Kulera Landscape REDD+ Program for Co-Managed Protected Areas, Malawi

Project Implementation Report

Climate, Community & Biodiversity Standard

Version 12-0

July, 2014

VERIFICATION PERIOD: October-1-2009 to September-30-2013

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TLC Malawi

Contents

1 Introduction & Original Conditions in the Project Area

1.1 Location of the Project and Basic Physical Parameters

The Project Areas include 5 km zone located just inside the border of three different protected areas in the Northern and Central Regions in Malawi: Nyika National Park, Vwaza Marsh Wildlife Reserve, and Nkhotakota Wildlife Reserve (see Figure 1).

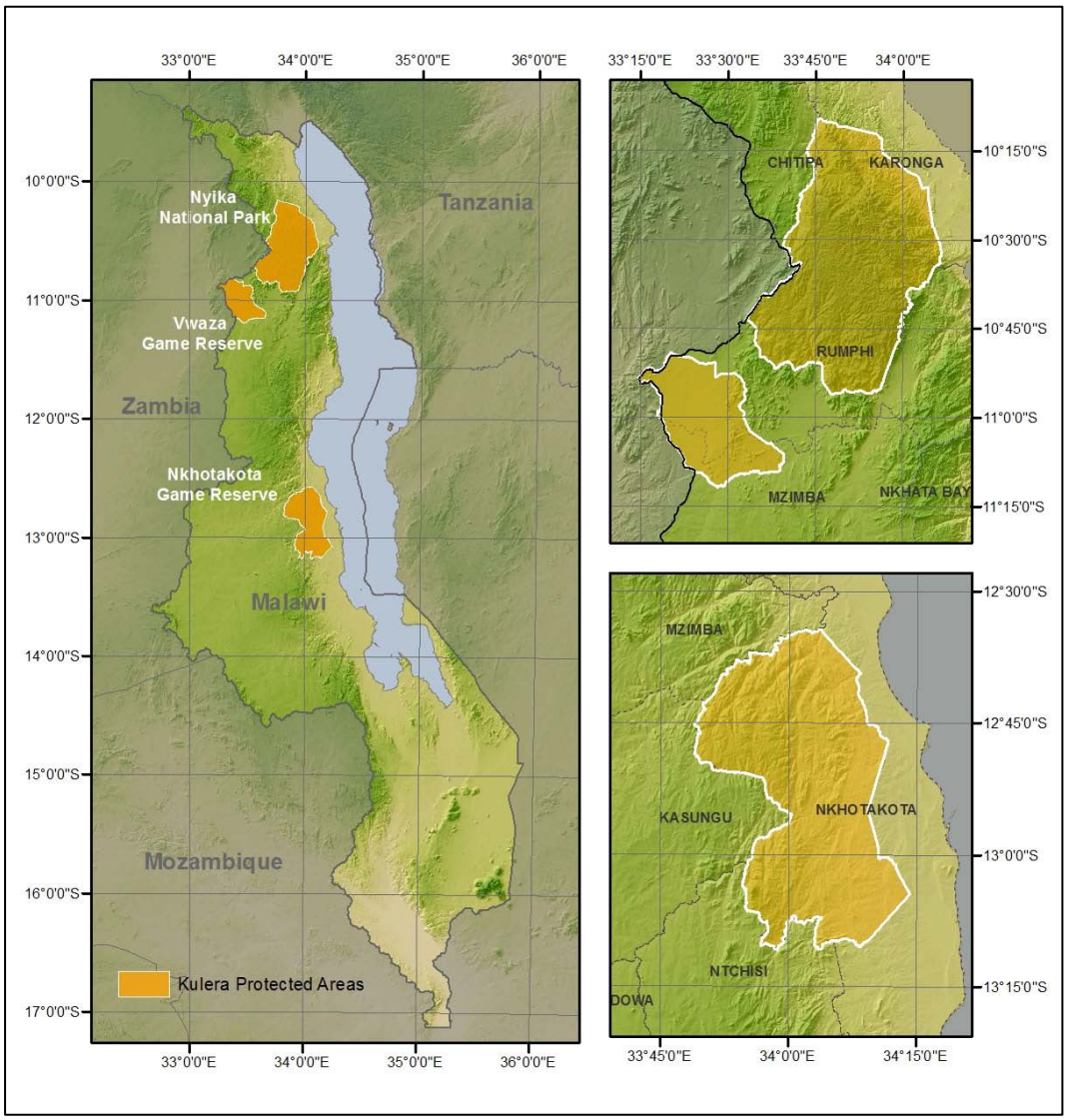

Figure 1. Regional Location of the Project Areas in Malawi

The Project Zones are comprised of both the Project Areas and a 10 km zone just outside the boundaries of the three protected areas. Communities living within 10 km of the Nyika and Vwaza areas have formed Natural Resource Committees which are cooperating with Malawi's DNPW to collaboratively manage these areas.

Specifically, elected representatives have created Community Associations, Nyika-Vwaza Association (NVA) and Nkhotakota Wildlife Reserve Association (NAWIRA), which have signed collaborative management ("co-management") agreements with the DNPW. The co-management agreement obligates the associations to ensure compliance with the National Parks and Wildlife Act (2004), other laws and the protected area management plans, on the part of the association members, employees and general public. In exchange, the community members receive assistance from the government to generate wildlife-based income. The NAWIRA association, established in Nkhotakota is currently organizing a similar co-management agreement with the DNPW. The Project Areas include the resource use zones within the park and Project Zones include the communities living 10 km outside of the park boundaries. Figure 2 illustrates the spatial distribution of the Project Areas and the Project Zones.

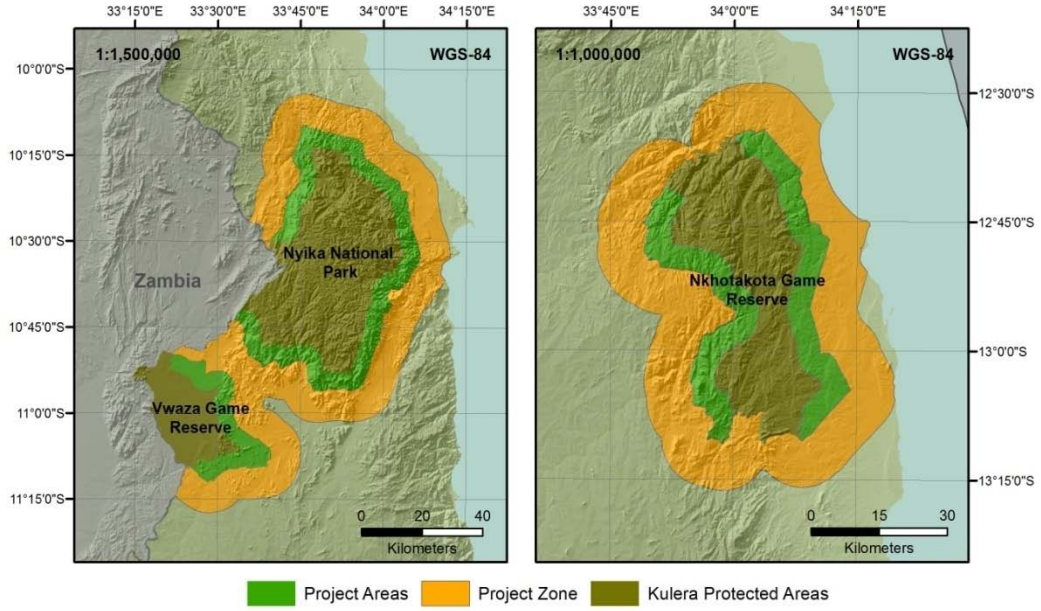

Figure 2. Spatial distribution of the Project Areas and Project Zones

Malawi is a landlocked country, of high mountains and deep lakes. One fifth of it is covered by Lake Malawi, which fills the trough of the Great African Rift Valley that traverses the country from north to south. East and west of the lake, the land forms high plateaus that reach as high as 2,600 meters in the Nyika uplands, and 3,048 meters at Mount Mulanje. Malawi shares borders with Mozambique to the east and south, with Zambia to the west, and with Tanzania to the northeast. There are four major urban centers: Blantyre, Lilongwe, Zomba, and Mzuzu. Out of a total land area of 9,448,741 ha, 48% is considered arable.

Most of the Project Areas are in the basin of Lake Malawi. Freshwater systems within the basin that are of relevance to the Project Areas include Lake Kazuni (adjacent to

the Vwaza Wildlife Reserve), the Bua river (in the central region, in the vicinity of the Nkhotakota Game Reserve), and the Rukuru river (which flows from the Nyika plateau in the northern region).

1.1.1 Nyika National Park

Nyika National Park (NP) occupies a tract of mountain plateau and associated hills and escarpments in northern Malawi in an area covering 3,200km^2 bordering Chitipa, Karonga, and Rumphi Districts whilst the western boundary borders Zambia. It is the largest national park in Malawi and is centered upon 10°33'S, 33°50'E.

The Nyika National Park is located on a high dissected plateau that consists of rolling plains with rocky outcrops, with an elevation ranging from 600-2600 m above sea level, and is in an area of relatively high rainfall. *Nyika* means "where the water comes from" and it is among the protected areas established to protect water sources. As its name suggests, it is a headwater area in a region of high rainfall, and is the source of tributary streams that feed the South Rukuru River.

Established as a reserve in 1948, the park boundary was extended in 1978 to protect an important catchment area that supplies the northern region with water for domestic consumption, irrigation and hydro-power generation and to maintain habitat for large mammal migration between the plateau and surrounding woodlands (Department of Parks and Wildlife 2004b). Land outside the park is mostly used for agriculture by smallholder farmers on customary land and medium to large-scale commercial farmers on leasehold estates. Farmers report continued depredations of their crops by wildlife from the park, particularly monkeys, baboons, wild pigs, elephant, and buffalo (Department of Parks and Wildlife 2004b).

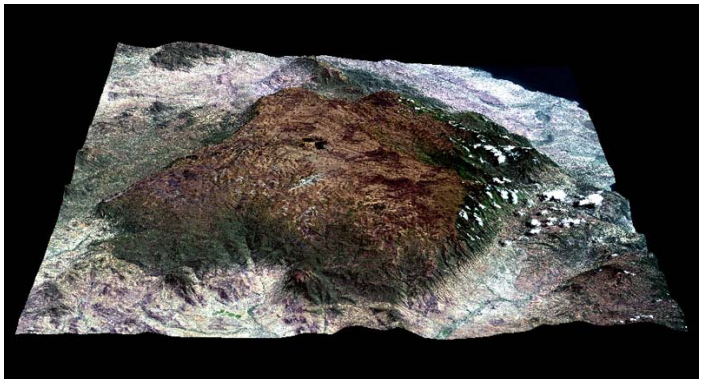

Figure 3. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Nyika contains six distinct physiographic zones: the eastern escarpment (Phoka-Nchenachena Kulera Biodiversity Project Priority Area); northern and southern hills; the western escarpment; the plateau; and the Mpanda-Kawozya ridge (a plateau remnant in the northern hill zone). The eastern escarpment is part of the western wall of the Great African Rift Valley, and the plateau is the remnant of an uplifted

block created by the tectonic activity that formed the rift (Department of Parks and Wildlife 2004b).

Most streams and rivers are perennial and stream flow characteristics are ascribed to high overall rainfall with some rain throughout the year, low evaporation (cloudiness and low ambient temperature), good vegetation cover to promote infiltration, and deep, freely draining soils. However, a recent survey of river conditions revealed that rapid bank erosion is occurring in some places. River channels are becoming wider and shallower and silt is being deposited over gravel beds (Environmental Affairs Department 2006). A recent survey of river conditions revealed that rapid bank erosion is occurring in some places. River channels are becoming wider and shallower and silt is being deposited over gravel beds (Environmental Affairs Department 2006). Soils are of two types: either deep, well drained, red and fine textured with high levels of acidity, or moderately deep to shallow, well drained, medium to fine textured and stony (Mawaya et al. 2011).

1.1.2 Vwaza Wildlife Reserve

Figure 4. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Vwaza Wildlife Reserve occupies a tract of diverse terrain in northern Malawi covering 978 km2 and it is centered upon 11° 00'S, 33° 28' E. The reserve comprises a region of hills and pediments in the east, and a region of wetland and alluvium in the west. The reserve lies partly in Rumphi and partly in Mzimba District whilst its western and part of its northern boundary coincides with the Malawi – Zambia border.

The Vwaza Wildlife Reserve, at an elevation of 1100-1400 m above sea level, consists of flat plains with dotted hills and marshy wetlands, fed by streams arising on the Nyika plateau. The South Rukuru River on the southern boundary drains into Lake Kazuni, which is located at the south-eastern tip before it turns east. Vwaza Marsh was declared a protected area in 1941 and expanded to its current size in 1984 (Department of Parks and Wildlife 2004b).

The reserve is predominantly flat with an average altitude of approximately 1,125 m. The lowest point is at Lake Kazuni (1,082 m) in the southeast and the highest point is 1,660 m at Mahobe Hill in the northeast. There are close associations between

landform and soils. The hills in the east are characterized by shallow rocky soils on hill slopes, and slightly deeper soils in valley bottoms.

Soil texture is generally sandy loam with moderate infiltration. The gently sloping pediments at the base of hilly areas comprise sandy and sandy loam soils with high infiltration rates and moderate fertility. Soils on lower pediment slopes have a higher clay content are more fertile and have lower infiltration rates. The plateau areas in the west of the reserve have deeply weathered sandy loam soils with high infiltration rates and low fertility. Alluvial soils of the plains, which comprise most of the center of the reserve, have sandy clay-to-clay soils that are seasonally waterlogged. These soils have low infiltration rates and are moderately fertile. Soils in the marsh are waterlogged for most of the year and comprise dark, fine textured mud. Gully erosion is a problem on some of the deeper, finer texture soils.

Surrounding communities grow maize, tobacco, beans, groundnuts and a variety of vegetable in the wetland gardens. Farmers report continual depredations of their crops by wildlife from the reserve, particularly hippo near Lake Kazuni, but also monkeys, baboons, wild pigs, elephant, and buffalo (Department of Parks and Wildlife 2004b).

All streams and rivers in the reserve flow into the perennial South Rukuru River on the southern boundary whilst Vwaza Marsh is supplied by the Hewe River that rises in the southeastern hills of the Nyika plateau. Soils are very deep, brown, and medium textured, with variable drainage (well drained to poor).

