplanned deforestation 'REDD Scheme' can be adapted and expanded to include additional forest reserves and other protected areas. Much of research, training materials and manuals, alternative livelihood approaches, and benefit sharing mechanisms developed for this program will be directly relevant to any future reduced deforestation/degradation projects around protected areas.

For forest reserve areas that have already undergone significant degradation, it is highly recommended any REDD project implemented estimate both baseline emissions, but also enhancements (the growth of the forest, including direct planting) over the life time of the project.

A large challenge this project type has is in the design of effective strategies to reduce potential leakage and non-permanence. It is highly recommended that detailed analysis take place to identify alternative livelihood strategies that have been proven to be effective in Malawi in the past. This would include methods to increase crop production and provid e additional income streams. As in the IFMSL project, this project requires an integrated community development approach.

Another challenge that must be addressed is the need to bring in multiple government agencies that may not interact regularly and collaboration between governmental and nongovernmental entities. Resources and knowledge from different organizations can be pooled to implement projects, increase community involvement, and ensure cross-cutting supporting. Broad involvement can also increase the potential for REDD projects to become integrated into national policy.

6.2.2 Afforestation, Reforestation, Revegetation

Afforestation and reforestation (A/R) projects entail actions that result in the creation of a forest. Under the CDM, it must be demonstrated that the area has not been covered by a forest since 31 Dec 1989 and would not return to a forest in the absence of a carbon project. Under the VCS and the ACR, it must be demonstrated that the area was not cleared of native ecosystems in order to develop a carbon project. Such A/R activities can take place both under the CDM and the voluntary market. The voluntary market also allows project activities that take actions that increase the carbon stocks but such actions do not result

in a forest, referred to as 'revegetation'. Malawi has a number of existing projects that may have the potential to be considered ARR carbon projects or can provide lessons learned for future ventures.

Under the CDM, AR projects can only take place in locations that have been in a nonforest state since 1990, and therefore all approved CDM methodologies are designed for locations currently under a nonforest state. It is likely that a revision to existing CDM methodologies would be required for project locations that do not meet the nonforest required under the CDM methodologies. Alternatively, although a project may be focused on tree planting, under the VCS and ACR, a specific REDD or IFM existing approved methodology may also be applicable. Therefore, it is recommended that for each proposed project and project location an assessment take place to determine if an existing approved CDM, VCS, or ACR methodology under the ARR, IFM, and REDD categories is applicable to the proposed project.

6.2.2.1 Description of ARR Project Types

Afforestation/Reforestation and Revegetation encompasses a wide range of potential activity types within Malawi. The types of planting can vary in both area and planting structure. Such activities can take place on customary land, private land, and public land. Based on an assessment of the ecological, economic, and social conditions of Malawi, the following are recommended project activities for Malawi. Within one project, a mix of activities can take place.

- Fuelwood plantations: Plantations that focus on fast growing species under a short rotation for fuelwood creation can serve as both a method for increasing the carbon stocks on the land where the plantation is located and as a strategy to reduce deforestation of native forests. Malawi has long term experience in the implementation of such fuelwood plantations, such as the Blantyre City Fuelwood Project, though it phased out in 1999, produced a eucalyptus buffer that has remained to date has been a source of fuelwood, construction material and prevention of encroachment for cultivation into protected lands in Zomba and Blantyre. Other examples are the Village Forests Areas (VFAs) in the Lake Chilwa Basin and other parts of the country.

- Timber plantations: Planting of timber species can be managed to both increase the average carbon stocks in the landscape, and produce the additional income source from timber. The government has previously established many such plantations in the past. Examples include: Mulanje Central Govt Timber Plantation; Amalika ; Chigumula; Michiru; Viphya, Chongoni/Dedza and Zomba Timber Plantations. Some of the plantations, including Viphya, Zomba, Chigumula and Michiru have recently suffered fire hazards and unsustainable harvesting due to insufficient management.

- Agroforestry entails the introduction of trees in crop and/or animal production systems. Tree planting as a part of an agroforestry system need not inhibit agricultural production, and in some cases can enhance productivity. Examples include: Mwanza Citrus Production on farm land and homestead planting; Crops interplanted with agroforestry species like *Faidherbia albida, Gliricidia sepium, and* Mango tree preservation. The tree *Faidherbia albida* holds much promise as an agroforestry species as it loses nutrient rich leaves during the rainy season thus improving soil fertility while allowing farming beneath the canopy with good benefits to maize crop. Trunks and

branches are often used for fuelwood, pestles. Leaf growth provides good shade during hot dry season in this area.

- Orchards: This can include both fruit and nut orchards planted on nonforested lands. Existing examples in Malawi include Mango orchards and Macademia Tree Farms.

- Natural forest regeneration: This achieved through the prevention of further wood cutting, thus allowing trees to naturally regrow and regenerate. Due to the ability of the Miombo Woodland system to regenerate without the need for direct human planting this project activity type would be possible ecologically in large areas of Malawi. However, such an activity would require additional studies to be conducted to estimate regeneration rates.

- Revegetation: This includes either natural regeneration or direct planting of species that results in an increase in the carbon stocks, but does not reach the definition of forest. This could include planting of woody crops (such as tea and coffee) and increase in woody shrubs in grassland areas. If it is necessary to remove existing vegetation in order to plant new crops/trees, these projects will have initial emissions that must be overcome prior to the generation of carbon credits. These projects may have important benefits beyond carbon, such as the restoration of degraded habitat.

- Revegetation of dambos: There is potential to improve degraded grasslands in areas where livestock numbers are small and dambos are not heavily utilized, for example in the southern and northern regions of the country. The recommended species include *Ravosia xaffra, Syzygium cordatum, S. guinesse, Parkia filicordia, Gloenardia salicina, Ficus spp.,* and *Khaya anthotheca.*

- Planting of trees, shrubs, woody crops outside of forests: This includes planting along the edges of fields, as live fences, around villages, and other planting systems. Such project types have a high degree of promise since they dramatically reduce the displacement of other activities within the locations being planted. For example, planting shrubs along the edges of fields still allows for the production of crops within the cropland. However, since only a small proportion of land is actually planted within a given area, the number of credits produced in the fields where planting will take place must be substantially larger than other ARR projects activities.

Figure 5 Examples of Faidherbia albida agroforestry planting

6.2.2.2 Potential of Afforestation/Reforestation/Revegetation – ARR

Additionality and Eligibility

The ability for a particular project to prove additionality is much more case specific for ARR projects. As discussed, many ARR activities result in additional economic benefits, such as timber, nuts/fruit, and fuelwood. Thus, for project activities that generate additional income streams projects have two options to prove additionality. For AR projects in Malawi, the recommended option is to conduct a financial analysis of the project activity to demonstrate that without carbon financing the project would not be financially advisable. The other option is to demonstrate that there is a barrier to implementation such as access to investment capital, access to markets/inputs, and lack of technical capacity to implement activity. Since Malawi has a large amount of tree planting experience, it may be difficult to demonstrate lack of knowledge unless a new planting system or species is being used. Therefore, the other recommended option is to provide evidence that the investment capital required to initiate the project activity could only be secured through investment motivated by expected carbon credit sale.

The land eligibility requirement for CDM may prevent many areas of Malawi from being eligible as CDM AR projects and thus must be given thorough consideration. Therefore an assessment of land eligibility will need to be included early on in the development of all ARR projects.

Technical Capacity:

The skills required to implement ARR projects include GIS, forest inventory, plantation and nursery management, community surveying, and community development skills. These skills are well represented in Malawi.

Malawi has a strong track record of implementation of afforestation and reforestation projects. Numerous tree plantings have been conducted throughout the country, with many continuing to be monitored and provide benefit. ARR projects for carbon markets may need to be conducted on a larger scale than most

existing projects, so it will be necessary to scale up existing capacity and focus on coordination of efforts across agencies and relevant organizations.

Forestry and agricultural extension officers offer access to most farmers in Malawi and for projects where the government is involved, it is recommended that such officers be used to train village members in implementation activities as needed.

Risk of Non-permanence

The risk of non-permanence for ARR projects can often be very high. While ARR does not preclude harvesting for various purposes, the management plans must include long term plans for the continuation of such activities. This must include sustainable funding of such activities.

In addition, activities that reduce agricultural lands must provide alternative livelihood activities so that there is a low risk of the project lands being converted back to cropland into the future. If ARR activities provide income from planned timber harvest or fruit production, the non-permanence risk is significantly decreased. The risk of non-permanence will also be lower on private land since the land owner has a more significant and longer term financial investment in the project activities.

Leakage

For ARR projects planting on small holder agricultural lands, the risk of leakage in Malawi is projected to be relatively minor for the highly populated regions of the country where there is a lack of forested locations where such agricultural activities could potentially be shifted to. For privately held land, the risk of leakage will be relatively easy to predict, control and monitor.

For areas where government held forested areas are nearby, the risk of activity shifting leakage to such areas may exist.

It is recommended that an assessment take place to determine potential leakage locations within an area surrounding the potential project area prior to the initiation of activities.

Credit Production

In Malawi, it is projected that ARR projects have a relatively high potential for carbon credit generation over the lifetime of the project. For example, the Miombo Woodlands growth rate has been estimated at 2.5 t biomass per hectare per year (4.31 $tCO_2e\ ha^{-1}\ yr^{-1}$)[39]. The negative side of ARR projects is that since crediting only takes place '*ex post*', the generation of any substantial volume of credits can take many years, depending on the species planted.

Financial Requirements

The upfront financial requirements of implementing an ARR projects can be high, due to the need for site preparation, seedlings, and maintenance. The return for this investment can also be high, resulting from

[39] Miombo in Transition: woodlands and welfare in Africa. 1996. Edited by Bruce Campbell. CIFOR, Bogor, Indonesia

carbon credits generated as well as the potential for the sustainable production of other forest products. However, this financial return is gradual, creating a temporary imbalance in the financial flow. This imbalance can be addressed, at least in part, by the ex-ante sale of carbon credits, the sale of credits before they have been generated. Such a situation requires the eventual delivery of the actual credits, and may entail a significant deduction for risk. With or without ex-ante sales, ARR projects require the availability of high initial investments and the ability to sustain projects over time.

Impact on Communities and Potential for Income Generation

ARR projects can be designed to ensure a net positive impact in the community. This can include increased access to fuelwood, potential income from timber / fruits, and increased capacity in plantation/nursery creation. However, in Malawi the largest concern for ARR projects is the impact on food security. Any areas planted that displace existing agricultural production have the potential to reduce the food security for that community. Tree planting projects are also often a critical element of protecting threatened or degraded watersheds, ensuring a consistent water supply, improvement of fish habitat, and the maintenance of a healthy ecosystem.

ARR projects often include potential for income generation beyond carbon credits, thereby yielding a positive impact on surrounding communities. Thus design of the ARR project must include an examination of the commodity production and market opportunities of the trees that could potentially be planted.

Replicability and Recommendations

ARR are highly recommended as a project activity for Malawi.

In order to determine potential locations for ARR projects, it is recommended that a spatial analysis take place to identify areas that would meet the applicability conditions of AR projects and would be ecologically and socially appropriate for ARR project activities.

It is also recommended that the Government of Malawi consider requiring any ARR projects to demonstrate that any ARR projects taking place on cropland must have parallel programs to increase agricultural production within the community agricultural lands.

The following activities are expected to have the highest potential for replication within Malawi: natural forest regeneration, fuelwood plantation species, timber plantations, tree/nut orchards, agroforestry species, and boundary planting.

Based on an analysis of the success of previous Malawi activities, the most highly recommended locations to target AR activities are degraded customary lands (not under crop production) that can be converted into Village Forest Areas, agroforestry on small holder farms, boundary planting on small holder farms, and AR on private land.

6.2.2.3 Existing Projects

The Government of Malawi through the Forestry Department has embarked on tree planting and plantation rehabilitation programmes across the country. A number of other government programmes/projects and NGOs such as LEAD SEA, Catholic Development Commission in Malawi (CADECOM), Churches Action for Relief and Development (CARD), University of Malawi (UNIMA) and Goal

Malawi are also promoting tree planting activities in various parts of the country. Through the above strategies and projects, 54,658,480 tree seedlings were raised and planted by different stakeholders in 2008/2009 financial year (Government of Malawi[40]). Below is a summary of existing efforts. Although listed here as ARR projects, for many areas these project activities may actually be considered IFM or even REDD projects.

Tree Planting and Management for Carbon Sequestration and Other Ecosystem services (TPMCSOES)

This project is supported by the Government of Malawi and aims at compensating local farmers for the land they have set aside for tree planting and for any trees that survive. In the 2007/2008 growing season, 580,000 seedlings, valued at MK2.4 million were purchased and distributed to 148 farmers across the country. A total of MK4.8 million was paid to farmers. An important component of this programme is research that focuses on conducting baseline surveys to determine area for planting; assessment of underground baseline carbon stocks; and training farmers on issues of climate change, carbon sequestration and data collection.

Figure 6. Examples of tree planting efforts under the TPMCSOES Program

[40] Government of Malawi. (2009). Economic repository for Malawi. Ministry of Economic and Development Planning, Lilongwe.

Additionality: This project was designed with the goal of carbon sequestration, however, it was not designed using as specific carbon Standard (CDM, VCS, ACR, Plan Vivo, Carbon Fix etc) nor a Standard's approved Methodology to generate certified/verified carbon credits. Therefore, at this stage in the development of TPMCSOES it might be difficult to apply a given standard to the areas that have *already* been planted and secure carbon credits from such areas.

But, this does not preclude the adaptation of the program to the CDM/VCS/ACR at this point in time. A more detailed analysis would need to take place to determine whether a case could effectively be made to allow credit creation from the areas already planted.

Based on our analysis, to demonstrate additionality, it is recommended the following barriers be demonstrated:

- Financial: Insufficient funds to organize planting efforts – including seedling purchase, capacity transfer, nursery creation
- Human Resources: Lack of expertise in species-site matching and tree propagation and care necessary for tree planting activities

Technical Capacity: Although there are high capabilities within Malawi for planting trees, this project relies on local farmers to plant and care for trees. Thus this project requires a large amount of training to many different farmers. To expand this project, forestry extension agents would need to receive training in baseline assessment and carbon monitoring, tree planting and care, and alternative livelihood development

Non-permanence risk: The trees planted in this program are planted on individual household farms. Therefore, farmers must continue to see an economic or cultural benefit to the trees to reduce the risk of reversal. If economic situations change and the farmers believe they will benefit more from an alternative commodity, it is likely the trees will be cut.

Therefore, it is believed that this project would be assessed to have a high risk of non-permanence.

Risk of leakage: Similarly to the risk of non-permanence, where the tree planting taking place displaces agricultural production, the risk of leakage may be very high. This will require improved agricultural techniques such as intensive agricultural production, introduction of improved seed varieties, and storage practices.

To reduce the risk of leakage, different strategies can be implemented including requiring that lands to be planted must be demonstrated to not be under any crop/fallow cycle (eg are degraded) or implementation of improved agricultural techniques. Both of these strategies will increase the overall operating costs of the current TPMCSOES project.

This project has been more successful in the north where the population density is lower and land holding size is greater. This reduces the need for individuals to deforest other locations to compensate for the loss in agricultural area in comparison to activities in the south.

Carbon credit generation potential: Since trees will be grown by many different farmers on small tracks of land, the rate of tree growth will likely be quite variable. Since tree planting will be spread across a large number of small holdings, a large amount of field monitoring will need to take place.

The carbon credit generation potential is classified as medium on a per hectare basis, but will require a large number of hectares to be cost effective.

Financial requirements and expected financial flows over time: Financial requirements are high especially for spatial land demarcation and mapping, assessment of land tenurial rights, species required, seed input money, and training to farmers. Expected financial flows are slow and increase with time depending on canopy cover, survival rate/percentage and species planted. The costs of monitoring is also expected to be high in comparison to other project types since trees are planted within a large number of very small areas, each of which will require area monitoring.

Impact of communities within and surrounding project area and income general potential: Impact on communities is positive as the trees grown generally are used for a commercial purpose (fruit, lumber, etc). These projects have potential to generate income when silvicultural operations are properly followed.

Assessment of repeatability and Recommendations: This project has a large ability to be repeated throughout a large portion of the country. The government of Malawi and the Department of Forestry have already placed a large amount of resources towards this project activity and therefore gained a large amount of experience with its implementation. It has the benefit of being run directly by the Dept. of Forestry and can direct forestry extension officers to implement this project activity. This dramatically reduces human resource implementation costs since these officers are already in place and have ongoing activities with local community members.

However, this project activity also has several challenges. The main challenge is the expected high transaction costs. Since planting takes place on land managed by individuals, all aspects of project implementation and management must take place with a very large number of actors. In addition, since planting is taking place on agricultural lands, there is a high risk of non-permanence and a high risk of leakage, thus reducing the total number of credits that could be sold by a large amount.

If this program is expanded, it is recommended that the criteria to bring additional lands into the project be reassessed to ensure farmers have adequate land and the project does not result in reducing food production. Standard operating procedures for planting and care of trees should be created and followed up with sufficient training by extension officers. It is also recommended that the benefit distribution system be re-evaluated. In existing efforts, farmers will be compensated based on the carbon sequestered on their individual parcels. This pushed farmers to favour species and planting schemes they felt would result in the highest payment. Therefore, the motivation for planting was directly related to expected short term compensation. Other programs have demonstrated that farmers can be motivated to plant and maintain tree cover not for expected compensation from carbon, but from other benefits such as timber, fruit, and NTFP.

Community Vitalisation and Afforestation in Middle Shire (COVAMS)

The Project for Community Vitalization and Afforestation in Middle Shire (COVAMS) is a Japan International Cooperation Agency (JICA) funded project that was launched in 2007 with the objective of rehabilitating the watershed of the Middle Shire River through tree planting and promotion of income generating activities. The Kapeni and Kuntaja traditional areas were targeted due to their importance for the hydroelectric power generation at Nkula, Tedzani, and Kapichira plants. These plants produce about 90% of the country's electricity (ESCOM Ltd website, 2010). The Shire is the major water source for Blantyre, Malawi's largest commercial city. The area is also located near to the city and thus has been the source of firewood and charcoal for domestic energy within the city leading to significant forest degradation on customary land. Such land deterioration has then resulted in soil erosion and silt deposition into the Shire river, reducing the potential for power generation and urban water supply.

The major activities included measures to reduce siltation, such as soil erosion control, ridge alignment, gully reclamation and vetiver grass growing; tree planting along rivers and Village Forest Areas; and promotion of natural regeneration through prevention of wood collection on customary lands. In association with the project, livelihood activities were introduced including bee-keeping and vegetable growing. It is purported that since 2007 when the project started people in the area have realised increased yields due to improved water and soil conservation practices, improved tree cover has provided more fruits than would have been the case. Soil erosion has decreased considerably where land conservation husbandry has been practised and used[41].

Additionality: Existing plantings that have taken place would not be considered additional. However, there is a high potential to expand the efforts to a larger area.

Non-permanence risk: The type of land where plantings take place will highly impact both non-permanence and leakage risk. If the land is highly degraded and no longer suitable for agriculture, this risk is lower. However, currently many of the areas planted are on former agricultural land, thus increasing these risks. Recommended approaches for reducing risks include: focusing planting on degraded customary lands not suitable for agriculture, intensifying agriculture on remaining cropland; introduction of homestead woodlots; alternative and improved cook stove such as promoted by Hestian Rural Development Initiative; boundary plantings; and agroforestry.

Carbon credit generation potential, financial requirements and expected financial flows over time: As is true for all AR projects, credit generation runs parallel with tree growth and area planted.

There are high initial capital outlays for inputs and training requirements as trees planted are managed by individual farmers. Therefore, it faces some of the same challenges as TPMCSOES.

Impact of communities within and surrounding project area: Community impact is positive as many of them realise and appreciate the need to address issues of deforestation, degradation, soil erosion. By reducing potential erosion and siltation, the surrounding Shire River area is greatly benefited.

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[41] http://www.africanews.com/site/list_message/37078

Income generation potential: Currently, the community members participating in the program do not receive direct income benefits. However, this area may have the potential to be designed as a Payment for Ecosystem Services program. Such a program could also introduce alternative income generation strategies such as honey making and lime generation.

Assessment of repeatability: The area of highly degraded and deforested areas in the Shire River basin is very large and therefore this project has a high the potential to be expanded.

Recommendations: There is very good potential for a PES program to be developed in the Shire River watershed that combines both water and carbon credit generation. This potential will be examined in more detail by the existing WB land use options assessment.

However, again, this project activity has many of the same challenges as the TPMCSOES project, including potential higher transaction costs as activities are taking place on many different farm lands and high risk of non-permanence and a high risk of leakage, thus reducing the total number of credits that could be sold by a large amount. The risk of non-permanence may be potentially reduced by combining carbon credit generation with water credits. Often continued protection of the watershed for water quality protection results in a yearly payment, thus creating a more long term payment.

Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP)

This is a 5-year programme (2010-2014) being implemented by three partner institutions namely LEAD-Southern Africa, FRIM and WorldFish Center. The overall goal of the programme is to secure the livelihoods of 1.5 million people in the Lake Chilwa Basin and enhance resilience of the natural resource base[42].The programme aims to achieve this goal through the development and implementation of basin-wide climate change adaptations in support of the Malawi NAPA in order to enhance the capacity of communities to adopt sustainable livelihood and natural resource management practices.

As part of this program, tree planting will take place on degraded customary lands, including Village Forest Areas, and degraded Forest Reserves. Forest Reserves will be planted with native species with the goal of long term maintenance of natural forest, managed by the Department of Forestry. It is expected that Village Forest Areas will be planted for future selective logging.

Additionality: This program was designed as an adaptation program, however, the tree planting activities that are being implemented result in carbon sequestration. It is recommended that there be further investigation to determine if and how existing efforts can be altered to include a climate change mitigation component.

Non-permanence and leakage risk: To mitigate the risk of non-permanence it is recommended that tree plantings focus on degraded areas not suitable for cropland and areas where communities have sufficient cropland to meet food requirements and have ability to enforce management plans. The risk of

[42] LEAD, FRIM, WorldFish Center. (2012). Lake Chilwa Basin Climate Change Adaptation Programme – Annual Report, 2011. Report to Royal Norwegian Embassy.

leakage will be minimized in locations where the land is already heavily degraded and no activities are currently taking place.

Carbon credit generation potential, financial requirements and expected financial flows over time: To increase the potential for credit generation and reduce financial requirements, it is recommended that plantings be focused in contiguous nonforested areas. As is true for all project types involving community lands, the transactions costs are high due to the need to demarcate areas, provide technical training in seedling care, and provide training in alternative livelihood strategy creation.

Assessment of repeatability and recommendations: Within the existing program, potential priority locations for sequestration and emission reductions are being identified. Potential locations are being assessed for their applicability to widespread tree planting, planting on steep slopes and river corridors, conservation of existing forest areas, and fire management.

The following are recommended next steps:

1. Examine the project more closely to determine if the project objectives can be altered to include credit generation and determine if such activities would meet additionality requirements.

