



PROJECT DOCUMENT

Republic of Tanzania / United Nations Development Programme/ Global Environment Facility

Project Title: Mainstreaming Sustainable Forest Management in the Miombo woodlands of Western Tanzania
UNDAP Outcome(s): 1) Key MDAs and LGAs integrate climate change adaptation and mitigation in their strategies and plans 2) Relevant MDAs, LGAs and Non-State Actors improve enforcement of environment laws and regulations for the protection of ecosystems, biodiversity and the sustainable management of natural resources
UNDP Strategic Plan; Environment and Sustainable Development Primary outcome: <i>Local Capacity for mainstreaming Environment and energy provision into national development policies, plans and programmes</i>
UNDP Strategic Plan <u>Secondary</u> Outcome: <i>Markets transformed to support sustainable use of natural capital in national development</i>
Expected CCPD Outcome(s): SAME AS ABOVE
Expected CCPD Output (s) <i>Technical, financial and governance capacities for sustainable land and forest management enhanced: 2 National Capacity to adopt and implement mitigation strategies for a low carbon and resource efficient development path enhanced 3) Alternative income generating activities established for income generation 4) Natural resource governance systems strengthened at local levels</i>
Executing Entity/Implementing Partner: <i>RAS Tabora and Rukwa in conjunction with the Department of Forestry and Bee Keeping and IRA (UDSM)</i>
Implementing Entity/Responsible Partners: Ministry of Energy and Mineral Development; Ministry of Agriculture, Tabora Regional Government

Programme Period:	5 years	Total resources require US\$	16,511,666
Atlas Award ID:	00061743	Total allocated resources: US\$	16,511,666
Project ID:	00078484	○ GEF	2,745,000
PIMS No.	3091	○ Government	5,900,000
Start date:	Jan 2012	○ UNDP (CO)	800,000
End Date	Dec 2016	○ ATTT (Pvt Sector)	3,566,666
Management Arrangements	NEX	○ IRA	3,500,000
Virtual PAC Meeting Date	----		

Agreed by (Government): Date/Month/Year
 Agreed by (Tabora Regional Government): Date/Month/Year
 Agreed by (UNDP): Date/Month/Year

Brief summary

Miombo covers 40% of Tanzania, in two major blocks; the drier south-east and the larger and richer area in the moist west of Tanzania, bordering the Congolian Forest patches of Mahale Mountains. The woodlands are a primary source of energy, in the form of firewood and charcoal, and a crucial source of essential subsistence goods such as poles and construction products, timber, materials for tool handles and household utensils, foods, medicines, leaf litter, grazing and browse. In addition, the woodlands provide ecosystem services in harboring biodiversity, maintaining carbon stocks (and therefore regulating climate), controlling soil erosion, providing shade, modifying hydrological cycles and maintaining soil fertility. The miombo woodlands are however threatened by deforestation and degradation driven by settlers, land clearance and burning for agriculture, saw millers, tobacco industry, charcoal producers, and climate change.

The long-term solution to the threats affecting biodiversity and livelihoods in the Miombo region as a whole is the adoption of sustainable-use management practices for resources harvested by local people for subsistence and local economic growth, and better regulation of commercial activities. The government is fully aware of these issues and is committed to the concept of Sustainable Forest Management, as depicted in the “Mkukuta”, the country’s Poverty Reduction Strategy. To achieve this, biodiversity conservation has to be mainstreamed into economic planning and development, so that agricultural productivity and sustainable livelihoods are improved while simultaneously improving the ecological integrity of the ecosystem, including securing its productivity from negative effects of climate change. Delivery of services to enable land owners and managers to adopt better production practices has however been hindered by policy, knowledge, capacity, skills, markets and technology barriers. The government proposes to resolve these problems through a pilot project that mainstreams Sustainable Forest Management into the production systems in the central part of Tabora Region with activity spreading to Rukwa, Kigoma, and Singida. The overall Goal of the project is that “Sustainable Forest Management secures ecosystem and biodiversity values while providing a buffer to the Congolian Rain forest, ensuring food security and sustainable livelihoods. The objective of the project is “To enable miombo dependent communities to adopt productive practices that are favorable to biodiversity conservation, reduce carbon emissions from land use change and improve livelihoods”. The project’s immediate focus is an area of 133,400 hectares covering 4 wards (Usinge, Imalamakoye, Mbola, Inyonga) in Urambo, Uyui and Mpanga districts. It will target 12,530 households spread over 28 villages (annex 2 provides detailed statistics at village level). The objective will be achieved through 3 components namely: component 1: Policy regulatory framework and institutional arrangements support Sustainable Forest Management Component 2: Strengthening skills and capacities for knowledge based CBFM/JFM, integrated soil fertility management and land use planning Component 3: Adoption of Sustainable charcoal and energy switch reduce pressure on woodlands; and, Component 4: Markets and technology support expansion of livelihood options to reduce pressure on agriculture and natural resources and increase income in the pilot wards. A fifth smaller component will support project management to ensure delivery of results and impacts.

The project will be implemented over a five year period, commencing in 2011. The GEF implementation agency (IA) for the project will be the UNDP Tanzania Country Office, and will be executed under UNDP National Implementation Modality (PIM) procedures. The Government through VPO will have overall responsibility for the project; however, given the scope of the project, this responsibility will be delegated to the Ministry of Natural Resources and Tourism (specifically to the Division of Forests and Bee keeping). Actual field activities will be coordinated by the Regional Secretary for Tabora, in collaboration with the Regional Secretary for Rukwa, with technical assistance from the Institute of Resource Assessment (IRA - University of Dar es Salaam) as needed for the implementation of specific project outcomes.

The total budget for the project is US\$ 16,511,666; GEF contribution is US\$ 2,745,000 (17%); the Government, The Tobacco Processing Company, UNDP and Norwegian International Development Aid (NORAD) contribution constitutes the difference (13,766,666, being 83% of total budget). NORAD’s contribution of USD 3.5 million is made through the Institute of Resource Assessment (IRA), which is part of the University of Dar es Salaam.