1.1.3 Nkhotakota Wildlife Reserve

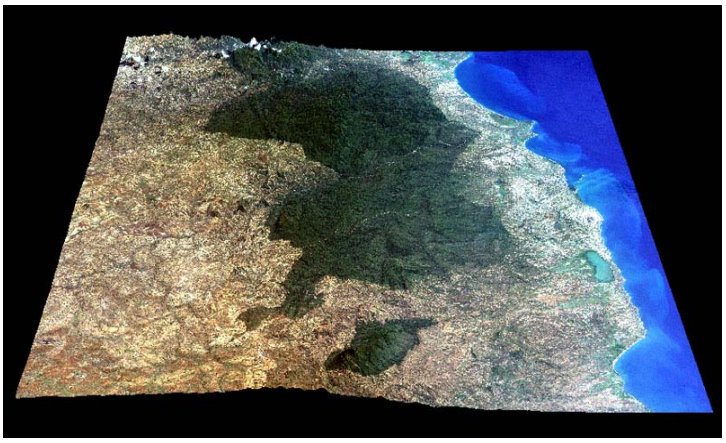

Figure 5. Landsat 8 imagery from 2013 draped over SRTM elevation data.

Nkhotakota Wildlife Reserve is the oldest and largest wildlife reserve covering 1082 km² and is centered upon 12°55′00″ S, 34°18′00″ E. It is located in the Central Region of Malawi. Most of the reserve is comprised of *miombo* woodlands with large patches of grasses along wetlands.

The Nkhotakota Wildlife Reserve, found at an elevation ranging from 500-1,700 m above sea level, consists of rolling to steeply dissected and undulating topography, which is mountainous in the west, where Chipata hill rises to a height of about 1,700 m. The wildlife reserve is an

important catchment area for Lake Malawi because three major rivers (Bua, Dwangwa and Kaombe) pass through it.

Soils are moderately deep to deep, well drained, coarse to medium textured and occasionally stony with often a skeletal subsoil (Mawaya et al. 2011).

1.2 Climate in the Project Region

The area's climate is subtropical, with 95% of rainfall occurring in the warm wet season which stretches from November to April (see Figure 6). The average annual rainfall across Malawi ranges from a minimum of 725 mm to a maximum of 2,500 mm. In the central/northern region in the vicinity of the lake, annual rainfall ranges from approximately 1,000 to 1,800 mm per year. The mean total rainfall ranges from 10 mm in September to 224 mm in March in the central/northern region, , though slightly lower in the Nyika plateau area. Precipitation varies between the three protected areas. The Vwaza Wildlife Reserve is one of the driest areas of Malawi while the Nyika National Park and Nkhotakota Wildlife Reserves receive significantly higher rainfall.

Nationwide, mean temperatures vary between 17 and 27 °C and between 25 and 37 °C during the hot dry season, in September and October. Maximum temperatures range from 22 to 30 °C, minimum temperatures from 12 to 20 °C (see Table 1).

However, the mean minimum temperature in Nyika can be much lower (i.e. mean temperature in July is 2.5-5.0°C, due to its high elevation). See Table 2 for a breakdown of climatological information by Project Area.

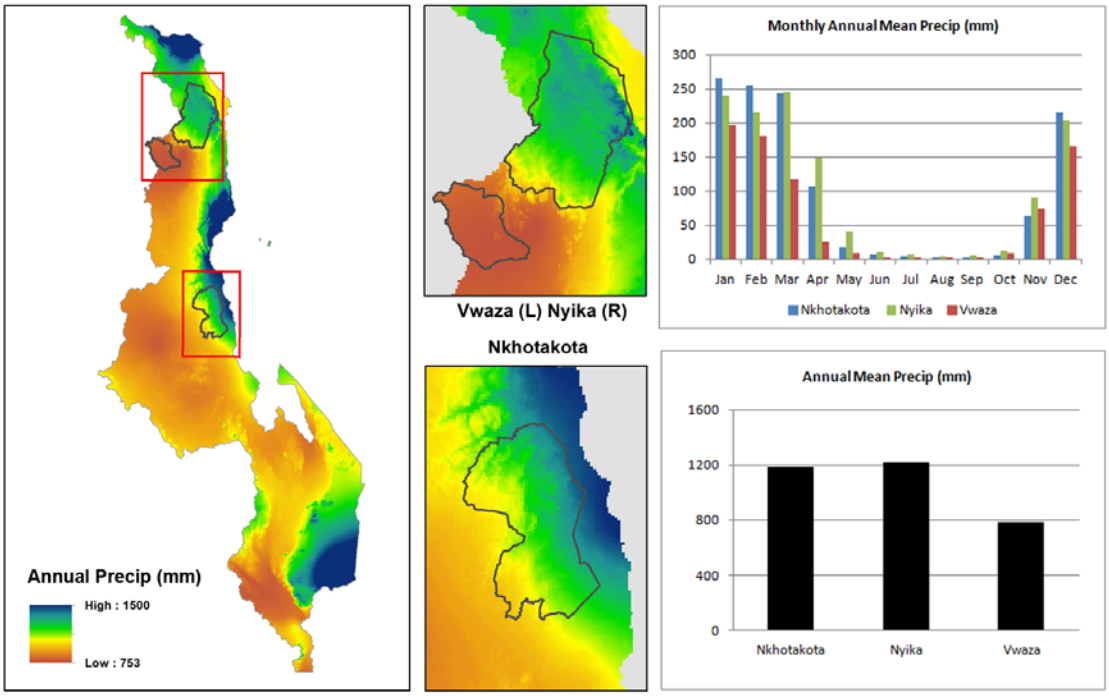

Figure 6. Annual precipitation based on interpolated climate station datasets from a period between 1950 and 2000. Source: WorldClim, Robert Hijmans (2005)

Table 1. Climatological information, Mzuzu (Central/Northern Malawi)

Month	Mean Temperature °C		Mean Total Rainfall (mm yr^{-1})	Mean Number of Rain Days
	Daily Minimum	Daily Maximum		
Jan	16.1	25.5	203.3	20.0
Feb	16.5	25.6	179.5	18.0
Mar	16.0	24.8	224.1	20.0
Apr	14.9	23.5	213.0	19.0
May	11.6	22.1	58.8	9.0
Jun	7.9	20.4	29.5	6.0
Jul	6.5	20.3	30.1	6.0
Aug	6.6	21.9	11.8	3.0
Sep	8.7	25.1	10.4	2.0
Oct	11.7	27.2	35.4	3.0
Nov	14.2	27.2	95.7	9.0
Dec	15.9	26.1	197.0	18.0

Climatological information is based on WMO Climatological Normals (CLINO) for the 30-year period 1961-1990

Mean number of rain days = Mean number of days with at least 0.3 mm of rain.

Source: World Meteorological Organization, www.worldweather.org

Table 2. Climatological information by Project Area

	Nyika NP	Vwaza WR	Nkhotakota WR
Mean monthly temperature during growing period (°C)	12.5 -20.0 (mean minimum temperature in July is 2.5 - 5.0)	20.0 - 22.5	20.0 - 25.0
Mean annual rainfall (mm)	800 - 1650	800 - 1200	800 - 1600
Length of the growing period (days)	180 – 225	165 - 180	150 - 195

Source: Total LandCare 2009

1.3 Types and Condition of Vegetation within the Project Areas

Of nine major vegetation types found in the country, the most prevalent are miombo woodlands, deciduous forests and thickets, evergreen and semi-evergreen forests, and afromontane grassland (Environmental Affairs Department 2006).

Across Malawi, land classified as forests is found in:

- Plantations - 110,000 ha (2.5%)
- Forest reserves - 870,052 ha (22%)
- National parks and game reserves - 981,479 ha (25%)
- Customary land 1,988,255 ha (50.5%) - mostly disturbed, 20-70% cultivated (Kainja, 2000).

Miombo woodlands are commonly restricted to protected areas and are a wooded savanna, similar to oak woodlands of California. Miombo woodland is a dry-deciduous ecosystem, where some trees will lose their leaves in the dry season. Grass can be seen through gaps in the woodland canopy, and fire can burn in the understory (Kulera VCS Methodology 2012).

Brachystegia spp. and *Julbernardia globiflora* are dominant miombo woodland species and play an important role in water conservation by protecting steep slopes from erosion. Other miombo woodland species include *Acacia spp., Bauhinia spp, Combretum spp., Sclerocarya birrea, Strychnos cuccloides, Parinari curatellifolia, Vangueria infausta, Azanza garckean and Schinziophyton rautanenii.* Over 20 genera were recorded including *Brachystegia, Julbernardia, Terminalia, Combretum, Acacia, Pterocarpus, Uapaca, Syzygium, Erica, Protea, Parinari, Pericopsis, Diospyros* and *Diplorrhynchus*. Miombo woodlands are under threat from deforestation for firewood, charcoal, honey collection, poaching, fire, and encroachment (Mawaya et al. 2011).

1.3.1 Vegetation in Nyika National Park

Vegetation consists of montane grasslands and evergreen forests with patches of relic montane evergreen forests. Predominantly, expansive rolling grasslands are interspersed with evergreen riverine forests along waterways. The park's vegetation has been broadly classified into four types: *dambo* grasslands near rivers and at headwaters of drainage lines; montane grassland on the plateau; montane forest; and *Brachystegia* woodland around the plateau. On the escarpment and at lower elevations, the vegetation is mainly deciduous miombo woodland. *Brachystegia spp*. and *Julbernardia globiflora* are the dominant woodland species which play an important role in water conservation by protecting steep slopes from erosion. In addition, the park is famous for its orchid species, many of which are endemic. A variety of plants such as Cape gooseberry and sisal survive at all old settlement sites in addition to peaches, mangoes, bananas, coffee, oranges, cassia and cedar trees (Department of Parks and Wildlife 2004b).

1.3.2 Vegetation in Vwaza Wildlife Reserve

The vegetation is a mosaic of open to dense woodland with wetland grasslands and marshes in the central low lands. Vegetation of the reserve has been broadly classified into *Brachystegia* woodlands communities on hills, pediments and plateau areas; *Combretum –Terminalia* woodland communities on pediments, alluvial pans and valley bottoms; *Colophospermum mopane* woodland on alluvial sites with clay soils; and *Acacia* woodland on river flood plains and grasslands communities on plains, dambos and in the marsh (Department of Parks and Wildlife 2004b; McShane 1985).

1.3.3 Vegetation in Nkhotakota Wildlife Reserve

The vegetation is comprised of dense *Brachystegia*woodland and riverine forests, interspersed with occasional patches of tall *Hyparrhenia-Andropogon*grasses in the low-mid altitudes, and dense evergreen forest in the uppermost elevations. Soils are moderately deep to deep, well drained, coarse to medium textured and occasionally stony with often a skeletal subsoil.

1.4 Boundaries of the Project Areas and Project Zones

The Project Areas of the Project are found within a 5 km wide area inside of the participating protected areas in Malawi (Table 3). GIS shapefiles of the protected areas were provided by the DNPW and used for defining the locations of the Project Areas. The 5 km inside buffer distance was selected to address observed deforestation and degradation occurring on the edges of Malawi's protected areas. According to the DNPW there are four main reasons for this: (1) lack of protected area enforcement, (2) community uncertainty of formal park boundaries, and (3)

depleted forest resources from areas surrounding the protected areas, and (4) livelihood needs of surrounding communities. The protected area edges are impacted due to the proximity of populated areas with diminishing impact towards the interior; the 5 km buffer distance represents an estimated mean maximum distance a villager will travel into the protected area for agriculture or wood product harvesting.

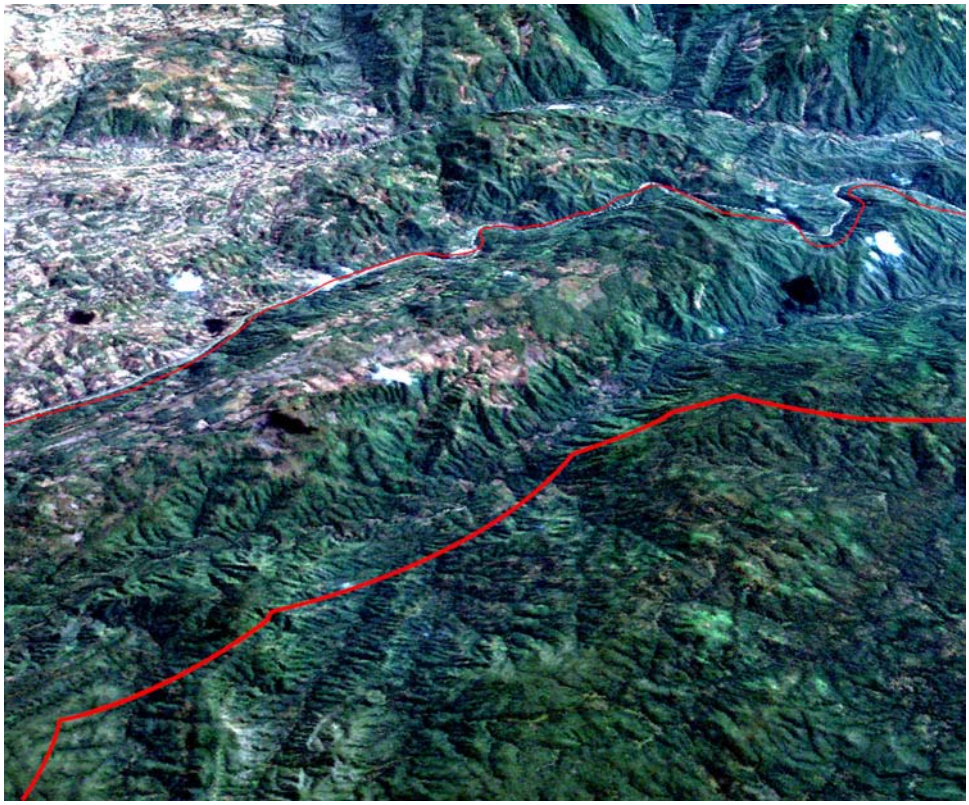

Figure 7. Five kilometer buffer area (between the red lines) in the northwest corner of Nkhotakota Wildlife Reserve. The ridgeline deforestation observable within this buffer zone demonstrates edge deforestation due to unenforced protected area boundaries. Image created using 2013 Landsat 8 imagery draped over a digital elevation

The Project Areas were set using the 5 km wide inside buffer of the protected area boundaries. Areas adjacent to the Zambia border were removed from both Nyika and Vwaza Project Areas along with areas adjacent to Forest Reserves (Mndilandsadzu FR and Dwambadzi FR) to the north and south of the Nkhotakota Project Areas. To complete the Project Areas from the resulting gaps, the parcel ends were set using watershed boundaries. Watersheds were generated using ESRI ArcHydro software based on an SRTM 90 m resolution elevation data, with the accumulation threshold set to 972 hectares (1200 pixels).