2. Evaluate the eligibility of all perspective lands to determine if the project will be considered an ARR project or an IFM project under the VCS. If it is determined that there will be barriers to implement the project under one of these categories, it is suggested that discussions be held with the ACR to determine how such a program could be included within that standard. If project activities will be considered IFM activities, it is likely that an existing approved VCS or ACR methodology will need to be adapted and submitted for approval. This process usually takes more than six months to complete, requires assistance from a consultant, and requires dedicated financial resources.

3. The benefit distribution system will also need to be determined based on existing studies.

Trees of Hope

This program has been designed as a carbon project following the Plan Vivo Standards. It was validated in September of 2011 and an initial set of credits have been verified. The programme is being implemented by Clinton Development Initiative (CDI) in Dowa and Neno districts in Central and Southern Malawi respectively. The objective of the programme is to improve livelihoods in the targeted communities through a forestry based, community-led payment for ecosystem services program, planned and delivered according to Plan Vivo Systems and Standards. The project is working to make tree farming attractive and profitable for smallholder farmers and to generate the important secondary benefit of reversing deforestation in Malawi[43]. Under the programme, rural community members voluntarily engage in the establishment of appropriate forestry and agro-forestry land-use systems for carbon sequestration and provision of other livelihood benefits[44].

[43] http://www.unitedbankofcarbon.com/projects/africa/trees-of-hope-project-malawi/

[44] Clinton Development Initiative. 2011. Project Design Document For The Trees Of Hope Plan Vivo

Additionality Since this program was designed as a carbon project, the activities are additional. The main barriers to implementation determined by the project are: financial investment, community mobilization, and technical knowledge in tree planting and care[45].

Technical Capacity: Although there are high capabilities within Malawi for planting trees, this project relies on local farmers to plant and care for trees. Thus this project requires a large amount of training to many different farmers.

Non-permanence and leakage risk: Since many of the trees are being planted on formerly cultivated land, the risk of non-permanence and leakage is high. The project has attempted to reduce the non-permanence and leakage risks by conducting the following activities: potential farmers are assessed individually to determine if farmer has sufficient land to allocate to non-food production; all participants must sign contracts that they will not displace activities; and community based 'policing' is formed to monitor activities.

Carbon credit generation potential: There is some credit generation potential resulting from the planting of trees, but this will be in parallel with the amount of trees planted. Unlike some other project standards, the Plan Vivo system allows for forward selling to take place as part of the validation thus providing additional upfront financing opportunities.

Financial requirements, impact on communities, and income generation potential: This type of project requires capital to be invested to initiate project activities and train farmers while credit generation has a longer time horizon.

Within this project, trees are planted as woodlots and orchards but many of the plantings take place in a dispersed area, such as along the border between fields. This dramatically increases the effort required for monitoring. In addition, since planting is taking place by many different individuals, the transaction costs will be higher in comparison with projects planting on land controlled by few entities.

The areas planted as orchards may provide additional income beyond carbon credit sale.

Assessment of repeatability and recommendations: The Tree of Hope Project itself has the potential to expand by adding additional farmers and areas planted to the project. The project is seen as very positive by the community and individuals have shown great interest in being involved in the program.

The Plan Vivo system is designed to benefit local farmers and improve livelihoods. The measurement and monitoring systems have been designed from the outset to directly involve community members. Since many individuals are involved, the program can improve skills in tree planting and care to a large number

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Project. Lilongwe. Submitted to Plan Vivo Foundation, Edinburgh,
http://www.forestcarbonportal.com/project/trees-hope

[45] Nyirenda, C. 2011. Project Design Document for Trees of Hope, Plan Vivo Project. Trees of Hope. Submitted Aug 2011 to: The Plan Vivo Foundation, Edinburgh, Scotland

of people. In addition, the system has an existing benefit sharing system that is in place and has been found effective.

The credits produced by Plan Vivo are not fungible with credits produced by other standards. The measurement and monitoring systems used differ largely from the systems used by the CDM, VCS, and ACR. The current volume of credits sold by Plan Vivo is only a fraction of that sold by other voluntary markets and since the Plan Vivo Standard only produces credits from the land use sector, a much smaller segment of potential buyers will likely be aware of this Standard. In the future, if the demand for voluntary market credits continues to be smaller than the supply, it may be very difficult to sell Plan Vivo credits and/or the price for credits may be lower than those produced by other standards. To offset such risks, if this type of project is replicated, it is highly recommended that investment capital be secured by through the sale of 'forward purchase Plan Vivo certificates' or other forward-sale arrangement.

Even if the Plan Vivo Standard is not pursued for other areas, it is highly recommended that the Plan Vivo system be looked at closely as many aspects of the system have been highly successful and are well suited for rural Malawi. This includes the Plan Vivo system of community participation, Plan Vivo manuals and training materials for planting and for community monitoring, benefit sharing mechanisms, and linkages between community members, village chiefs, government ministries (such as forestry), and non-profit organizations.

Bio Energy Resources Limited (BERL) Jatropha project

This project entails planting *Jatropha curcas* as a boundary around existing crops, and using the product to produce biofuel. There is a potential for generation of carbon offsets from both revegetation and production of biofuels, however, currently BERL is only seeking credits from the revegetation aspect under the VCS using a CDM methodology. Currently this project has planted over 200 hectares over three districts in Malawi and has been validated under the VCS.

Additionality: The planting of Jatropha by BERL will result in the production of a commercial commodity. Therefore, to been seen as additional, the BERL project needed to demonstrate either a strong barrier to implementation or conduct an investment analysis demonstrating that this project activity not the most financially attractive in comparison to other potential activities. The investment capital to implement this project was directly sourced from investors seeking to produce carbon credits and allowed BERL to overcome the investment capital barrier.

Non-permanence and leakage risk: Depending on the pruning techniques and rotation period used, any area planted with Jatropha may reach the long term average carbon stocks in only a few years. This would increase the risk of non-permanence greatly as once the long term average has been reached, no further credits are created, thus reducing the incentive to maintain the land cover. However, through the design of this project, the risk of non-permanence has been greatly reduced: This program will be working with thousands of individual farmers, and therefore, although some farmers will cease production, this will likely be offset by other farmers joining the program as it expands over time; the Jatropha planted will also produce a product with a known buyer, thus reducing risks of the producer; and the Jatropha planted will produce a commodity that can be sold for many years.

By planting along field boundaries, the area of crop production is not reduced removing the risk to food security and opportunity costs.

Carbon credit generation potential: Jatropha growth is relatively fast, thus credits can be generated quickly. The amount of credits generated can be increased overtime through the addition of more farmers to the program.

Financial requirements and expected financial flows over time: The capital investments required by BERL to create the production and distribution system of Jatropha products are high in comparison to other project types. The initial financing for the BERL program was sourced from a private company conducting corporate social responsibility. Since the commodity produced is also relatively new, BERL is investing in all segments of production and sale. This includes a multimillion dollar facility to process the Jatropha seeds into saleable commodities.

However, developing this entire system does not need to take place prior to the initiation of Jatropha planting. The financial resources obtained from the future sale of carbon credits will likely only cover a small portion of the entire investment by BERL, however the sale does increase the feasibility of such a project.

Impact of communities within and surrounding project area: Farmers involved in this program will benefit from the sale of Jatropha seeds to BERL, thus adding to and diversifying their income. In addition, it the production and processing facilities will add long term jobs at various production and sale stages.

Income generation potential: Jatropha is both a potential source of money from bio-diesel and carbon benefits.

Assessment of repeatability and recommendations: The BERL program is an excellent example of combining various investment and commodity production streams conducted by private industry. It is highly recommended that further expansion of the BERL company be supported through reducing any existing regulatory barriers. Malawi is using the comprehensive Energy Act of 2004 to rule around biofuels[46]. Probably the development of an independent policy for bioenergy or review of the Act for relevant changes would give more impetus to this mitigation option.

6.2.3 Improved Forest Management

Under the VCS, projects involved with forests remaining forests are categorized as 'Improved Forest Management' (IFM) and such projects involve a change in management practices on areas currently covered by forest that results in an increase in carbon stocks over and above those present in a business as usual scenario. This type of project is not allowable under the CDM.

[46] Lerner, A, Matupa, O, Mothlathledi, F, Stiles, G, and Brown, R. 2010. Southern African Development Community (SADC) Biofuels State of Play Study: An assessment of the Biofuel Sector Development in the SADC. Report for SADC Biofuel Task Force, GTZ and Programme for Basic Energy Conservation (ProBEC)

6.2.3.1 Description of Improved Forest Management Project Types

There have been limited transactions in the global market of carbon offsets generated from IFM projects, though this could change with the recent development of approved methodologies under VCS[47]. Based on the analysis of current land cover and land management practices in Malawi, recommended opportunities for improved forest management in Malawi are:

- Improved management of Forestry Department plantations which are currently not maintained. Severely degraded or mismanaged lands have the potential to generate both carbon offsets and timber if management is improved. Currently many of the Forestry Dept. plantations are not adequately managed due to lack of staff and infrastructure. Needed inputs would likely include thinning, replanting, and removal of deadwood. Previous harvesting of timber left a large volume of dead wood within many of the plantations (for example Chikangawa), resulting in high risk of fires. Initiation of improve management will likely require significant financial resources. In addition, initial management will result in a temporary increase in emissions.

- Reduction of cutting rates and/or increase in rotation length on Forestry Department Plantations. This has the potential to result in larger and thus higher value timber or other wood product such as charcoal. However, it requires a deferral of revenue in comparison to the business as usual situation. In order to implement this type of project, detail and documented information is needed on historic extraction rates. This is used to project future harvesting. This type of project could be prioritized for the following timber plantations: Zomba, Dedza, Michiru, Dzonzi-Mvai and Dzalanyama.

- Improved management and stocking density of Village Forest Areas, including those areas transferred under the Wood Energy Programme to communities for management.

- Reduction of charcoal production by limiting or disallowing cutting or increasing the rotation cycle. This has great risk of leakage and could require substantial monitoring to ensure that production does not increase elsewhere as a result of the project.

The government of Malawi owns over 90,000 ha in plantations. These plantation areas contain relatively large contiguous areas owned by a single entity, and thus hold advantages for carbon project development. Most of the tree plantations in Malawi owned by the government were strategically situated on hills and mountains for water catchment and soil erosion control purposes while also supplying the urban centres with fuelwood, poles and timber. The largest government plantation is Viphya, covering some land area of 53,000ha and other notable plantations include Chongoni in Dedza, Zomba and Mulanje. The Viphya plantations were established for pulp production and are now managed for timber after the establishment of a paper factory proved not feasible. Much of the government plantations are degraded and not adequately managed due to illegal logging, bush fires, and purposefully destructive activities by former employees. In addition, the government plantations have been encroached by cultivation. The majority of the government plantations are softwood species, mainly pines while areas of hardwood plantations are

[47] Diaz, D, K. Hamilton, E. Johnson. 2011. State of the Forest Carbon Markets 2011. Ecosystem Marketplace.

mostly eucalyptus, planted for poles and fuelwood. Existing spatial datasets do not provide adequate information on the forest cover and degradation state of the plantations. It is likely that any project taking place within government plantations will contain a mix of activities and apply both ARR and IFM methodologies.

6.2.3.2 Potential of IFM

Additionality

To be additional, projects must demonstrate that the project activities would not have taken place in the absence of carbon financing. For IFM projects, the land cover itself does not change but instead the project activities relate to only a change in the management of the forest. Therefore, projects must be able to demonstrate what the baseline land management is through records or common practice analysis and demonstrate that the project management activities would not have taken place regardless of carbon finance. For many IFM projects, the most straightforward method will be to demonstrate a financial and/or technical capacity barrier or demonstrate through the investment test that the project activities are less economically attractive than the baseline.

Technical Capacity

Malawi has limited experience with implementation of improved forest management techniques and some high level of technical experience with forest and land use management exists within the Department of Forestry, Local Government and civil and private sector. However, to implement wide-spread programs, the number of people with this experience would need to grow.

For projects to take place in Village Forest Areas, forestry extension officers would need to receive extensive training in IFM techniques along with best practices for training village members.

It is highly recommended that a feasibility analysis take place to evaluate existing and additional data that would be required to create estimates of baseline management, baseline growth and yield, and what alterations in management could be made that would result in carbon credit creation.

Risk of Non-permanence and Leakage

Projects focused on alteration in rotation periods or volume of timber extracted have a high risk of non-permanence since any gains in carbon can be lost if the project implementer harvests trees due to a need for financial resources. However, well designed IFM projects should lead to the production of higher quality timber, creating a built-in incentive to maintain project activities beyond carbon financing. In addition, the risk of non-permanence is very low for projects focused on reducing the amount of waste wood produced per unit volume of timber produced.

There is some risk of leakage for projects that reduce the total volume of timber or other commodity produced within a given area of forest. However, this risk can be reduced and nearly eliminated if the project is designed to incorporate sustainable income generation through harvest of timber and non-timber forest products.

Projects focused around the protection of a given area from selective cutting for charcoal may have very high levels of both activity shifting and market effects leakage. Therefore, prior to implementing this type

of project a detailed analysis of potential project activities and leakage estimation and prevention strategies will be required.

Credit Production

In comparison to REDD and ARR projects, IFM projects tend to have a much lower potential for carbon credit generation on a per hectare basis, approximately 0-8.6 CER per hectare per year. However, for the majority of IFM projects, the project area is still generating income through the sale of timber or NTFP and therefore the sale of credits is often only a small additional positive income to an otherwise sound business.

Financial Requirements and Additional Income Generation

For many IFM projects the financial investment capital required to implement improved practices is must lower in comparison to many ARR and REDD projects. The main financial requirements will be for technical capacity building activities, new equipment (depending on activity), and deferred timber harvests.

In addition, for plantations owned by the government or by private entities, the transaction costs will be substantially lower than for project types where many farmers must be engaged. This also removes some of the complexity of project initiation and reduces risks of non-permanence.

As noted above, the return from the sale of carbon credits may be relatively low, but the sale of timber and non-timber products can be significant, causing these projects to be financially attractive.

Impact on Communities

For project activities implemented on government controlled forest plantations, the impact on communities may be very small. One impact would be the reduced risk of fires that could potentially escape to surrounding areas.

Replicability and Recommendations

The Department of Forestry manages the government owned plantations while District level forestry offices manage small plantations owned by district level governments. These plantations have undergone a large amount of degradation over the years.

Since these plantations are centrally owned, many of the transaction costs associated with working with many small holders are removed. Experience has shown, however, that in Malawi the long term success levels of projects requires that surrounding communities must see a positive benefit. Therefore, it is imperative that even for projects on government owned plantations, specific and direct benefits to farmers be included in the project design and implementation.

The other potential area would be improvement of Village Forest Areas which are managed by communities.

Supportive policies and legislation are also an important component required to facilitate implementation of IFM projects. The National Environmental Action Plan (NEAP) of 1994[48], the Forestry Act and Environmental Policy provide overall policy guidance and framework to address the principles of sound environmental management including sustainable use and management of forest resources, restoration and maintenance of essential ecosystems and ecological processes and enhancing community awareness and participation in sound environmental management. Environmental laws in Malawi are in the process of being revised to take into account current trends in approaches to sustainable use and management of natural resources and the environment.

6.2.3.3 Existing Projects

Forest replanting and Tree Nursery Project (FOREP)

The project aimed at rehabilitating degraded industrial forest plantations to ensure sustainable timber supply. Through the project, 300 hectares were replanted in 2009, in different softwood plantations. This project was part of a Presidential initiative implemented by the Forestry Department. Seedlings were planted within community areas and within degraded forest reserves.

Additionality: The existing areas managed under the FOREP program would not be additional since carbon finance was not the motivation of the program. However, if this program was expanded, the additionality of such a program would be relatively easy to demonstrate.

Non-permanence risk: The risk of non-permanence is high and there is a strong potential for low project success rate. The existing program has been met with limited and mixed success. For example, while around 5 tonnes of seed were collected for distribution and there was a large number of training activities; it can be demonstrated that only about 300ha of plantations were replanted.

In many locations, small holder agriculturalists previously converted plantation areas into cropland illegally; however, it has proven very difficult to permanently remove these farmers as the surrounding areas are heavily populated and degraded.

Risk of leakage: The risk of leakage is very minimal because most FOREP projects are on degraded marginal lands that were either in use before the 1993 multiparty era or not in use at all.

Carbon credit generation potential: The credit potential is dependent on the species and area planted. This program focuses on the planting of indigenous species, many of which are slow growing, but which include some faster growing species such as *Khaya anthotheca* (m'bawa), *Acacia spp.* and *Syzygium spp.*

Financial requirements, impact on communities, and income generation: Financial requirements for this type of program are based around planting seedlings, managing forest area, and continued

[48] Government of Malawi. (1994). National Environmental Action Plan. Department of Research and Environmental Affairs, Lilongwe.

protection. The financial gains beyond carbon only take place in the long-term once the trees have grown enough to allow for selective logging.

Repeatability and Recommendations: There are many areas where planting can take place on degraded woodlands and plantations. In addition, there are existing capacity building materials for all stages of tree planting and forest/plantation management that could be used in the future.

It is recommended that if this program is expanded, it implements comprehensive management strategies, such as fire prevention, and plantation management over time. Several previous programs focused on tree seedling planting without adequate attention to long term management.

If this program was expanded, it is recommended that a spatial analysis assessment be conducted prior to initiation. The existing program was focused on peri-urban areas where the demand for firewood and charcoal is very high. Thus, the risk of non-permanence was very high.

6.2.4 Agricultural Land Management

There have been limited transactions in the global market of carbon offsets generated from agricultural land management projects although this may change with the recent development of approved methodologies under VCS[49]. Based on the analysis of agricultural management in Malawi, potential opportunities within agricultural lands include the following:

- Increase or maintenance of soil carbon stocks: This could include activities such as conversion to no-till or low-till management systems; reducing use of bare fallows; increasing use of cover crops; improved fallows; and various systems to reduce water run-off. A methodology based on this system has been approved by the VCS and this type of project has recently been successfully implemented in Kenya.

- Switch to high-carbon stock crops: This can include planting of various crops that would result in increased long-term biomass and likely increase soil carbon levels. This could include things such as conversion to woody crops such as tea or coffee; agroforestry; and boundary planting. Depending on the project activities and the standard used, such projects may be applicable under agricultural management or under ARR.

The potential of various biomass plantings is covered within the ARR section of this report.

Switching tillage systems can have a long term impact on soil carbon stocks and often will also result in increased crop production. Programs that encourage such management are highly encouraged. Where agroforestry-type carbon projects are implemented, it may be recommended to analyse the increase in soil carbon stocks along with the increase in biomass. However, implementing this type of project activity as a carbon project alone has a number of challenges to implementation in Malawi. The main challenges include:

[49] Diaz, D, K. Hamilton, E. Johnson. 2011. State of the Forest Carbon Markets 2011. Ecosystem Marketplace.

- **Low credit production:** Both the rate of soil carbon accumulation and the maximum sequestration amount are both very low compared to other project types. This results in only small volume of credits per hectare created over many years.

- **High risk of non-permanence**: The occurrence of any tillage can result in a substantial release of any emissions previously removed and therefore the risk of reversal is very high.

- **Financial requirements**: Since the number of credits that can be generated per hectare is low, for a project to be profitable a very large area of farmland will need to be included in the project. Given the small field sizes within Malawi, this will require a very large number of households to be incorporated into the project and require extensive amounts of monitoring.

Given these challenges, the credits generated may be very low and therefore this type of activity is recommended to take place as part of a livelihood improvement program as opposed to a profit making endeavor.

6.2.5 Overall Recommendations

Based on this review of existing projects and potential project activities in Malawi, some overall recommendations can be made.

For all project types in Malawi, one of the main elements that will define project success will be creating long term improvements in the lives of the people through the implementation of project activities. Based on a review of previous projects, projects were most successful where the was short, medium, and long term benefits directly to those involved through the continuation of project activities. Given the myriad of projects that have taken place, it is highly recommended that an analysis take place to clearly identify the types of local farmer interactions that have been found to meet with the highest success.

Multi-Activity project types:

For projects focused on reducing deforestation, it is recommended that an integrated land use management strategy be used. Such projects should include multiple components, some of which can be used to generate credits, while others will be used to reduce leakage potential. This type of multiple credit-generating project types is allowed under Plan Vivo, ACR, and VCS.

The recommended components could include such activities as:

- Direct actions that generate carbon credits:
    - Avoided deforestation and degradation of existing forest reserves
        - Fire prevention / management associations
        - Community groups monitoring forest reserve activities
    - AR: Fuelwood/charcoal plantations, potentially using a combination of fast growing species and longer term native species.
        - The creation of ‘buffers’ around forest reserves has been successful in Malawi in the past.
        - It is recommended that plantations only occur on non-cropland
    - AR: Replanting of areas within forest reserve that have been deforested or heavily degraded

  - AR: tree planting on areas with high slope
  - ARR: Agroforestry on cropland and/or degraded cropland
  - ARR: Boundary planting around existing cropland
  - Agricultural land management: improved cropland management techniques, including cover crops and reduced tillage practices
- Non-credit generating activities
  - Small business development
  - Farmer / Business / Conservation / Community associations
  - Other agricultural techniques that improve crop yields, improve farmer incomes

It is recommended that this type of project be initiated as a type of joint government – private sector initiative. Given this type of project is focused on rural livelihood development; the private sector partner most interested in such a project would likely be a local or international nonprofit non-governmental organization. It is also possible to have multiple partners, each focusing on a specific aspect of the project (e.g. improved agricultural techniques; charcoal efficiency improvement; agroforestry fruit production; boundary crop planting).

- Potential Role of Government:
  - Provide access to specific land areas
  - Produce guidance documents on how to design and implement activities
  - Produce guidance documents on the measurement and monitoring of carbon stocks
  - Produce time-series of land cover maps
  - Train farmers on how to implement land-use activities (such as tree planting, fire prevention etc) through extension services
- Potential Role of Private Sector Partner:
  - Upfront capital to purchase resources required to implement activities (e.g. seedlings, create nursery, expendables such as fuel)
  - Conduct spatial modeling required to estimate projected location of deforestation (likely a technical consultant) (or may be done by government if training takes place)
  - Manage and maintain all activities, such as plantations, nurseries, etc.
  - Develop required carbon project documentation
  - Provide capital for project validation and credit verification
  - Design benefit sharing distribution system (together with government)
  - Monitor all project activities and estimate GHG emissions/removals overtime

ARR and Agricultural Land Management Project Types

It is highly recommended that activities focused on creating plantations or native-species forests be promoted and take place **only on non-cropland**. This would include currently deforestation government owned land (such as forest reserves and plantations), degraded customary lands, and especially degraded customary lands with a high slope. Such projects could take place either as part of a large integrated land use management project, or alone. Such project activities could take place as government run efforts, as a public-private partnership, or by a private entity. To ensure long term maintenance of the tree plantings, specific and proven activities that result in short, medium, and long term benefits to any surrounding community members. Based on previous efforts, this will be required even where the project activities are taking place on government owned land.