List of acronyms

APR	Annual Performance Report
ASDP	Agricultural Sector Development Plan
ASDS	Agricultural Sector Development Strategy
CAMCO	Carbon Management Company (formerly ESD)
CBFM	Community Based Forestry Management
CBO	Community Based Organization
CDM	Clean Development Mechanism
CFR	Catchment Forest Reserves
CIFOR	International Centre for Research on Forestry
CIS	Community Investment Sub-project
DADS	District Agricultural Development Strategy
DADP	District Agricultural Development Plans
DED	District Executive Director
EB	Executive Board of the Clean Development Mechanism
ECF	East Coast Fever
ESD	Energy for Sustainable Development
FAO	United Nations Food and Agricultural Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
HIV/AIDS	Human Immunodeficiency Virus Acquired Immune Deficiency Syndrome
ICRAF	International Agroforestry Centre
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
IRA	Institute of Resource Assessment (Tanzania)
IUCN	The World Conservation Union
JFM	Joint Forestry Management
LD	Land Degradation
LFA	Logical Framework Approach
MAFC	Ministry of Agriculture Food Security and Cooperatives
MDG	Millennium Development Goals
MEM	Ministry of Energy and Minerals
MNRT	Ministry of Natural Resources and Tourism
MLDF	Ministry of Livestock Development and Fisheries
MITM	Ministry of Industry Trade and Marketing
NAPA	National Adaptation Programme of Action
NAP	National Action Plan
NBSAP	National Biodiversity Strategy and Action Plan
NEMC	National Environment Management Council
NEPAD	New Programme for Africa's Development
NIM	National Implementation Modality
NGO	Non-governmental Organization
NLUPC	National Land Use Planning Commission
NPES	National Poverty Eradication Strategy
NPK	Nitrogen, Phosphate and Potassium Fertilizer
NPV	Net Present Value
NRM	Natural Resources Management
NTFP	Non-timber Forest Products

PADEP	Participatory Agricultural Development and Empowerment Project
PES	Payment for Ecosystem Services
PFM	Participatory Forestry Management
PMO-RALG	Prime Minister's Office-Regional Administration and Local Government
PPG	Project Preparation Grant
PRSP	Poverty Reduction Strategy Paper
RAS	Regional Administrative Secretary
RCU	Regional Coordination Unit
REDD	Reducing Deforestation and Forest Degradation
SAIPRO	Same Agricultural Improvement Project
SDC	Swiss Development Corporation
SLM	Sustainable Land Management
SUA	Sokoine University of Agriculture
TANRIC	Tanzanian Natural Resources Information Centre
TFAP	Tanzania Forestry Action Plan
TOR	Terms of Reference
TSH	Tanzania Shilling
UCLAS	University College of Lands and Agricultural Studies
UDSM	University of Dar-es-Salaam
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational Scientific and Cultural Organization
URT	United Republic of Tanzania
VER	Verified Emissions Reductions (under the CDM)
VPO	Vice President's Office

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SECTION I: Elaboration of the Narrative

PART I: Situation Analysis

1. The Miombo woodlands extend between 2.7 and 3.6 million km² of the African sub-humid tropical zone in 11 countries, including Tanzania¹. The woodlands constitute the largest mostly contiguous dry forest area in the world and the largest vegetation type in East Africa (Anon, 2007). Generally, a mature, relatively undisturbed Miombo stand typically comprise a 10-20 m high, single storey, partly closed canopy of mostly pinnate-leafed trees, a discontinuous understory of broad leafed shrubs and an often sparse but continuous herbaceous layer of forbs, small sedges, and caespitose, heliophytic C4 grasses.
2. The woodlands occur in two distinct sub-types: wet and dry (White, 1993, URT, 1998). The wet miombo occur in areas where the annual rainfall exceeds 1000 mm; mainly in eastern Angola, south western Tanzania, northern Zambia and central Malawi. Here tree canopies exceed 15 m. The dry miombo type is found in areas with annual rainfall of less than 1000mm such as Zimbabwe and central Tanzania, southern areas of Mozambique, Malawi and Zambia. Here the canopy height is less than 15m (Bridges, 1996).
3. In Tanzania, miombo woodlands constitute about 90% of all forested land, equivalent to 44.6 million ha covering 40% of Tanzania's total land. The woodlands occur in two major blocks that reflect the wet and dry regional sub-types. The relatively dry miombo woodlands cover extensive areas of Shinyanga, Kigoma, Tabora, Rukwa, Mbeya and Iringa regions. The wet miombo woodlands occupy a larger and richer area in the moist west of Tanzania, bordering the Congolian Forest patches of Mahale Mountains (Nshubemuki and Mbwambo, 2007). This proposal focuses on the wetter Miombo woodlands where the main vegetation type is dominated by *Brachystegia Julbernardia* and/or *Isoberlinia* species interspaced with seasonally flooded plains. This part of the Miombo woodlands constitutes a significant part of the Malagarasi basin, which extends across some 9.2 million hectares, encompassing five substantial rivers and extensive riparian wetlands. The Malagarasi basin is important as it is the largest drainage system into Lake Tanganyika, a recognized center of world biodiversity. Due to the exceptional size and importance of the ecosystem, the core of the basin has been designated a site of international significance under the Ramsar Convention on Wetlands (<http://www.ramsar.org>).

Soils and vegetation in the project area

4. The ecology of the wet Miombo block represents typical characteristics of Miombo woodlands and is closely linked to soil types, vegetation and distribution pattern of rainfall. Although Miombo soils (annex 6) are inherently nutrient poor, there is a wide variation in fertility influenced by depth and drainage. The major soil type in Tabora is region is Ferralic Cambisol (*locally known as Kikungu in Nyamwezi*), while that of Malagarasi Muyowosi is dominated by vertisol (*Kadondoli in Nyamwezi*). The Malgasi vertisols are considered generally fertile, particularly those which occur in valley bottoms and flooded areas, and they have the potential to support production of a wide variety of crops. They are also associated with fluvisols which have good potential in the production of rice. The Tabora show a wide local variation in fertility and drainage, ranging from sandy loams in the south and centre and west and north to heavy black/dark brown soils in poorly drained areas.
5. Upland vegetation consists of woodland, bush land, thickets, and grassland while lowland or wetland vegetation consists of wooded grassland and swamps. The sandy soils are dominated by a mix of *Branchystegia-jubernadia* and *Hyperphenia* grass and other associations dictated by variations in soil fertility and structure. On the heavier soils, the tree cover is lower and grass dominates in all marginally drained areas.