The Project is being developed as a Grouped Project under the assumption that additional Project Areas will be added in the future under Grouped Project guidelines. For example, communities have been engaged surrounding the Ntchisi

Forest Reserve in anticipation of the future inclusion of Project Areas located within the Ntchisi Forest Reserve.

Table 3. Size and Location of the Project Areas at Project Start Date

ID	National Park (NP) Name	Size of Project Areas (ha)	Centroid Coordinate [decimal degrees] WGS-84	
			Lon (X)	Lat (Y)
NYKA	Nyika National Park	102,316	33.4482	-11.0134
VWZA	Vwaza Wildlife Reserve	38,482	33.8483	-10.5703
NKHT	Nkhotakota Wildlife Reserve	76,472	34.0353	-12.8740
	Total	217,270*		

**Project Areas include a percentage of non-forest area. Only forested Project Areas will be used in carbon calculations.*

1.5 Reference Region

A Reference Region was selected to assess historical and current deforestation and forest degradation quantities and trends for the Project Area baseline according to the process set out by VCS Methodology VM0006 v2.0. Variables considered in selecting the Reference Region location were: (1) forest laws and policies, (2) land use history and dynamics (e.g. forest cover, agricultural systems), (3) ecological conditions (forest types present and climatic conditions), and (4) social conditions (e.g. population density, sources of income).

The methodology requires that the minimum size of the Reference Region excluding the Project Area and Leakage Area must be 250,000 ha or the size of the Project Area at the start of the crediting period, whichever is greater. However, the Exclusive Reference Region defined for this project is only 232,782 hectares in size due to the lack of additional suitable area. This was reported as a methodology deviation. The Reference Area is set across a swath of forest use areas inside and outside of Protected Area boundaries. The Reference Region includes both the 5 km boundary area inside and the community forest use areas adjacent to the Protected Areas. The bounds of these regions are constrained within the footprint of the satellite imagery (3 Landsat scenes). These Protected Areas include all the Game Reserves, Forest Reserves and National Parks in the proximity of our Project Area. Including only nearby Protected Areas ensures that the Reference Region conservatively reflects the historic deforestation rate and that it is similar from the point of view of deforestation drivers due to the similarity of forest laws, land use history, ecological conditions and social conditions to those of the Project Areas. In addition to the three Project Protected Areas, other nearby Protected Areas were included in establishing the Reference Region boundaries. These additional areas are the

Mndilandsadzu Forest Reserve bordering the north of Nkhotakota, Dwambadzi Forest Reserve bordering the south of Nkhotakota, and Ntchisi Forest Reserve located ~10 km south of Nkhotakota (Figure 8). No other Protected Areas were identified within the footprint of the remote sensing imagery used to produce the historic baseline.

The resulting potential Reference Region area was clipped to fit within the footprint of the remote sensing imagery used for classification. Additionally the boundary of a pine plantation observed in remote sensing imagery located within the Reference Region, south of Nkhotakota was manually digitized and removed from the Reference Region. The final Reference Region, see Figure 8, has an area of 232,782 ha, The area used for creating the historic baseline is the combined areas of the Project Areas, Leakage Belt, and Reference Region, known as the Inclusive Reference Region as opposed to the Exclusive Reference Region described above. The Inclusive Reference Region has a total of 687,802 ha.

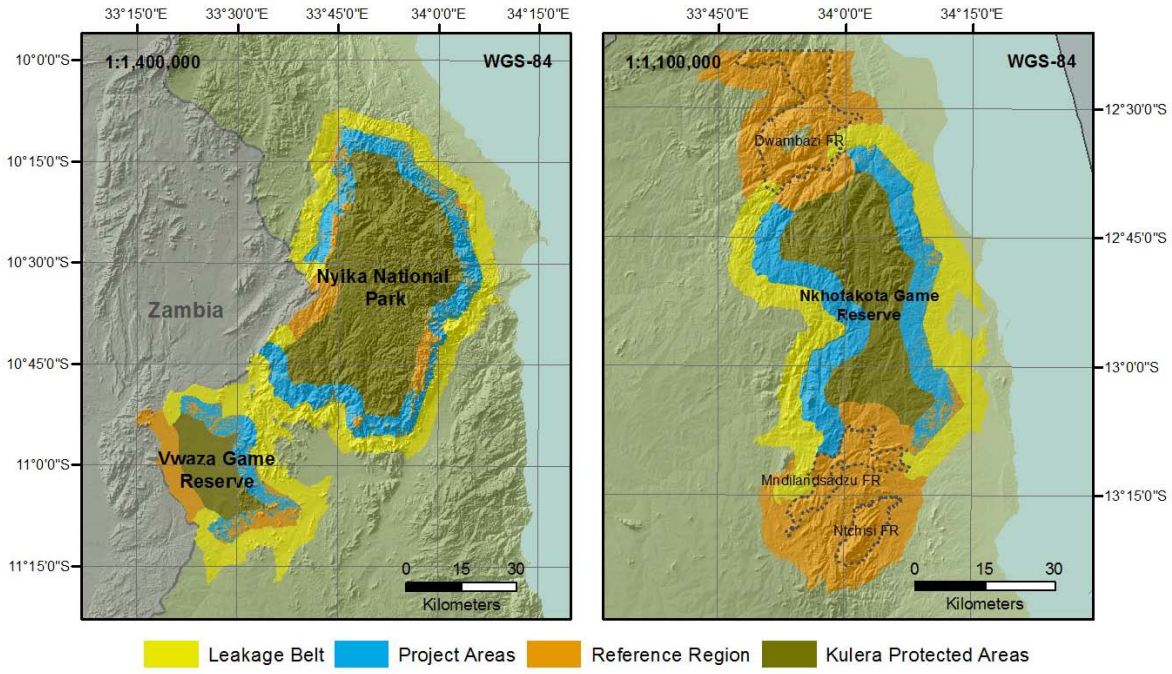

Figure 8. Overview of the Extent and Location of the Leakage Belt, Reference Region, and Project Areas. The surrounding Protected Areas used for the Exclusive Reference Region (Nkhotakota on right) are bounded by dashed lines.

1.5.1 Overview of Monitoring Plan

This project will monitor all required components according to the methodology. In general, the following components for calculating actual GHG benefits generated by the REDD project, or Net anthropogenic Emission Reductions (NERs) are included in the monitoring plan.

- Monitoring of deforestation drivers, project activities and emission sources related to REDD project activities inside and outside of the project area.

- Monitoring LULC class and forest strata transitions in the project area, leakage area and reference region using remote-sensing technologies and validated with ground-truthing data.
- Monitoring carbon stock densities in LULC classes and forest strata.
- Monitoring carbon stock increases in the area on which ANR is performed.
- Monitoring of any natural disturbances regardless of the cause of the loss.

Before every verification event, a monitoring report will be produced which contains all of the information above, and which outlines the calculations for actual NERs generated. At every verification event, project proponents will attest that no other land-based carbon projects registered under any other carbon trading scheme (both voluntary and compliance-oriented) are present in the project area.

1.6 Organizational Structure, Responsibilities and Competencies

- **Total LandCare**. During the first five years after validation of the project, the implementing partner (TLC) is responsible for managing, outsourcing and collecting the results of (1) biomass inventory measurements, (2) social assessments, (3) recording action activity implementation, and (4) any other data required to be monitored under this methodology. TLC will execute first-pass of quality assurance and quality control (QA/QC) checks on all of the data collected by them or any other partner. TLC will keep records of all field inventory and social appraisal data sheets and all other evidence demonstrating the correct execution of project implementation.
- **Department of Parks and Wildlife**[1]. During the first five years of the project, the DPW will provide assistance in the annual field inventory measurements, and review the monitoring reports. The DPW will be trained to become the responsible party for all monitoring requirements five years after validation of the project.
- **Terra Global Capital**. During the first five years after validation of the project, Terra Global Capital is responsible for verifying that the required elements are monitored, overseeing or executing all modeling and calculations, and performing second-pass QA/QC checks. In addition, Terra Global Capital is responsible for developing the monitoring reports during the first five years after validation of the project.
- **NAWIRA and the Nyika-Vwaza Association** projects, report natural disasters and all challenges related to forest protection to the implementing organization.

[1] The Department of Parks and Wildlife is also refered to the Department of National Parks and Wildlife (DNPW)

2 Monitoring Data Collection, Storage and Reporting

The data quality will be maximized and ensured during all aspects of the monitoring process by quality assurance and quality control (QA/QC) procedures. To monitor field inventory data, data analysts, and involved individuals/institutions in evaluating the quality of analytical data, rigorous QA/QC procedures are developed relevant to this project. The QA/QC procedures include specific criteria to evaluate the quality of analytical data that has been gathered. The QA/QC procedures are therefore an absolutely essential part of monitoring.

2.1 Procedures for Handling Internal Auditing and Non-Conformities

The Kulera Biodiversity Project involves a wide range of stakeholders at village, community, zone, and national levels. The success of this long-term project depends on the ability of the stakeholders to effectively and amicably resolve any problems and issues that arise during implementation. As such, the project has developed policies and procedures providing guidance to project stakeholders on how to resolve resolving complaints and grievances.

The Project Stakeholders are defined as any individual with a stake in the implementation and outcomes of the Kulera Biodiversity Project. These include community members, local authorities, and NGOs.

The Project Team is defined as the core project management group composed of Total LandCare, Department of Parks and Wildlife, and the Nawira and Nyika-Vwaza Associations. Each institution shall assign one individual as its focal point member. In addition, one Project Team member shall be designated as the group's Secretary responsible to keep and track records of meetings and correspondence.

Project Stakeholders may raise complaints and grievances to the Project Team or its member either verbally or in writing. The Project Team's Secretary is obliged to (1) record every complaint and keep track of the status, and (2) keep complaints and grievances confidential unless otherwise directed by the Project Stakeholder.

2.2 Monitoring Reporting

Monitoring will take place continually through the life of the Kulera REDD+ project. During each verification event a Monitoring Report will contain the *ex-post* values of the actual net GHG emission reductions. Actual net NERs must be based remote sensing, biomass inventories, and social surveys, and must follow steps in the methodology. Social data and biomass inventories gathered at Validation can be used for the first Monitoring Report.

3 Drivers of Deforestation Identified During Monitoring Period

3.1 Underlying Causes of Deforestation and Forest Degradation

A detailed socio-economic baseline survey was conducted in the three Project Zones over thirteen weeks from December 2010 to March 2011 (Phiri, Mapemba, and Sopo 2011). Most households living around these PAs are characterized by dire poverty, undertaking practices that are destructive to the same resources upon which their livelihoods depend. The main occupation in the Project Zone is small-scale farming (92% of households) followed by small-scale or barter trade (48-50% of respondents). Average annual incomes in the Project Zone ranged from MK66,798.00 (approximately US$248) to MK68,548.80 (approximately US$254) . Food insecurity is chronic in many areas in Malawi. In the Project Areas, one-fifth to one-quarter of the survey respondents reported running short of food the previous year. The worst months for food shortages and insecurity occur between December and March, at the start of the planting season before food crops are mature enough to harvest. Almost without exception, fuelwood is the main source of energy for cooking and heating households.

In addition, most communities have limited access to support services such as health care, education, agricultural extension, inputs, markets and telecommunications because they reside in remote areas with poor roads and infrastructure. Survey respondents reported lacking access to training in basic skills needed to run small enterprises.

3.1.1 Overview of Deforestation Drivers and Agents

Social appraisals carried out by TLC identified eight distinct deforestation drivers, and five deforestation agents operating in the Project Area (TLC, 2011) shown in Table 4.

Table 4. Summary of deforestation drivers and corresponding agents active in the Project Areas

Driver / Agents	Hunters/Poachers	Local Communities	Local Farmers	Migrants	Tobacco farmers
Collection of wood for charcoal		●		●	
Conversion of forest to small-scale agriculture			●	●	
Forest fires by hunters (mice hunters)	●				
Forest fires for other anthropogenic reasons	●				
Other				●	
Wood and poles for construction and domestic use			●		
Wood for cooking and heating locally				●	
Wood for tobacco curing			●		●

3.1.2 Description of Deforestation Drivers

3.1.2.1 Collecting Wood for Charcoal Making

Charcoal is a leading driver for deforestation in Malawi, and is a prominent source of income for many poor rural communities. The charcoal trade is worth an estimated MK5.78 billion (USD 41.3 million) per year – almost the same value as the nation's tea industry[2]. Trees are seen as a relatively free resource, and other input costs of charcoal are minimal. Charcoal is not used in rural areas as it is viewed as a "cash product." The main advantages for using charcoal are that it contains smaller amounts of volatile compounds for indoor cooking, lights easily, burns uniformly and at a higher temperature, is light to transport, and is culturally accepted. Charcoal is made in rural areas and is transported to urban centers. Charcoal can be seen for sale along almost every major road in Malawi (Figure 9)

Due to the extreme exploitation of forests for charcoal production, the Malawian government made the production of charcoal illegal, unless it is produced from a sustainable source. Sustainable charcoal makers must be issued a permit (proving that wood used comes from a sustainable source), which is also carried/ used by the seller. Though this is a national law, the government has issued no permits so far, and funds or capacity for enforcement are insufficient. Despite controls, large-scale charcoal businesses buy significant quantities of charcoal in rural areas and transport it to cities by truck. Any standing tree has the potential to be made into charcoal; it is created in rural areas, transported, sold, further transported and re-sold, etc.

[2]www.ifmslp.org/reports/ifmslp_charcoal_study_options_25_aug.doc

Pressures on standing trees are greater in areas near cities, and along roads leading to them.

Figure 9. Wood charcoal is sold along roadsides and is used for domestic heating and cooking in urban areas

3.1.2.2 Conversion of Forest to Small-scale Agriculture

Approximately 85% of Malawi's population lives in rural areas, making Malawi one of the most densely populated countries in Africa (per km²). Currently, there is a land rush where individuals or families move from populated areas to more rural areas, seeking permission from village chiefs for access to land. If granted, these new farmers are not treated as migrant workers, but are incorporated into the village community. Migrants are most commonly entering areas near Nkhotakota, where as many as twelve new families per year join a village. In rural communities, shifting slash-and-burn agriculture is practiced. New migrant farmers are surprised by this activity, as land is limited and must be used long-term. Often, new settlers from more urban areas have better land practices, and are more knowledgeable about forest protection. Most landholdings in Malawi are 0.4 ha per family. A village commonly consists of 30 families (ranging from 10-60) and covers an area totaling about 5 ha.