- Potential Role of Government:

  - Provide access to specific land areas
  - Produce guidance documents on how to design and implement activities
  - Produce guidance documents on the measurement and monitoring of carbon stocks
- Potential Role of Private Sector Partner:
  - Upfront capital to purchase resources required to implement activities (e.g. seedlings, create nursery, expendables such as fuel)
  - Manage plantations on short and long term
  - Develop required carbon project documentation
  - Provide capital for project validation and credit verification
  - Design benefit sharing distribution system (together with government)
  - Monitor all project activities and estimate GHG emissions/removals overtime

On cropland, a large number of activities have the potential to generate credits but also improve farmer incomes and reduce land degradation. As stated, these activities can either be done singly or a combination of efforts can take place within various farmlands. This can include agroforestry with species like *Faidherbia albida, Gliricidia sepium*, and Mango, boundary planting, and improved cropland management activities. Since these types of activities can also generate a commodity, it is recommended that this type of activity be implemented by the private sector. Where needed, the government can provide only a support role, such as producing documents and trainings on how to implement activities.

- Potential Role of Government:
  - Produce guidance documents on how to design and implement activities
  - Produce guidance documents on the measurement and monitoring of carbon stocks
  - Train farmers on how to implement activities through extension services
- Potential Role of Private Sector Partner:
  - Upfront capital to purchase resources required to implement activities (e.g. seedlings, create nursery, expendables such as fuel)
  - Manage and maintain all project activities
  - Develop required carbon project documentation
  - Provide capital for project validation and credit verification
  - Design benefit sharing distribution system (together with government)
  - Monitor all project activities and estimate GHG emissions/removals overtime

Table 8. Brief assessment of each potential AFOLU project type

Project type	Addition-ality	Technical capacity require-ments	Previous Implementa-tion	Non-permanence risk	Leakage risk	Carbon credit potential	Financial require-ments	Impact on communities*	Income generation potential	Repeatability
REDD – Planned Deforestation	Easy	Low-Medium	Medium	Low-Medium	Medium	High	Medium	Medium	Medium (w/ alter. livelihoods)	Low
REDD – Unplanned Defor.	Moderate	High	Medium	Medium	Medium	High	High	High	Medium (w/ alter. livelihoods)	Medium-High
REDD – Reduction of Charcoal Prod.	Easy	Medium	Low	Medium-High	High	Medium	Medium	Medium-High	Low-Medium	Medium-High
REDD – Reduction of Timber Theft	Moderate	Medium	Low	Medium-High	Medium-High	Medium	Low-Medium	Medium	Low	Low- Medium
ARR – Tree Planting	Easy	Low	High	Medium-High	Low-Medium	High	High	Low-Medium (pot.impact)	High	High
ARR – Revegetation (ceasing cutting)	Moderate	Low	Low	Medium-High	Medium	Medium	Medium	Low	Medium	Medium
ARR – Revegetation	Moderate	Low-Medium	Low	Medium	Low-Medium	Medium	Medium	Low (potential positive impact)	Low-Medium	Medium
ARR – Boundary Planting	Easy-Moderate	Low	Medium	Medium	Low	Low	Medium	Low (potential positive impact)	Low-Medium	High
IFM – Reduced Cutting/Increased Rotation	Moderate	Low-Medium	Low	Medium	Low-Medium	Low-Medium	Low-Medium	Low-Medium	Medium	Medium
IFM – Improved Management of Degraded Lands	Moderate-Difficult	Medium-High	Low	Medium	Low	Medium	Medium	Low (potential positive impact)	Medium-High	Medium

*All negative impacts on communities should always be mitigated in order to decrease the risk of permanence and provide alternative livelihoods. This column provides an assessment of the potential negative or positive impact without any mitigation.

7 INSTITUTIONAL CAPACITY ASSESSMENT

7.1 Institutional Overview

Malawi has a strong foundation for attracting carbon market financing. The government has created a Designated Operating Entity, allowing development of Clean Development Mechanism (CDM) projects – the single largest global channel for carbon offset financing. The DNA has established a portal on the National Climate Change Programme website, is collecting CDM Project Idea Notes and Project Design Documents and has produced an approval letter for one offset project. It has implemented power sector reforms which allow the establishment of independent power producers (in 2003's Malawi Energy Sector Reform Program) – an essential component of energy sector offset development. The Department of Forestry and affiliated institutions have implemented several projects which might have qualified for offset crediting. The government has also established Sustainable Development Criteria and incorporated Climate Change as one of its Malawi Growth and Development Strategy focus areas.[50] Additionally, most of the critical government agencies and departments have specified at least one staff member responsible for climate change/carbon markets and participate on the CDM technical committee. National REDD+ Strategy and Climate Change Policies are in planning phases, with several REDD+ pilot project outline documents to be released soon. REDD+ consultative meetings have been held with stakeholders, especially development partners and those from key departments. Raising of awareness amongst forestry department staff, concerning technical aspects of REDD+, has been made. Further awareness on REDD+ is to be made amongst the other stakeholders outside the forestry sector. A national workshop on the REDD Strategy is also to be convened to identify gaps and map the way forward for the country.

While these achievements can help facilitate carbon offset project development and the government shows signs of keen enthusiasm for the sector, many features of the current institutional structure which could be improved in order to accelerate offset investment inflows. We outline the Malawian institutions with key roles in carbon finance facilitation below.

7.1.1 The Forestry Department

As the forestry sector represents one of the largest and most cost-effective sectors for offset project implementation, Malawi's Forestry Department is likely to play a critical role in promoting sector development. The Forestry Department was established in 1942[51] and oversees all forestry operations in the country. The current National Forest Policy of Malawi was established in 1996 and has as its goal the conservation of forest resources for Malawians' "diverse and changing needs," with a particular focus on the needs of rural people, who are typically the most disadvantaged. The policy is administered by the Forestry Department and aims to encourage the participation of local communities in forest management and provide incentives to create stable rural economies. The National Policy is fairly comprehensive, defining formal local involvement through Village Natural Resources Committees (VNRCs), identifying the

[50] Sustainable Development Criteria Available at http://www.nccpmw.org/index.php?option=com_filecabinet&view=files&id=18&Itemid=2

[51] http://www.sarwatch.org/sarwadocs/MalawiTimberTradeFA.pdf

role of NGOs in national forest strategy and funding, encouraging gender equity in resource management and utilization, and enabling cross-sectoral approaches to natural resource management. The National Forestry Programme (NFP) was established in 2001 to implement the national policy. Despite this, the National Forest Policy is not always enforced fully, due to the demands on forests in Malawi, and the limited resources to ensure sustainable management and use.

The National Forest Policy of Malawi (1996) represents a departure from the previous strategies which favoured forest protection rather than participatory forest management. In this regard the policy provides the basis for communities to conserve and sustainably use forest resources, including trees on farms, to support livelihoods. It also focuses on the importance of involving the private sector in the utilisation and management of forests and highlights the strong link between forest degradation and poverty, especially the deep impact fuelwood shortages have on women and children.

Despite clear language in the forest act, the creation of co-management agreements between the Forestry Department and local communities and the private sector has taken place slowly. It is felt that bureaucratic procedures may hamper wider participation in sustainable forest management.

Increasing experience in concession agreements will assist in determining the impact of privatisation efforts and the desirability of expansion. If seen as effective, such management agreements can become part of either a voluntary carbon project and/or part of Malawi's national REDD+ strategies.

7.1.2 Governance of Forest Land

Also critical to understanding institutions' impact on offset development is the ownership/governance structure of Malawian forests. Forests in Malawi are composed of state-run reserves, customary lands[52], and government or private plantations.

There are 82 Forest Reserves, managed by the Forestry Department, which were established to reduce erosion and maintain water catchments. There are also five national parks and four game reserves, which are managed by the Department of National Parks and Wildlife. These are scattered across the country and comprise 19% of total forest area.

Customary land forests account for 63% of forest area in Malawi, and are owned by small land holders. These include community forests, managed by and for the good of individual communities. These lands are managed at the discretion of the village chief, as deemed beneficial for the village as a whole. Communities have the right to harvest and sell forest products according to the bylaws established for their village forest.

Forest lands other than reserves or customary lands are either privately or state owned plantations. Privately owned lands are managed according to the plans of the owner, and account for only about 0.4% of total forests. State-owned plantations comprise about 1.8% of total forests in Malawi, some of which is leased to and managed by the private sector. There has been a recent decline in the area currently under private sector management. The most common plantation species are *Pinus patula* and *Eucalyptus* species.

[52] http://www.fao.org/docrep/004/ab585e/AB585E04.htm

The Forestry Department oversees and monitors the management of all plantations, with the intent to encourage value-added products, sustainable rates of harvest, and replanting after harvest. However, Department staff is relatively small and underfunded, and the capacity to ensure that such practices are followed is limited and market forces are more often the driving force behind management.

In Malawi, many of the programs the government and many donor programs institutes are implemented at the ground level by the various Extension Services officers (Box 2). These staff are distributed throughout the country and these services have an existing and functional process for information exchange and knowledge and technology transfer. This is the level of government that interacts directly with its citizens.

Box 2. Existing responsibilities of Extension Services

The Department of Forestry is divided into divisions, one of which is the Forestry Extension Service (FES) headed by the Assistant Director of Forestry (FES). At the district level there are forestry extension officers starting from the District Forestry Officer, technical officers and technical assistants. All these are extension officers on the ground. Their roles include:

- Enforcing and interpreting the forest policy and law
- Conducting forest resource assessment and mapping
- Protecting forest resources
- Promoting and establishing forest plantations
- Empowering communities in management of forest resources
- Coordinating forest development activities with other stakeholders
- Raising awareness on investment opportunities in forestry plantations
- Identifying of sites and appropriate species to take advantage of existing and potential demand
- Providing technical advice
- Implementing forest management agreements
- Monitoring standards
- Participating in demarcating forest boundaries/village forest areas
- Carrying out community needs assessment in relation to foresr resources
- Training user groups
- Facilitating creation/establishment of village forest areas (VFAs)
- Disseminating forest related information
- Promote multiple use of forest products etc

Similarly, the Department of Agricultural Extension Services (DAES) is mandated to provide quality agricultural extension services to enhance adoption of improved technologies for all gender categories and vulnerable groups in order to improve and sustain agricultural productivity for improved food, nutrition and income security contributing to socio-economic growth and development[53]. The department services are rendered through five branches namely Food and Nutrition Branch, Extension Methodologies, Agricultural Communication Branch, Agribusiness Branch, and Agri Gender Roles and Extension Support Services.

[53] Kamkwamba, S. (2011). Capacity Development and Program Delivery in Food Nutrition. DAES, Lilongwe.

7.1.3 Malawi's Designated National Authority--DNA

The most critical entity to supporting carbon market access in Malawi is the country's Designated National Authority (DNA). As noted earlier, a DNA is a UNFCCC prerequisite for any country seeking to host a CDM project. Malawi's DNA operates primarily from the Environmental Affairs Department under the Ministry of Natural Resources, Energy and Environment. The DNA consists of three functional bodies, as outlined in Figure 6.

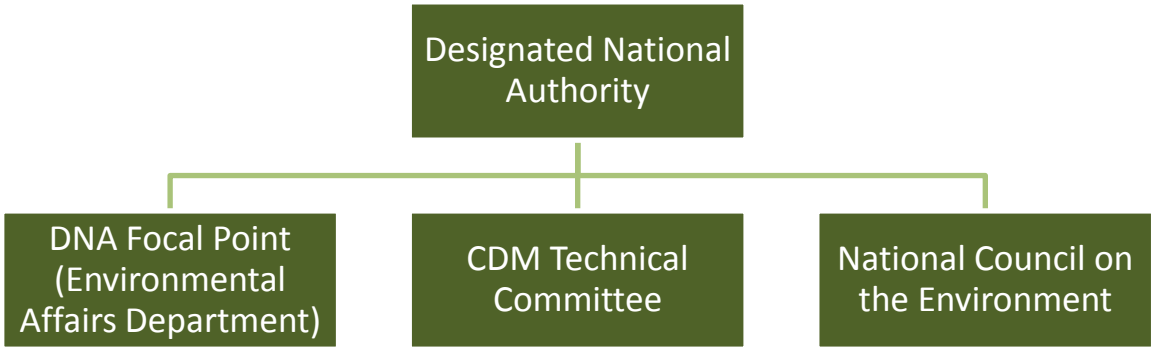

Figure 7 Malawi's Designated National Authority subdivisions

The DNA focal point has the closest direct role in carbon project development, playing the role of CDM regulator and promoter. Its principal (and sole full-time) manager contributes from her position in the Environmental Affairs Department (EAD). Operational since 2007, the EAD has drafted approval procedures, Project Idea Note (PIN) formats, as well as Sustainable Development Criteria for CDM projects.

The Environmental Affairs Department, in the form of the DNA focal point, is tasked with:

- Conducting initial assessments of CDM projects as submitted Project Idea Notes;
- Issuing letters of approval to project developers upon successful assessment of project design documents by the CDM technical committee (and no objection voiced from the National Council for the Environment);
- Raising public awareness of CDM among private and public sector; and
- Coordinating internal climate change policy regarding the CDM and developing positions for international climate change negotiations[54]

The focal point is currently assessing 10 Project Idea Notes and 3 Project Design Documents, and has recently given a letter of approval to one PDD.

[54] Malawi Environmental Affairs Department, 2010. Clean Development Mechanism Project Approval Procedure for Malawi.

In the approval cycle, developers are expected to provide project information in a two-stage process. In the first, optional stage, a developer submits a Project Idea Note to be reviewed by the focal point. In response the focal point may issue a "letter of no objection", suggesting that the project developer is likely to have success submitting a PDD building on the project outlined in the PIN. The DNA may also provide feedback directing the project proponent to make specific changes to project documentation prior to PDD submission. The feedback may help ensure that the project will satisfy the DNA's sustainable and/or successfully meet UNFCCC criteria for registration. The steps in the approval process are outlined in Figure 7 below, as taken from the DNA's website. The approval outline here resembles the process required by several other national DNAs in the region.

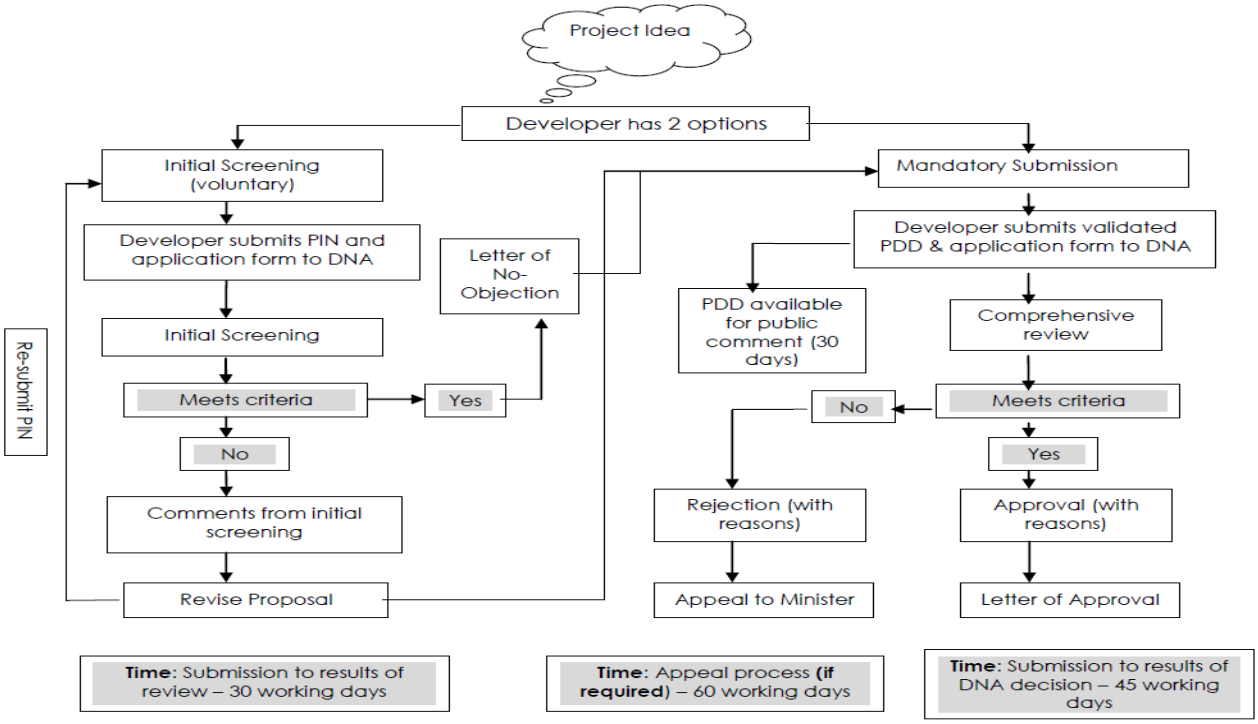

Figure 8 CDM Project Approval Process Flowchart. National Council on the Environment[55]

As a note, during the Mandatory Submission process, the DNA specifies a number of actions a Developer must take to ensure that project details are disseminated widely in the community: "publishing a notice twice in local newspapers, running four radio announcements and putting up posters in the national language at the site of the proposed development."[56] Consultants did not notice similar disclosure specificity in other published local African DNA project approval summaries. When asked about this public announcement criterion, the DNA suggested that the standards are effectively being relaxed, as project developers found them difficult and relatively uncorrelated with justified public awareness. The

[55] Malawi Environmental Affairs Department Report. Clean Development Mechanism Project Approval Procedure for Malawi. Available at: http://www.nccpmw.org/index.php?option=com_filecabinet&view=files&id=18&Itemid=2

[56] *Ibid*

Mandatory Submission process also requires the Developer to post a PDD document on the DNA's website, currently part of its broader Malawi Climate Change and Environmental Programmes (http://www.nccpmw.org) portal.

One project is currently posted on the site, posted by the developer CarbonSoft for a Pan-African Program of Activities. The project proposes to distribute LED lamps in place of commonly used kerosene lanterns, with a CPA on the site detailing CarbonSoft's local project manager – Solar Solutions Ltd, will execute the local component of the planned activities. The project document was posted in April 2011 and received DNA approval in May 2012 according to CarbonSoft[57].

The focal point has led a number of regulatory changes to the CDM project approval process and is undertaking a number of sector promotion initiatives. On the regulatory side, it is

- Revising sustainable development criteria for national approval, in part to streamline the project evaluation process (scheduled to be issued in July 2012);
- Looking to reform relatively onerous public announcement processes originally established in approval rules;
- Requiring late stage draft validators' reports for projects before approval, lessening the time and background research needed from regulators and ensuring that only projects likely to register are submitted to the UNFCCC;
- Shifting National Council of the Environment official project approvals to be largely ceremonial, speeding up the development cycle, as the NCE only meets 4 times a year; and
- Pushing to ensure that administrative fees imposed on project developers for the approval process are retained in the DNA (including for inter-ministerial Technical Committee members) in order to facilitate the entity's activity

As part of offset promotional efforts, the Focal Point is

- Showcasing Malawi as a potential CDM investment destination, particularly as an LDC (eligible for EU ETS compliance market credit development post-2012), at international fora, such as the recent Carbon Expo in Cologne;
- Developing "investor guide" materials, in coordination with the Malawian Investment and Trade Center;
- Increasing the information on Malawian CDM opportunities highlighted on the DNA website (part of the National Climate Change Programme portal); and
- Assessing new possibilities for disseminating new "Suppressed Demand" methodologies, which would ease difficulties associated with energy sector methodologies in Malawi

[57] http://www.carbonsoft.net/blog/

Other functional entities considered part of the DNA are inter-ministerial, including technical experts- in the case of the CDM Technical Committee, and other senior agency officials- as with the National Council on the Environment (NCE).

The Technical Committee (TC) was established to review CDM projects and make recommendations for approval by the National Council on the Environment. The committee is composed of members from various departments and agencies, including, but not limited to:

- Department of Energy;
- Department of Forestry;
- Department of Transport; and
- Environmental Affairs Department;
- Ministry of Development Planning and Cooperation; and
- Ministry of Finance

The DNA TC is composed of permanent members from these departments and calls on other sector experts as required when assessing projects. As noted earlier, the TC recently approved Malawi's first CDM PDD and is now considering three other projects. While the organization was originally envisioned as a body that would simply make recommendations to the NCE, the DNA has been reassessing this structure in order to accelerate project assessment decisions. The NCE meets only four times a year and often may not be able to provide prompt confirmation of TC recommendations. Thus in practice, approval decisions are now being made by the TC, while subject to subsequent supervisory review.

The National Council on the Environment is composed of various agency directors and was originally seen as the final approval-granting body within the DNA. Currently, the NCE is expected to conduct high-level reviews of approved projects, in order to ensure that they don't entail gross violations of sustainable development criteria. For reference, we discuss below how the Malawian DNA compares to analogous units in the region over several categories.

Table 9 Characteristics of DNA in select African countries

Country	Department	Staff	Promotional Activities	Website / PDD publication	Registered Projects	DNA-approved projects (at validation)
Malawi	**Environmental Affairs Department**, in the Ministry of Natural Resources, Energy and Environment	1	Yes	Yes; shared with various other climate change programs / Yes	0	1
Tanzania	National CDM secretariat	4	Some; limited marketing	Yes; though appears to currently be down	1	9
Kenya	National Environmental Management Authority	3	Yes	Yes	7	26

Uganda	Department of Meteorology	2	No	No	10	15

Note: field data and classification criteria partially based on GIZ - Franz et al 2007 *The Clean Development Mechanism in Relation to Energy in East Africa: Status Quo, Obstacles and Recommendations*

7.1.4 NCCP and its role

Malawi has developed a strategic framework to address national environmental objectives as part of its broader national development policy. The government has been developing its National Climate Change Programme (NCCP) with support from international partners. As part of its formulation phase, the Environmental Affairs Department will produce documents guiding Malawi's Institution Building, Climate Change Risk and Adaptation Assessment and Strategic/Programmatic Investment Analysis activities. The NCCP "aims at mainstreaming and addressing climate change issues in the national development agenda".[58] DFID, IrishAid and the Norwegian Ministry of Foreign Affairs recently issued an analytical report intended to guide the programme's adaptation strategy in light of the current national institutional environment. The CCP Technical Committee is made up of government staff with high level positions within their own departments. It is envisioned that the CCP TC can provide strategic direction for the government in climate change mitigation involvement and direct structures throughout the government to take specific actions.

7.1.5 Carbon Unit creation

The Malawian government is contemplating creating a Carbon Unit within the Department of Forestry, which would coordinate data required by project proponents and facilitate forestry offset project development. Based on government consultations, potential roles voiced included:

- Coordination of data requirements for offset projects between government ministries
- Coordination of government programs that include climate change mitigation development
- Creation of basic information needed for land-based carbon offset programs (such as land cover maps, deforestation estimates, and carbon stock data)
- Guidance on the forestry offset development process; and
- Contact information for useful technical advisors on AFOLU

The Forestry Department is a focal point of REDD+ projects in Malawi. The department has a mandate for the management of forest ecosystems and Payments for Ecosystem Services which is linked to Carbon Finance. Deforestation and degradation cause the majority of GHG emissions within Malawi and as such the greatest opportunity for GHG mitigation in Malawi is through the forestry sector and terrestrial sequestration. The forestry sector, as documented throughout this report, also represents an estimated 70% of the total emissions reduction potential in Malawi accessible through offset projects.