Socio-economic context:

6. As reported by Campbell et al (2009), the socio-economics of Miombo woodlands is highly influenced by eight characteristics unique to the biome, which in turn influence soil-fertility and biomass production, determining how people utilize the resources and relate to the ecosystem. The woodlands have relatively low proportion of high quality commercial timber species so a commercial timber industry is absent. However majority of the tree species

¹ Tanzania, DR Congo, Zimbabwe, Angola, Zambia, Malawi and Mozambique

have unpalatable and toxic characteristics and provide fibrous bark used extensively in a variety of ways such as construction, weaving, beehives, etc. In contrast to the high availability of wood and bark products, there is a relatively low availability of edible-fruit producing species. Most Caesalpinoid trees in the miombo produce small, hard, explosively dispersed seeds. Edible products only occur in limited quantities as fruits, edible roots or vegetables growing as weeds on cleared farms.

7. Caesalpinoid tree species, as well as *Uapaca kirkiana*, have fungal associations with their roots (Frost 1996; Lowore and Boa 2001). This evolutionary association has resulted in a remarkable diversity of associated macrofungi, many of which are edible, making the biome “a kingdom of mushrooms”. The dominance of *Brachystegia*, *Julbernardia* and *Isobertinia* provides the basis for beekeeping as a highly significant (culturally, socially and economically) form of land use in miombo woodland. The woodlands experience high levels of insect herbivory. Some of these, such as the scale insect *Aspidoproctus glaber* are a threat, resulting in die-back. Others are a culturally important food resource, the best known being the Saturniidae, a family of giant silk moths, whose caterpillars are an important source of protein and cash to local people (Frost 1996; Lowore and Boa 2001).

8. The consequent resource availability and opportunities for new natural resource enterprises have led to some particular uses of miombo, with economic and management implications, particularly at the local level. It is estimated that over 75 million people live within the miombo biome, with 40 million depending on the woodlands directly and a further 15 million in urban areas drawing food, fibre, fuelwood and charcoal (Campbell, et al 1996). In Tanzania, the woodlands provide a range of products important to rural livelihoods, from medicines and food to building timber and fuel. The woodlands are also central to the spiritual needs of the people, with specified trees and even blocks of woodland being conserved by communities for cultural reasons. Sacred groves associated with spirits of the dead or with territorial rain deities are found throughout the miombo region.

9. The woodlands are also primary source of energy, in the form of firewood and charcoal, and a crucial source of essential subsistence goods such as poles and construction products, timber, materials for tool handles and household utensils, foods, medicines, leaf litter, grazing and browse. They also have high potential for bee-keeping. Under this system, the woodlands provide a rich variety of alternative livelihoods and income.

10. **Tenure issues:** The Miombo woodlands are under three types of ownership: State owned, Local government owned and community managed. Under State Owned, some forests are owned by the Central Government but managed under JFM/Sustainable Forest Management (SFM) regimes. In this regime communities/villages partner with the central government to manage forests. Under Local government ownership regime, forests are owned and managed by Local Government Authorities (Districts) under JFM/SFM or District Councils with the participation of communities. JFM has been heavily promoted in all catchment forests in Tanzania, particularly those considered to be important biodiversity areas with high conservation value. In many places the protection status of the most critical forests is now being upgraded to nature reserves, which provides them with additional protection (Blomley and Iddi, 2009). This protection status notwithstanding, participants in the FGD and also key informants confirmed that both land and tree tenure in this management regime remained firmly in the control of the state (national or local).

11. Under community ownership regime, forests are owned and managed by communities/villages with technical assistance from Forestry and Beekeeping Division under CBFM regime. Each village in such areas has a Village Environmental/Village Natural Resources Committee, which has the overall management responsibilities of community/village forests. These committees also assist in the management of Central Governments and Local Governments forests by carrying out patrols in the forests. The management approach of CBFM emphasizes full delegation of management rights, responsibilities and returns to village level institutions and below.

12. **Global significance:** The Miombo woodlands are biologically rich and diverse with up to 8,500 vascular plant species, 4,590 of them endemic, together with 35 endemic mammals, 51 endemic birds, 52 endemic reptiles, 25 endemic amphibians and an unknown number of endemic invertebrates. The antelopes are especially diverse and include Eland, Impalas, Gazelles, Oryx, Gerenuk, and Kudu. Other important animals include Buffalo, Wildebeest, plains Zebra, Rhinos, Giraffes, Elephants, and Warthogs. Up to sixteen grazing and browsing species may coexist

in the same area. The species-rich herbivore trophic level also supports a diverse set of carnivores, including cats (lions, leopards, cheetahs, servals), dogs (jackals, wild dogs), and hyenas.

13. The Malagasi basin is home to more than 20,000 water birds, estimated to constitute more than 1% of the individuals of several water bird species, including the shoebill *Balaeniceps rex* (10-20%), the wattled crane *grus caunculatus* (5-10%), the Ardea goliath (1-2%), and the Egretta alba (2%) (SIMMORS, 2000; URT, 2001). Although most birds are resident with restricted movements, the region hosts long distance migrants, which usually come in the wetlands during summer and return to the north at the end of winter, including the white pelican. The African spoonbill and Madagascar bee-eater are important intra African migrant resident in the wetlands for some part of the year (Yanda et al, 2001). Other bird species include the saddle billed stork (*Ephippiorhynchus senegalensis*), the great egret (*casmerodius albus*) the great snipe (*gallinago media*) the white winged tern (*Chlidonias leucopterus*) and many other important species.