Figure 10. Forest conversion as a result of slash-and-burn agriculture, practiced outside of Nkhotakota Wildlife Reserve

3.1.2.3 Fires to Hunt Mice

Mice are a common food in the Lilongwe Plains and in surrounding areas. Mice vendors, usually boys, sell boiled mice along the roadside (Figure 11). Though mice prove to be a good source of protein, hunting practices are very destructive. In the dry season, mice hunters set fire to fields to find mouse holes. In the burnt field, mouse holes can easily be spotted and the mice dug up. Fire is also regarded as a good way to burn off weeds, and the smaller fires started by mice hunters are left to burn. Fire is a culturally accepted land management tool, though most Malawians are unaware of the long term damage caused by constant fire. Many areas of south central Malawi are distinctly blackened with evidence of fires in the dry season. Fire is so prevalent in some regions in Malawi that Total LandCare created a radio jingle, i.e., a short catchy song about not starting fire and about how damaging it can be.

Miombo ecosystems, which contain many fire adapted species, are quite resilient to fires. However, given that the fire return interval is so frequent due to arson, these ecosystems are unable to recover. The *miombo* woodland that once existed over the majority of Malawi has been greatly reduced.

Figure 11: Fires are set to hunt mice, which are caught, cooked and sold along roadsides

3.1.2.4 Fires for Other Anthropogenic Reasons

Fires to concentrate animals inside protected areas. Hunting for bushmeat is illegal in Malawi. However, hunting for wild game often occurs - some on an as-needed basis - while other hunting is full time. Socially, hunting game is not widely accepted. Hunters are commonly equipped with a rifle and poorly made bullets, and must concentrate animals for increased accuracy. Fires used to concentrate animals must cover a very large area.

Hunters also burn areas to attract game to new shoots that regenerate after a burn. This is very prevalent in Nkhotakota, where the presence of fire is common on the highlands, and the population of ungulates is fairly large. (Figure 12) these highlands are a natural savannah, arson fires affect both grasslands and burn into the surrounding forestlands. Deforestation caused by fire associated with hunting is present in all Protected Areas within the Kulera Project except for Mkuwazi. Hunting is almost exclusively done within Protected Areas, as this is where most wildlife can be found.

Figure 12. Fires are often used to concentrate animals inside of protected areas, such as this roan antelope in Nyika National Park

3.1.2.5 Other

This captures two main non-anthropogenic deforestation drivers, which include forest destroyed by elephants and a flood event that was estimated to destroy ten hectares of forest in the Project Area. These drivers are not directly addressed by the Project activities as they are from natural causes.

3.1.2.6 Wood and Poles for Construction for Domestic Use

Wood and poles are used to construct houses, tobacco drying sheds, fencing, concession stands along roads, and pens for domestic animals. In general, Malawians prefer brick houses to houses built of wood and cob/clay, which are used by poorer communities and those building temporary houses. These temporary buildings are not of high quality, but the wood used lasts for many years. Wood used for building materials must be taller, straighter, and thicker then fuelwood to support the weight of construction. Wood used for construction and brick making accounts for 10% of wood consumption in Malawi.

Figure 13: Wood and poles used for domestic construction

3.1.2.7 Wood for Cooking and Heating Locally

Rural Malawians rely on fuelwood, often gathered by girls and women, for domestic cooking and heating. Due to the need for fuel, land surrounding villages that once supported *miombo* woodland are heavily harvested, and most trees are reduced to multiple shoots below two meters. Cooking is done on inefficient stoves that are usually made up of three rocks or clay mounds to balance a cooking pot. Fuelwood must be gathered, on average, every three days, sometimes at great distances. Fuel-efficient stoves greatly reduce the need for fuel and improve lives of girls and women. Fuel-efficient woodstoves are desired by many Malawians, but they often lack the knowledge, incentives to overcome tradition and/or capital to cover the costs of stove creation. Wood used by rural communities for cooking and heating accounts for 57% of wood consumption in Malawi.

Figure 14: In rural areas, women are responsible for collecting and transporting firewood used for cooking and heating

3.1.2.8 Fuelwood for Tobacco Curing

Tobacco is the major cash crop of Malawi, and is grown in many regions throughout the country. Much of the analysis on the returns of tobacco to the Malawian economy neglects inclusion of input costs of tobacco production. If all of the input costs of tobacco, such as labor, transport and taxes were taken into account, farmers might grow alternative crops. Tobacco is harvested from January to March/April by removing two to three leaves per plant every ten days, totaling twelve leaves per plant. The average size of a single-owner tobacco field is 0.2 ha or less. For proper storage and sale, tobacco leaves must be dried. Many tobacco farmers dry their leaves together in long drying sheds. This is done by hanging the leaves in an open shed, in which they are heated and smoked by wood-burning fires. Because tobacco is such a valued crop in Malawi, large quantities of fuelwood are needed for drying tobacco. A total of 10% of all wood consumed in Malawi is used for tobacco leaf curing and tobacco shed construction.

Figure 15. Tobacco leaf bundles that have been cured with fuelwood

4 Implementation Status of Project Activities

4.1 Strengthening Land Tenure and Forest Governance

Strengthening land tenure and providing clarity on governance structures for Protected Areas management are critical first steps in protecting reserves from illegal encroachment. The project will provide support to strengthening land tenure and forest governance by creating and improving participatory, decentralized governance through co-management of the Protected Areas between the DNPW and Community Associations representing over 45,000 villages adjacent to protected areas.

The activities to enforce the Protected Area tenure and establish formalized co-management governance structures include:

- Clarification of Protected Area boundaries and where necessary facilitation of zoning/re-zoning in collaboration with stakeholders;
- Formation of formation of functional democratically-elected Community Associations with formalized governance through there bi-laws and constitutions;
- Facilitate the transfer of rights and access to natural resources in Protected Areas, including where appropriate revenue sharing in the protected areas from the DNPW to local communities through co-management agreements, and;
- Facilitate development and execution of REDD+ agreements between DNPW and Community Associations to define roles and responsibilities under REDD+ program, carbon tenure and financial and operational governance arrangements.

4.1.1 Implementation Status

During the first year of the monitoring period, progress under this Project activity was limited. The process of identifying and demarcating target areas and communities in the border zone around the Protected Areas was still in progress at the close of the first year, with 450 villages in the 10 km area around Nyika and Vwaza identified. The Project also facilitated the formation of one functional, democratically-elected Protected Area committee.

During the second year, the Project identified and demarcated an additional 1,220 communities in the border zone around the Protected Areas. The Project also facilitated the zoning or re-zoning of 52 GVH (zones). One additional Protected Area committee was formed during this year, and its governance structure legitimized. The identification of key natural resources and areas for the development of co-management agreements was still in progress at the end of year two.

With regard to building capacity of the Protected Areas governance structure in year two, the Project recruited and trained 20 community workers to support natural resource management (NRM) institutions in law enforcement, training, and other areas. 24 village umbrella committees (VUCs) were formed and trained.

During year three, the outcomes of some activities were not captured for reasons unknown at the time of this report. With regard to strengthening the governance structure, the Project facilitated the formation of an additional Protected Area committee during the third year and supported its legitimization. One review was completed of legal and institutional frameworks for their compatibility with Protected Area governance structures. There was no progress to report regarding the creation of co-management agreements.

With regard to capacity building within the Protected Area governance structure, the Project recruited and trained nine additional community workers to support NRM institutions. Fifty Protected Area officials were recruited and trained in corporate governance, team building, fundraising, project write-ups, resource assessments, natural resource rights, and conflict resolution. An additional 81 individuals representing a variety of Protected Area, legal and law enforcement groups were trained in community mobilization and participatory law enforcement. Logistical support for communication and mobility was also provided to one Protected Area.

4.2 Support for the Development and Implementation of Sustainable Forest and Land use Management Plans

Building on strengthened tenure and protected area governance structures in place, the project supports the development of co-management plans that define allowable land uses inside the protected areas. The co-management plans signed between the DNPW and the Community Associations:

- Obligate the communities to ensure compliance with the National Parks and Wildlife Act (2004), as amended, and pertinent laws of Malawi with terms of this agreement, and with approved Nyika National Park and Vwaza Marsh Wildlife Reserve Management Plans, on the part of the Association members and employees of the Association and the members of the public in general;
- In the event that the Association is unable to ensure compliance, the Association shall inform the appropriate government agency in writing (DNPW, Malawi Police etc), which shall take action to ensure compliance, and;
- Renew co-management agreements to enable communities to share benefits from park entrances and concession fees.

The co-management plans obligated the DNPW to:

- Build capacity in relevant fields in the Association, and;
- Facilitate wildlife-based and other income generating activities for the Association.

At the village level, forest management plans are created and submitted to the district commissioner. In these plans, the village level rules for land and forest uses are adopted by the community and included in the village by-laws, which prescribe penalties for not following the agreed upon uses. When the village level forest management plan is signed off by the district commissioners, this gives the chiefs the formal support needed to impose penalties.

4.2.1 Implementation Status

During the first year of the project, there was no progress of note made with regard to this activity, as communities and households were still being made aware of the project.

Progress was also limited during year two given the legal review that needs to take place before the co-management agreements can be made and signed. The Department of Parks and Wildlife (DNPW), the Nyika-Vwaza Association (NVA), and Total LandCare (TLC) had an ongoing dialogue during the year regarding the co-management agreements, and drafts were completed pending US and Malawi legal review.

As of year three, all activities related to the development and signing of co-management agreements were pushed to the no-cost extension period. The implementation of co-management agreements was deemed contingent on the establishment of NAWIRA.

4.3 Forest Protection through Patrolling, Social Fencing, and Maintenance of Forest Boundaries

The capacity of law enforcement authorities is too limited to defend the boundaries of each of the Protected Areas. Therefore, the Project will provide training and capacity building for communities to engage in participatory forest protection. Once these institutional structures are established and adequate training has been delivered, DNPW and the Community Associations will be able to oversee and enforce community-based co-management of the Protected Area. This approach to improved governance aims to stimulate forest stewardship through "social fencing[3]" of forest resources that are co-managed by local communities (Henkemans 2000).

[3]the protection of forests from external threats through organization and social control

The activities that mobilize community-based NRM in the Protected Areas through increased awareness and capacity include:

- Recruit and train community workers to support Community Associations in law enforcement, training and other needs;
- Provide training for Protected Area and Community Association officials in NRM institutions in corporate governance, team building, fund raising, project write-ups, resource assessments/problem analysis, basic NR rights and conflict resolution;
- Provide training for Protected Area and Community Association officials in community mobilization, participatory law enforcement, etc.;
- Provide logistical support to Protected Area officials to improve communications and mobility with GPS and radio units;
- Provide motor bikes and bicycles to allow communities to access better facilities for communications;
- Provide support for establishment of village umbrella committees and provide training for community development of NRM activities, and;
- Conduct awareness campaigns through training of primary school teachers in environmental education, facilitate the establishment of youth conservation clubs, Protected Area visits for youth clubs, initiation of the development of environmental education curricula for primary schools and adults.

4.3.1 Implementation Status

During the first year, a series of awareness campaigns were initiated in Rumphi and Nkhotakota zones. However, activities related to social fencing and participatory law enforcement, etc., were pushed back to year two.

During year two, the Project began the process of recruiting community workers for training to support NRM institutions in law enforcement, training, and other needs. The Project established a target of 40 individuals, but only 20 had been recruited by the end of the year as recruitment was still in progress. A workshop on community mobilization and participatory law enforcement for Protected Area officials and their counterparts was planned for year three.

Nine additional community workers were recruited during year three to receive training to support NRM institutions. The workshop that was planned in the previous year for Protected Area officials and their counterparts was held, and 81 individuals were trained among Protected Area executives from the Nyika-Vwaza Association (NVA), NRCs, DNPW officials from Nkhotakota Wildlife Reserve, Vwaza Wildlife Reserve, and Nyika National Park, community policing forums, local judiciary, and law enforcement officers. The goal of the workshop was to provide a clearer

understanding of the issues, responsibilities, and roles of all stakeholders in addressing illegal resource use and poaching within Protected Areas.

4.4 Fire Prevention and Suppression Activities

The DNPW will develop jointly with the Associations a fire management plan, and implement fire management activities within the protected areas, including: installation of fire breaks, instituting early warning systems (e.g., use of mobile phones), clearing the forest of dead wood, discouraging fire for hunting, and warding off revenge-based fires. The project will implement a fire control and management plan campaign to increase understanding and awareness of the program.

Activities aimed at preventing and suppressing bush fires include:

- Provide Training and education within the conservation agriculture component on fire reduction;
- DNPW develops a fire management plan in collaboration with associations;
- Implementation of fire management activities inside of protected areas, including controlled burns, fire breaks, weed control, and fire management based on sound ecological principles;
- Implementation of a fire control and management campaign for communication and to increase awareness.

4.4.1 Implementation Status

With regard to preventing the establishment and spread of bush fires, conservation agriculture techniques play an important role by improving and retaining soil moisture and nutrients; this is especially critical in preventing and reducing fires that could be started outside of the Project Areas that have the potential to spread inside the Project Areas.

Fire reduction strategies and activities have been promoted through both the conservation agriculture and regeneration and tree planting components; promoted activities include the creation of fire break, as well as weed control. One way in which these activities are promoted is through community sensitization meetings on conservation agriculture, tree planting and regeneration. During the first monitoring period, the project consistently met or surpassed established targets for land maintained under conservation agriculture techniques. To date, there are 1,484.7 ha on which conservation agriculture practices have been implemented, compared with a cumulative target of 1,160 ha. The increase in hectares is attributed to a high level of interest in training in and implementation of these techniques. A similar trend can

be seen for new land specifically under soil and water conservation practices, with a total of 2,059.6 ha against a target of 1,271 ha.

The levying of penalties against those that start bush fires is essential to enforcing best practices in fire prevention and suppression. Co-management agreements between communities and DNPW have established penalties for setting fires within protected areas, which are further reinforced by responsibilities undertaken by local leaders to establish additional precedents for punitive actions at the village level. These include rules adopted by the community and included in the village by-laws, as well as village-level forest management plans that are signed off on by district commissioners, which give chiefs the formal support necessary to be able to impose penalties.