[58] http://www.nccpmw.org/index.php?option=com_content&view=article&id=19&Itemid=27

Because of the forestry sector's large abatement potential in Malawi, several previous consultant studies have suggested that Malawi house a Carbon Unit within the Forestry Department. We think that such a placement could function adequately and benefit carbon market development efforts.

Discussions with senior managers within the Forestry Department suggested that officials expected the unit to maintain a very small staff. Based on consultations, it is understood that the Department of Forestry will initiate the creation of such a unit, but negotiations within the government would still need to take place to institutionalize this unit and provide financial resources. The challenges of building this new unit within the Forestry Department were further accentuated other discussions consultants held with Forestry officials, which suggested relatively substantial reductions in the department budget for the next fiscal year, linked to the recent currency devaluation. The Forestry Department also repeatedly emphasized that they preferred the term "Carbon Unit" to "Carbon Finance Unit", largely because of their professed lack of links to financial management or analysis.

7.1.6 Additional Agencies

Table 1011 describes the current activities and potential future role for other agencies and departments involved in climate change.

Table 10. Non-DNA Malawian Departments/Agencies involved in climate change

Government Agency	Current Institutional Role	Potential Role in Attracting Climate Finance
Department of Environmental Affairs (EAD)	• Serves as DNA • Developed PIN Formats and subsequent PIN approval process maps • Has 10 PINS and 4 PDD documents • Approved one PDD • Developed CDM investor guide	• Continue international outreach • Coordinate specific training sessions at other agencies and with private sector and civil society entities • Direct information dissemination activities (e.g. posting on website project participant directory, baseline estimate information)
Malawian Investment and Trade Center (formerly the Malawi Investment Promotion Agency)	• Advises government on policy environment and incentives for facilitating private sector growth • Promotes investment in and trade with Malawi to foreign entities	• Support design of private sector outreach materials • Connect DNA to potential offset developers in private sector and assess their training needs • Provide feedback to DNA and other government agencies on perceived barriers to project development
Department of Energy Affairs	• Currently developing transmission line studies and wind/solar power studies.	• Identify site locations for renewable projects including transmission siting, grid connectivity issues, and develop grid emission factors.
Department of Forestry	• Carbon project design and development • Sectoral policy development • Project Validation • Community and staff training on carbon issues • Site-species matching • Climate adaptation and mitigation	• Develop baselines and definitions of forest as required by the UNFCCC • Determining forest cover and forest cover change • Monitoring carbon and biomass level

Government Agency	Current Institutional Role	Potential Role in Attracting Climate Finance
	measures • Soil-leaf nutrient analysis	
Department of Climate Change and Meteorological Services	• Climate negotiations • Provision of climate data and services • Installation of weather stations	• Develop adaptation risk analysis for existing energy (hydro), transportation, and agricultural infrastructure
Department of National Parks and Wildlife	• Implementing agent in participatory programmes in their area of jurisdiction e.g. bee-keeping • Currently, they are the agency most involved with Terra Global's REDD projects. That information is not being shared with Department of Forestry.	• Joint monitoring exercises with other agencies e.g. Forestry Department • Link between the community and other agencies
Department of Fisheries	• Implementing agent in participatory programmes in their area of jurisdiction • Climate change adaptation and mitigation	• Joint monitoring exercises with other agencies • Link between the community and other agencies
Ministry of Agriculture, Food Security, Irrigation, and Water Development.	• Monitor and manage food security situation • Hydrological assessment – surface and sub-surface water • Climate adaptation and mitigation measures e.g. improved varieties, etc. • Soil loss assessment • Policy formulation • IGA diversification/Agro-business promotion	• Assist with Department of Energy on capacity study for small-scale hydro • Assist/Coordinate with Department of Climate Change and Meteorological Services on adaptation risk analysis for hydro and agriculture. • Identify effective improved agricultural techniques to reduce need for additional forest conversion • Lead training efforts on improved livelihood strategies
Ministry of Economic Planning and Development	• National economic and development planning • Monitoring and evaluation of socio-economic issues in the country. • Provide professional advice and technical support to Government and the public on economic and social policy development and management. • Coordinate the implementation and review of the national policy development agenda. • Plan provision of Other Recurrent Transaction (ORT) Funds to government ministries and departments	• Clearing house for climate change finances

7.1.7 Other Data Centres

Different government agencies maintain large volumes of data and information. Below includes a summary of a subset of agencies which maintain information relevant to the carbon market.

National Statistics Office (NSO): The role of the NSO is to provide independent, statistical information and promote its use for policy formulation, decision-making, transparency and general public awareness.

Georgraphic data is collected when conducting the census. This would include such things as the locations of schools, hospitals, health centres, and villages. Information is in vector data on a server. Compiling the most recent survey data into a GIS system is a task that would be highly beneficial for a number of project types and would be a relatively small task for the Survey Department to complete.

Land Resource & Conservation department (LRCD): The Ministry of Agriculture, Food security, Water and Irrigation Development has a department of Land Resources Conservation. The mandate of the department is managing land-based resources in a sustainable manner for socio-economic development. This includes agricultural land (for smallholder farmers), forestry and water. The department has mainly been addressing the problem of soil degradation caused by soil erosion through land use planning and conservation. To ensure national coverage of its activities the department has staff positions in all establishments from headquarters level to agricultural development division district to local level. The officers work with extension staff to promote sustainable land & water conservation among the smallfarmers. The department has three operational areas/units namely: Environmental conservation and education; Land resources surveys and evaluation; and Land management training.

The LRCD maintains datasets on soil types and land use. This is primarily arranged at the Agricultural Development Division (AD) level. This information can be connected with tabular datasets on annual agricultural production (crops and animals). The LRCD currently holds SPOT 10 imagery at the 1 km resolution and has 1:50,000 maps for 1991. It is the intention of the LRCD to initiate a 'hot spot' analysis to identify priority locations that have high levels of susceptibility to land degradation due to inherent properties or level of vegetation cover due to human activities. Current GIS/RS capacity and equipment is limited.

The Department of Climate Change and Meteorological Services (DCCMS): This unit monitors climate and weather parameters for Malawi. It maintains weather stations and a database of climate data for the country. It is involved in some climate change adaptation projects, such as disaster risk management.

Surveys Department: The role of the Surveys Department is to provide surveys and mapping services including-topographc survey; cadastral surveys; hydrographic surveys and map production. On land use change in the country it just offers technical advice. This department maintains GIS capacity, however, equipment may not be sufficient if tasks are expanded.

The **National Spatial Data Centre (NSDC)** is the custodian/controller of spatial datasets produced by different data producers and maybe an authority that would have the mandate to authenticate any map for the country produced by any other dept/agency etc. however, its mandate is not yet legal albeit it is embedded in the national land policy yet to be tabled in parliament.

The Ministry of Lands and other land sector agencies are in the process of developing improved resource inventory and data base management systems. However, all such land-based records are, by law required to rely on maps produced by the Surveyor General and cadastral records generated by the Ministry of Lands. Because of the fundamental role that the Ministry plays in setting land policy, and because all the land agencies in Malawi are rapidly moving into the digital age, setting the right standards for coordinating access to land information may soon become problematic if an arrangement for sharing land information is not sanctioned early at the database creation stage. It has been recommended by all stakeholders

consulted on this issue that a system should be developed to relate all land information to the same geodetic and cadastral reference codes to sanction and protect public and private property.

Stakeholders stated that the non-systematic regulations around free access to data limited data sharing, cooperation between units, and cross-agency capacity development. Multiple stakeholders expressed a strong desire to have a systematic system that allowed free access to all data by all government entities. It was expressed this would be a role for the NSDC.

7.1.8 Private Sector participation

Both globally and within Malawi, offset projects are largely planned and executed by private organizations, both for- and not-for-profit. To realize a flourishing carbon market, Malawi will need private entities that are both aware of the opportunities available to them via carbon finance and sufficiently capable of capitalizing on these opportunities.

7.2 Capacity Needs

Malawi's governmental departments and agencies are not currently equipped to attract private sector capital associated with carbon market mechanisms. The largest obstacles to capital are: coordination/training needs and data needs.

The involvement of the DNA and the Carbon Unit can assist in coordinating all of the involved agencies, ensuring that they understand what is required of them, and facilitating communication and required actions.

7.2.1 Technical Capacity

During interviews and workshops, consultants perceived that officials' understanding of carbon market opportunities was good, though general in nature. While most have had exposure to the concept of offsets and existing carbon markets, few seemed able to describe specific components of the project development process or the international institutions that underpin carbon trading. Only DNA officials among those met in Malawi seemed familiar with offset finance transaction structuring, including contractual arrangements critical to local project development (such as Emission Reduction Purchase Agreements). However, we would suggest that comprehensive knowledge of this very specific sector is unlikely to be attained broadly and that the current general carbon market knowledge is likely to suffice for most officials other than those directly coordinating the offset approval process or carbon finance promotional efforts.

There is currently a wealth of capacity building resources being made available for capacity building by international development agencies. The World Bank, UNEP Risoe, UNDP, and others are all allocating resources to programs increasing the Malawian public sector's knowledge of carbon finance mechanisms. In the last 3 years, capacity building sessions executed by development organizations for Malawian officials have included UNEP Risoe, UNDP GIZ and the World Bank.

These sessions have typically been general in both topical coverage and audience, though some offered sector-specific recommendations and details on the project development process.

We suggest that the most critical remaining gaps in technical capacity relate to:

1. Specific financing and sectoral knowledge for entities which are promoting project growth through marketing initiatives;
2. General awareness of carbon market opportunities for private entities which could, directly, design and execute offset transactions;
3. Project development techniques for private entities expressing interest in offset development opportunities; and
4. Retention of acquired carbon market knowledge, keeping sector experts in relevant positions and consistently allowing them exposure to developments in the field and relevant transactions in the region.

Recommended sessions addressing these capacity needs are outlined in chapter 8.

7.2.2 Energy Sector Reference Data

Acquiring relevant technical data represents one of the most critical challenges facing private offset developers in the project design process. Making data available for estimating projects' emission impacts can make offset opportunities much more attractive to developers.

Malawi has not publicly presented default emissions data pertaining to the major sources of GHG emissions such as off-grid energy consumption, selective logging, land cover carbon stocks, and agricultural emissions. All of these components would lower developers' costs of estimating baselines, required in net emission calculations.

For the energy sector, the most critical information gaps include:

1. Household emission energy consumption emission factors, and growth estimates, incorporating suppressed demand
2. Population and settlement data to be critical for justifying Programme of Activity (POA) emissions impact, such as the effective housing material demand scale (for efficient brick-making projects), number of households in project regions and features of households affecting potential baseline emissions and thus credit generation
3. Templates for calculating industrial emission factors in key Malawian economic sectors, including Tobacco, Tea, Forest processing, Sugar, Bottling and others, which could be adapted easily with in-house data by managers at processing facilities for efficiency and fuel-switching projects

Why grid emission factors are not relevant in Malawi

Technical assistance and training is required to determine reference baselines and emission factors (or CO_2 produced per operational unit, such as CO2e / MWh generated) for GHG sources. While in many other contexts, a project developer would look for grid emission factors as the most relevant counterfactual datapoint, in Malawi such values are not likely to be useful and may be fairly costly to obtain. No default national emission factors have been established in Malawi, but countries with similarly large hydro-electric power generation portfolios typically show low EFs. Low emission factors can present a substantial investment barrier for CDM projects. Fewer CERs are generated from projects assuming low emission factors as part of the project baseline. As over 98% of generated electricity comes from cascaded run-of-

the-river power plants on the Shire River, it may be expected that the Malawian grid emission factor would be low. Based on previous experience with CDM projects in Sub-Saharan Africa, it could be expected that an emission factor as low as 0.2 – 0.4 tCO_2/MWh would be applicable to most of the Malawian grid. The small magnitude of this factor would also be compounded by the fact that significant new hydropower capacity has been identified in the country, if the emission factor incorporates a "build-margin" representing projects likely to be built to supply energy to the grid[59].

As grid emissions factors and grid-linked build margins used by project developers are not likely to facilitate the generation of significant credit volumes, the government may better focus its information provision efforts on obtaining other data. Some example default values are summarized below.

Other critical emissions reference data

1. Credible household emissions estimates

For projects which substitute lower emissions energy sources for household consumption activities, such as improved cookstove and LED lamp distribution, baseline emission estimates will likely depend on estimates of CO2e generated as part of typical households' daily activity. In similar Programs of Activities (PoAs), these household emissions factors are left for the developer to determine or link with default factors, as suggested in the *CarbonSoft Open Source PoA* document (see page 12)[60], which has been approved by the Environmental Affairs Department and highlighted for potential use in Malawi. Determining emissions generated in a representative household will be a function of typical emissions factors for the fuel used and the duration of source use throughout the year. These components of household emissions should be accessible to the DNA via recorded government statistics and/or collected various PoAs and PINs in respective sectors. Private offset developers are not likely to have similarly easy access to data on household emissions and may need to resort to global default values, such as those provided in AMS.III.AR *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories* (page 5). Such default factors may not accurately represent Malawian household emissions and understate actual project emissions reductions. By identifying more appropriate local defaults, the DNA can effectively streamline the PDD creation process and enhance the credit volumes available to project developers.

2. Population and settlement data

While household emissions estimates will help developers generate credits through projects such as improved cookstove distribution, more accurate data on area populations and household structure would help guide project developers to ensure their efforts yield the highest emissions reduction impact at the lowest cost per offset unit.

3. Industrial emissions factors

[59] See Malawi Government Concept paper for the Energy Sector (2011-2016)
[60] http://www.nccpmw.org/index.php?option=com_filecabinet&view=files&id=26&Itemid=2

Diesel generators are widely used in industrial contexts to meet demand and avoid systematic problems with rolling blackouts and instability. These and other similar combustion power sources emit CO2e volumes far larger per kWh than those released by grid sources in Malawi. By using emissions factors for these generation methods when estimating project baselines, a developer in Malawi may have much larger scope for generating emissions credits.

As with the data discussed above, these industrial power emissions factors are not available in Malawi and may be costly to obtain for individual developers. By collecting or estimating emissions factors from industrial sites in key industries, such as Tobacco, Tea, Forest processing, Sugar, etc, a Malawian government entity could significantly lower multiple developers' project costs.

Other critical emissions reference data

Project developers may also look to new Suppressed Demand methodologies to increase their baseline (and hence credit potential). These methodologies account for a baseline in which local populations consume increasing volumes of electricity as certain supply constraints are lifted. This helps CDM energy projects avoid low emissions reduction outcomes as a result of currently "suppressed" consumption or demand. Such dynamic projections are incorporated in the CarbonSoft PoA referenced in previous paragraphs, where baseline emissions are multiplied by a factor: FFG *"defined as the documented national growth rate of kerosene fuel use in lighting from the preceding 3 or 5 years (depending on the availability of reliable data)".* If the DNA can offer such reliable data, it will further expand the potential volumes developers can credibly generate.

7.2.3 Land Use Sector Reference Data

The development of basic baseline and project implementation data presents a substantial upfront cost to project development for many AFOLU project types, and especially REDD project types.

While default emission factors under AFOLU are not submitted to the UNFCCC and would not be used within a given voluntary market project, they can be used to gauge the potential of different project types and encourage investor interest. Although IPCC Tier I general default values can be used based on Malawi's ecosystem types, climate, and elevation, in order to obtain more accurate estimates, it is necessary to develop country-specific data for the carbon stocks of initial land uses in Malawi.

A current effort is underway, funded by the Government of Japan, to increase Malawi's REDD-preparedness, including conducting biomass surveys across Malawi. Inventory data is being collected in 17 forest reserves in the country to estimate biomass volume in these reserves and to assess the current state of the established forests. This data can provide a basis for developing initial AFOLU emission factors[61].

[61] A report on biomass surveys conducted on seven forest reserves in the Southern region is available from FRIM: Meke, G, M. Chirwa, and E. Mbingwani. 2011. Biomass Field Survey Report for the Southern Region. Prepared by FRIM for Asia Air Survey.

A summary is provided of the priority data gaps that would assist land use sector project development. This description is grouped into data required for many types of projects and data required for specific project activities. Within each section, data gaps are classified as non-spatial, spatial, and integrated data types.

The below items describe the **priority actions that the National government can initiate** to attract and assist potential project developers to initiate projects in Malawi. This list is not comprehensive but instead describes priority information.

Reference Data Needs – Reduced emissions from Deforestation and Degradation

The development of voluntary market REDD projects require a large amount of spatial and non-spatial data. To reduce the barriers of such projects to be implemented, the GoM could either compile existing data or create a database of data that could be used by such projects. The following description includes studies and analyses that are recommended for the GoM to conduct.

These studies will also be basic inputs for any REDD+ readiness framework that Malawi develops in the coming years.

Non-spatial analyses

1. Deforestation and forest degradation **agent** analysis

   This analysis would examine who are the main groups and/individuals responsible for the deforestation and degradation taking place. These are often referred to as the 'agents of deforestation' or the 'agents of degradation'. Clearly identifying what type of group is responsible for baseline activities is a critical step in identifying what actions can be taken to reduce such activities within a project. Existing studies likely provide sufficient information for this analysis, including the National Communications and the IALUO study.

   Output: Description and spatial representation of main deforestation agents and main degradation agents within forest reserves; government plantation; communally managed forest; and privately owned lands.

2. Forest degradation analyses

   There is some existing data on amounts of forest degradation for Malawi, but it may need to be compiled. An assessment will need to be done to determine if such data requires updating, and how such data can be applied spatially. In addition, non-spatial data on firewood and charcoal creation and use per household may also allow additional estimates of degradation rates to be developed for Malawi.

   This type of analysis would be used to identify what actions can be taken to reduce degradation. Therefore, potentially appropriate project activities to emphasis. It would also allow potential project developers to estimate the potential credit generation from a project designed to reduce degradation. However, please note that this type of national level analysis could likely **not** be used as an input into the documentation required for a specific voluntary market REDD project only taking place within a specific location.

Output: Assessment report on existing data regarding estimates of forest degradation. This should include data such as firewood and charcoal use rates by families and industry.

3. Forest Carbon Stock Inventory Database

   A detailed carbon stock inventory has recently been conducted for 17 of Malawi's Forest Reserves. There is potential to expand this inventory to other forest areas within Malawi. However, such a comprehensive database will only need to be required for GoM if a REDD+ strategy is implemented. Where only a voluntary market project approach will be used, detailed field measurements of all forest reserves of Malawi is **not** a recommended priority action.

   Please note, a comprehensive analysis of forest and nonforest carbon stocks across the country of Malawi is ***not*** required for the development of voluntary carbon projects and therefore is not a recommended priority action. Such a nationwide study is *only* recommended as part of National-scale REDD+ readiness programs.

   Output: Publically accessible forest inventory database. Report summarizing mean carbon stocks and associated uncertainty for all inventoried forest reserves and other areas where inventories exist

4. Field Measurement Method Standards

   It is highly recommended that standard operating procedures and data base creation procedures manuals be created and published. The government can then request all project developers to use this manual to conduct and forest carbon stock surveys.

   These manuals can be based on the DoF existing protocols and the recent inventory conducted for 17 of Malawi's Forest Reserves.

   These standard operating procedures must include explicit data quality assurance and quality control measures along with explicit methods for error assessment. This would allow all future data collected in a consistent manner and to be added to an increasing national database.

   In addition, field measurements have taken place in association with the already developed REDD projects. It is recommended that this data be included within the national database if possible.

   Output: Standard field measurement inventory procedures, data calculation procedures, and database development template.

5. Create 'best practice' guides for the implementation of various types of implementation activities

   As mentioned previously, to successfully reduce emissions from forests any potential project will actually need to focus the majority of its implementation effort on reducing the need to deforest and degrade the forest. Thus activities will need to focus on improving food security and farmer incomes. Therefore, it is highly recommended that significant effort be place to determine what has already been identified as successful and cost-effective. This will vastly increase the chances of success for any newly implemented efforts.

   The Department of Forestry and Land Resource & Conservation Department would be the key creators of such guides. Best practice guides that could be developed include:

   - Agricultural improvements (improved seeds, improved fallows, no till etc)
   - Development and implementation of VFA

- Small business development guides (eg bee keeping)
- Agroforestry systems
- Boundary planting
- Nursery development
- Afforestation guidelines

6. Create 'Best Practice Guides' for carbon project development.

   It is recommended that a 'lessons learned' assessment take place specifically on the projects: Trees of Hope, BERL, TPMCSOES, and Mkuwazi and Nyika REDD scheme efforts. It is recommended that particular attention be paid to: costs; benefit distribution systems; income generation; community involvement; and successful alternative livelihood approaches.

   From this, it is recommended that guidelines be compiled and created on carbon project development. This would include:

   - Communication Materials
   - Benefit Sharing and Distribution
   - Field measurement methods for carbon stock assessment
   - Methods to use local people in measurement and monitoring
   - Stakeholder Engagement surveys

Spatial Analyses

1. Forest Definition

   Conduct an analysis to determine the implications of various 'forest' definitions. Submit recommendation to DNA.

   A forest definition is required to initiate any REDD or AR projects. It is highly recommended that a government recognized and standard definition be defined so that all projects are using the same definition. The definition selected should be in-line with the land cover maps produced by the Forest Preservation Programme.

   Output: GoM recognized 'forest definition'. This definition can be submitted to the UNFCCC.

2. Finalize land cover maps to determine locations and spatial extent of existing forest and non-forest areas

   It is expected that the Forest Resource Mapping component within the Forest Preservation Programme and being funded by the Japanese Grant, will contribute towards land cover mapping for Malawi through capacity building and establishment of a robust and effective forest monitoring system for the country.

   The development of government approved forest/nonforest maps is a major barrier to the implementation of REDD projects. With the government creation and approval of such maps, the cost of REDD project development are significantly reduced.

Output: GoM approved land cover maps including a 'benchmark map' of current land cover

3. Stratify existing forest areas into carbon stock strata

   Within a forest class, forest areas may need to be further stratified based on ecological conditions and/or degradation state. To implement such stratification, field measurements of carbon stocks are required.

   Please note: This step will only be required under a National REDD+ program and is not needed to take place nationally to attract carbon projects. Therefore, this step **only** needs to take place in locations where voluntary RED projects will take place.

   Output: Forest stratification map

Data Integration

1. Create default estimates of rates of activities and associated emissions per unit of activity

   The recent submission by the GoM of its UNFCCC National Communications[62] provides an initial estimate of the contribution of different sectors to GHG emissions. This report used existing studies and data to produce estimates. However, at the end of 2012 land cover maps for all of Malawi for multiple points in time will be finalized. It is recommended that these maps and emission factor data created by the IALUO study be used, following the methods within the National Communications, to create spatially explicit estimates of emissions from deforestation and degradation.

   Such estimates can be used to create an estimate of the amount of emissions/removals a certain proposed project activity could generate. The following are the general steps required:

   a. Based on land cover maps, estimate rate of various activities that cause emissions or removals - such as deforestation, degradation, afforestation, revegetation. If possible such rates can be spatially differentiated.

   b. Create default estimates of net emissions and/or removals resulting from a certain activity (referred to as Emission Factors). These can be based on IPCC defaults, but for many activities, such data is being developed. Examples of such estimates exist for Malawi (Figure 8).