14. The western miombo woodlands are also home to various protected areas, including Gombe National Park (Chimpanzee area-endangered species), Katavi National Park, and the Kigosi, Moyovosi and Ugalla Game Reserves. Other protected areas are the Game Controlled Areas of Luganzo, Ugunda, Msima, Inyonga, Rungwa River, and Mlele, and the Forest Reserves of Igombe River, Inyonga, Ugunda, and Luganzo. However, approximately 54% of miombo woodlands are found under public lands (URT, 2001). At a continental level the miombo acts as a buffer zone (Tanzania, DRC, Zambia), protecting the biodiversity values of the ecologically important Congo Basin Rain Forests. By absorbing population pressure, the miombo woodlands buffer the remaining areas of Guinea-Congolian forest (Gombe & Mahale Mountain NPs in western Tanzania). In addition, the woodlands provide ecosystem services in harboring biodiversity, maintaining carbon stocks (and therefore regulating climate), controlling soil erosion, providing shade, modifying hydrological cycles and maintaining soil fertility. A recent study by UNEP/WCMC reported that the Miombo woodlands provide high carbon stocks at about 60-80 tons per hectare² of above ground stock. However, other studies from miombo woodlands in Mozambique (Williams et al³ reported lower figures of 19.0 (+/- 8) (t C ha⁻¹) for stem wood hectare. with a recovery rate of 0.7 t C ha⁻¹ per annum on land that had been abandoned for agriculture. The study further found that undisturbed miombo woodlands have considerably higher soil C content than stem (vegetation) carbon; storing up to 100 tons of carbon per hectare in some particularly carbon rich patches. The study also found evidence that disturbance of soils associated with cultivation generally leads to a rapid decline in soil organic C content as a consequence of enhanced microbial respiration; the median soil carbon stock for undisturbed woodland soils was 23% higher than in disturbed abandoned agriculture fields (57.9 t C ha⁻¹ against 44.9t C ha⁻¹).

15. In Tanzania these ecosystem values are recognized, with over 100,000 km² of Miombo forests incorporated within major Protected Areas, either as National Parks or Game Reserves⁴, where sport hunting of the large mammals ensures a high rate of economic return in Game Reserves. However, a recent study confirmed that although much of the high biodiversity high carbon areas are covered in the protected area network, there is a significant area of high carbon land, particularly in the Miombo that is not well represented in the network⁵.

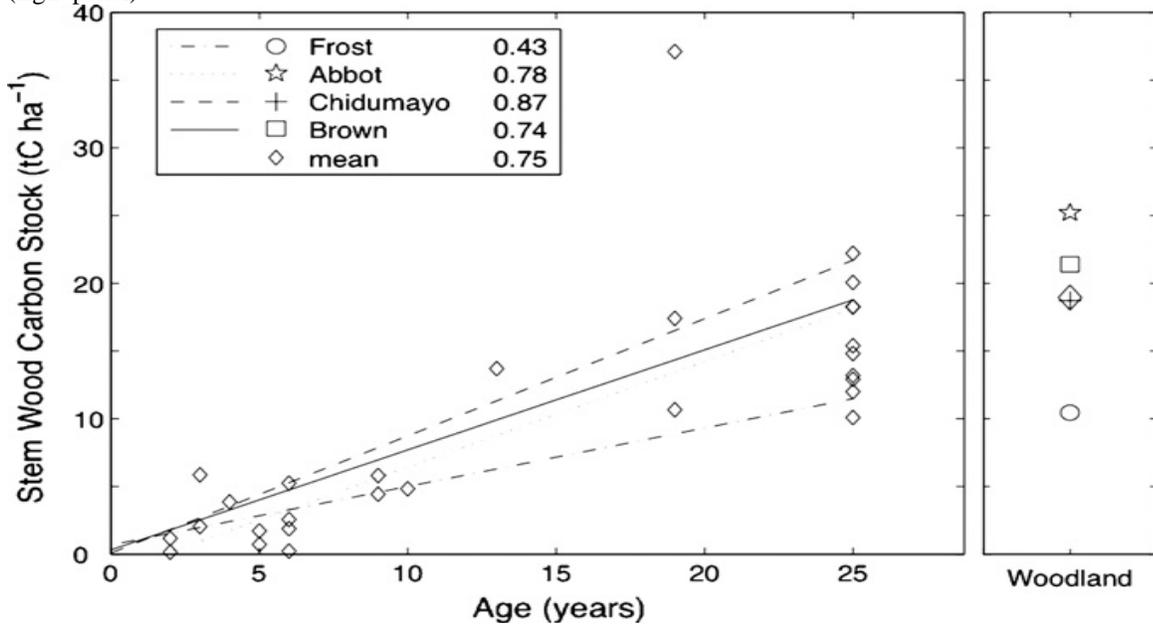
² Carbon and Biodiversity: A demonstration Atlas. UNEP WCMC 2008.

³ Williams et al, 2008: Forest Ecology and Management 254 (2008) 145–155

⁴ NPs: Ruaha; Katavi eg Mlele Hills, and part of Mahale Mts. Game Reserves: Selous, Rungwa, Moyowosi, Ugalla Biharamulo, Kigozi; PLUS Forest Reserves: of several thousand sq kms in SE and West Tanzania, over fifty FRs of over 40,000 sq kms total.

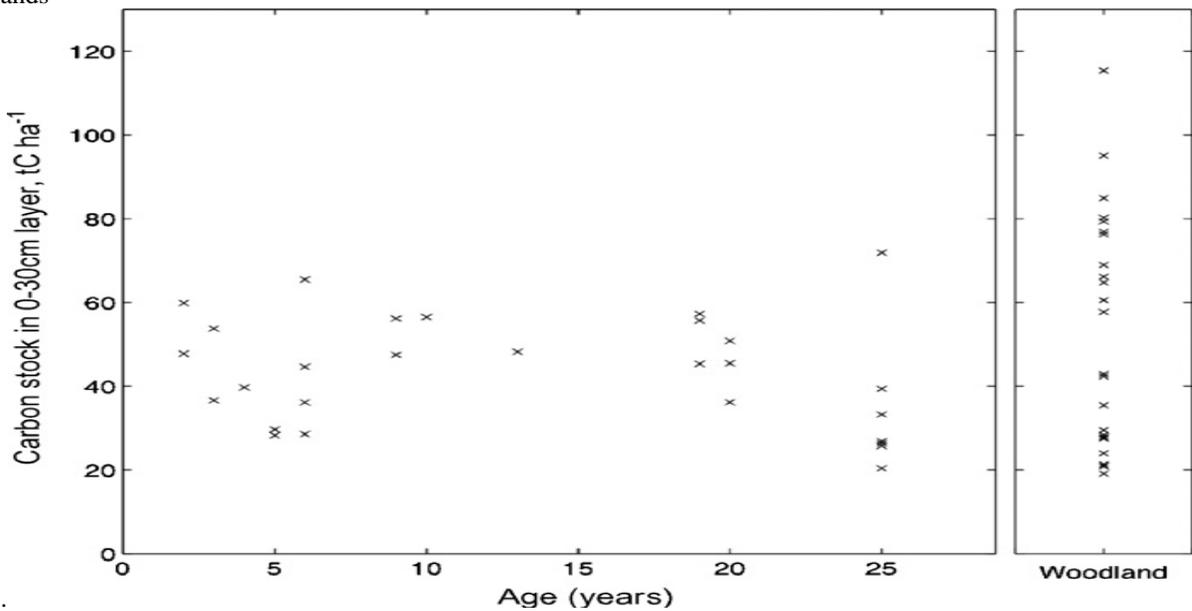
⁵ Carbon and Biodiversity: A demonstration Atlas. UNEP WCMC 2008.