4.5 Reduced Fuelwood Consumption and Increased Energy Efficiency by Introducing Fuel-efficient Cookstoves

The project will deliver a fuel-efficient cookstove to every household to reduce fuelwood consumption. TLC has been promoting the fuel-efficient cookstove across its project sites for over 5 years (2004-2009) prior to the beginning of the first monitoring period, and has selected a particular design that is efficient, low-cost and uses readily available locally-sourced materials. The stove is constructed of mud and bricks and can be built in a convenient fireplace within traditional kitchens. The current design yields efficiency in terms of wood use ranging between 30-50%.

The ultimate goal is to improve the design to reduce wood use and/or increase efficiency by 50%. In this regard, TLC is working with other designers to produce a more efficient low-cost stove for rural households. Each stove is made by hand by the users; therefore only very interested parties are willing to bear the time-production cost. The stoves are stationary, and therefore built into the location to be used. Because the creation is time consuming and fuelwood conserved is so observable, stoves promoted by the project are adopted at a much higher rate than moveable metal stoves often provided by donors.

Activities to promote reduced fuelwood consumption and increased energy efficiency include:

- Training of trainers on construction and maintenance of cookstoves;
- Introduce improved kitchen stoves to reduce firewood consumption and impacts of deforestation in communities surrounding NV and NKK, including through community sensitization meetings.

4.5.1 Implementation Status

During the first monitoring period, the project established a cumulative goal of 5,000 households to be the recipients of improved cookstoves. Community sensitization meetings have taken place over the course of the monitoring period to promote adoption of this improved technology. During year two of the monitoring period, the project more than doubled this goal, with 10,485 households in 847 villages in Nyika-Vwaza, Ntchena Chena, and Ntchisi. Improved cookstove construction and use was also demonstrated during year two of the monitoring period at the Kulera Biodiversity and WADA joint project launch.

During the third year of the monitoring period, an additional 10,754 households in 669 Kulera sites received improved cookstoves. Training and extension support was also provided on their construction, use, and maintenance. An additional 6,255 cookstoves were adopted during year four, for a cumulative total to date of 27,494 improved cookstoves adopted.

4.6 Creation of Alternative Sources of Fuelwood through Agroforestry and Farm Woodlot Management

This set of activities focuses on creating an alternative source of fuelwood through agroforestry interventions, such as interplanting trees with crops that increase yields (e.g. *Faidherbia albida*) and the provision of fuelwood to local farmers.

In addition, under the Kulera Biodiversity Project, woodlots will be planted in communal village areas to produce fuelwood. Similarly, the management of existing woodlands will be improved through workshops and capacity building sessions. The increase in biomass in woodlots and improved woodlands is accounted for in a different carbon project (see Kulera Woodlots PD). However, the effects on the protected forest areas from a reduction in fuelwood collection due to the existence of woodlots and woodlands is accounted for in the REDD project.

Activities to create alternative sources of fuelwood include the following:

- Community sensitization and training on nursery creation and management, and outplanting;
- Village-level nurseries established and maintained in communities surrounding NV and NKK;
- Outplanting of seedlings, and;
- Community management of natural woodlots

4.6.1 Implementation Status

Central to achieving progress under this project activity during the first monitoring period has been defining the area size and key activities in avoided deforestation, forest management of woodlands and woodlots, and agroforestry with *F. albida.* This process began in year one and was fully completed during year three, allowing for improved harmonization of activities aimed at creating alternative sources of fuelwood.

During the first monitoring period, there was significant progress achieved in relation to tree planting, nursery establishment, and outplanting of seedlings. During the first year, the Project established a target of 1,000,000 trees planted to impact 10,000 households. 876,128 trees were ultimately planted during year one, impacting 2,801 households in Nkhotakota and Rumphi zones. During year two, the Project once again established a target of 1,000,000 trees planted to impact 10,000 households. 1,208,266 trees were planted, and 7,837 households were impacted. Over years one and two of the Project, a cumulative total of 2,084,394 trees were planted, impacting 10,638 households. The year three target for trees planted was significantly more ambitious than the previous two years of the Project; 11,000,000 trees planted to benefit an additional 10,000 households. During year three, the Project planted 6,344,511 trees across 21,222 households. Bamboo starts in particular were scare and were thus given maximum attention, while some non-bamboo seedlings were not able to be outplanted due to mortality in some nurseries. Overall, the Project to date has planted 8,428,905 trees, which has impacted 31,860 households.

The Project has also had success in catalyzing community management of natural woodlands during the first monitoring period, due in part to a high level of willingness by communities to manage these areas as the Project has progressed. During year one, progress was nominal, with 132 ha of land being placed under management by 53 communities. A target of 1,000 ha managed by 100 communities was set for year two. The Project achieved an additional 446.9 ha of land under management by 149 communities. In year three, 2,794 ha were targeted for community management by 216 communities. While the Project fell short of achieving the targeted number of hectares, with an additional 335 ha during year three, the project vastly exceeded the targeted number of communities based on a final household count of 40,668. These outcomes are attributed to the fact that while plots per household were smaller, on average, than anticipated, the number of households involved in community management far surpassed the target. To date, the Project has achieved a cumulative 913.9 ha of natural woodlands under community management.

Community management of natural woodlands was also supplemented during the third year of the Project through training and extension support on nursery management and natural woodland regeneration. The Project trained 10,154 farmers against a year three target of 35,000.

4.7 Sustainable Intensification of Agriculture on Existing Agricultural Lands

Agricultural intensification activities are essential to improving productivity of agricultural lands and increasing the yields of crops supported by those lands. Distributing higher-yield varieties of crops grown locally, such as cassava, results in faster maturation times over traditional varieties. Improving irrigation access and efficiency promotes more productive irrigation seasons that support a higher diversity of crops, with as many as three crops supported per year. Resulting improved water efficiency and residual soil moisture due to irrigation interventions also improves agricultural yields, while the distribution of pumps reduces the opportunity costs associated with other methods of water collection. Conservation agriculture techniques also improve the viability and yield of vegetable crops, as well as improve residual soil moisture and nutrient content. The Kulera project will promote an increase in productivity and agricultural yields on existing agricultural lands through the following activities:

- Community sensitization meetings focused on the use and installation of treadle pumps and other irrigation methods to produce vegetables;
- The distribution of higher-yielding, improved cassava bundles, and;
- Encouraging the adoption of conservation agriculture techniques, including the use of herbicides, weed reduction, and the enhancement of soils;

4.7.1 Implementation Status

The Project has taken steps to engage communities in activities related to sustainable intensification on existing agricultural lands during the first monitoring period. During the first year, interventions were primarily focused on irrigation, targeting 250 ha and 2,000 households as beneficiaries of improved irrigation techniques. A total of nine hectares was under irrigation with Kulera funding at the close of the first year, with 64 households impacted by these new projects. During the fourth quarter, treadle pumps were procured, distributed, and installed.

During the second year, the Project once again targeted 250 ha of land for irrigation interventions, and increased the targeted number of households to 2,500. Through a combination of stream diversion and treadle pumps, the Project added an additional 46.2 ha under irrigation, impacting 361 households (26.2 ha treadle and 20 ha

stream diversion, respectively). In addition to these interventions, Renewable Energy Solutions (RES) provided a three week consultancy focused on RAM pumps and stream diversion irrigation technologies in Rumphi Zone.

During year two, the Project also began activities to address crop diversification through the planting of cassava, groundnuts, beans, and soy beans. Though the Project targeted 500 ha for diversification impacting 1,000 households during year two, a total of 133.6 ha were ultimately planted, impacting 3,292 households.

Soil and water conservation activities under the 'conservation agriculture' umbrella also began during year two. 50 ha and 1,000 households were targeted to benefit from these strategies, which included the application of organic manure, interplanting with soil-improving trees, intercropping with perennials, and the planting of fallows and vetiver grasses. These strategies have the benefit of decreasing erosion through increasing infiltration capacity and residual soil moisture, as well as through the improvement of soil health via increased soil nutrient content. During year two, the Project vastly exceeded its target outputs. 677.8 ha of land were managed under soil and water conservation strategies, impacting a total of 2,378 households.

During year three, some of the targets for irrigation and crop diversification were deemed to be unrealistic based on the outcomes of some of these interventions. 323 ha were targeted for improved irrigation technology, while just 68 ha were added during this period. 362 households were impacted against a target of 2,152. During the third year, two RAM pumps were installed in Rumphi to provide irrigation for crop diversification. Targets for total crop diversification across all crop types were not established for year three, but the Project exceeded targets established for soy beans, groundnuts, maize, and cassava. A total of 177.7 ha were targeted to be planted with beans, but this target was deemed to be unrealistic and only five hectares were ultimately planted. Targets, results and completion status for crops planted during year three can be viewed in the following table:

Crop	Year 3 Target	Year 3 Achieved	Complete?
Beans	177.7 ha	5 ha	no
Groundnuts	133.25 ha	201.35 ha	yes
Maize	322.24 ha	344 ha	yes
Soy beans	133.25 ha	433 ha	yes
Cassava	300 ha	433.1 ha	yes

Table 5. Area placed under cultivation by target crops during Year 3

The Project also exceeded its established targets for soil and water conservation. 1381.8ha and 4,316 households benefited from soil and water conservation techniques, against targets of 1,221 ha and 2,121 households, respectively.

4.8 Development of Local Enterprises Based on Sustainably Harvested NTFPs, Such as Honey, Coffee, Macadamia, and Livestock

The development of rural enterprise through the promotion of ecotourism activities and the production, processing and marketing of sustainably produced non-timber forest products is critical to transforming livelihoods away from subsistence and improving rural livelihoods through increased self-sufficiency. The NTFPs being most heavily promoted include honey, coffee, and macadamia. Small livestock husbandry is also an important skill for diversifying and increasing protein sources available in communities while reducing hunting pressure and encroachment on protected areas.

Activities to support the development of local enterprise based on ecotourism and sustainably harvested NTFPs include:

- Promote the development of new eco-tourism sites and projects;
- Collaborate with Wilderness Safaris to organize ecotourism activities in and around Protected Areas;
- Provide training to local communities, including community sensitization meetings, on the construction and management of beehives for honey production;
- Purchase and distribute apiary equipment to households in the Project Area;
- Identify markets for the sale of local honey produced from NRMAs, and facilitate the distribution and sale of honey;
- Conduct community sensitization meetings in agriculturally appropriate areas, such as Ntchena Chena and Ntchisi, on the benefits of coffee production;
- Conduct extension work with farmers in order to teach them how to produce and maintain seedling outplants and coffee plants;
- Assist smallholder farmers in finding markets for their products;
- Conduct community sensitization meetings in agriculturally appropriate areas, such as Ntchena Chena and Ntchisi, on the benefits of macadamia production;
- Establish and maintain regional nurseries;
- Carry out extension work with farmers on the production and maintenance of macadamia seedling outplants and macadamia trees;

- Assist smallholder famers in finding markets for their products, and;
- Provide training through extension services in animal husbandry and animal health

4.8.1 Implementation Status

Year 1

Before being able to focus on enterprise development through the identification and sustainment of markets, the Project needed to provide support for the production of sustainable NTFPs through the procurement and distribution of materials, as well as through trainings and sensitization meetings. During the first year of the monitoring period, the Project promoted beekeeping and honey production alongside coffee production. The Project procured and distributed 400 beehives, suits and smokers to 40 farmers, meeting its target for year one. The Project also planned to have two training sessions on beekeeping to benefit 40 farmers. Mzuzu Coffee, a cooperative union of coffee producers, conducted training on beekeeping that was attended by 68 farmers.

Year one activities aimed at coffee producers included training for farmers and staff, maintenance of a mechanized hand pulper, and the formulation of a board of trustees for the coffee cooperative, which was facilitated by Mzuzu Coffee. Mzuzu Coffee also promoted the creation of five zonal boards and 12 business center boards.

Activities promoting small livestock interventions during the first year included sensitization meetings, staff training, the creation of farmer contract agreements, farmer group formation and training, and familiarization visits by staff to Kulera project sites. Training manuals for viable livestock species in Malawi were prepared for distribution. The Project also briefed village umbrella committees (VUCs) and village development committees (VDC) on the Kulera project. The Project achieved its target of three familiarization visits to Project sites, as well as its target of four briefings for VUCs and VDCs.

During year one, 453 farmers attended sensitization meetings. Four staff training sessions were planned but just one was completed; 17 staff members were trained in piggery, poultry, and goats. 2,000 farmers had been previously identified for possible participation in the livestock component of the Project, but due to first year procurement restrictions on livestock and the desire to avoid disappointment on the part of the farmers, 650 farmers were selected to go ahead with their participation in this component.

Committees for livestock were formed that are similar to those formed for coffee producers, with 23 out of 50 targeted committees created and trained during the

first year. Farmers chosen to participate in the livestock component received training in animal husbandry and the construction of *kholas*, or stockades for livestock.

There was no progress to report regarding macadamia production or enterprise development during the first year of the monitoring period.

Year 2

During year two, the Project continued the promotion of beekeeping by training an additional 134 farmers in two sessions. The Project also aimed to double its distribution of apiary equipment to farmers but was 25% short of its goal, providing 300 hives to 30 additional farmers. Extension support services began more earnestly during year two, particularly those directed at beekeepers and coffee producers. In total, seven monthly visits were conducted, as well as 11 review meetings.

The Project supplied 194 kgs of coffee seeds with a 95% germination rate during the second year, resulting in a total of 432,032 seedlings planted in farmers' fields. One eco-pulper was procured and installed. 503 farmers were trained in coffee husbandry and business development, with a total of 13,869 farmers receiving training and extension support. A variety of other trainings and meetings also took place during the second year, including: a field day with the Ntchisi Mountain Business Zone; one board meeting; one annual general meeting (AGM) for the coffee growers' cooperative; six zonal AGMs, and; 21 business center AGMs. The Ntchisi cooperative is now registered with 155 members, 65 of whom have bought shares in the cooperative.

The viability of smallholder macadamia producers and the market for their products was investigated during year two through efforts from Renewable Energy Solutions (RES) and Washington State University's Dr. Tom Byers. RES developed a business plan to create organizational sustainability for the Highlands Macadamia Cooperative Union Ltd. (HIMACUL), an association of macadamia producers in Malawi. RES also conducted research and made recommendations related to value-added interventions for smallholder macadamia producers. A separate value chain analysis was conducted by Dr. Byers, which indicated that viable markets for macadamia products are "significant," resulting in a recommendation that Project funding be more directly leveraged for macadamia production in year three.