[62] Ministry of Natural Resources, Energy, and the Environment. 2011. The Second National Communication of the Republic of Malawi to the Conferences of the Parties (COP) of the UNFCCC. http://unfccc.int/resource/docs/natc/mwinc2.pdf

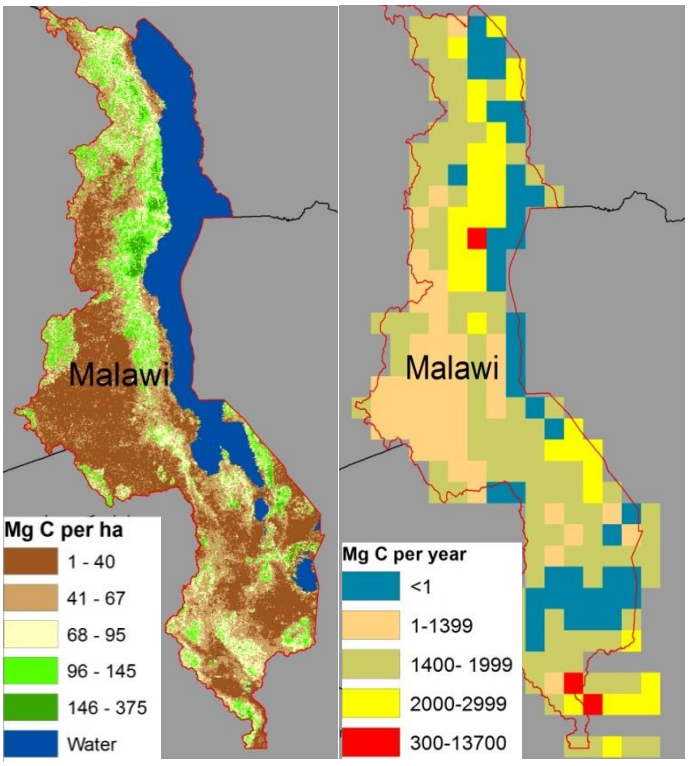

Figure 9 Spatial distribution of forest carbon stocks (left) and annual carbon emissions from deforestation for the period 2000-2005 (right) for Malawi (Forest carbon stocks are defined as 50% of the sum of the above and belowground biomass.) Results extracted from: Harris, NL, S Brown, SC Hagen, SS Saatchi, S Petrova, W Salas, MC Hansen, PV Potapov, A Lotsch. 2012. Baseline map of carbon emissions from deforestation in tropical regions. Science Vol. 336 no. 6088 pp. 1573-1576

This type of analysis will be needed for national level REDD+ programs. However, for voluntary market projects, the creation of such national level data would be used to assist potential project developers to estimate the potential credit generation of a project.

Once a REDD project was initiated at a specific location, addition data collection will be required, dependent on the standard used.

Output: Default 'Activity Data' rates for deforestation and degradation. Default 'Emission Factors' for deforestation.

2. Identify spatial locations under expected high deforestation and degradation threat

This can be done using advanced spatial models (GEOMOD, Land Use Modeler) or can be done through overlaying various GIS data layers that impact deforestation/degradation threat, such as land management type, population centers, roads, elevation, crop suitability, and others. Professional and local knowledge should also be used where possible.

This will identify potential locations for proposed projects that are under imminent threat of deforestation/degradation. This analysis would be very helpful to potential project developers to understand where in Malawi to locate a voluntary market REDD project.

Output: Spatially explicit map of risks of future deforestation and degradation.

3. Link results of Integrated Assessment of Land Use Options with spatial locations identified as high risk for deforestation

Reference Data Needs – Afforestation and Reforestation

In comparison with REDD type projects, the initial data needs for AR type projects are relatively small for projects within Malawi. There are few data barriers preventing the implementation of AR projects.

Non-spatial Data

1. Creation of AR specific 'project design best practice' guides.

   Based on the review conducted, the success of previous AR projects was heavily impacted by the manner in which the local communities and farmers were involved in the effort. Therefore, a significant input the GoM could make towards improving the success rate of regulatory or voluntary market ARR projects would be to assist project developers in the design of such ARR activities and guidance on how best to interact with village level governance structures, the GoM extension services, and local farmers. The Department of Forestry would be the key creators of such guides.

   Output: AR Guidance documents on recommended approaches for the development of ARR projects on different types of land (communally held land, farmer land, degraded forest reserves, etc).

2. Update existing DoF documents into AR specific 'project activity implementation' guides.

   The DoF has a large amount of experience in the best methods to create nurseries and plant trees. It is recommended that existing documents be updated for use in regulatory and voluntary ARR projects.

   Output: User manuals on how to initiate and manage ARR systems. These could include: Nursery development; Afforestation guidelines; Agroforestry systems; and Boundary planting.

3. Estimates of GHG credit generation potential of dominant ARR tree species

   When designing and planning to initiate a carbon project, project developers will need to understand the potential amount of credits that could be generated for different types of activities. This data will be used in the financial analyses that will be required to create a successful project.

   Often this type of data is difficult to access for non-commercial species. However, in Malawi several research, education institutions, and existing tree planting programs have collected data on growth rates of various forest types and tree and non-tree species. It is recommended that this data be compiled and transferred into carbon stock accumulation rates per tree and per hecatre. This analysis should include both native, planted, and agroforestry species. Data gaps should be identified.

   Output: Published and publically accessible carbon stock accumulation rates for all forest and tree species available.

Spatial Data

1. Land cover maps identifying suitable locations for ARR

   Based on the review conducted, carbon projects are likely to be more successful if multiple types of project activities are initiated. This could include a combination of boundary plantings and agroforestry on farmer fields, and afforestation on degraded (non-cropped) and sloped lands. The IALUO project

and the upcoming Forest Preservation Programme land cover maps will identify areas that are currently nonforested.

These spatial datasets together with expert knowledge of different areas can be used to identify suitable and priority locations for ARR type projects.

Output: Spatial explicit map identifying priority locations for ARR projects. Such a map will guide potential project developers on where to initiate carbon projects.

Reference Data Needs – Improved Forest Management

Prior to promoting IFM type projects on a large scale, it is expected that several baseline studies will be required. Therefore, it is recommended that the below initial study take place and then a reassessment occur as to the potential of IFM in Malawi.

1. State of Forest Plantations

   One step to determine whether IFM of existing plantations is a recommended priority pilot action will be to assess the current state of the government owned plantations. This would include the estimated degradation state, forest cover, and extraction rates. It is likely this analysis would include both a non-spatial and spatial component. This study could be conducted by the Department of Forestry itself.

   Output: Forest Plantation status report

2. Historical extraction rate analysis

   This analysis can only take place following the state of forest plantations studies. In order to implement a voluntary market applicable improved forest management project, an estimate of the baseline emissions is required. This would be based on the historic and projected rate of wood extraction.

   This is **not** a recommended national priority action. This type of analysis is only recommended for specific locations where a potential voluntary carbon project will take place.

   Output: Estimate of baseline emissions in forested areas undergoing authorized selective logging.

General Data requirements

1. Create 'best practice' guides for the implementation of various types of implementation activities

   Malawi has a long track record of various development efforts. As mentioned, a large portion of any small-holder A/R, REDD or IFM project will need to be focused on the strategies that will be implemented to increase the productivity of existing productive lands and reduce dependence on planted or existing forests. Therefore, it is highly recommended that significant effort be place to determine what has already been identified as successful and cost-effective. This will vastly increase the chances of success for any newly implemented efforts.

   The Department of Forestry and Land Resource & Conservation Department would be the key creators of such guides. Best practice guides that could be developed include:

   - Training guidelines
   - Benefit sharing and distribution

- Role of extension officers, DoF officials, village associations/committees/governance structures, and local farmers
- Development and implementation of VFA
- Agricultural improvements (improved seeds, improved fallows, no till etc)
- Small business development guides (eg bee keeping)
- Agroforestry systems
- Boundary planting
- Nursery development
- Afforestation guidelines

2. Create 'Best Practice Guides' for carbon project development.

   It is recommended that a 'lessons learned' assessment take place specifically on the projects: Trees of Hope, BERL, TPMCSOES, and Mkuwazi and Nyika REDD scheme efforts. It is recommended that particular attention be paid to: costs; benefit distribution systems; income generation; community involvement; and successful alternative livelihood approaches.

   From this, it is recommended that guidelines be compiled and created on carbon project development. This would include:

   - Communication Materials
   - Benefit Sharing and Distribution
   - Field measurement methods for carbon stock assessment
   - Methods to use local people in measurement and monitoring
   - Stakeholder Engagement surveys
   - Estimates of costs of different components of project development

8 CLIMATE CHANGE MITIGATION ROAD MAP

8.1 Observations on potential roles of government in development of carbon market

Despite the Government's work in creating many requisite procedural frameworks to support carbon finance, there are critical inputs Malawian public entities could provide to facilitate a greater volume of successfully executed offset projects. Malawian policies and offices which currently facilitate the development of offset projects have been described along with specific suggestions regarding strategies to supplement these to attract funding through offset programs. As potential relationships between increased CDM project volumes and specific policy / institutional changes in Malawi are bound to be very complex, our recommendations are modest. Many of the suggestions follow practices in neighboring

African states, as many of these countries share similar policy priorities and constraints. Specific programs which might be executed by the Malawian DNA – the Environmental Affairs Department and Carbon Unit[63] are outlined below.

It is suggested that these strategies can help facilitate significant investments in local projects and not only prevent increases in GHG emissions but potentially promoting national development objectives through deepening the financial sector, promoting families' health and preserving the value of the country's environmental assets.

8.2 Climate Change Mitigation Finance Development

8.2.1 Overall Strategy

During their research and meetings with Malawian policy-makers, project developers and civil society representatives, consultants perceived strong local interest in carbon markets, climate change mitigation and climate change adaptation. On all three issues officials demonstrated enthusiasm and discussed initiatives being undertaken to address them. At the same time, it seems that institutions which could underpin carbon finance development in Malawi are occasionally being structured for objectives tangential to attracting offset investment. Consultants felt that to some extent, enthusiasm for climate change objectives enshrined in the revised MGDS has somehow led to a lack of focus in addressing carbon market development. Having been assigned to scope the opportunities for carbon development in Malawi, we offer an overall strategy which envisions a more streamlined set of institutions targeting sector development.

Malawian officials seem to be in the process of implementing many approaches we tentatively suggested as part of initial research for the workshop we conducted in Malawi on carbon market capacity building. We were encouraged by many officials' pro-active carbon market position. This awareness of national market-building needs and recent global policy developments suggests also that reform proposals may not need to be extensive or radical. . As there are already several programs underway that will facilitate the growth of offset projects and REDD+ in Malawi, it is hoped that the recommendations provided assist in optimizing the country's carbon market initiatives instead of creating parallel and potentially redundant actions. The following discussions focus on steps thatcan be initiated immediately and completed within 6-12 months.

8.2.2 Malawian DNA Recommended Actions

As noted in Chapter 7, the entity most closely involved in the process of carbon market development in Malawi is the Designated National Authority ("DNA"), which is housed largely in the Environmental Affairs Department, though with sub-sections composed of officials from other ministries. Because of its close involvement in the sector, the agency also seems most familiar with the requirements for and challenges of developing carbon offset projects.

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[63] Note: interviewed representatives from the Forestry Department, which would house the unit have expressed strong interest in dropping the term "Finance" from its original title, the Carbon Finance Unit.

Based on observations largely summarized in the Chapter 7 capacity review, we offer the following suggestions for enhancing the DNA's impact:

1. Continue efforts to streamline the national CDM project approval process, potentially revising specific public announcement requirements and setting approval application fees proportional to the resources required by the DNA for determining project eligibility,

2. Assume lead role as coordinating entity in the carbon market development process, using its inter-ministerial contacts via the Technical Committee to smooth regulatory hurdles in various agencies for eligible offset project proponents,

3. Provide guidance on market-building data gathering and dissemination activities for critical departments, such as Forestry and Energy Affairs,

4. Expand promotional activities currently undertaken, offering more detailed "investor guide" materials, pre-approval submitted PINs and PDDs on the group website and directories of potential project contributors (developers, investors and ancillary service providers), possibly in coordination with the Malawian Investment and Trade Center, and

5. Direct capacity building efforts with potential project developers in the private sector, both general carbon market discussions and on-site detailed project development seminars

8.2.3 Malawi Investment and Trade Center potential roles and actions

The Malawian Investment and Trade Center has already started playing a key role in marketing domestic carbon market opportunities. It helped the DNA to produce an investor guide which was recently shared with market participants at Carbon Expo- the world's largest offset-related trade event. As the organization has extensive experience highlighting the benefits of investment in Malawi, it is well-placed to advise on very similar offset marketing opportunities. Through its activities, it also has access to a range of entrepreneurs, from whose ranks a corps of active offset project developers and/or service providers may potentially emerge. This access also offers a conduit for receiving comments from potential project developers. Using such feedback, the government may be better able to create a supportive environment for carbon market development. Ideas for MITC largely relate to initiatives recommended for the DNA, including

1. Enhancing Malawi-focused offset investment marketing materials
2. Convening national carbon finance opportunity events for private sector entities
3. Advocating on behalf of project developers within the government for policy support and financial incentives

Beyond the current general Malawi Carbon Investment Guide, the DNA/MITC could create more detailed documents educating interested potential project proponents. Officials might consider include content such as:

- An analysis of the energy sector in Malawi, discussing the potential, and priorities, for CDM projects in both the supply and demand sides (for example, see similar services provided by the South African DNA at http://www.energy.gov.za/files/esources/kyoto/kyoto_frame.html)

- A review of the potential for AFOLU projects in Malawi, including prioritized actions and spatial locations;
- A review of the current state of CDM project development in Malawi, types of projects, location, status of development (many projects currently at PIN status are not listed on the website); and
- A list of government, non-government, and private sector entities that are involved with and/or have technical capacity in climate change and carbon activities in Malawi

We recognize that staff at the MITC may not have the technical expertise to produce the documents listed above. To facilitate their drafting, MITC managers may choose to coordinate with qualified personnel from the DNA and other Departments, including Forestry and Energy. As suggested in 8.2.2 (recommendation 2), the DNA Technical Committee may offer one channel for the coordination process. The DNA and MITC can connect with senior technical officials from many departments in Committee events, and outline for them the sector-specific inputs needed for documents which would assure and educate potential project developers. Several DNAs, including Brazil and China, have produced similar guides. We recommend that the MITC consider incorporating projects discussed in this report and make recommendations publicly available on the DNA website.

8.2.4 National Climate Change Program Recommended Actions

The Climate Change Program may also help to facilitate carbon market development activity. However, its target activities are largely distinct from those being driven by the DNA, as outlined in preceding sections. The Programme's two headline initiatives, the National Programme for Managing Climate Change in Malawi (CCP) and the Africa Adaptation Programme are targeted at reducing the impact of Climate Change on Malawi's resources and people. This is an extraordinarily important goal for the country, but one that requires substantially different work content and sets of expertise.

In our meetings with managers with the NCCP, we perceived that they were already burdened with disproportionately large and varied task loads as they sought to complete NCCP work as well as their primary responsibilities within their respective host departments. To add yet other duties for these personnel may not yield benefits for carbon market promotion objectives and may diminish their ability to complete their core tasks.

The Ministry of Development Planning and Cooperation (MDPC) has been designated as the agency to coordinate the NCCP and is responsible for coordinating all major development programs[64]. The most useful and appropriate role for the CCP in promoting carbon market development could be as the MFDP assigned coordinator of contributions from International Development agencies associated with climate change. Program managers already have close ties with sponsors from groups such as NORAD, DFID, UNDP and JICA. After determining their carbon market promotion activities, NCCP could reach out to other

64 Capacity Needs Assessment for Climate Change Management Structures in Malawi. 2011. Ministry of Finance and Development Planning, National Climate Change Programme. Government of Malawi

agencies active on this front to establish a comprehensive database of local programs, and advise new donors on targeting new activities so as to maximize impact and minimize activity duplication.

Currently numerous bilateral and multilateral development agencies are funding many climate change mitigation, climate change adaptation, improved land use planning, and community development programs, among others. For instance, the UN-REDD Programme enables multiple donors to pool resources to support national governments in preparing REDD strategies and the Clean Technology Fund supports the deployment of low-carbon technologies. Many of the implementation activities planned under these projects overlap in both location and in specific actions. The Climate Funds Update website provides a listing of international climate finance initiatives (http://www.climatefundsupdate.org/).

We recommend that the Ministry of Development Planning and Cooperation (MDPC) and the CCP Technical Committee appoint a coordinator to coordinate climate mitigation, climate change adaptation, REDD+, and UNFCCC National Communications actions. This coordinator should also be tasked to ensure efficient and targeted capacity building programs and maintain knowledge of finance opportunities. This will help create a transparent process that will aim to reduce redundancy of donor funded programing while also encouraging effective distribution of donor funds within the government.

It is recommended that the CCP TC members include a point person for the mitigation project types in the energy sector and in the land use sector. This point person will interact closely with the DNA to determine what additional actions the government should take to promote carbon projects in Malawi.

It is also recommended that the CCP TC direct the creation of a Carbon Unit and ensure that financing is provided for its implementation and maintenance. The CCP TC coordinator will need to work closely with the technical staff within the Carbon Unit. The Carbon Unit should be responsible for promoting the development of land-use sector projects.

8.2.5 Carbon Unit Recommended Actions

It is highly recommended that a Carbon Unit be established within the Department of Forestry, and include select staff from other sectors, specifically: Land Resource & Conservation Department, Department of Agricultural Extension Services, Surveys Department, and National Spatial Data Centre.

The Forestry Department has already begun building capacity in carbon management within its own staff and also within FRIM and the main Universities. This includes a limited number of staff with experience in carbon measurement and accounting methods. We think that the department has sufficient expertise in the sector and familiarity with offset project technical principles to lead technical analyses which will be critical for drafting promotional and offset data dissemination data to support project development. Currently, the DoF maintains its key technical research experts within FRIM. As the GoM key forestry research institution, expertise in carbon project development may be best placed within FRIM as well.

Based on stakeholder consultations, it is felt that the financing and budget of the Carbon Unit should be institutionalized as part of the GoM mandate and not through a ‘development project’. Past experience has shown that such programs end when the development project closes and therefore long term planning and commitment is hindered.

It is recommended that a select number of staff (~3) be given full time responsibility as members of the Carbon Unit. Since these staff will developed as the key experts in climate change mitigation, it is highly recommended that these positions be both permanent positions (instead of 'short term projects') and be seen as technical research positions (as opposed to management positions). Since the Carbon Unit will be placed within the DoF, it is recommended the head of the Carbon Unit report to the DoF. Potential recommended reporting options include: Dr. Dennis Kayambazinthu-Director of Forestry, Dr. Clement Chilima of FRIM, Stella Gama-Assistant Director-Forestry Biodiversity Conservation (FBC), or Nyuma Mughogho-Assistant Director-Forestry Extension services (FES). The Carbon Unit would also have reporting duties to the CCP TC and to the DNA.

However, another recommended option would be to create an Assistant Director position of Climate Change within the DoF or FRIM. This elevated position could be responsible for developing climate change mitigation projects, directing REDD+ activities, and interacting with climate change adaptation programs. Such a position would then report directly either to Dr. Dennis Kayambazinthu or Dr. Clement Chilima.

It is recommended that the Carbon Unit have the following mandate:

- Create strategic vision of climate change mitigation opportunities for Malawi
- Encourage and facilitate carbon finance within Malawi
- Serve as the technical research experts in GoM on climate change mitigation related to land cover management
- Formulate and direct a Climate Change Consortium of staff from other sectors whose technical expertise is required for implementation activities

After consultation with a range of government staff, civil society, and the private sector, a consensus view on the role of the government on project development was found. It is felt that the GoM is best placed to provide a support role in the development of carbon projects but to not serve as the lead 'Project Proponent'. Instead it is recommended that the private sector, civil society, and the NGO community be encouraged to lead carbon project creation while the GoM facilitates such implementation by providing background data, technical expertise, and access to potential project lands and links with community members.

Recommended specific terms of reference of the Carbon Unit include:

- Report to and coordinate with the Climate Change Program Technical Committee and the DNA
- Coordinate technical components of government programs on climate mitigation, climate change adaptation, REDD+, and National Communications.
  This group should be aware of the expertise, data, and analyses needs of these efforts and understand how these efforts can be integrated.
  - Ensure the same technical research staff are assigned to tasks to build up expertise
  - Technical analyses must be integrated
  - Data compilation and development created in a manner suitable for all objectives
- Attract financial investment in Malawi through climate change mitigation
  - Coordinate with the CCP TC and DNA on actions to attract investment
  - Actively reach out and coordinate with private sector to develop projects

  - Actively interact with development agencies to seek directed assistance
- Coordinate and advise AFOLU climate change mitigation project proponents
  - DNA would serve to direct potential project developers to the Carbon Unit
  - Coordinate and advise project proponents interested in implementing projects on government lands or through the use of existing government structures, such as the extension services.
- Serve as climate change technical experts in GoM
  - UNFCCC arena, including serving as technical advisors to the UNFCCC official negotiators
  - Emerging REDD+ frameworks
    - Assist in the formation and implementation of GoM REDD+ Readiness and Strategy development; In particular, the technical aspects of Reference Level and MRV creation
  - IPCC GHG accounting methods
  - Climate change mitigation programs
- Initiate, develop, and maintain climate change database

  As previously discussed, one barrier to project implementation for many carbon projects is access to data. It is recommended that the development and maintenance of such data be a key role for the GoM. The Carbon Unit can work together with the DNA to develop and maintain key data points such as:
  - GHG database: Create database on land cover carbon stocks, forest inventories, and key default emission factors. This data must be created and maintained in the format needed for both carbon projects and National GHG inventories
  - GIS database: Coordinate with and provide relevant data to the National Spatial Data Center, or other spatial database created
  - 'Best Practice' database: Maintain 'best practices' database of various afforestation, agricultural, forestry, and community development practices
  - Malawi Experts Database: Maintain database of experts within GoM, academic and research institutes, civil society, and private sector on various project activities such as agroforestry, community forest management, conservation agriculture, plantation development and management

- Formulate and direct Climate Change Technician Consortium

  To implement climate change mitigation projects, expertise is needed from a variety of sectors. It is envisioned that that Carbon Unit develop a Climate Change Technician Consortium that would be made up of technical staff in various government agencies that could be called upon as needed in the development of carbon projects. This would include members from Department of Climate Change and Meteorological Services, Department of National Parks and Wildlife, Department of Fisheries, Ministry of Agriculture, Irrigation, and Water Development (esp Land Resource & Conservation Department and Department of Agricultural Extension Services (DAES)), Surveys Department, National Spatial Data Centre, and others.

  As envisioned, this consortium would be made up technical experts and directed by both the Carbon Unit and by the CCP TC. Consortium members would be requested to assist the Carbon Unit in the following tasks:

- Contribute to directory of experts
- Assist in the development of 'best practice' guides
- Contribute data to National Climate Change Database

8.2.6 Technical Capacity Building Recommendations

Carbon markets are new institutions. Few people globally understand how they function and fewer know how to participate in them. As might be expected, few Malawian officials have a comprehensive knowledge of the opportunities they have to access related investment channels. Wider (across ministries) and deeper (individual) understanding of carbon finance within the Malawian government would certainly help the country benefit from the sector. However, as officials face extensive challenges and are limited in time and resources, we recognize that capacity building should be targeted to maximize its impact on actual carbon market development.