Figure 1: Estimate wood C stock plotted against age for all abandoned machambas (farms) (left panel), and for woodland plots (right panel).



This table is taken from Williams et al (2008). The age of the oldest abandoned machambas is given as 25 years, but lies between 20 and 30 years. C stock is calculated from basal area, wood density and four different allometric relationships. The data here are the mean estimates from the four different allometric equations. The linear regressions determined from each individual relationship are plotted to indicate the uncertainty in biomass estimates. The legend indicates the author of the allometric relationship and the slope of the C stock vs. age relationship (i.e. annual wood C productivity, $t\ C\ ha^{-1}\ year^{-1}$).

Figure 2: Total soil C content in surface 0.3 m for all sites plotted against age for all abandoned machambas (left panel) and for woodlands (right panel).



panel).

The table is also taken from Willimas et al (ibid). The age of the oldest abandoned machambas is given as 25 years, but lies between 20 and 30 years

16. Despite such diversity of resources, the region is faced with a number of management problems associated with multiple trade-offs in managing different resources. For example, the past few decades have witnessed a rapid change in people's use patterns and perceptions and, consequently, benefits derived from the woodlands. Central to this change is commercialization without consideration for sustainable use, population increase and weakening resource governance, amongst many others.

Policy and Legal Context of Sustainable Land Management

17. Tanzania has a comprehensive policy and legislative framework for environmental management. The country's constitution requires the state to hold in trust for the people and protect important natural resources, including land, water, wetlands, minerals, oils, fauna and flora. Until recently however, the country's policy framework and legislation was largely of a sectoral nature where each line ministry developed a policy without adequate consultation with other key stakeholders. Growing challenges in the environment and development nexus have necessitated a well coordinated policy framework, culminating in a number of reforms in the last decade.

18. The National Environment Management Act No. 19 of 1983, a key policy instrument was the first to recommend an integrated national policy framework and legislation for sustainable maintenance, protection and exploitation of the environment and natural resources. The National Environment Management Council (NEMC) was created along this Act and in response to the national need for such an institution to oversee environmental management issues and also implement the resolutions of the Stockholm conference (1972), which called upon all nations to establish and strengthen national environmental Councils to advise governments and the international community on environmental issues.

19. The enactment of Environmental Management Act No. 20 of 2004 (EMA, 2004) by Parliament in October 2004, repealed the National Environmental Management Act No.19 of 1983 and re-established NEMC. EMA (2004) provides for a legal and institutional framework for sustainable management of the environment, prevention and control pollution, waste management, environmental quality standards, public participation, environmental compliance and enforcement. Furthermore, it gives NEMC mandates to undertake enforcement, compliance, review and monitoring of environmental impacts assessments, research, facilitate public participation in environmental decision-making, raise environmental awareness and collect and disseminate environmental information

20. Tanzania's overall policy objective is to achieve sound sustainable development by reconciling economic growth and conservation of resources while spearheading social development. The sectoral laws address the main policy goals on environmental management which include the integration of environmental considerations in all sectoral policies, plans and programs, the requirement that all projects with potentially damaging effects on the environment be preceded by an environmental impact assessment, and that users and polluters of the environment pay for the use and/or pollution. Specific policies that affect forest and land management in the miombo woodlands are discussed below.

21. The country has developed a National Biodiversity Strategy and Action Plan (2001). The government of Tanzania, being a signatory to the CBD Convention since 1992, developed a National Biodiversity Strategy and Action Plan in 2001 as an obligation to the country as Contracting Party. The NBSAP is guided by the overall vision which is to build a society that values all the biodiversity richness using it sustainably and equitably while taking the responsibility for actions that meet both the competing requirements of the present and the legitimate claims of the future generations

22. The Government of Tanzania is also committed to related conventions such as Convention on International Trade in Endangered Species (CITES), United Nations Convention to Combat Desertification (UNCCD) and United Nations Framework Convention on Climate Change (UNFCCC) for the conservation and sustainable utilization of biological diversity.

23. The Rural Development Strategy of 2002 is a lead policy guideline for rural development projects/programmes that seeks to reduce poverty in rural areas. The Strategy spells out key actions to address the land degradation problems in rural areas such as making environment impact assessments for rural development projects mandatory. The strategy also points out the importance of promoting social forestry and Agroforestry for

small scale and medium wood based industries, fuel wood saving techniques and alternative energy sources to deter encroachment of forests. It acknowledges that pro-poor growth is heavily dependent upon rural people being able to secure the natural resources that sustain their livelihoods.

24. Progress made in the land policy reform, which saw the enactment of the Land Act No 4 and the Village Land Act, both of 1999, creates an enabling environment for adoption of sustainable land management practices. The National Land Policy (NLP) promotes and ensures access to land, encourages the optimal use of land resources and facilitates broad-based social and economic development without upsetting or endangering the ecological balance of the environment. NLP promotes an equitable distribution of and access to land by all citizens. The NLP further ensures that existing rights to land, especially customary rights of small holders (i.e. peasants and herdsmen who include beekeepers and women), are recognized, clarified and secured in law.