A variety of activities to promote small livestock production took place during the second year, including a baseline study on livestock production in all Project sites, the results of which are available in the Kulera Socio-Economic Baseline Survey. The Project established a goal for three sites around the four Protected Areas to be the focus of the baseline studies; during year two and over the course of the Project to date, just one baseline study has been conducted. Complimentary to this baseline

study was the evaluation and documentation of local extension services for livestock, including the availability of veterinary medicine. The Project targeted five areas around the four Protected Areas but produced just one baseline study. The results of the extension service baseline study are also available in the Kulera Socio-Economic Baseline Survey.

In addition to the 650 farmers selected from the group of 2,000 for participation in the livestock component during the first year, the Project targeted an additional 2,500 farmers for participation during year two. With guidance from the Department of Parks and Wildlife (DNPW) and the local communities, the Project identified and selected an additional 500 farmers based on established criteria, for a Project total to date of 2,500 farmers. The Project also supported the creation and training of an additional 44 livestock committees for a cumulative total of 67 committees at the close of year two. 11 committees were formed with a focus on pigs, 19 with a focus on goats, and 37 with a focus on poultry. In addition to these three types of livestock, training was also carried out on rabbit husbandry and care, as well as different aspects of livestock management such as feeding, housing, parasites and disease control, and breeding. 1,206 farmers were trained in these topics during year two, for a cumulative total of 1,856.

Year 3

During year three, HIMACUL successfully bought 218.5 liters of cooperative-produced honey and sold it locally, surpassing the year three goal of 200 liters. Local household consumption of cooperative-produced honey was very high, but a lack of hives to accumulate large volumes of honey hindered regional and national marketing opportunities for this product. This was partially addressed through the distribution of an additional 760 hives, 13 suits, and 14 smokers. Three courses were held on beekeeping and attended by 207 participants. The potential for a honey-based micro-, small- and medium-enterprise (MSME) was further explored during year three, with continued support from Kulera partners HIMACUL and RES.

The third year of the Project exceeded all of its goals related to coffee production and processing, with 557 coffee farmers trained in coffee husbandry and business during seven courses and eight community demonstrations. Two farmer field days and open days were also conducted. An additional 24 farmers were trained in monitoring and evaluation (M&E). Seven review meetings were conducted over the course of the year. 74 growers were trained in two courses on improved coffee processing.

Mzuzu Coffee and the Project also facilitated the production of 2,402,024 coffee seedlings, more than doubling its third year target. One census was also conducted

in order to determine the levels of mortality for out planted coffee seedlings. Two courses on cooperative development and management were also held, and were attended by 273 farmers.

The Project also diversified its interventions directed at coffee growers and beekeepers during this year by working with 28 existing local organizations in Ntchisi on issues related to gender, HIV/AIDS, and disaster risk reduction (DRR).

Macadamia production and processing activities were fully underway in year three, with the goal of increasing the volume of macadamia produced, as well as strengthening the governance and technical capacity of the cooperatives and increasing the range of value chains being utilized by smallholder macadamia producers. The Project more than tripled its target for root stock production by propagating 170,500 kg in nurseries throughout the Project zones. Field grafting teams were created and trained, with 95 people participating in four training sessions. Across Rumphi and Ntchisi zones, a total of 47,884 rootstocks were grafted.

19 trainings were held on macadamia tree and orchard management, which were attended by 1,255 participants. An additional five sessions were held on sustainable farming practices for macadamia farmers, which were attended by 55 individuals. The Project more than doubled the targeted number of macadamia trees to be planted, with a total of 81,988 planted during year three. 28 demonstration plots for intercropping of macadamia and coffee were also established in Ntchisi and Rumphi.

The Project established a test target for Macadamia oil processing of 75 liters; a total of 181 liters were processed during year three given the expeller technology available, but a larger expeller will be required to increase production efficiency and the volume of oil produced. In order to market macadamia kernel and sub-products like oil, three potential markets were explored. HIMACUL helped macadamia producers connect to the international market by facilitating a link between farmers and Germany's El Puente.

Small livestock promotion continued in year three. An additional 23 livestock committees were formed and trained, and training of farmers in piggery, poultry, and goat production is ongoing, with 2,270 individuals trained in the third year. *Khola* construction for different livestock classes was demonstrated on 37 different occasions. Through the use of loan schemes, additional heads of livestock (104 pigs, 4,340 chickens, 275 goats) were procured and distributed to farmers. The demand for chickens in particular has remained very high for the duration of the Project. While some Malawians in the Project Area had never been exposed to goats prior to the Project, the low capital investment required and the ease of care have also made them popular.

660 farmer agreements regarding animal care and cooperation with other farmers were developed and signed during the third year, for a Project total to date of 1,113 agreements. Training on feeding, veterinary care, and diagnosis of common diseases was conducted for 2,270 farmers. 26 club committees were also established in order to improve farmer access to veterinary services and medication for their livestock.

Lastly, fodder material was planting and fodder banks established in Rumphi, Nkhotakota and Ntchisi. 10,700 sticks of planting material for Napier grass and other fodder species were procured, and 1,750 fodder banks were established. 12.5 ha in the Project Areas were treated with manure as a benefit of livestock production.

The success of NTFP development during the third year had a positive impact on enterprise development. A value chain study was completed through a joint effort between Washington State University and RES., and 8,013 farmers were trained in microenterprise production and processing with the help of HIMACUL, Mzuzu Coffee, and the Small-Scale Livestock Production Program (SSLPP). An additional 107 entrepreneurs and 50 groups were trained in business skills and marketing. The sustainable harvest and use limits for honey and macadamia were explored, and three potential ventures were explored by HIMACUL and RES for honey, macadamia, and oil extracted from groundnuts and macadamia.

5 Status of CCB Standards

5.1 G1: Project Goals, Design and long-term Viability

5.1.1 G1.1 Project Proponent

The Project proponents, as listed in the Executive Summary of the CCB PD, have no changed during the course of the first monitoring period.

5.1.2 G1.2 Climate, Community and Biodiversity Objectives

The climate, community and biodiversity objectives outlined in Section 1.3.1 of the CCB PD have not changed during the first monitoring period.

5.1.3 G1.3 Project Location and Social and Physical Parameters

The location of the Project Areas have remained the same, and no new Project Areas or communities have been added to the Project during the first monitoring period. Changes to social and physical parameters against the baseline that have occurred during the first monitoring period can be viewed in Sections 7 and 8 of this document.

5.1.4 G1.4 Project Area and Project Zone Boundaries

The Project Area and Project Zone boundaries have remained unchanged during the first monitoring period.

5.1.5 G1.5 Stakeholder Identification Process and G1.6 Stakeholders Identified

The stakeholders identified through the process described in Section 5.1.5 have remained unchanged during the first monitoring period.

5.1.6 G1.7 Map of Project Area(s)

The maps provided in Section 1.1.1.1 of the CCB PD are unchanged.

5.1.7 G1.8 Project Activities and Expected Climate, Community and Biodiversity Outputs, Outcomes and Impacts

The Project Activities presented in Section 1.3.2 of the CCB PD, as well as the expected climate, community, and/or biodiversity outputs, outcomes and impacts detailed therein, have not changed during the first monitoring period.

5.1.8 G1.9 Project Start Date, Lifetime, and GHG Accounting Period

The Project start date, lifetime, and GHG accounting period described in Section 1.3.4 of the CCB PD were unchanged during the first monitoring period.

5.1.9 G1.10 Natural and Human-induced Risks and Mitigation Efforts Undertaken

Changes in regard to the natural and human-induced risks outlined in Section 1.3.5 of the CCB PD are briefly described below. The Project Activities detailed in Section 1.3.2 of the CCB PD are intended to mitigate some of these risks; the results for each Project Activity are available in the climate, community and biodiversity impact monitoring sections of this document.

5.1.9.1 Human-induced Risks

5.1.9.1.1 Community adoption Risk

Thanks to the implementation of Project Activities within Project communities and extensive community engagement and consultation in the Project design and implementation process, community adoption risk has been lessened. This is attributed to successful and wide-spread adoption of interventions aimed at reducing deforestation, such as improved cookstoves, as well as the development and implementation of alternative livelihood activities.

5.1.9.1.2 Government Approval Risk

Government approval risk has been decreased during the first monitoring through the receipt of approvals from the government entity, as well as the signing of agreements with the DNPW and the NVA.

5.1.9.1.3 Enforcement Capacity in Protected Areas

Risks related to enforcement capacity in Protected Areas have been lessened during the first monitoring period through the mobilization and training of additional community members, as well as through capacity building among park rangers.

5.1.9.1.4 Policy Effectiveness

The Project has been able to mitigate some of the risk related to policy effectiveness by clarifying roles and responsibilities in the natural resource management process through REDD+ agreements between DNPW and community associations, as well as strengthening co-management agreements.

5.1.9.2 Natural Risks

5.1.9.2.1 Fire

Fire risk is one of the natural risks that the Project Activities addressed and mitigated during the first monitoring period. The Project is unable to fully mitigate the larger factors driving fire risks, such as prolonged periods of drought that contribute to wildfires, though Project Activities aimed at improving natural resource and fire management practices have been able to reduce this risk somewhat.

5.1.9.2.2 Extreme Weather

The risk of extreme weather in the Project Area is in part driven by larger global climate systems. Droughts in particular have been problematic throughout Malawi, as well as in the Project Area, though just two droughts were experienced in the last 50 years. As such, no risk score was assigned to the Project Area related to extreme weather, and thus no change has occurred with regard to mitigation activities or their impacts.

5.1.9.2.3 Geological Risk

The Project Area is positioned in a region subject to minimal risks of loss arising from earthquakes. As a result, the risk score of 0 was assigned to geological risk in the VCS Risk Buffer, and as such, no changes have taken place during the first monitoring period with regard to mitigating geological risk.

5.1.10 G1.11 Measures Taken to Maintain and Enhance Climate, Community and Biodiversity Benefits beyond the Project Lifetime

Several of the planned Project activities permanently enhance and support the incomes of Project households. For example, there are long-term contractual agreements (i.e. the co-management agreements) in place between the DNPW and the Community Associations that will be strengthened and renewed on an on-going basis beyond the Project's lifetime. In addition, the Project is designed to become self-sustaining over the long-term by developing local enterprises, such as honey, coffee, macadamia and small livestock for breeding, as well as attracting ecotourists to the Project Areas.

Deforestation mitigation activities, such patrolling, social fencing and maintenance of forest boundaries, will also continue beyond the lifetime of the Project, as many of these activities do not rely entirely on revenue from the sale of emission reductions. For example, the Project has provided training and capacity building during the first monitoring period that will be valuable beyond the life of the Project. Communities will be able to engage in participatory forest protection (e.g. "social fencing"). Once these institutional structures are in place and strengthened, Community Associations will be able to oversee and enforce co-management of the Protected Areas and stimulate sustainable forest stewardship over forest resources.

Further, the Project trained rural communities to undertake activities that promote self-reliance, build resilience, improve food security and open up new opportunities for wealth creation. Some of these interventions include conservation agriculture, creating alternative sources of fuelwood through agroforestry and farm woodlots, and reducing fuelwood consumption through introduction of fuel efficient cookstoves.

5.1.11 G1.12 Financial Mechanisms Adopted and Flow of Funds

Project implementation budgets for the 30 years of the Project life plus 30 more years for maintaining carbon stocks from previously issued credits have been developed for the Project covering all the Project Activities. These are combined with the projected revenue from the Project to provide the annual cash flow estimated from the project.

5.1.12 G1.13 Identify Any New Project Areas and/or Communities Added to the Project

During the first monitoring period, no new Project Areas or communities were added to the Project.

5.2 G2 Without-Project land use scenario and Additionality

5.2.1 G2.1 Most Likely Land-use Scenario in Absence of the Project

Please see Section 1.2.1 of the CCB PD.

5.2.2 G2.2 Project Benefits that would not have Occurred in Absence of Project

Please see the additionality section of the CCB PD (Section 1.2.2).

5.3 G3: Stakeholder Engagement

5.3.1 G3.1 Access to Documentation by Community Members

Please see CCB PD Section 1.3.8.

5.3.2 G3.2 Publicizing costs, Risks and Benefits to Communities

Please see Section 1.4.6 of the CCB PD. This process has not changed during the first monitoring period.

5.3.3 G3.3 Access to Information on the Validation and Verification Process

Please see CCB PD Section 1.3.8.

5.3.4 G3.4 Community Consultation on Project Design and Implementation

Please see Section 1.3.8 of the CCB PD.

5.3.5 G3.5 Direct Consultation with Communities or their Legitimate Representatives

Please see Section 1.3.8 of the CCB PD.

5.3.6 G3.6 Enabling Participation of Communities

Please see Section 1.3.8 of the CCB PD.

5.3.7 G3.7 Non-discrimination and Anti-sexual Harassment Measures

Please see CCB PD Section 1.4.6.

5.3.8 G3.8 Addressing Grievances

This process has not changed during the first monitoring period. Please see CCB PD Section 1.3.10.

5.3.9 G3.9 Plan to Provide Orientation and Training to Project Employees and Relevant Community Members

Please see CCB PD Section 1.4.3.

5.3.10 G3.10 Equal Opportunity

Please see CCB PD Section 1.4.4.

5.3.11 G3.11 Relevant Laws and Regulations Covering Workers' Rights

Please see CCB PD Section 1.4.5.

5.3.12 G3.12 Assessing and Minimizing Risks to Workers' Safety

Please see Section 1.4.6 of the CCB PD.

5.4 G4: Management Capacity

5.4.1 G4.1 Governance, Roles and Responsibilities of Entities Involved in Project Design and Implementation

The Project proponents and their respective roles and responsibilities have not changed during the first monitoring period. Please see Section 1.4.1 of the CCB PD.

5.4.2 G4.2 Identification of Key Skills and Experience of Management Team

Please see Section 1.4.2 of the CCB PD.

5.4.3 Financial Health of the Implementing Organization(s)

Please see Section 1.4.7 of the CCB PD.

5.5 G5: Legal Status and Property Rights

5.5.1 G5.1 Land Tenure and Use

Information on legal status and property rights is available in Section 1.5 of the CCB PD. The Project has also incorporated specific Project activities aimed at strengthening land tenure (Section 1.3.2.1 of the CCB PD).

5.5.2 G5.2 Documented Consultations and Agreements

5.5.2.1 Project will not Encroach on Private, Community or Government Property

Please see Section 1.5.3 of the CCB PD.

5.5.2.2 Free, Prior and Informed Consent has Been Obtained Where Necessary

Community consent and support for the Project is maintained through agreements with the Community Associations, which also reduces community adoption risk. Please see Section 1.3.5.1.1 of the CCB PD.