Currently, select individuals within the most offset-exposed ministries possess the bulk of the government's collective carbon market knowledge. While increases in the number of officials with improved carbon market knowledge would enhance Malawi's ability to support project development, we suggest that the government may have already had sufficient access to general capacity building sessions. Going forward, Malawi's carbon markets could best be supported through:

1. Retaining, in relevant positions, select officials as carbon finance "point-personnel", who would be responsible for carbon market development and consistently working on initiatives which keep their knowledge of the sector fresh and current

2. Increasing coordination between government bodies, the non-governmental organization community, civil society, and the private sector

3. Improve understanding of GoM staff of climate change mitigation programs through cross-country exchanges

4. Providing capacity building workshops on very specific market topics to point personnel and other officials directly involved in offset development, for example on topics such as Emissions Reduction Purchase Agreement (ERPA) structuring, Program of Activity (PoA) project development, and suppressed demand baseline construction

5. Building awareness of carbon market opportunities and transaction processes in the private and civil society sectors through general informational roundtable discussions with key top managers

6. Conducting specific project development trainings onsite with private enterprises which have shown interest in executing carbon projects and have the potential to do so

Large overview workshops allow general information on the carbon market to reach a wide audience and this is an important component of building awareness in Malawi. However, we also recommend that focused and hand-on trainings be promoted. These workshops should have a tighter sectorial focus and provide technical information. Workshops could employ a "train the trainers" approach, assisting initial trainees in mastering and then re-teaching course materials to a wider audience.

In addition, it was widely held by stakeholders that staff would benefit highly from direct exchanges with surrounding countries working on similar issues. There is a lot of activity taking place on climate change mitigation and REDD+ in countries surrounding Malawi and training programs focused on short and long term trips where select GoM are able to 'shadow' staff in other countries would be seen as highly beneficial. Likewise, requesting staff from other countries to conduct a several month detail in Malawi would also be seen as a highly beneficial training option.

Stakeholders also expressed the view that staff would benefit from attendance at international fora such as the COP events, SBTSA meetings, and Carbon Expos. These events would allow staff to better understand the overall arena and expected future market potentials.

8.3 Recommended Capacity Building Initiatives

As outlined above, appropriate capacity building activities may focus on:

1. Project Developers (private sector – both profit and non-profit organizations):
    a. Cultivating a larger pool of potential project developers with offset project benefits awareness programs;
    b. Specific learning objectives essential to the project development process, aimed at potential local project developers and financiers;
2. Government Staff:
    a. Educating specific government staff on climate change mitigation projects to allow GoM to develop appropriate government role in project development;
    b. Educating government regulators and market promoters on critical new instruments for Malawi's participation in carbon markets, including PoA development and Suppressed Demand baseline development;
    c. Realistically assessing the short and long term budgetary requirements to allow the successful execution of regulatory and promotional activities; Retaining trained personnel and ensuring their continued involvement in promotional activities;

Below we outline specific training sessions which address objectives 1 to 3 above and potential institutional changes addressing objectives 4 and 5.

8.3.1 Offset awareness programs for private (for- and not-for-profit) sector entities

To help address the capacity gaps within the potential project developer community we recommend starting with a series of awareness seminars for entities which can provide the technical and managerial competency to execute successful offset projects. During conversations with Malawian carbon market stakeholders, consultants repeatedly heard concern about private entities' awareness of and ability to carbon market opportunities. We suggest that capable local developers are likely to emerge in Malawi as private entities gain understanding of the opportunities associated with carbon projects and the skills they will need to acquire to capitalize on these opportunities.

As part of the awareness program, we recommend holding a series of half-day seminars with top managers from private companies and NGOs. The sessions would illustrate the

1) Benefits to an organization of executing offset projects (including credit issue revenue, branding, regulatory, etc)
2) Potential for offset project development in Malawi, including sectoral analyses,
3) International regulatory mechanisms which influence investment opportunities and market pricing
4) An overview of the requirements for and estimated costs of project development,
5) Resources available for further investigation of options

The objectives here should be sufficiently concrete and concise to attract seminar participants. As discussed with officials working with the private sector, these managers are likely to have limited time for trainings and will not in the core business of offset development. Furthermore, they suggested that the opportunity to congregate with leading counterparts from various industries would also help drive active participation. An overview of program specifics is shown below:

Audience	**Private Sector**: Executives from Agriculture, Forestry, Manufacturing, and Power sectors, among others **Civil Society Organizations**: Heads of active groups with objectives which can be furthered through project development
Trainers	**Experienced carbon market participants** (developers, validators, and/or consultants) with track record of managing capacity building programs
Supporting Gov't entities	**Various**- the DNA (**EAD**), with inter-ministerial support from Technical Committee members, can help coordinate curriculum design based on experience with project applicants, and contribute to modules on the CDM approval process. The **MITC**, having close contacts in the business community should be involved in participant selection and outreach. Other departments may be useful as providers of regulatory and technical data for seminar content development.
Timing	**Within 3 to 6 months**. Initially, the government should target 3 half-day sessions, best spaced at 3-week intervals. If session impact is observed to be strong and further interest in the private sector community is perceived, the government may want to consider further sessions, potentially in other communities.
Objectives	Clear understanding of the benefits, opportunities and potential costs of offset project development
Content	Theme: How attendees can concretely profit from offset development Overview of offsets and offset crediting mechanisms • Offset description • UNFCCC / CDM

	• Voluntary markets • Emerging low-carbon crediting instruments: green bonds, NAMAs and LEDS • International policy changes; impact on local offset opportunity development Discussion of local project successes and lessons learned • Land-use / forestry (e.g. Kasigau corridor REDD in Kenya) • Energy generation (e.g. Mtoni dumpsite in Tanzania) • PoA / distribution (e.g. cookstoves and LED lights in various) Outline of project development process • PDD design and implementation • Resource and financing overview • Steps for validating and registering projects • Benefits from issuing and marketing credits and reporting impact Summary of lessons to be covered in "on-site" programs (8.3.2)
Envisioned budget	Approximately $20,000 per training session: 7 consultant work-days for preparation, 1 for execution and 3 for follow-up review and outreach, at $1,500 / work-day, plus expenses

8.3.2 On-site project development training programs

Within the private sector generally, and among the organizations participating in the "offset awareness" seminars, particularly, the government employees are likely to identify managers with strong interest in exploring offset opportunities in detail. To satisfy these managers' enthusiasm and help prepare them for actual project development, we recommend sponsoring in-depth training programs which would be implemented at a candidate organization's place of business. These sessions would be 1-2 days and would involve a range of organization staff. With a critical mass of employees educated on offset benefits and requirements, and strong support expressed from the executive, participating organizations will be ready to mobilize in pursuit of carbon market opportunities.

On-site training sessions would cover

1) Benefits to company and individual staff from project development (brief session, to ensure widespread organizational support);

2) Specific offset methodologies which could be effectively developed by the organization;

3) Relevant approval and regulatory processes (national and international), with step by step guidance on their completion;

4) Examples of similar projects' development through critical case studies;

5) Function-specific guidance for participating staff (e.g. – financing module for CFO, technical modules for engineers, etc); and

6) Sources of ongoing support and relevant contact information, including a directory of relevant regulators, potential investors and development service providers

Courses should include open forums for addressing specific staff questions and interactive exercises which reinforce the principles of offset project development.

Audience	**Private sector or CSO staff** from organization with strong interest in carbon markets
Trainers	**Experienced carbon market participants** (developers, validators, and/or consultants) with track record of managing capacity building programs
Supporting Gov't entities	As in awareness program, the support of the **DNA** and **MITC** will be essential. Both of these organizations can help identify candidate organizations and contribute to the curriculum design. **Sector experts** from various departments should be used extensively when developing program content
Timing	Within 4 to 8 months, with sessions following completion of awareness-building seminars.
Objectives	**Full organizational readiness** for executing offset project transactions.
Content	Recap of overview lessons from 8.3.1 • CDM / voluntary markets • International policy changes; impact on local offset opportunity development Detailed survey of the project development process • Project selection and design • Selection of offset or emissions mitigation project crediting standard • Highlighted resources for support and financing • Project validation, implementation and registration steps • Development pitfalls and how to avoid them Steps for collecting benefits • Verifying project impact and issuing credits • Marketing and selling credits • Reporting project impacts and benefits Resources, strategies and incentives • Descriptions of relevant support programs (UNEP, UNDP, and other) for offset development • National incentive and resource offerings for development • Contact directory and outreach recommendations
Envisioned budget	Approximately $40,000 per training session: 18 consultant work-days for preparation, 2 for execution and 4 for follow-up review and outreach, at $1,500 / work-day, plus expenses

8.3.3 Exchange Program

Many countries in the region have made great strides in the development of carbon projects and in REDD+ readiness. Carbon Unit, DNA, and other select staff would benefit highly from witnessing what actions and programs are currently underway. Such staff could 'shadow' parallel staff within other countries while at

the same time developing explicit concrete work plans for transferring such knowledge to Malawi. An overview of program specifics is shown below:

Audience	**Carbon Unit and DNA staff**
Trainers	Similar staff in surrounding country (potential recommended countries: RSA, Tanzania, Kenya, and Zambia)
Supporting Gov't entities	DNA, CCP TC. Would require significant commitment from host countries
Timing	**Within 3-12 months**. Shadowing would take place for 3-6 weeks.
Objectives	Understand pathway similar countries have taken and develop workplan for own government unit

8.3.4 Climate Change Mitigation and REDD+ Overview for national government staff

Although select government staff have an understanding of carbon projects, a large number in relevant sectors lack sufficient understanding. To provide the correct type of assistance and to properly encourage carbon finance projects, we suggest a training program be conducted. History and expected future of UNFCCC

1) Components of regulatory and voluntary markets
2) Technical components needed in carbon projects
3) Role of government in project promotion

An overview of program specifics is shown below:

Audience	**Government Staff**: Staff from Agriculture, Forestry, and Energy sectors among others
Trainers	**Experienced carbon market participants and Carbon Unit staff**
Supporting Gov't entities	The CCP TC, Carbon Unit, and the DNA (**EAD**) can help coordinate curriculum design and identify correct staff to target
Timing	**Within 3 months**. Target can be a 3-4 day workshop
Objectives	Clear understanding of the benefits, opportunities and potential costs of offset project development
Content	Global carbon cycle and climate change • Global carbon budget • Other greenhouse gases (GHG) • Anthropogenic emissions

	• IPCC scenarios • Impacts of increased GHGs Carbon Market Overview • UNFCCC • Kyoto Protocol, Clean Development Mechanism • Voluntary markets • Post 2012 New Market Instruments—NAMAs and LEDS Carbon financing • Financial structures in carbon market • Project, verification, and registration costs • Cost-benefit analysis Project standards and registries • Regulatory: CDM • Voluntary: VCS, ACR, GS, CarbonFix, Plan Vivo • Project Design Document • Verification • Registration • Project cycle
Envisioned budget	Approximately $20,000: 6 consultant work-days for preparation, 3 for execution and 4 for follow-up review and outreach, at $1,500 / work-day, in addition to workshop costs

8.3.5 Climate Change Mitigation Awareness for Extension Services staff

It is expected that Extension Services staff will be involved in the implementation of many carbon projects. To assist in this development, a 1-2 day awareness workshop could be held repeatedly in different areas of the country.

1) Overview of Climate Change and Carbon markets

2) Technical components needed in carbon projects

The objectives here would be to allow extension officers to increase their understanding of carbon project development and expected future activities in the country. An overview of program specifics is shown below:

Audience	**Extension Officers**
Trainers	**Carbon Unit and/or FRIM staff**
Supporting Gov't entities	The Carbon Unit, and the DNA (**EAD**) can help create training content
Timing	**Within 6-12 months**. Target can be a 1-2 day workshop
Objectives	Clear understanding of the benefits, opportunities and potential costs of offset project development

Content	Overview of global carbon cycle and climate change • Global carbon budget • Other greenhouse gases (GHG) Carbon Market Overview • UNFCCC • Kyoto Protocol, Clean Development Mechanism • Voluntary markets • REDD+ • Project standards and registries Carbon Project Development • Project cycle • Baseline and Monitoring Plans • Project Activities overview
Envisioned budget	Approximately $30,000: 3 consultant work-days for preparation, around 10 workshops, in addition to workshop and travel costs

8.3.6 Advanced carbon market promotion workshops

Government officials responsible for carbon market promotion may require additional training on specific topics of critical relevance in the Malawian context. Concepts such as PoA project design, Suppressed Demand methodologies, and REDD+ are evolving rapidly and not yet widely understood. They are also mechanisms which can have a significant impact on Malawi's ability to access carbon financing. Other concepts, such as spatial modelling, carbon inventory and stratification, and nesting of projects within National REDD+ program in the Forestry sector could be more clearly illustrated to officials looking to promote forestry offset projects.

To address remaining knowledge gaps within the Malawian government, we would suggest courses which cover in detail:

1) The latest best practices in PoA design;

2) Recommendations for developing projects using Suppressed Demand methodologies;

3) Baseline construction practices from DNAs of large CDM host countries (like China, India and Brazil);

4) Other strategies for overcoming obstacles to Malawian energy sector projects (such as incorporation of off-grid emission factors);

5) Carbon stock measurement and monitoring methods

6) REDD baseline modelling analyses

Courses should include open forums for addressing questions and interactive exercises which reinforce the advanced principles covered in the course. We would envision 3 – 4 courses, each devoted to a single carbon market topic.

Audience	**Government officials** (potentially from EAD, MITC, Department of Forestry, Department of Energy Affairs and others)
Trainers	**Experienced carbon market participants** (developers, validators, and/or consultants) with exposure to specific seminar topics
Supporting Gov't entities	**DNA Technical Committee** guidance on course and participant selection will be critical
Timing	Within 3 to 9 months, in parallel to private sector seminar sessions.
Objectives	Deep understanding of project design concepts critical to Malawi's participation in global carbon markets, in order to better target promotion efforts.
Content	**Carbon stock measurement and monitoring methods** • Baseline scenario identification • Carbon pools: above ground live trees, belowground biomass, shrubs, deadwood, litter, soil • Sampling Design • Field measurement methods • Allometric equation development and use • GIS requirements • Monitoring steps **REDD baseline modelling analyses** • Overview of REDD methodology components • Remote Sensing and GIS data requirements • Identification of Reference Regions • Spatial Modeling Overview • Field data requirements
Envisioned budget	Approximately $20,000 per training session: 11 consultant work-days for preparation, 1 for execution and 4 for follow-up review and outreach, at $1,250 / work-day. Additional work on baseline development if required by participants would be around $30,000, on 20 workdays at $1,500 / day.

Suppressed demand ideas can help Malawi promote development of projects in the energy sector by demonstrating credible baseline projections with much higher emissions than can be shown by the current grid. Suppressed demand can also be used to augment more straightforward adjustments to assumed energy baselines. As a beginning the government Malawi should look to incorporate current off-grid electricity sources as a counterfactual. Such an approach is outlined in the CDM Methodological Tool (Version 01.1) "Tool to calculate the emission factor for an electrical system." Calculating baseline emission factors using this tool can greatly increase the scale of project developers' recognized emissions

reductions. The greater net impact is achieved as through using off-grid power plants (such as diesel generators which are widespread in Malawi) as the alternative to a low-emissions project instead of primarily hydropower-generated grid electricity. The methodology requires that the "total capacity of off-grid power plants (in MW) should be **at least 10% of the total capacity** of grid power plants in the electricity system; or the total power generation by off-grid power plants (in MWh) should be **at least 10% of the total power generation** by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid is primarily due to constraints in generation and not to other aspects such as transmission capacity[65]." After making diesel generation the counterfactual, the DNA can use Suppressed Demand considerations to estimate a baseline of greater diesel usage, currently not realized due to supply restrictions. The combined use of these baseline estimation techniques can offer much greater opportunities to project developers in the energy sector.

With the support of experienced CDM project auditors during advanced training sessions, the Malawian DNA can obtain guidance on strategies for preparing such enhanced baselines. Advanced Market Promotion session leaders should also be available for follow-up research facilitating further technical resource development. For example, trainers should be ready to help the DNA establish public estimates of credible suppressed demand or off-grid baselines according to CDM-recognized principles. Experienced trainers can establish these factors through sampled analysis of local generator systems and data from similar systems gathered through global project assessment. Such follow-up activities should add no more than two months to the envisioned training schedule.

8.3.7 Institutional development initiatives

While trainings for government officials and private employees can help ready Malawi to attract low-carbon investment, some institutional changes may be required to retain knowledgeable staff and provide them sufficient resources to execute their carbon finance responsibilities.

To maintain institutional expertise, the government should attempt to recognize its "carbon market experts" and ensure their continued focus on the sector by avoiding their transfer to other roles. These key personnel should be involved in promotional initiatives and regulatory decisions, as well as the advanced training sessions outlined above.

Carbon market experts will also be more likely to remain in the role if offered sufficient resources for the duty. Currently, many officers in the government are being assigned additional carbon market duties beyond their current roles without proportional compensation or budgets. Because resources within the government are limited, the government must be selective in expanding the ranks of those serving the carbon market. It may be fair to explore self-financing measures that facilitate more extensive sector support. For instance, administrative fees are now levied on project developers seeking CDM PDD approval. In discussions with officials, many or all of these fees are allocated to the government's general budget. The government should consider designating the funds for Technical Committee and DNA Focal Point activities.

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[65] CDM Methodological Tool (Version 01.1) "*Tool to calculate the emission factor for an electrical system.*"

Such a revenue structure would more directly align government incentives with carbon market development. The DNA understands the challenges of project development and should limit excessive fees in order to ensure sector growth which reflects positively on its managers. Furthermore the revenue would go toward activities which will be of direct tangible value for project developers- public baseline construction, investor directories, PDD template design, private sector capacity building, etc. Growth in project submissions can then lead to follow-on increases in public sector support, forming a virtuous cycle. If these activities are visible, developers are also more likely to view their fee contributions as fair and worth incurring as part of the approval process.

8.4 Rapid Implementation Steps

8.4.1 Priority actions within DNA

To augment its current carbon market promotion campaigns, the Malawian DNA should consider focusing on the following priority actions

Next 3 Months:

1. Increase content available to potential project developers on the DNA web portal (part of the National Climate Change and Environment Programmes site), including the project pipeline information available in its Investor Guide materials
2. Oversee execution of 3 "offset awareness" seminars (outlined in 8.3.1)
3. Continue streamlining approval process; look to approve 2 PDDs from pipeline

Before end of 2012:

4. Coordinate at least 2 "on-site project development" (outlined in 8.3.2) sessions with private firms
5. Complete at least one "advanced carbon market promotion workshop" (8.3.6), covering new energy baseline emission factor design
6. Build and distribute for potential project developers at least one key energy sector baseline incorporating household biomass emissions factors and/or off-grid fossil fuel power generation (estimated 20 work-days)

Between now and mid-2013:

5. Develop at least three key public baseline emission factor estimates applicable to the most common submitted offset project types (for example, in cookstove distribution, landfill gas and efficient brick production - estimated 30 work-days)
6. Add to DNA web portal documents including
    d. Directory of potential project investors and developers
    e. All submitted PINs and PDDs
    f. Offset project sector analyses
7. Facilitate at least one capacity building summit with neighboring countries' DNAs to promote regional PoA development
8. Complete at least one additional "advanced carbon market promotion workshop"

8.4.2 Priority actions for Department of Forestry

The top recommended action for DoF is to initiate the creation of the Carbon Unit. This Carbon Unit can lead potential partnerships with project developers. The recommended steps to include:

Next 3 Months:

1. Caron Unit Formalization
    - Formalize staffing, mandate, and responsibilities of Carbon Unit based on above recommendations into a proposed Carbon Unit Terms of Reference (estimated 5 work-days)
    - Submit Carbon Unit ToR to CCP TC
    - DoF, CCP TC, and other entities will need to negotiate budget structure for CU
    - Assign permanent staff to Carbon Unit
2. Voluntary Market Carbon Project Development
    - Through existing waterbasin projects, such as Lake Chilwa Basin Climate Change Adaptation Programme, assign staff in the DoF to evaluate the potential to develop Payment for Ecosystem Services (PES) projects on watershed lands. Such PES projects could focus on both water and carbon.
    - Initiate discussions between DoF and Total Land Care and Clinton Development Initiative about the potential to extend partnerships through replication of activities to additional areas.Before end of 2012:

1. Assess expertise gaps within Carbon Unit members (estimated 2 work-days)
2. Implement training: Climate Change Mitigation and REDD+ Overview (section 8.3.4)
3. Design training: Climate Change Mitigation Awareness for Extension Services staff (section 8.3.5) (estimated 10 work-days)
4. Actively seek gov't-private sector agreements to initiate pilot carbon projects
    a. As stated, it is recommended that the government promote the private sector or NGO community to be the lead project proponent.
5. Write proposal to international funding agencies to develop REDD+ readiness and carbon project data (estimated 20 work-days, budget estimate at ~1 million USD level)

Between now and mid-2013:

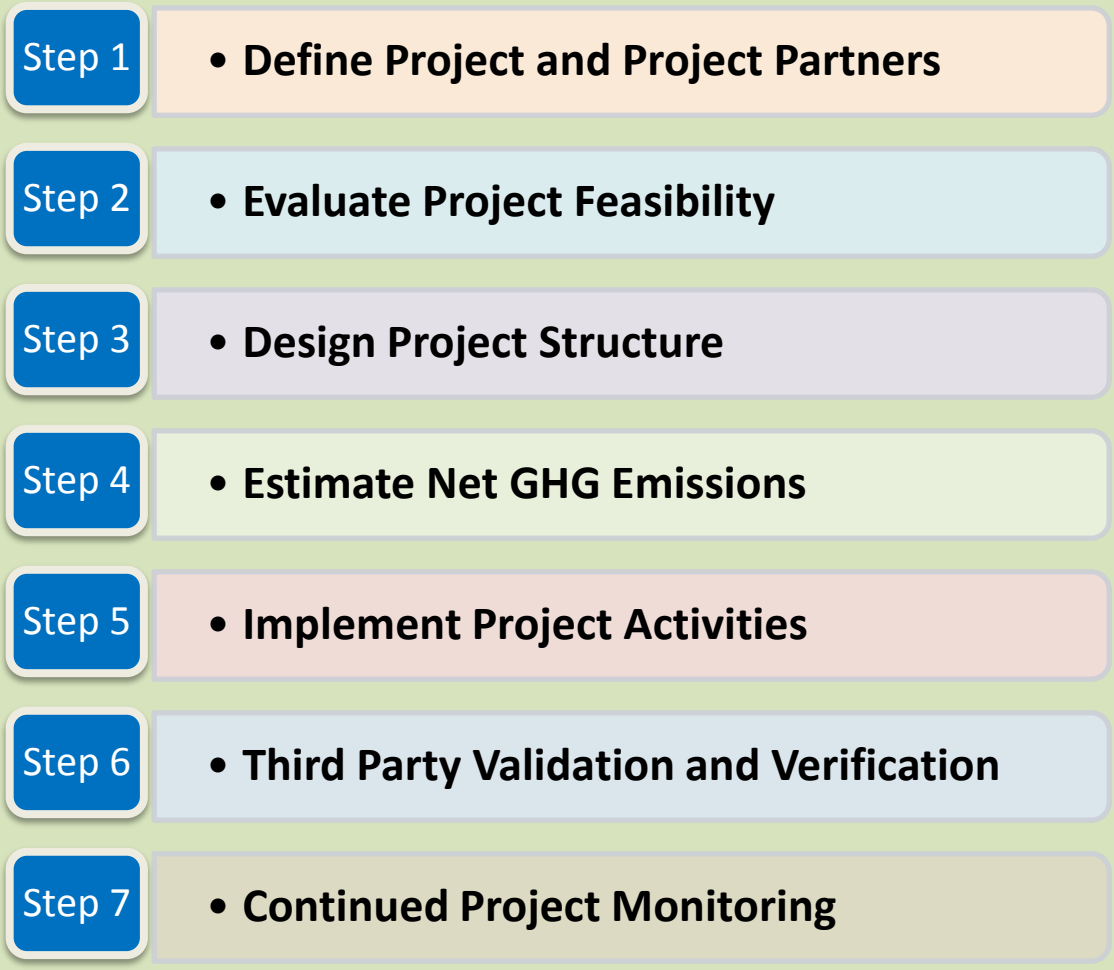
1. Implement Exchange Program (See section 8.3.3) for two Carbon Unit staff
2. Conduct training: Climate Change Mitigation Awareness for Extension Services staff (section 8.3.5) (estimated 30 work-days for Carbon Unit staff, plus 3 work-days per Extension Services staff; will require travel and accommodation costs)
3. Initiate database creation using existing programs and data (estimated 2 months/year for Carbon Unit member to be responsible for compiling data and creating database; ~10 consultant work-days to design database)
4. Initiate 'Best Practice' guidance documents (Estimated 10 work-days to create templates; estimated 2 months/year for Carbon Unit member responsible for directing document creation. Estimated 20 work-days per best-practice document)
   Carbon Unit staff responsible for managing this process.
    a. Identify priority Best-Practice guidance documents (Estimated 3 work-days – Carbon Unit staff)

b. Create template for all guidance documents (Estimated 10 work-days – Carbon Unit staff)
c. Direct and manage creation of guidance documents (Estimated 2 months/year - Carbon Unit staff)
d. Compile existing information and data; Write 'best practice' document (estimated 30 work-days – various GoM staff; Likely also require funds for travel to compile documents and potential questionnaires etc.)