25. The Village Land Act of 1999 provides opportunities for villages to develop land use plans, which take into account all activities including agriculture, forestry and the environment. It provides opportunities for surveys and demarcation of village boundaries and development of land use plans and allows women to own land. The land policy and the Village Land Act will contribute greatly to secure ownership of land for various uses, encourage sustained investment and development, reduce conflicts and encourage increased agricultural production in the districts and the region as a whole. These legislative provisions for SFM are the responsibility of the National Land Use Planning Commission (NLUPC) which has the role of coordinating all land use and management related activities in Tanzania. Under the proposed project, the role of the NLUPC will be enhanced to ensure effective coordination of these functions across all relevant sectors. The Commission will also be supported in its capacity building role at national, regional and local levels

26. The National Environment Policy of 1997 defines the environmental policy framework which is relevant to forest management. The policy establishes the framework within which government empowers communities to participate in activities to avoid the degradation of life supporting land, water, vegetation and air. The Institutional and Legal Framework for Environmental Management (2003) further clarifies the role and responsibilities of districts, wards and villages in the management and conservation of natural resources and the environment. Further, an overarching Environmental Management Act was promulgated by Parliament in November 2004 (URT 2004). A National Environmental Trust Fund was established to support the implementation of activities related to combating land degradation (including deforestation) and poverty. The main functions of the fund include among others, facilitation of environmental research, fostering capacity building, provision of scholarships and promoting and assisting community based environmental management programmes. Activities under this fund also relate to the rehabilitation of degraded lands and sustainable land and forest management.

27. The National Forestry Policy (1998) and the Forestry Act (2002) aim to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources. The Policy calls for the involvement of local level institutions such as district councils, wards, villages and individuals where new forms of partnership with the Central Government are being promoted for improved conservation and income generation. Income generating activities such as beekeeping are being introduced to help improve the incomes of communities in line with the Tanzania overall development goals. A programme of Participatory Forest Management has been introduced and operationalized through the Joint Forest Management (JFM) and Community Based Forest Management (CBFM) processes across the country. Since forests play an important role in catchment management especially with respect to amelioration of the flow of water, PFM will be used as a vehicle for the re-establishment of the integrity of catchment forests as an input into SFM. Under JFM, agreements between community groups and the Government have been developed with a view to promoting the participation of communities in the management and utilization of forest resources. This programme is currently practiced in 30 districts across the country. The Community Based Forest Management programme encourages communities to set up forest reserves from the general lands for economic and conservation activities. These initiatives provide an excellent opportunity for ownership and sustainable management of land resources as well as increasing land productivity.

28. The relevant policy instruments and legislation that relate to trade that might have an effect on BD friendly businesses are: Agricultural and livestock policy as related to: Regulatory services e.g. Seeds Plant Protection Services Animal Health Services Agricultural Information and Marketing of Inputs and Outputs, and Cooperative Development Services The Wildlife Policy of Tanzania as related to Regulatory services e.g. Wildlife and Wetlands laws Strategies and programmes for Policy Implementation User rights and trading licenses Management plans for wildlife protected areas and Ramsar Sites. iii) National Forest Policy Legal and Regulatory Framework Legislation for the Forest Sector National Criteria and Indicators for sustainable Forest Management Pricing of Forest Products.

29. As pointed out earlier, there are three major categories of forests which include: forests owned and managed by the central governments, those owned and managed by the local government and finally those forests owned and managed by communities/villages. The Ministry of Natural Resources and Tourism strives periodically to revise forest legislation following the approved policy and harmonizes these with the legislation of other related sectors mentioned above. The ministry also focuses on policy development, regulations, monitoring and facilitation of the forest sector. It promotes decentralization of forest resource management responsibilities. It strives to strengthen the capacity of the local governments to administer and manage forest resources. The responsible ministry encourages communities/villages to participate in forestry activities e.g. land use planning, defining forest land and tree tenure rights. It encourages the forest division and communities to form or start CBFM in different parts of the country.

30. The Tanzania policy environment generally provides opportunities for promotion of sustainable land and forest management practices that will result in improved food security. There are however a number of constraints to the implementation of activities that would result in the institutionalization of the practice in the long term. The major constraints include conflicting provisions in laws that guide sectors responsible for sustainable forest management. Most legislation with implications for SFM is also dated. Sectoral policies at national and regional and local level will need to be harmonized to facilitate a coordinated approach to SFM. Bye laws for the effective management of woodlands through CBFM require coordination between the four key interrelated policies; namely: National Forest Policy, Wildlife Policy, Environmental Policy and Land Policy, which are supposed to be coordinated in formulating bye laws. This coordination is lacking.

Threats, root causes and barriers analysis:

31. Degradation of Miombo woodlands is well pronounced in Tanzania, which has the second highest rate of deforestation in the Miombo belt (FAO 2007). The miombo have been heavily modified with the mature woodland in Tabora region recorded as mostly secondary since the early nineties (Deweese, 1994). The major causes of degradation are deforestation and over-extraction driven by resource scarcity, commercialization, ineffective local institutional arrangements, droughts, and high demand for wood products from urban areas. Deforestation is largely caused by agricultural expansion, shifting cultivation, commercial timber harvesting, and overexploitation for fuelwood and poles and general industrial development including general urban development. These factors have, to a large extent, been influenced by the high rate of population growth since 1960s. In addition, the villagisation programme of 1970's significantly affected village environments by intensifying pressure on land and woody biomass resources through concentrating a large human and livestock population in specified land areas (Kikula, 1997). The details of these threats are outlined below.

32. Changing agricultural systems and agricultural expansion without considerations for sustainability:

33. The main traditional form of land use in the Miombo region was shifting cultivation on small fields of sorghum, millet, maize and pulses, either under some form of shifting agriculture, usually involving ash fertilization and hand cultivation. In drier regions free from trypanosomiasis, shifting agriculture was practiced in conjunction with rearing livestock, which provided the necessary draught power for cultivation (Puzo 1978). This has changed dramatically in the last few decades. In Tanzania, miombo is seen as the "last agricultural frontier", to be converted and developed, and to accommodate people emigrating from over-populated mountains such as Kilimanjaro, and has experienced an influx of refugees.

34. Refugee movement is a major migratory category in western Tanzania. Political upheavals in the DRC and Burundi have generated a wave of refugees that have found refuge in the border regions of Kigoma, Kagera and

Tabora. The establishment of new settlements/camps involves the erection of new buildings and clearing for new farms. Extraction of ropes from the regenerating young miombo woodland is shifting the woodland population structure and endangering long term stability. The most affected is the southern part of Kigoma and Tabora Regions where there are several refugee camps. Bitanyi (1997) estimated that a 2-year radius of deforestation around refugee camps ranged between 1.9 km to 11.2 km, depending on the size of the refugee camp and number of refugees.