5.5.2.3 G5.3 No involuntary Removal or Relocation

Please see Section 1.5.4 of the CCB PD.

5.5.3 G5.4 Illegal Activities that could Affect Climate, Community and Biodiversity Impacts

Please see Section 1.5.5 of the CCB PD for ways in which illegal activities have been identified and mitigated.

5.5.4 G5.5 Unresolved or Ongoing Disputes and Demonstration that Project Activities will not Prejudice Outcomes

Though tension or conflicts between parks and communities occurs throughout Africa, and Malawi is no exception, there were no notable unresolved or ongoing disputes whose outcome the Project could potentially influence. Encroachment of wildlife onto property outside of parks and Protected Areas remains an issue, as wildlife is not constrained to a particular area, but Project activities focused on education and other strategies are intended to reduce this tension.

5.5.5 G5.6 Relevant National and Local Laws

Please see Section 1.5.1 of the CCB PD.

5.5.6 G5.7 Authority Approval

Please see Section 1.5.2 of the CCB PD.

5.5.7 G5.8 Ability to Claim Project Benefits

Please see Section 1.5.6 of the CCB PD.

5.5.8 G5.9 Avoidance of Double Counting

Please see Section 2.1.5 of the CCB PD.

6 Climate Section

6.1 CL 1Without-Project Climate Scenario

6.1.1 CL1.1 GHG Emissions, Including Carbon Pools

Table 6 shows baseline emissions from 2009 to 2012 based on the requirements of the methodology as reporting in the PD.

Table 6. Baseline Emissions during Monitoring Period

Nyika		Nkhotakota		Vwaza		Total	
YEAR	Estimated baseline emissions or (removals) (tCO2e)	YEAR	Estimated baseline emissions or (removals) (tCO2e)	YEAR	Estimated baseline emissions or (removals) (tCO2e)	YEAR	Estimated baseline emissions or (removals) (tCO2e)
2009	174,537	2009	141,774	2009	74,211	2009	390,522
2010	182,324	2010	154,875	2010	76,611	2010	413,810
2011	190,700	2011	163,578	2011	79,661	2011	433,939
2012	196,011	2012	172,145	2012	82,495	2012	450,651
Total	743,572	Total	632,372	Total	312,978	Total	1,688,923

6.2 CL 2Net Positive Climate Impacts

6.2.1 CL2.1 GHG Emissions under Project Scenario

Table 7 shows actual GHG emissions or removals observed after project implementation (ex-post) from 2009 to 2012. Negative numbers represent small net regeneration in the Project Areas. Table 8 shows a summary of GHG Emission Reductions and Removals.

Table 7. Ex-Post Project Emissions or (Removals) during the Monitoring Period

Nyika		Nkhotakota		Vwaza		Total	
YEAR	Ex-Post Project emissions or removals (tCO2e)	YEAR	Ex-Post Project emissions or removals (tCO2e)	YEAR	Ex-Post Project emissions or removals (tCO2e)	YEAR	Ex-Post Project emissions or removals (tCO2e)
2009	77,489	2009	13,864	2009	24,385	2009	115,738
2010	81,337	2010	14,788	2010	26,030	2010	122,155
2011	85,185	2011	15,711	2011	27,676	2011	128,572
2012	89,033	2012	16,635	2012	29,322	2012	134,990
Total	333,043	Total	60,998	Total	107,413	Total	501,455

Table 8. GHG Emission Reductions and Removals

YEAR	ΔGHG from avoided DF	ΔGHG from DF due to leakage	ΔGHG from improved cookstoves	NER	Risk Buffer	Buffer	VCU
	[tCO2e]	[tCO2e]	[tCO2e]	[tCO2e]	[%]	[tCO2e]	[tCO2e]
2009	262,158	0	0	262,158	10.00	(26,216)	235,942
2010	277,935	0	33,355	311,290	10.00	(27,794)	283,496
2011	290,805	0	60,476	351,281	10.00	(29,081)	322,200
2012	300,218	0	64,929	365,147	10.00	(30,022)	335,125
Total	1,131,116	0	158,759	1,289,875	10	(113,112)	1,176,764

6.2.2 CL 2.2 Demonstrate Net Positive Climate Impacts

Please see Section 2.1 of the CCB PD.

6.3 CL3 Offsite Climate Impacts

6.3.1 CL3.1 Leakage

Please see Section 2.2 of the CCB PD.

6.3.2 CL3.2 Leakage Mitigation

Please see Section 2.2.2 of the CCB PD.

6.3.3 CL3,3 Non-CO_2 Emissions

Please Sections 2.1.2 and 2.2.4 in the CCB PD.

6.4 CL4 Climate Impact Monitoring

The following carbon pools have been selected for monitoring. Non-CO2 GHGs have been conservatively excluded from monitoring as they are expected to be less than 5% of total CO2 equivalent benefits generated by the project.

Table 9. Summary of carbon pools monitored

Carbon Pool	Included	Justification/ Explanation of Choice
Aboveground tree biomass	Yes	Major carbon pool affected by Project Activities
Aboveground non-tree biomass	Yes	Expected to increase from Project Activities
Belowground biomass	Yes	Major carbon pool affected by Project Activities
Dead wood	Yes	Major carbon pool affected by Project Activities
Litter	No	Excluded as per VCS AFOLU requirements
Soil organic carbon	Yes	The conversion of forest to small-scale agriculture, as well as fires which lead to conversion to agriculture, are major drivers of deforestation. These agricultural systems in the baseline are primarily conversion, annual and bi-annual cropping including maize and cassava.
Wood products	No	Major carbon pool affected by Project Activities

Table 10: Climate impact monitoring parameters

Type of Measurement	Sampling Method	Indicator	Frequency
Within the biomass plots, the following will be monitored: 1) live trees, 2) canopy cover, 3) standing dead trees, 4) lying dead trees, 4) SOC, 5) seedlings, 4) non-tree biomass.	Biomass Inventory. *For more information, see the Biomass SOP*	Mg DM per hectare in each stratum, and forest health data	Monitored at every verification
Historical LULC and forest strata transition matrix in reference region	Remote Sensing	Hectares of each stratum	Once at validation (and at baseline reset)
Hectares undergoing transition within the project area, under the project scenario	Remote Sensing	Hectares of each stratum	Monitored at a verification event
Hectares undergoing transition within the leakage area under the project scenario	Remote Sensing	Hectares of each stratum	Monitored at a verification event
Hectares undergoing transition within the leakage area under the baseline scenario	Remote Sensing	Hectares of each stratum	Monitored at a verification event
Net Emission Reductions	Numerous data inputs and models	Tons of CO_2e	Each verification period

The following CCB climate indicators are also a part of the PMP. Some of these indicators are also covered under the VCS monitoring reports, and it should be noted that additional indicators will be added, as appropriate, in subsequent monitoring periods.

Table 11: Project level climate indicators

Indicator	Measured Impact
Indicator 1.4:Number of hectares under improved natural resource management as a result of USG assistance	Definition: "Improved NRM" includes activities that promote enhanced management of natural resources for one or more objectives, e.g. woodland management, mitigating climate change, and/or promoting sustainable agriculture, etc. Unit: ha
Indicator 2.11:Number of carbon projects developed	Definition: Project activities dealing with Agriculture, Forestry and Other Land Use (AFOLU) will be assessed for their potential to generate carbon credits. These activities may be eligible for registration and implementation under a recognized carbon market standard Unit: #
Indicator 2.12:Quantity of greenhouse gas emissions (GHG), measured in metric tons of CO2 equivalent, reduced or sequestered as a result of USG assistance	Definition: The amount of emissions, in metric tons of carbon dioxide equivalent (CO2e), which is reduced or sequestered as a result of USG programs in natural resource management, agriculture, biodiversity, energy, industry, urban and transport sectors. Relevant greenhouse gases are: CO2, methane, perfluorocarbons, hydrofluorocarbons, sulphur hexafluoride, and nitrous oxide. Unit: Metric tons CO2 equivalent (annual)

6.5 GL1 Climate change adaptation benefits

Please see Section 5.1 of the CCB PD.

7 Community Section

7.1 CM1 without Project Scenario

Please see CCB PD Section 1.2.4.

7.2 CM2 Net Positive Community Impacts

Please see Section 3.1 of the CCB PD.

7.3 CM4 Community Impact Monitoring

Monitoring used to measure the Project's impact on community livelihoods is designed to address specific monitoring targets and indicators set out in the CCB Monitoring Plan. A summary of these expected impacts, benefit area, and relevant indicators is available in Table 12. Please see the Kulera Biodiversity Project Year 4, Quarter 3 Technical Report April-June 2013 for a narrative of monitoring results. Indicators and their results at the conclusion of the first monitoring period are reported below in Table 13. It should be noted that additional indicators will be added, as appropriate, in subsequent monitoring periods.

Table 12. Expected community impacts and indicators

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
Formalized and democratically elected management structure to represent villages around Protected Areas under Community Associations	Community	• Successful election of officials to the Community Associations and registration of the entity
Formal inclusion of DNPW and communities in a VCS/CCB emission reduction REDD+ project and increased funding to support implementation according to the Project plan	Community	• Spatially defined and recognized protected area boundaries (recorded under VSC registry with shape files) • 3rd party audited accounting for emission reductions (VCS monitoring reports) • # of emission reductions generated by project (VCS monitoring reports) (indicator 1.4, 2.11, 2.12) • $$ of revenue from sale of emission reductions (transactional records) • Benefit sharing plan is developed for project, beyond benefits distributed through the activities supported under the Project Implementation Plan
Legally enforceable roles and	Community	• REDD+ agreement is signed and enforce

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
responsibilities to implement Project activities between Project partners		• Number of laws, regulations or agreements to promote sustainable NRM (indicator 1.7) • # of households receiving benefits (non-monetary such as technical, grants, training, inputs and monetary) under the REDD+ (indicator 1)
Legally recognized relationship between the DNPW and the communities to manage Protected Areas	Community	• # signed co-management agreements (Indicator 1.6)
Formalized dispute resolution process between DNPW and communities around Protected Areas	Community	• # of disputes handled under the terms of the Co-management agreements (managed/monitored per Section 5 of Co-management agreement and recorded by project partners under the grievance process which is summarized in the CCB monitoring plan Section 1.6)
Collective recognition between DNPW and communities of the Protected Area boundaries	Community	• # disputes or conflict in boundary, access or use rights (managed/monitored per Section 5 of Co-management agreement and recorded by project partners under the grievance process which is summarized in the CCB monitoring plan Section 1.6)
Increased level of community education on the value of sustainably managed forests.	Community	• (HH Survey K6)
Increased community participation in Protected Area governance by having a clearer understanding of the issues, responsibilities, and roles of all stakeholders and participate in addressing illegal resource use and poaching within Protected Areas	Community	• # of community workers that are trained to support NRM institutions in law enforcement, training, and other needs (Indicator 1.5 and 2.1) • # of NRM committees within villages formed (HH surveys J13 and J14)
Reduced fuel wood usage from unsustainable sources	Community	• # cookstoves adopted (indicator 2.9) • % HH using cookstoves (HH survey J2)
Improved respiratory health from decreased particulate matter	Community	• # cookstoves adopted (indicator 2.9) • % HH using cookstoves (HH survey J2)
Reduced time spent gathering fuel wood	Community	• # times fuel wood is gathered in 12 months (HH survey J6)

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
		• Distance and time to collect fuel (HH survey (J7 and J8)
Increased sources of sustainable fuel wood	Community	• # hectares of village woodlots
Reduced time spent gathering fuel wood	Community	• # times fuel wood is gathered in 12 months (HH survey J6) • Distance and time to collect fuel (HH survey (J7 and J8)
Increased capacity to adopt conservation agriculture practices	Community	• # HH that have received training for crop diversification, irrigation, conservation agriculture (indicator 2.1)
Increased hectares and farmers using one or more conservative agricultural practices	Community	• # hectares (indicator 2.4) • # farmers (indicator 2.2)
Adoption of new conservation agriculture technologies adopted	Community	• # of new technologies
Increased crop diversification	Community	• Histograms of % of agricultural area in each crop (HH D5,D6,D7)
Increased use of soil fertility technologies	Community	• % HH aware of technologies (D11) • % usage of each technology (D14)
Increased use of irrigation	Community	• Hectares under irrigation (indicator 2.7, HH E1, E5)

Table 13. Community monitoring indicators, data sources, reporting and analysis

Performance Indicator	Targets	Cumulative Result	Remarks
Indicator 1: Number of people with increased economic benefits derived from sustainable natural resource management and conservation as a result of USG assistance	N/A	N/A	Indicator measuring number of people with increased economic benefits found not appropriate for measuring benefit.
Indicator 1.5: Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	20,000 HH	27,951	The trainings were in all areas of Kulera Biodiversity Project partner activities.
Indicator 1.6: Co-management agreements signed between government departments and PAs	2	1	The NVA agreement is in place and the NAWIRA agreement is drafted, and waiting for one signature.
Indicator 1.7: Number of policies, laws, agreements or regulations promoting sustainable natural resource management and	2	1	The indicator will be assessed at the close of the no-cost extension. However, the process of setting up by-laws

Performance Indicator	Targets	Cumulative Result	Remarks
conservation that are implemented as a result of USG assistance			and other agreements have been initiated and completed in Rumphi Zone while work is still continuing in Nkhotakota zone.
Indicator 2.1: Number of households acquired new knowledge/skills in improved livelihoods & NRM practices	6,445	40,270 HH	These are households that were trained to undertake various that include conservation agriculture, community based natural resource management, tree regeneration, improved cook stoves, tree nursery establishment and tree planting
Indicator 2.2: Number of farmers, processors & others who have adopted new technologies or management practices as a result of USG assistance	32,225	35,555	New farmers who adopted improved cook stoves during the quarter was recorded to be 3,068 HH
Indicator 2.3: Number of MSMEs acquired new knowledge/skills in business administration & value-added processing	No target - not in NCE	107 Entrepreneurs and 50 Groups	107 entrepreneurs and 50 groups were trained in business skills and marketing with particular emphasis on price negotiation
Indicator 2.4: Number of hectares under sustainable agriculture practices	500 hectares	3,346 HA	
Indicator 2.5: Number of hectares under reforestation	4,679 hectares	8,181 HA	This was mainly additional area under tree regeneration
Indicator 2.6: Number of households with access to small livestock for nutrition and income	500 HH	1,277 HHDS	
Indicator 2.7: Area under irrigation	60 hectares	106 HA	
Indicator 2.8: New technologies made available for transfer	2	2	Improved cook stoves were demonstrated
Indicator 2.9: Number of households/schools/individuals accessing alternative energy sources/fuel efficient systems	5,000 HH	6,225 HHDS	Adoption rates were high in Rumphi in new villages
Indicator 2.10: Number of communities/ groups engaged in village savings and loan	No target-not part of NCE	147 groups	The project is merely monitoring groups formed during the first 3 years

Performance Indicator	Targets	Cumulative Result	Remarks
Indicator 3.1: Number of producer groups and MSMEs trained in production, processing, business and marketing skills	No target- not part of NCE	73 producer groups	Producers groups were trained by CARE.
Indicator 3.2: Number of MSMEs accessing loans from commercial banks / lending institutions / DCA facility	No target- not part of NCE	200 kgs	Farmers have indicated little interest in accessing loans from commercial lenders citing high interest rates as the reason. They seem to prefer loans from VS&L
Indicator 3.3: Volume of NRM and agro-based products produced and sold	No target- not part of NCE	827 kgs of honey reported by HIMACUL and Mzuzu Coffee	NRM and agro-based products produced and sold honey and Grade A macadamia kernels packaged for sale at Tree Nut Co in Thyolo in next quarter.
Indicator 3.4: Percentage increase in revenue from eco-tourism	50	0	No good baseline data.