5. Initiate gov't-private sector pilot carbon projects (multi-year effort, >1 million USD required)
   These activities would be implemented with the DoF providing data development support and implementation through the extension officers and the private sector organization serving as the main project proponent and carbon project documentation developer.

Box 3. Steps to Develop an AFOLU Carbon Project

The development of an AFOLU voluntary or regulatory carbon project is a large undertaking that generally requires multiple partners and a large level of effort. Although each individual project type will have specific steps and procedures that must be followed, the overall steps are broken down below:



Of course each one of these steps includes many components. An overview of such steps is provided here.

Step 1

• Define Project and Project Partners

Where the government is promoting a project idea, potential project partners will need to be identified. This may include the private business sector or non-profit development organizations or both. As stated in section 6.2.5, the private sector will be most interested in activities that generate commodities beyond carbon credit creation.

Types expertise needed include:

- Accessing capital
- Implementation of project activities
- GHG measuring and monitoring
- Stakeholder engagement / benefit sharing

Defining the project will include deciding on potential range of project activities, potential project locations, project participants' roles, and an overview of existing project financing. This should also include a discussion of carbon credit ownership.

As stated in Section 6.2.5, the following roles are recommended:

- Potential role of Government:
  - Provide access to specific land areas
  - Produce guidance documents on how to design and implement activities
  - Produce guidance documents on the measurement and monitoring of carbon stocks
  - Produce time-series of land cover maps
  - Train farmers on how to implement land-use activities (such as tree planting, fire prevention etc) through extension services
- Potential role of private sector partner:
  - Upfront capital to purchase resources required to implement activities (e.g. seedlings, create nursery, expendables such as fuel)
  - Conduct GIS mapping needs
  - Conduct spatial modeling required to estimate projected location of deforestation (only for unplanned REDD) (likely a technical consultant) (or may be done by government if training takes place)
  - Manage and maintain all activities, such as plantations, nurseries, etc.
  - Develop required carbon project documentation
  - Provide capital for project validation and credit verification
  - Design benefit sharing distribution system (together with government)
  - Monitor all project activities and estimate GHG emissions/removals overtime

Step 2

• Evaluate Project Feasibility

This would include creating a Project Idea Note (PIN)

- This document provides an initial overview of:
  - expected project activities
  - the costs of implementing such project activities on a per unit basis (e.g. per hectare)
  - the estimated carbon credit potential per year of each project activity
  - the location of activities
  - project partners and their roles
  - project financing – this includes existing financing and the plan for obtaining additional financing
  - Standard (e.g. CDM, ACR, VCS) and Methodology likely to be used
- Two example PINs are presented in Annex II
- Although the government can create this document, it is recommended that this document be the responsibility of project partners

For very complex project types, a more thorough Feasibility Study is recommended

- This step is recommended for REDD project types
- Assess existence of required data (such as land cover maps)
- Determine standard and methodology to be used, and applicability of existing methodologies to project
- Initial assessment of additionality test
- Initial assessment of leakage
- Detailed estimation of credit potential

Step 3

• Design Project Structure

- Determine the 'agents' of the baseline activity.
  For ARR this will simply be the entity (individuals/ community/gov't) responsible for the land where activity taking place. For REDD, this may require an analysis such as recommended in Section 7.2.3. The completion of such a study can be completed by the government
- Finalize location where the project activities will take place
- Design project activities
  As described in section 6.2.5, this is a description of the actual tasks that will be implemented by the project to reduce emissions or increase removals.
  - Government Role: advise private sector on previous experience, ensure local communities benefit
  - Private Sector Role: design activities that will result in carbon credit and potentially additional commodity creation
- Finalize what Standard will be used and which Methodology will be applied
- Determine carbon credit ownership and outline of benefit distribution system
- Examine the legal and regulatory framework
- Identify stakeholders and conduct stakeholder process

Step 4

• Estimate Net GHG Emissions

The majority of this work may be done by project partners and not by the government itself. However, the government may have the expertise to assist the project partner to conduct these measurements

- Demonstrate land eligibility, prove additionality, and establish baseline scenario
    - For certain standards and project types only certain types of land will be applicable. This analysis must be conducted. This will require GIS skills.
    - For a project to create credits, it must prove that the activities would not have occurred in the absence of carbon financing. The project also must demonstrate what the most likely land use would have been in the absence of the project. This is known as the 'baseline.' Each standard has a tool that can be used to demonstrate additionality and the baseline scenario. This requires knowledge of laws and regulations, financial analysis of project costs and benefits, and assessment of the common land uses and practices in the region.
- Estimate baseline emissions
  The steps to estimate baseline emissions will vary by Methodology. However generally this requires:
    - Measurement and estimation of existing carbon stocks
    - Estimation of the rate of any baseline activities in the project area projected to occur in the absence of the project. This would include estimation of the rate of deforestation and degradation
    - Estimation of GHG emissions from other sources such as fertilizer use and fire
- Estimate Project Emissions and Leakage
  Again, the specific methods will vary by Methodology, however, generally the expected emissions and removals resulting from project activities would be estimated
    - Area and/or amount different activities are taking place (e.g. area of land planted with cashew trees)
    - Expected rate of emissions or sequestration on a per area/activity basis
    - Projected estimate of leakage resulting from project
- Develop documentation needed for the Standard chosen
    - The main components of the documentation are:
        - Additionality
        - Legal requirements
        - Proof of credit ownership
        - Methodology applicability
        - Baseline Scenario and ex-ante estimation of baseline emissions
        - Ex-ante estimation of leakage emissions
        - Ex-ante estimation of project emissions
        - Quantification of net emissions/removals in significant GHG sources and sinks as a result of expected project activities

- Risk assessment (for VCS)
- Creation of a Monitoring Plan
- Stakeholder consultations
- Environmental Impact Assessment (depend on country requirements for project type)

Step 5

• Implement Project Activities

This would include all actions that will be taken to cause a change in GHG emissions. Therefore this would include all plantation development, fire prevention, agricultural improvements, etc.

As stated above, the government role could be to train community members to implement such activities. The project partners may provide the capital required for such actions.

Step 6

• Third Party Validation and Verification

Under all standards, a separate pre-approved entity must evaluate the project. This includes reviewing all documentation and a field visit to the project location. Once validated, the project can register with the standard.

As the project activities continue to take place, the project may choose to conduct a third party verification to estimate the total amount of net emission reductions have taken place as a result of the project.

This verifier will then issue carbon credits that may be sold.

Step 7

• Continued Project Monitoring

The project will need to continue to ensure all activities continue to take place and that all emissions and removals are monitored and estimated over time.

Over time, this would be followed by additional verification of the credits that were produced since the last verification event.

ANNEX I STAKEHOLDER GROUPS CONSULTED IN ASSESSMENT

Name	Institution	Designation
Government Agencies		
Annie Mapulanga	DCCMS	Climate Change Officer
Elina Kululanga	DCCMS	Climate Scientist
Leonard Gobede	Department of Energy	Principal Energy officer
Alinafe Chibwana	Department of Forestry	Climate Change Officer
Dennis Kayambazinthu	Department of Forestry	Director
Francis Chilimampunga	Department of Forestry	Assistant Director of Forestry (Development Services
Kasizo Chirambo	Department of Forestry	Assistant Director of Forestry (Training & Planning)
Kosaku Onaka	Department of Forestry	Advisor - Forestry Conservation
Nyuma Mughogho	Department of Forestry	Assistant Director of Forestry Extension Services
Stella Gama	Department of Forestry	Assistant Director (Forestry Biodiversity Conservation)
William Mitembe	Department of Forestry	Principal Planning Officer-Planning Section,
Titus Zulu	Department of Forestry	PFO
Alex Namaona	DP	D. Director
Sipho Billiat	DP	Economist
Josephine Zimba	EAD	Climate Change Officer
Aloysius Kamperewera	EAD	Director
Shamiso Najira	EAD	DNA Focal Point
Yamikani Dakalira	EP&D	Climate Change Officer
Friday Njaya	Fisheries Department	CFO Planning
Dr Clement Chilima	FRIM	D. Director
Henry Utila	FRIM	PFRO
Mike Chirwa	FRIM	SFRO
John Mussa	Land Resources Conservation Department	Director
Dikani Chibwe	Min of Natural Resources Energy and Environment	Assistant Statistician
Yanira M. Ntupanyama, PhD.	Ministry of Environment and Climate Change Management	Principal Secretary for Environment and Climate Change Management
Dikana Chibwe	MoEM	Statistician
Dr Henderson Chimoyo	National Commission for Science and Technology	Director General
Mercy Safalaoh	OPC	Policy Specialist
Alice Gwedeza	Surveys Department	GIS Specialist

Name	Institution	Designation
Christopher Sinkonde	Surveys Department	Cartographer
Geoffry Mzembe	Surveys Department	GIS Specialist
Joel G Munthali	LRCD	C/Droughtsman
Emmanuel Chiundira	WRD	Hydrologist
Henry Njoloma	WRD	WRDO
Patricia Kaupa	Malawi Investment and Trade Center	Investment Promotion Executive
Academic Institutions		
Dr Justice Mlatho	Chancellor College	Senior Lecturer
Dr Dalitso kafumbata	LEAD SEA, Chancellor College	Post Doctor Fellow
Arnold Juma	Mzuzu Univeristy	Senior Lecturer - Energy Policy
Weston Mwase	Department of Forestry and Horticulture, Bunda College of Agriculture	
Research Institution (Private)		
Dr Albert Changaya	Tea Research Foundation (Central Africa)	Director
Non-Governmental Agencies		
Chris Mwambene	CURE	Executive Director
Khumbo Kamanga	CURE	Programme Officer
Patrick Abbot	LTS International	IALUO Team Leader
Benoit Rivard	LTS International	Consultant
Jan Fehse	Value for Nature	Managing Director
Mayamiko Minofu	WESM	Project Officer
Vincent Gondwe	MUREA	Project Coordinator
Commodious Nyirenda	CDI (Trees of Hope)	Director
Precious Mwanza	World Fish Centre	M&E Office
Philip Tembo	Total Land Care	
Mwiriha Kapondamgaga	Total Land Care	
International Organizations		
Alick G Nkhoma	FAO	Assistant Representative
Rosebell Mbamba	FAO	Food Security Coordinator
Anand Babu	MFDP/UNDP	Advisor
Ilaria Gallo	UNDP	Program Anlysis - CC
Henry Sibanda	UNDP/MoECC	SLM Adviser
Francis Nkoka	World Bank	DRM/CCA Specialist
Kosaku Onaka	JICA	Policy Advisor for Forest Conservation
Babiker Elimam	WFP	Programme Officer
Private Sector		
Datla K. R	Aspire Global Ltd	AGM

Name	Institution	Designation
Dhiren Thakra	Aspire Global Ltd	Director
Robert I Kawiya	AYISE	Project Manager
Abbie Chittock	BERL	PRO & Sustainability
Richard Tembo	CHICO Asset Management	Executive Manager
Colin Thorneyeroft	Chimpeni Estate	GM
Simplex Chithyola	Chinansi Foundation	Executive Director
Conon Fox	CLIOMA / Hestian	MD
Scott Burns	DNV KEMA	Presenter
Mick van Hasselt	Eastern Produce Mw	Technical Manager
Evans Masamba	Illovo Sugar (Dwangwa)	Agronomist
Meher Prasad	Raiply Malawi Ltd	Factory Manager
Dr Soumen Maity	TARA	Team Leader

ANNEX II EXAMPLE DRAFT PINS

PIN: Afforestation/Reforestation in Malawi: Agroforestry, Boundary Plantings, and Fuelwood Plantations

Project Idea Note (PIN) for Land Use, Land-Use Change and Forestry (LULUCF) Project

(Including Reduced Emissions from Deforestation and Degradation Activities)

Name of Project: Afforestation/Reforestation in Malawi: Agroforestry, Boundary Plantings, and Fuelwood Plantations

Date submitted:

A. Project description, type, location and schedule

General description	
A.1 Project description and proposed activities	An ARR project will be undertaken in Malawi, combining agroforestry, boundary plantings, and fuelwood plantations. The goal of this project is to increase carbon sequestration, enhance agricultural productivity and improve livelihoods. The agroforestry component will entail interplanting crops with species such as *Faidherbia albida*, *Gliricidia sepium*, and Mango trees. These can enhance agricultural production while increasing the carbon sequestration potential on agricultural fields. [*Add further description of the plantings, including size (ha) of planting, geographic location, appropriate agricultural crops, the requirements (costs, labor, tree spacing, number of trees, water, etc.) of planting these tree species, benefits additional to carbon, etc.]* In addition to interplanting with the species described above, *Jatropha curcas* will be planted as a boundary around existing crops. Jatropha offers the potential to generate carbon offsets from both revegetation and the production of biofuels. [*Include additional description of the methods and benefits of planting Jatropha, include size (ha) of project and geographic location.*] The third component of this project will be the establishment of fuelwood plantations of native species on degraded lands with slopes greater than 20%. Such plantations focus on fast growing species under a short rotation for fuelwood creation, and can serve as both a method for increasing carbon stocks, reducing deforestation of existing native forests, and improve watershed protection. [*Provide additional explanation about where such plantations are appropriate, what species could be planted, how large an area should be planted, etc.*] *[Include explanation of who will do these plantings and approximately when]*
A.2 Technology to be employed (mention if REDD will be undertaken)	[*Describe how plantings will be undertaken – by hand, with machinery, etc. Also explain any spatial analysis or remote sensing and forest inventory that will be or has been done to identify*

	appropriate areas for planting.
Project proponent submitting the PIN	
A.3 Name	[*Name the project proponent, the entity responsible for the project.*]
A.4 Organizational category *(choose one or more)*	[*Pick one*] a. Government b. Government agency c. Municipality d. Private company e. Non Governmental Organization
A.5 Other function(s) of the project developer in the project *(choose one or more)*	[*List all appropriate roles*] a. Sponsor b. Operational Entity under the CDM c. Intermediary d. Technical advisor
A.6 Summary of relevant experience	*[Describe experience of project proponent]*
A.7 Address	*[of project proponent]*
A.8 Contact person	*[representative of project proponent]*
A.9 Telephone / fax	*[of project proponent]*
A.10 E-mail and web address	*[of project proponent]*
Project sponsor(s) financing the project *(List and provide the following information for all project sponsors)*	
A.11 Name	*[List all project sponsors]*
A.12 Organizational category *(choose one or more)*	[*List all appropriate roles*] f. Government g. Government agency h. Municipality i. Private company j. Non Governmental Organization
A.13 Address *(include web address)*	*[of project proponent]*
A.14 Main activities	*[Describe work and activities of project sponsor(s)]*
A.15 Summary of the financials *(total assets, revenues, profit, etc.)*	*[Provide assets, revenue, profits, and other relevant financial information for project sponsor]*
Type of project	
A.16 Greenhouse gases targeted	CO_2
A.17 Type of activities	Sequestration through agroforestry, planting of boundary trees, and creation of fuelwood plantations
A.18 Field of activities (*Select code(s) of project category(ies) from the list*)	1. Rehabilitation of degraded lands to both forest (1a) and agroforestry (1b) 3. Establishing tree/shade crops over existing crops 6. Fuel wood plantings at a commercial scale *[delete if fuel wood plantings will be small scale rather than commercial]*

	15. Bio-fuels *[only include if Jatropha will be used to produce bio-fuels]*
Location of the project	
A.19 Country	Malawi
A.20 Nearest city	Lilongwe *[Replace with relevant city if necessary]*
A.21 Precise location	*[Provide latitude and longitude of project area]*
Expected schedule	
A.22 Earliest project start date *(Year in which the project will be operational)*	2013
A.23 Estimate of time required before becoming operational after approval of the PIN	*[List number of months needed for each component below]* Time required for financial commitments: *xx months* Time required for legal matters: *xx months* Time required for negotiations: *xx months* Time required for establishment: *xx months*
A.24 Year of the first expected CER / ERU / RMU / VER delivery	2023
A.25 Project lifetime *(Number of years)*	Project is sustainable and long term. Average life span of trees = *40*. The period of active growth of trees is *15* years after planting. *[Correct numbers if necessary]*
A.26 Current status or phase of the project	*[Chose relevant option for time when PIN is submitted.]* a. Identification and pre-selection phase b. Opportunity study finished c. Pre-feasibility study finished d. Feasibility study finished e. Negotiations phase f. Contracting phase
A.27 Current status of the acceptance of the project by the Host Country *(choose one)*	*[Chose relevant option for time when PIN is submitted.]* a. Letter of No Objection is available b. Letter of Endorsement is under discussion or available c. Letter of Approval is under discussion or available
A.28 Position of the Host Country with regard to the Kyoto Protocol *(choose one)*	The Host Country, Malawi, Is a Party to the Kyoto Protocol (i.e. has ratified or otherwise acceded to the Kyoto Protocol)

B. Expected environmental and social benefits

Environmental benefits	
B.1 Estimate of carbon sequestered or conserved *(in metric tonnes of CO_2 equivalent – t CO_2e. Please attach spreadsheet.)* Provide estimated from REDD activities separately	*[This will be based on carbon sequestered in trees and other vegetation as well as soil if there is likely to be an increase in soil carbon. Numbers can be based on IPCC defaults, similar existing projects, or known projections from literature or elsewhere. Total sequestration is calculated as tCO2e/ha/yr * years * area (ha). For example, Miombo Woodlands growth rate has been estimated at 4.31 tCO2e/ha/yr, therefore, by year 5 a 500 ha project of Miombo afforestation would have sequestered 4.31*5*500 = 10,775tCO2e. Note that CO2e is calculated by converting from carbon (C*44/12) and carbon is half of biomass by weight. (Example numbers taken from Opportunity Assessment Final Report)]* Up to and including 2013: xx t CO_2e Up to and including 2018: xx t CO_2e Up to and including 2023: xx t CO_2e
B.2 Baseline scenario *(What would the future look like without the proposed project? What would the estimated total carbon sequestration / conservation be without the proposed project? Mention the baseline methodology, as per the CoP9 text.[66] Also explain why the project is additional referring to the EB16 guidelines[67]).* If REDD activity, mention the main drivers and agents for deforestation and how the project will address them[68].	The project area(s) currently does not have any significant tree cover, nor are trees expected to grow naturally within the project area(s). The crops that are planted in the agricultural fields within the project area(s) include *[list existing crops, describe whether they are annual or perennial, their approximate levels of carbon sequestration, and whether they will be replaced with different crops with higher sequestration potential in the project scenario.]* The areas which will be converted to fuelwood plantations are currently highly degraded forests, which have minimal cover and are in poor health. The forest cover in these areas is not likely to increase without significant inputs. *[Add more specifics about areas where fuelwood plantations will be established, describe existing trees and other vegetation, if any, explain what growth is likely to occur, describe carbon sequestration potential of existing vegetation.]* All of the project area has depleted soil, and low soil carbon content. *[provide more detail, or delete if not relevant]* The baseline methodology relies on existing and historical changes in carbon stocks in the carbon pools within the project boundary, as this is the most likely scenario in the absence of the project, and is also the most attainable information. Project additionality is clear based on current common practice, barriers to

[66] http://cdm.unfccc.int/Reference/Documents/dec19_CP9/English/decisions_18_19_CP.9.pdf
[67] http://cdm.unfccc.int/EB/Meetings/016/eb16repan1.pdf
[68] The BioCF is developing a methodology for project activities reducing emissions from deforestation and forest degradation, which should be fully adopted during project preparation. It will be available by November 2007.

	project implementation, and the financial costs of the project activities. Without carbon financing the project would not be financially advisable. In addition, none of the project activities are required by law.
B.3 Existing vegetation and land use *(What is the current land cover and land use? Is the tree cover more or less than 30%?)*	*[Fully describe current land cover in chosen project areas]*
B.4 Environmental benefits	The tree plantings will increase crop production, improve wildlife habitat, protect threatened and degraded watersheds, ensure a consistent water supply, improve fish habitat, and maintain a healthy ecosystem
B.4.a Local benefits	The project will provide increased access to fuelwood, potential income from timber / fruits, and increased capacity in plantation/nursery creation.
B.4.b Global benefits	The project will reduce CO_2 concentration in the atmosphere and contribute to the mitigation of climate change.
B.5 Consistency between the project and the environmental priorities of the Host Country	This project supports the implementation of Malawi's Growth and Development Strategy (MGDS), which is a comprehensive strategy to create wealth through sustainable economic growth and infrastructure development. The MGDS specifically addresses climate change, its relevance to the health of Malawi, and the potential for Malawi to participate in global carbon markets.
Socio-economic benefits	
B.6 How will the project improve the welfare of the community involved in it or surrounding it. What are the direct effects which can be attributed to the project and which would not have occurred in a comparable situation without that project? *(e.g., employment creation, poverty alleviation, foreign exchange savings).* Indicate the number of communities and the number of people that will benefit from this project.	The project can provide jobs in the form of tree planting and management for the communities in the surrounding areas. It may also improve the economic situation of participating farmers, by contributing to an increase in crop production. Planting Jatrohpa provides income opportunity through the sale of biofuels. *[Identify and describe the specific potential in terms of number of jobs created and the communities impacted.]*
B.7 Are there other effects? *(e.g., training/education due to the introduction of new technologies and products, replication in the country or the region)*	The project will involve training of nearby communities in methods of tree planting and maintenance. Farming communities will be provided with training on relevant methods of agroforestry.