35. Although the regional population growth rates and average household sizes appear low and stable, they mask remarkable variations between wards and villages. Average household sizes have risen over time indicating that demographic trends at that level are more dynamic than demonstrated by the regional data. For example, the household sizes for Kigoma Rural District rose from 4.5 to 5.5 between 1967 and 1978 and from 5.8 to 6.3 between 1988 and 2002. In Tabora Region (Rural Districts) household sizes changed from 4.5 to 5.0 and 5.7 and 5.8 for the same periods. These figures deviate positively from the national average recorded for the same period at 4.4, 4.9, 5.2, and 4.9. Fertility levels are high in the region, with women capable of conceiving between 6 and 15 pregnancies in a life time in some of the villages. This is exacerbated by an observed trend of declining age of first pregnancies.

36. Some strategic areas like Nguruka, Usinge and Mtegowanoti in Nguruka Wards (Kigoma and Tabora Regions respectively), suffer more from strenuous pressure on their resources due to rural-rural migration than other less endowed areas in the catchment. Nguruka and other wards have in this respect been the focus of many immigrants from the Ufipa Plateau, the eastern parts of Kasulu and Kibondo, Shinyanga and Urambo who come in to fish, to find virgin land, and to engage in various trading ventures. The seasonal influx of the Sukuma agropastoralists and their lubaga herds in Mtegowanoti Ward is a typical case in point.

37. In addition, there have been expansion of agro-pastoralists southwards (burning and clearing shrub cover which removes tsetse fly). Most peasant cultivation is for maize and some cassava; crops fail frequently, fertiliser is essential but expensive, and dry-seasons are long and hard. Crossing the woodlands is a network of drainage channels (“dambos”) that provide dry-season water resources supporting small-scale “irrigated agriculture” such as rice. These fragile wetlands support woodland biodiversity and human settlements in dry seasons and so are magnets for immigrants, causing rapid degradation.

38. Deforestation is also associated with the tobacco industry. Tobacco is a major cash crop promoted, with incentives by government and private sector. Indeed, nearly 90% of African tobacco is produced within miombo woodland countries where the annual loss of forest cover is altogether 1.9 million hectares, amounting to 51% of all forest cover change in Africa (3.7 Mill. ha). In Tanzania, tobacco provides the largest share of income to the District coffers in the predominantly miombo woodland areas of central and western Tanzania, where more than 60% of the country’s tobacco is produced. But tobacco growing has several major drawbacks to sustainable forest management: it is a pioneer crop and often at the miombo frontier; the crop develops root nematode infestation requiring field abandonment after three years, hence virgin land is always needed for seedbeds and tobacco plots (fresh land is free from nematodes). The areas temporarily abandoned during the rotation period are rarely planted with trees, but with food crops such as maize, millets, groundnuts, etc. Tobacco drying consumes huge quantities of wood; the curing barns are inefficient, and with individual households it is difficult to build bigger and more efficient ones because the costs are too high for family enterprises. During land clearing for planting tobacco, the trees are usually completely destroyed by burning rather than stored for tobacco curing. Wood for curing tobacco is then harvested in new areas.

39. PPG studies (annex 7) revealed that curing one acre’s crop required about 14 cubic meters of firewood. To flue-cure 600 acres of tobacco grown in Usinge Ward in one season for example, required a minimum of 8,400 cubic meters of wood. In Tanzania flue-cured tobacco production is dominated by smallholder farmers who account for about 90% of annual output. (Mnzava 1984). Although there are two main types of tobacco produced, flue-cured Tobacco account for more than 95% of the total tobacco production in the miombo woodland areas such as Urambo, Mpanda and Kigoma rural districts. Up to 75% of flue cured tobacco production is obtained from Tabora.

40. Natural regeneration in abandoned tobacco fields is problematic, partly because of adverse environmental factors, and partly because of the inherent characteristics of some of the species involved. This “modern shifting

cultivation” therefore leaves the soil open, increasing vulnerability to invader weeds and erosion. Although tobacco companies have tried to introduce woodlots, majority of the wood for drying still comes from the natural forest. A study undertaken in Songea in 2006 for example found that 88% of drying wood is taken from indigenous natural woodlands, with only 12% coming from the woodlots.

41. **Inefficient charcoaling processes:** Charcoal is the most commercialized resource in the miombo region, with 70% of cash incomes of most of villagers in central Tanzania coming from one or two aspects of the charcoaling process. PPG studies reported that a total of 1,368,124 tons of charcoal are consumed each year in the country (3,748 tons daily). Nearly 99% of charcoal used in Tanzania is from natural forests and woodlands; for example charcoal from Itebulanda Village (Urambo District, Tabora Region) was made in the Ugalla Forest Reserve. Older hardwood trees such as *Melicia excelsa*, *Pterocarpus angolensis* and *Dalbergia melanoxylon* are the most sought after, as they produce a very high quality, longer burning charcoal. Large tree species (>20cm diameter) with high caloric values are the most preferred, due to the large quantity of dense and hard charcoal they produce (Monela *et al.* 1993).

42. The technologies for both production and consumption of charcoal contribute to further deforestation. To produce the 3,748 tons of charcoal used in the country daily using traditional methods, the producers have to clear around 399 hectares of forest every day, equivalent to clear cutting nearly 4,000 km² of forest, most of which will not regenerate as it is converted to other land uses (Norconsult 2002). A full year of such consumption equates to more than 145,000 hectares or clear cutting more than over a million kilometres (ibid). As reported in table 1 (below), there is already a negative balance between woodlands needed to supply this amount of charcoal sustainably compared to woodlands available. This negative balance is projected to increase dramatically if the current trends continue. The Forestry and Beekeeping Division of Tanzania estimates an annual forest reduction between 130,000 to 500,000 ha, against only 25,000 ha planted annually.

43. The accelerated harvesting of trees impacts negatively upon soil, watersheds, biodiversity and climate change. According to various studies and calculations, each ton of charcoal produced and consumed in Tanzania generates nine tons of CO₂ emissions, one million tons of charcoal thus translating into nine million tons of CO₂.