Table 13 defines progress achieved with regard to each of the indicators when compared to the baseline data, which is viewable in the PMP in Annex I of this document. For many of the community indicators, baseline data were not available. This is a result of many Project indicators focusing on Project-specific interventions that have not previously occurred in the Project Area, such as the distribution of new technologies or education on MSME development.

7.4 GL3 Exceptional Community Benefits

For a description of exceptional community benefits conferred by the Project, please see Section 5.2 of the CCB PD.

8 Biodiversity Section

8.1 B1 without Project Scenario

Please see 1.2.5 of the CCB for a description of how the without project scenario would impact biodiversity in the Project area.

8.2 B2 Net positive Biodiversity Impacts

Please see Section 4.1 of the CCB PD.

8.3 B3 Offsite Biodiversity Impacts

Please see Section 4.2 of the CCB PD.

8.4 B4 Biodiversity Impact Monitoring

Table 14 summarizes the expected biodiversity impacts of the Project and the indicators used to monitor these impacts. Community indicators monitored and reported in the Kulera Biodiversity Project Year 4, Quarter 3 Technical Report April-June 2013 are summarized in Table 11. It should be noted that additional indicators will be added, as appropriate, in subsequent monitoring periods.

Table 14. Expected biodiversity impacts and indicators

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
Formal inclusion of DNPW and communities in a VCS/CCB emission reduction REDD+ project and increased funding to support implementation according to the Project plan	Biodiversity	• Spatially defined and recognized protected area boundaries (recorded under VSC registry with shape files) • 3rd party audited accounting for emission reductions (VCS monitoring reports) • # of emission reductions generated by project (VCS monitoring reports) (indicator 1.4, 2.11, 2.12) • $$ of revenue from sale of emission reductions (transactional records) • Benefit sharing plan is developed for project, beyond benefits distributed through the activities supported under the Project Implementation Plan
Legally enforceable roles and responsibilities to implement Project activities between Project partners	Biodiversity	• REDD+ agreement is signed and enforce • Number of laws, regulations or agreements to promote sustainable NRM (indicator 1.7) • # of households receiving benefits (non-monetary such as technical, grants, training, inputs and monetary) under the REDD+ (indicator 1)
Increased forest cover and health as	Biodiversity	•

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
habitat for wildlife		
Increased biodiversity (species present in Project Area)	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3) • Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3) • Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)
Legally recognized relationship between the DNPW and the communities to manage Protected Areas	Biodiversity	• # signed co-management agreements (Indicator 1.6)
Formalized dispute resolution process between DNPW and communities around Protected Areas	Biodiversity	• # of disputes handled under the terms of the Co-management agreements (managed/monitored per Section 5 of Co-management agreement and recorded by project partners under the grievance process which is summarized in the CCB monitoring plan Section 1.6)
Collective recognition between DNPW and communities of the Protected Area boundaries	Biodiversity	• # disputes or conflict in boundary, access or use rights (managed/monitored per Section 5 of Co-management agreement and recorded by project partners under the grievance process which is summarized in the CCB monitoring plan Section 1.6)
Increased biodiversity (species present in	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3)

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
Project Area)		• Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3) • Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)
Increased biodiversity (species present in Project Area)	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3) • Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3) • Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)
Reduced risk of fire	Biodiversity	• # of hectares destroyed by fire (monitored in PRA

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
in the Project Area and Project Zone		and VCS risk buffer)
Increased biodiversity (species present in Project Area)	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3) • Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3) • Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)
Increased biodiversity (species present in Project Area)	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3) • Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3)

Expected Impacts from Project Activities	Benefit Type	Indicator(s) (as measured within monitoring periods)
		• Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)
Increased biodiversity (species present in Project Area)	Biodiversity	• % of woody species (Biophysical inventory (BI) Section 3.1.3) • % of herbaceous species (BI Section 3.1.3) • Vegetation (BI Section 3.1.3) • Age structure at DBH class (BI Section 3,1,3) • Canopy coverage % (BI Section 3.1.3) • Number of observed mammal species (BI Section 3.1.2)
Reduced poaching	Biodiversity	• Number of observed mammal species (BI Section 3.1.4) • Number of illegal activities recorded (BI Section 3.1.4) • Number of poached animals (BI Section 3.1.4) • Number of poachers' bases (BI Section 3.1.4)
Increased water quality and quantity	Biodiversity	• Water quantity and sediment loads in key rivers and streams (BI Section 3.1.2) • Soil erosion (BI Section 3.1.1.3)
Increased forest cover and health	Biodiversity	• % of woody species (BI 3.1.3) • % of herbaceous species (BI 3.1.3) • Vegetation (BI 3.1.3) • Age structure at DBH class (BI 3.1.3) • Canopy coverage % (BI 3.1.3) • Soil bulk density (BI Section 3.1.1.1) • Soil organic carbon (BI Section 3.1.1.2)

Table 15. Biodiversity Monitoring indicators, data sources, reporting and analysis

Performance Indicator	Targets	Cumulative Result	Remarks
Indicator 1.1: Number of hectares in areas of biological significance showing improved biophysical conditions as a result of USG assistance	25,000 hectares		The data from the Biophysical baseline inventory established indicators for "improved biophysical conditions". Indicators are: decreased illegal activity, decreased poaching numbers and decreased number of poaching bases. Unfortunately, these numbers are reported for each PA and not for each Kulera project zone adjoining the given PA boundary. For this reason, among others, it appears that poaching indicators do not provide a very meaningful measure of "improved biophysical conditions". At best, poaching statistics are proxy rather than direct indicators. Since the project has been extended for a fourth year,

Performance Indicator	Targets	Cumulative Result	Remarks
			the no-cost-extension will be used to collect data on non-poaching indicators as part of the final impact survey. Some data addressing indicators beyond poaching will be presented in the final NCE PPR and End of Project report- mostly looking at satellite images.
Indicator 1.2: Number of hectares in areas of biological significance under improved management as a result of USG assistance	22,670 hectares	90,693 hectares	The total maximum number of hectares projected to be impacted by activities in project target zones within the 5 km band inside Nyika-Vwaza and Nkhotakota PA boundaries (areas of biological significance) is 151,155 ha. Kulera field staff has conducted activities in conservation agriculture, village woodlots, afforestation, woodland regeneration, soil and water conservation, crop diversification, improved woodstove, irrigation, animal husbandry, etc. It is estimated that the area impacted by these activities radiates 5 km in all directions around target communities. Over the course of Year 3, TLC approximates that 60% of the communities have participated in Kulera activities. Therefore in Year 3, approximately 90,693 hectares in areas of biological significance have been impacted by improved management.
Indicator 1.3: Number of hectares of natural resources showing improved biophysical conditions as a result of USG assistance	302,310 hectares		Measurement to be taken in Quarter 3 of the no-cost extension. This measurement, like Indicator 2.1.1, will require collection of a second set of data in order to determine "improvement" in biophysical conditions.
Indicator 1.4: Number of hectares under improved natural resource management as a result of USG assistance	40,000 hectares	10,510 hectares	The project targeted 10,000 ha the first year, with an increased target of 20,000 ha set for year two. This second year target was deemed to be too ambitious, so the third year target was once again established to be 10,000 ha.

The results of the first monitoring period are compared against the results of the baseline biophysical survey conducted at Project start; the baseline data, where available, can be viewed in the PMP in Annex I. Where the indicators and their respective parameters have made determining biodiversity impacts during the first monitoring period more challenging, a note has been provided in the above table clarifying plans for future monitoring and reporting. Due to the less tangible nature of some of the Project's biodiversity impacts when compared to community or other Project indicators, additional data collection will be required in order to fully gauge the extent to which the Project has positively impacted biodiversity in the Project area.

8.5 GL3 Exceptional Biodiversity Benefits

Please see Section 5.3 of the CCB PD for the exceptional biodiversity benefits conferred by the Project.

Annex I: Performance Monitoring Plan

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Strategic Objective: Long term biodiversity of Malawi's protected areas secured under a vision to help transform impoverished communities on degraded lands around their borders to prosperous communities on healthy lands															
Indicator 1: Number of people with increased economic benefits derived from sustainable natural resource management and conservation as a result of USG assistance	+	See item VII - PMP	# of people	Sex	2009	Zero	5,000 M=3500 F=1500			20000 M=14000 F=6000			20000 M=14000 F=6000		
Intermediate Result # 1: Improved governance of protected areas															
Indicator 1.1: Number of hectares in areas of biological significance showing improved biophysical conditions as a result of USG assistance	+	See item VII - PMP	Ha	Marine / Terrestrial	2009	Zero	0			25000			35000		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 1.2: Number of hectares in areas of biological significance under improved management as a result of USG assistance	+	See item VII - PMP	Ha	Marine / Terrestrial	2009	Zero	10000			35000			15000		
Indicator 1.3: Number of hectares of natural resources showing improved biophysical conditions as a result of USG assistance	+	See item VII - PMP	Ha	Type of area	2009	Zero	0			0			40000		
Intermediate Result # 1: Improved governance of protected areas															
Indicator 1.4: Number of hectares under improved natural resource management as a result of USG assistance	+	See item VII - PMP	ha	Type of area	2009	Zero	10000			20000			10000		
Indicator 1.5: Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	+	See item VII - PMP	#	Sex	2009	Zero	10000 M=7000 F=3000			25000 M=17500 F=7500			10000 M=7000 F=3000		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 1.6: Co-management agreements signed between Govt Depts and PAs	+	See item VII - PMP	#	Type of agreement	2009	1 (NVA signed 2003)	0			2			1		
Indicator 1.7: Number of policies, laws, agreements or regulations promoting sustainable natural resource management and conservation that are implemented as a result of USG assistance	+	See item VII - PMP	#	Type of policy	2009	Zero	0			0			1		
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices															
Indicator 2.1: Number of households acquired new knowledge/skills in improved livelihoods & NRM practices	+	See item VII - PMP	#	Type of household	2009	20,000 i.e. 50-%	10000 M=7000 F=3000			20000 M=14000 F=6000			15000 M=10500 F=4500		
Indicator 2.2: Number of farmers, processors & others who have adopted new technologies or management practices as a result of USG assistance	+	See item VII - PMP	#	Sex	2009	6,000 i.e. about 15%	10000 M=7000 F=3000			20000 M=14000 F=6000			15000 M=10500 F=4500		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 2.3: Number of MSMEs acquired new knowledge/skills in business administration & value-added processing	+	See item VII - PMP	#	Type of MSME	2009	Zero	0			20			40		
Indicator 2.4: Number of hectares under sustainable agriculture practices	+	See item VII - PMP	ha	Type of practice	2009	Less than 2% of cultivable land. Approx.	1000			5230			4930		
Indicator 2.5: Number of hectares under reforestation	+	See item VII - PMP	ha	Type of practice	2009	60% involved with an average of 0.1 ha= 240	1500			3500			3500		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 2.6: Number of households with access to small livestock for nutrition and income (includes pass on)	+	See item VII - PMP	#	Type of livestock	2009	34000. – on average 87% owned livestock- chickens common	2000			5875			6533		
Intermediate Result # 2: Improved Rural Livelihoods and NRM Practices															
Indicator 2.7: Area under irrigation	+	See item VII - PMP	ha	Type of practice	2009	1100	250			450			450		
Indicator 2.8: New technologies made available for transfer	+	See item VII - PMP	#	Type of technology	2009	None	2			4			N/A		
Indicator 2.9: Number of households / schools / individuals accessing alternative energy sources/fuel efficient systems	+	See item VII - PMP	#	Type of household	2009	Zero	5000 M=3500 F=1500			10000 M=7000 F=3000			10000 M=7000 F=3000		
Indicator 2.10: Number of communities/ groups engaged in village savings and loan	+	See item VII - PMP	#	PA	2009	Zero	100			100			100		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 2.11: Number of carbon projects developed	+	See item VII - PMP	#	Type of practice	2009	Zero	0			0			4		
Indicator 2.12: Quantity of greenhouse gas emissions (GHG), measured in metric tons of CO_2 equivalent, reduced or sequestered as a result of USG assistance	+	See item VII - PMP	tons	Type of practice	2009	TBD	TBD			TBD			TBD		
Intermediate Result # 3: Increased Rural Incomes from Enterprise Initiatives															
Indicator 3.1: Number of producer groups and MSMEs trained in production, processing, business and marketing skills	+	See item VII - PMP	#	Enterprise	2009	4	20			40			100		
Indicator 3.2: Number of MSMEs accessing loans from commercial banks / lending institutions / DCA facility	+	See item VII - PMP	#	Enterprise	2009	Zero	20			20			20		
Indicator 3.2: Volume of NRM and agro-based products produced and sold	+	See item VII - PMP	tons	Product	2009	Less than 100 kgs	1047			1875			2438		

Indicator	Direction of Change (+) or (-)	Definition	Unit of Measure	Dis-aggregated by	Baseline Year	Baseline Value	2010 Target	2010 Semi	2010 Annual	2011 Target	2011 Semi	2011 Annual	2012 Target	2012 Semi	2012 Annual
Indicator 3.4: Percentage increase in revenue from eco-tourism	+	See item VII - PMP	%	PA	2009	Zero	0			50			25		

PA = Protected Area

TBD = To Be Determined (applies to base value which will be determined once a baseline survey has been finalized)