C. Finance

Project costs *[Determine project costs based on cost of: clearing of existing vegetation (if necessary), tillage and other ground preparation, tree seedlings, planting, irrigation, fertilizer (if necessary), maintenance, etc.]*

C.1 Preparation costs	US$ million
C.2 Establishment costs	US$ million
C.3 Other costs *(explain)*	US$ million
C.4 Total project costs	US$ million
Sources of finance to be sought or already identified *[Potential sources of funding need to be identified and explored. The DNA, the Technical Committee, and the Carbon Finance Unit (once it's in place) need to determine the most viable sources of funding; the Climate Funds Update provides a list of potential funders at www.climatefundsupdate.org.]*	
C.5 Equity *(Name of the organizations and US$ million)*	
C.6 Debt – Long-term *(Name of the organizations and US$ million)*	
C.7 Debt – Short term *(Name of the organizations and US$ million)*	
C.8 Grants	
C.9 Not identified *(US$ million)*	
C.10 Contribution sought from the BioCarbon Fund *(US$ million)*	
C.11 Sources of carbon finance *(Has this project been submitted to other carbon buyers? If so, say which ones)*	
C.13 Indicative CER / ERU / RMU / VER price *(subject to negotiation and financial due diligence)* Please discriminate VERs from REDD activities.	
C.14 Emission Reductions Value *(= price per t CO_2e * number of tCO_2e)* Please discriminate VERs from REDD activities.	
Until 2012	US$
Until 2017	US$
C.15 Financial analysis *(If available for the proposed CDM / JI activity, provide the forecast financial internal rate of return (FIRR) for the project with*	FIRR without carbon: FIRR with carbon:

and without the CER / ERU / RMU / VER revenues. For standardization purposes, provide the financial rate of return at the expected CER / ERU / RMU / VER price above and US$4/t CO_2e and assume 20 years worth of carbon payments, even though that price and purchasing period may not be the one offered by the BioCarbon Fund. Please attach spreadsheet if available.)	

PIN: Reduced Emissions from Deforestation and Forest Degradation of Malawi's Forest Reserves

PROJECT IDEA NOTE

Name of Project: Reduced Emissions from Deforestation and Forest Degradation of Malawi's Forest Reserves

Date submitted:

B. Project description, type, location and schedule

General description	
A.1 Project description and proposed activities	Reduced Emissions from Deforestation and Forest Degradation (REDD) will be pursued on forest reserves in Malawi. Additionally, in the areas surrounding reserves, afforestation and reforestation (ARR) activities will be undertaken to create forest buffers near the reserves. This project will improve forest health, increase carbon sequestration, and improve livelihoods of communities around forest reserves. Forest degradation is taking place within the protected areas of Malawi at a high rate as this is where a major proportion of trees and woodland remain. This is due to its protected nature and previous enforcement by forest guards and patrolmen prior to the multiparty system of government. In addition, most national parks and forest reserves contain the indigenous tree species most preferred by the general public. Currently, enforcement of protection is quite low and the penalties meted out by the courts are very small on cases of encroachment, illegal charcoal trade, and poaching. In addition, cases of encroachment, illegal charcoal production and poaching are most often suspended either deliberately or by using the old forest policy because magistrate courts have not been given the new forest policy/act (1996/1997). Unplanned deforestation is also common in Malawi, caused by shifting cultivation and subsistence farming on reserves where legal protections are not enforced. In addition, degradation by charcoal production often leads to subsequent conversion to farmland. This REDD project will increase protection of government and community held lands by fully enforcing existing policies and improving the management of forest reserves. The current practices of illegal collection of wood for firewood, charcoal production, and timber will be curtailed. *[Describe areas where improved enforcement would occur, how enforcement would be conducted, training necessary to carry out enforcement, who would be trained, etc.]* ARR activities in surrounding areas will provide alternatives for the nearby communities in need of forest products. These activities will

	include Jatropha plantings as forest buffers, the establishment of fuelwood plantations, and interplanting crops with *Faidherbia albida* and other appropriate species. Alternative livelihoods will be provided through harvest of Jatropha for bio-fuels, collection of fuelwood from plantations, tree planting and management on ARR project areas, trained management and monitoring of the forest reserves, and sustainable agricultural practices. *[further describe alternative livelihood options]*
A.2 Technology to be employed (mention if REDD will be undertaken)	Spatial modelling will be required to implement this type of project along with compilation of existing data on the rates of wood extraction in existing forest reserves or other protected areas. To estimate the emissions resulting from deforestation, thorough forest inventories of existing forest carbon stocks must take place. In addition, the area and carbon stocks of the forested area must be monitored over time. To assess what behaviors would have occurred in the absence of a REDD project, surveys of the local populations are required, and a detailed understanding of the causes, drivers, and potential alternatives to such deforestation and degradation is required. *[Describe how ARR plantings will be undertaken and who will do them.]*
Project proponent submitting the PIN	
A.3 Name	[*Name the project proponent, the entity responsible for the project.*]
A.4 Organizational category *(choose one or more)*	[*Pick one*] k. Government l. Government agency m. Municipality n. Private company o. Non Governmental Organization
A.5 Other function(s) of the project developer in the project *(choose one or more)*	[*List all appropriate roles*] e. Sponsor f. Operational Entity under the CDM g. Intermediary h. Technical advisor
A.6 Summary of relevant experience	*[Describe experience of project proponent]*
A.7 Address	*[of project proponent]*
A.8 Contact person	*[representative of project proponent]*
A.9 Telephone / fax	*[of project proponent]*
A.10 E-mail and web address	*[of project proponent]*
Project sponsor(s) financing the project *(List and provide the following information for all project sponsors)*	
A.11 Name	*[List all project sponsors]*

A.12 Organizational category *(choose one or more)*	[*List all appropriate roles*] p. Government q. Government agency r. Municipality s. Private company t. Non Governmental Organization
A.13 Address *(include web address)*	*[of project proponent]*
A.14 Main activities	*[Describe work and activities of project sponsor(s)]*
A.15 Summary of the financials *(total assets, revenues, profit, etc.)*	*[Provide assets, revenue, profits, and other relevant financial information for project sponsor]*
Type of project	
A.16 Greenhouse gases targeted	CO_2
A.17 Type of activities	Conservation (REDD) of forest reserves and sequestration through afforestation and reforestation in areas surrounding reserves
A.18 Field of activities (*Select code(s) of project category(ies) from the list*)	1. Rehabilitation of degraded lands to both forest (1a) and agroforestry (1b) 3. Establishing tree/shade crops over existing crops 6. Fuel wood plantings at a commercial scale *[delete if fuel wood plantings will be small scale rather than commercial]* 15. Bio-fuels *[only include if Jatropha will be used to produce bio-fuels]* 16. Reduced Emissions from Deforestation and Degradation (REDD)
Location of the project	
A.19 Country	Malawi
A.20 Nearest city	Lilongwe *[Replace with relevant city if necessary]*
A.21 Precise location	*[Provide latitude and longitude of project area]*
Expected schedule	
A.22 Earliest project start date *(Year in which the project will be operational)*	2013
A.23 Estimate of time required before becoming operational after approval of the PIN	*[List number of months needed for each component below]* Time required for financial commitments: xx months Time required for legal matters: xx months Time required for negotiations: xx months Time required for establishment: xx months
A.24 Year of the first expected CER / ERU / RMU / VER delivery	2014
A.25 Project lifetime *(Number of years)*	This project is sustainable and long term. The minimum project lifetime will be 40 years, though increased protection of forest reserves is expected for a much longer period.
A.26 Current status or phase of	*[Chose relevant option for time when PIN is submitted.]*

the project	g. Identification and pre-selection phase h. Opportunity study finished i. Pre-feasibility study finished j. Feasibility study finished k. Negotiations phase l. Contracting phase
A.27 Current status of the acceptance of the project by the Host Country *(choose one)*	*[Chose relevant option for time when PIN is submitted.]* d. Letter of No Objection is available e. Letter of Endorsement is under discussion or available f. Letter of Approval is under discussion or available
A.28 Position of the Host Country with regard to the Kyoto Protocol *(choose one)*	The Host Country, Malawi, Is a Party to the Kyoto Protocol (i.e. has ratified or otherwise acceded to the Kyoto Protocol)

B. Expected environmental and social benefits

Environmental benefits	
B.1 Estimate of carbon sequestered or conserved *(in metric tonnes of CO_2 equivalent – t CO_2e. Please attach spreadsheet.)* Provide estimated from REDD activities separately	*[Estimate will be based on carbon sequestered in planted and protected trees and other vegetation as well as soil if there is likely to be an increase in soil carbon. For REDD component, this is based on the increased forest biomass and carbon stocks as a result of enforcing protection of forest reserves. For ARR component, it is based on trees planted and resulting expected sequestration. Numbers can be derived from IPCC defaults, similar existing projects, or known projections from literature or elsewhere.* *Total REDD sequestration is calculated as* *Deforestation rate (%/yr) * carbon stocks (tCO_2e/ha) * area (ha) * years* *For example, using a deforestation rate of 2.8%, average carbon stocks of 132.85, and a project area of 100 ha, sequestration from a REDD project after 10 years would be 0.028*132.85*100*10 = 3,719.8* *Total ARR sequestration is calculated as* *Growth (tCO_2e/ha/yr) * years * area (ha).* *For example, Miombo Woodlands growth rate has been estimated at 4.31 tCO_2e/ha/yr, therefore, by year 5 a 100 ha project of Miombo afforestation would have sequestered 4.31*5*100 = 2,155tCO_2e.* *Note that CO_2e is calculated by converting from carbon (C*44/12) and carbon is half of biomass by weight.* *(Example numbers taken from Opportunity Assessment Final Report)]* Up to and including 2013: xx t CO_2e Up to and including 2018: xx t CO_2e Up to and including 2023: xx t CO_2e
B.2 Baseline scenario *(What would the future look like without the proposed project? What would the estimated total carbon sequestration / conservation be without the proposed project? Mention the*	In the past, Malawi was heavily forested. Currently, forest remains primarily on protected areas such as National Parks and Wildlife Reserves, Forest Reserves, and protected hill slopes. Some forest does still also exist as natural woodland on customary land and in graveyards/sacred forests. *Brachystegia* species dominate in the forest reserves and natural woodlands. Unfortunately, these forests are now under severe threat of depletion as enforcement of

baseline methodology, as per the CoP9 text.[69] *Also explain why the project is additional referring to the EB16 guidelines*[70]*).* If REDD activity, mention the main drivers and agents for deforestation and how the project will address them[71].	their protection has been surpassed by the rate of deforestation and the Department of Forestry lacks sufficient resources to protect all the existing forest reserves from degradation. The total cover is estimated to be declining at the rate of 1.0 to 2.8% annually due to deforestation for fuelwood, charcoal and settlements. The Forest Resource Mapping and Biomass Assessment of 1991 showed that in 1973, *Brachystegia* forests occupied about 45% of the total land area of Malawi while in 1990/91 land under *Brachystegia* forest cover declined to 25.3, a decline of about 44%[72]. Malawi supports one of the highest population densities in Africa, its inhabitants numbering nearly 14 million[73], 85% of which is in rural areas, relying on forests for livelihoods. As the population increases (currently at a rate of more than 3% per year), forests are being rapidly cleared for settlement and energy supply. It is recognized that this high and rapidly growing human population is one of major causes of forest degradation in Malawi, leading to a retrogressive trend over the years due to deforestation.
B.3 Existing vegetation and land use *(What is the current land cover and land use? Is the tree cover more or less than 30%?)*	*[Fully describe current land cover in chosen project areas]*
B.4 Environmental benefits	Improved protection of forest reserves and tree plantings will improve wildlife habitat, protect threatened and degraded watersheds, ensure a consistent water supply, improve fish habitat, and maintain a healthy ecosystem
B.4.a Local benefits	Surrounding communities have the opportunity to benefit in the short and long term from having such a forest resource nearby. Such communities are also positioned to monitor activities such as selective logging and fires that might be occurring in the forest reserve and it has been shown that if they have proper motivation, community members are very engaged in implementing protection measures.
B.4.b Global benefits	The project will reduce CO_2 concentration in the atmosphere and contribute to the mitigation of climate change.
B.5 Consistency between the project and the environmental	This project supports the implementation of Malawi's Growth and Development Strategy (MGDS), which is a comprehensive strategy

[69] http://cdm.unfccc.int/Reference/Documents/dec19_CP9/English/decisions_18_19_CP.9.pdf

[70] http://cdm.unfccc.int/EB/Meetings/016/eb16repan1.pdf

[71] The BioCF is developing a methodology for project activities reducing emissions from deforestation and forest degradation, which should be fully adopted during project preparation. It will be available by November 2007.

[72] Government of Malawi. (2010). Malawi State of Environment and Outlook Report. Ministry of Natural Resources, Energy and Environment, Lilongwe

[73] Government of Malawi. (2008). Malawi Housing and Population Census Report. National Statistical Office, Zomba.

priorities of the Host Country	to create wealth through sustainable economic growth and infrastructure development. The MGDS specifically addresses climate change, its relevance to the health of Malawi, and the potential for Malawi to participate in global carbon markets.
Socio-economic benefits	
B.6 How will the project improve the welfare of the community involved in it or surrounding it. What are the direct effects which can be attributed to the project and which would not have occurred in a comparable situation without that project? *(e.g., employment creation, poverty alleviation, foreign exchange savings).* Indicate the number of communities and the number of people that will benefit from this project.	The project can provide jobs in the form of management and monitoring of forest reserves, tree planting, and management of forest plantation for the communities in the surrounding areas. It may also improve the economic situation of local communities, by providing more sustainable and long term access to fuelwood, charcoal production, and timber. In addition, planting Jatrohpa provides income opportunity through the sale of biofuels. *[Identify and describe the specific potential in terms of number of jobs created and the communities impacted.]*
B.7 Are there other effects? *(e.g., training/education due to the introduction of new technologies and products, replication in the country or the region)*	The project will involve training of nearby communities in monitoring, forest management, tree planting, plantation maintenance, charcoal production, and sustainable fuelwood and timber harvest.

C. Finance

Project costs *[Determine project costs based on cost of: clearing of existing vegetation (if necessary), tillage and other ground preparation, tree seedlings, planting, irrigation, fertilizer (if necessary), maintenance, etc.]*	
C.1 Preparation costs	US$ million
C.2 Establishment costs	US$ million
C.3 Other costs *(explain)*	US$ million
C.4 Total project costs	US$ million
Sources of finance to be sought or already identified *[Potential sources of funding need to be identified and explored. The DNA, the Technical Committee, and the Carbon Finance Unit (once it's in place) need to determine the most viable sources of funding; the Climate Funds Update provides a list of potential funders at www.climatefundsupdate.org.]*	
C.5 Equity *(Name of the organizations and US$ million)*	
C.6 Debt – Long-term *(Name of the organizations and US$ million)*	
C.7 Debt – Short term	

(Name of the organizations and US$ million)	
C.8 Grants	
C.9 Not identified *(US$ million)*	
C.10 Contribution sought from the BioCarbon Fund *(US$ million)*	
C.11 Sources of carbon finance *(Has this project been submitted to other carbon buyers? If so, say which ones)*	
C.13 Indicative CER / ERU / RMU / VER price *(subject to negotiation and financial due diligence)* Please discriminate VERs from REDD activities.	
C.14 Emission Reductions Value *(= price per t CO_2e * number of tCO_2e)* Please discriminate VERs from REDD activities.	
Until 2012	US$
Until 2017	US$
C.15 Financial analysis *(If available for the proposed CDM / JI activity, provide the forecast financial internal rate of return (FIRR) for the project with and without the CER / ERU / RMU / VER revenues. For standardization purposes, provide the financial rate of return at the expected CER / ERU / RMU / VER price above and US$4/t CO_2e and assume 20 years worth of carbon payments, even though that price and purchasing period may not be the one offered by the BioCarbon Fund. Please attach spreadsheet if available.)*	FIRR without carbon: FIRR with carbon:

ANNEX III MAIN CARBON FINANCE SECTORS AND SPECIFIC POTENTIAL ACTIVITIES FOR MALAWI

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
Energy				
	Cooking Using Grid Electricity	• CDM AM0045 Grid connection of isolated electricity systems	• Thermal energy from plant oil for the user of cooking stoves. • Ecologically Sound Fuel Switch to Biomass with Reduced Energy Requirement. • Voluntary Gold Standard Methodology for Biodiesel from waste oil/fat from biogenic origin for use as fuel	• ACR accepts CDM Methodologies • VCS accepts CDM Methodologies • VCS VM0002 New Cogeneration Facilities Supplying Less Carbon Intensive Electricity to Grid and/or Hot Water to One or More Grid Customers
	Efficient Lighting Technologies Efficiency in ESCOMs Capacity and Energy Balance Fuel Additives (Ethanol) Wind Power Flaring Fugitive Emissions Commercial and Residential Energy Efficiency	• CDM AM0019 Renewable energy projects replacing part of the electricity production of one single fossil fuel fired power plant that stands alone or supplies to a grid, excluding biomass projects. • CDM Methodology for zero-emissions grid-connected electricity generation from	• Thermal energy from plant oil for the user of cooking stoves. • Ecologically Sound Fuel Switch to Biomass with Reduced Energy Requirement. • Indicative Program, Baseline and Monitoring Methodology for Large-	

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
	Geothermal Solar Mini-hydro	renewable sources in Chile or in countries with merit order based dispatch grid • CDM AM0035 SF6 Emission Reductions in Electrical Grids • CDM AM0036 Fuel switch from fossil fuels to biomass residues in heat generation equipment • CDM AM0042 Grid-connected electricity generation using biomass from newly developed dedicated plantations • CDM AM0044 Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors • CDM AM0045 Grid connection of isolated electricity systems • CDM AM0046 Distribution of efficient light bulbs to households • CDM AM0048 New cogeneration facilities supplying electricity and/or steam to multiple customers	Scale Supply and Distribution of Efficient Light Bulb, Showerheads and Water Saving Products to Households	

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
		and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels • CDM AM0052 Increased electricity generation from existing hydropower stations through Decision Support System optimization • CDM AM0061 Methodology for rehabilitation and/or energy efficiency improvement in existing power plants • CDM AM0062 Energy efficiency improvements of a power plant through retrofitting turbines • CDM AM0067 Methodology for installation of energy efficient transformers in a power distribution grid • CDM AM0094 Distribution of biomass based stove and/or heater for household or institutional use • CDM AM0097 Installation of		

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
		high voltage direct current power transmission line • CDM AM0100 Integrated Solar Combined Cycle (ISCC) projects --- Version 1.0.0		
Industrial Processes				
	Carbon Capture and Sequestration Cement Blending CO_2 as Raw Material Industrial energy Efficiency	• CDM AM0054 Energy efficiency improvement of a boiler by introducing oil/water emulsion technology • CDM AM0091 Energy efficiency technologies and fuel switching in new buildings	• Accepts CDM Methodology	• ACR accepts CDM Methodologies • VCS accepts CDM Methodologies
Transport				
	Fuel Switching	• CDM AM0031 Bus rapid transit projects	• Accepts CDM Methodology	• ACR accepts CDM Methodologies • VCS accepts CDM Methodologies
Waste Management				
	Reduction in the generation of waste	• CDM AM0098 Avoidance of landfill gas emissions by in-situ aeration of landfills	• Accepts CDM Methodology	• ACR accepts CDM Methodologies • VCS accepts CDM

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
		• CDM AM0093 Avoidance of landfill gas emissions by passive aeration of landfills -		Methodologies
	Composting	• CDM AM0025 Avoided emissions from organic waste through alternative waste treatment processes		
	Mechanical-biological treatment	• CDM AM0086 Installation of zero energy water purifier for safe drinking water application		
	Landfill Gas			
Agriculture, Land Use Change and Forestry				
	Agricultural Management		• Does not include AFOLU project types	• ACR N_2O Emission Reductions through Changes in Fertilizer Management • ACR N_2O Emission Reductions through Fertilizer Rate Reduction (not fully published) • ACR Emission Reductions in Rice Management Systems (not fully published)VCS VM0017

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
				Adoption of Sustainable Agricultural Land Management (SALM), v1.0
	Afforestation/Reforestation (Fuelwood plantations, native species replanting)	• CDM AR-AM0002 Restoration of degraded lands through afforestation/reforestation • CDM AR-AM0004 Reforestation or afforestation of land currently under agricultural use • CDM AR-AM0005 Afforestation and reforestation project activities implemented for industrial and/or commercial uses • CDM AR-AM0006 Afforestation/Reforestation with Trees Supported by Shrubs on Degraded Land • CDM AR-AM0007 Afforestation and Reforestation of Land Currently Under Agricultural or Pastoral Use • CDM AR-AM0009 Afforestation or reforestation on degraded		• VCS accepts CDM Methodologies • ACR accepts CDM Methodologies • ACR Afforestation and Reforestation of Degraded Lands • CarbonFix Standard • PlanVivo Standard

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
		land allowing for silvopastoral activities • CDM AR-AM0010 Afforestation and reforestation project activities implemented on unmanaged grassland in reserve/protected areas • CDM AR-AM0011 Afforestation and reforestation of land subject to polyculture farming • CDM AR-AM0012 Afforestation or reforestation of degraded or abandoned agricultural lands • CDM AR-AM0013 Afforestation and reforestation of lands other than wetlands • CDM AR-AM0014 Afforestation and reforestation of degraded mangrove habitats • CDM AR-ACM0001 Afforestation and reforestation of degraded land • CDM AR-ACM0002 Afforestation or reforestation of degraded land without displacement of pre-project		

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
		activities		
	Improved Forest Management			• VCS VM0003 Methodology for Improved Forest Management through Extension of Rotation Age • VCS VM0005 Methodology for Conversion of Low-productive Forest to High-productive Forest • VCS VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest
	Reduced emission from deforestation and forest degradation			• ACR REDD - Avoiding Planned Deforestation • ACR REDD Methodology Modules (applicable to projects reducing emissions from planned

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
				deforestation, unplanned deforestation, and degradation through non-renewable fuelwood collection and charcoal production) • VCS VM0006 Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation • VCS VM0007 REDD Methodology Modules (REDD-MF) • VCS VM0009 Methodology for Avoided Mosaic Deforestation of Tropical Forests • VCS VM0011 Methodology for Calculating GHG Benefits from Preventing Planned Degradation • VCS VM0015

Sector	Activities	CDM Methodologies	Gold Standard Methodologies	Voluntary Standards Methodologies
				Methodology for Avoided Unplanned Deforestation

Questions or Comments:
Sarah Walker
Program Officer, Ecosystem Services
Winrock International
swalker@winrock.org