44. To the extent that charcoal production competes with other forest uses, it reduces growth potential in the forest sector as it leads to a decline of the total stock. In many parts of Tanzania, e.g. Dar es Salaam, Morogoro, and Iringa, the sustainable yields seem to have been exceeded and thus the country’s natural capital is sacrificed for charcoal production. Charcoal is hence being produced at a cost to society in terms of its present and future availability to meet wood biomass needs and wood needs for other purposes.

Table 1: Projection of the impact of charcoal production on the country’s forests and woodlands (Source: Norconsult (2002:18)

Year	Urban charcoal consumption (tons)	Woodlands needed for sustainable production(km ²)	Woodland remaining (km ²)	Woodland surplus or deficit (km ²)
2002	926,000	98,511	300,000	201,489
2005	1,071,961	114,038	218,700	104,662
2010	1,368,124	145,545	129,140	-16,405
2015	1,746,111	185,757	76,256	-109,501
2020	22,285,529	237,078	45,028	-192,050

45. The net present value (NPV) for both charcoal and tobacco show a positive value when environmental cost-benefit analysis is not included. When the cost of labour, raw materials and opportunity costs are considered, the NPV value is negative indicating that profit realization is currently being accomplished at the expense of sustainability. Biofuel production is also contributing to deforestation. Village governments are giving off areas of land for *Jatropha* plantations. Between 2004 and 2007, it is estimated that close to 220,000 ha have been allocated to various international companies for *Jatropha* country wide (UNDP Tanzania Country Office, 2008). Although local communities and their leaders are quite enthusiastic about the investments into the local economies, they are not always fully aware of the potential negative impacts of monoculture on land especially on the forests and other natural resources, or the long-term impacts of reduction in land availability.

46. **Climate change as a compounding threat:** Climate change and variability has been a part of the rural agriculture in Tanzania for decades, increasing the burden on food security and income among many farming families. Analysis by Hatibu et al. (2000) revealed that more than 33 percent of disasters in Tanzania over 100 years period were related to drought, with 37 occurrences of drought recorded between 1872 and 1990 alone (URT, 1998a). Some important evidence of climate change often mentioned for Tanzania include receding ice on Mount Kilimanjaro, sub-mergence of Maziwe Island and intrusion of fresh water by salt water in shallow wells in Bagamoyo district (Mwandosya et al., 1998; WWF, 2006; Mwandosya, 2006).

47. The IPCC forecasts an increase in average temperatures for most parts of Tanzania (IPCC, 2007), but warns of a rapid change in the occurrence and predictability of climatic variability. According to this report, many parts of the western region have experienced an increase in temperature of between 1 and 2°C from 1974 to 2005, while the rest of the country increased from 0.2 to 1°C during the same period. The report projects further increase in temperature of between 3 and 4°C by 2080 under no action scenario. The International Institute for Environment and Development (IIED) forecasts a rise in temperature of between 2 and 4°C and a decline in rainfall of between 5 and 15% over Western Tanzania by the year 2100 (IIED, 2009), under no action scenario. In 2005, Tumbi meteorological station reported the highest temperatures of 35.2°C since it started recording over 30 years ago (TMA, 2009b). Rising temperatures, changing precipitation regimes and changes in the amount of carbon dioxide are expected to affect phenology, composition, structure, distribution, succession processes and community dynamics in the following ways, which will affect the flow of ecosystem goods and services, and in particular the ability of the ecosystem to support economic development and wellbeing sustainably.

48. **Composition:** Although data on the miombo woodlands is limited, several studies report clear trends in other biomes which show that change in climate has already altered the composition of many ecosystems. Some observational studies have already documented species turnover and attendant changes in species richness in the tropics (Bunker et al. 2005; Bush et al. 2008; Phillips et al. 2008). This is supported by the fact that there is a strong relationship between rainfall and the dynamics of African savanna ungulates (abundance, composition, vigour (Ogutu et al. 2008b)). Any changes in rainfall due to global warming is therefore likely to alter the abundance and diversity of the vegetation, with consequent changes in the abundance, diversity and structure of the associated animals. Such scenarios are likely to be compounded by the likelihood of some low abundance species becoming one of the dominant species in the grassland following a period of prolonged below-average rainfall while the abundance of an alien invasive grass greatly increases following major El Niño events (Hobbs et al. 2007a). Several examples of species turnover have been identified by modelling studies (Levinsky et al. 2007; Buisson et al. 2008; Colwell et al. 2008; Trivedi et al. 2008b). For example, Mesic grassland ecosystems in the Pyrenees showed strong shifts in plant diversity and composition after a short period of warming and drought, as a consequence of acute vulnerability of some dominant grasses, losses of rare species, and aggregate and trigger effects of originally uncommon forb species (Sebastia et al. 2008).

49. **Structure:** Changes in species composition related to climate change have led to changes in the physical and trophic structure of ecosystems, with resulting further effects on ecosystem function, and composition. Although data for the miombo woodlands is limited, examples of structural changes related to climate change have been observed in other systems, including: accelerated forest turnover and associated gap formation in the tropics (Phillips et al. 2008); increased abundance of lianas in both tropical and temperate forest systems (Allen et al. 2007; Phillips et al. 2008); changes in gross primary productivity (GPP) in some geographical areas (Woodward et al. 2008); invasion of temperate grasslands by woody plants, which is facilitated by increasing CO₂ concentrations (Morgan et al. 2007; Bloor et al. 2008) and which alters the availability of food for grass-eating herbivores; trees' disappearance as a result of drought (February et al. 2007; Foden et al. 2007; Badgley et al. 2008); advances of the tree line (e.g. montane systems) (Beckage et al. 2008); and increased probability of extinction for herbivores unable to digest C₄ grasses, as well as the dispersal and dynamics of other plant species.

50. **Phenology:** Although it is not yet clear how phenology of plants will change due to climate change, long-term observational data show that warming accelerates spring budburst and delays autumn leaf fall in warm temperate forests (Fujimoto 2008). In Miombo ecosystem water stress is considered to be a primary trigger for leaf shedding and likely to affect reproductive phenology or flowering. In the semi-arid region of north-western

Venezuela, the varying timing of episodic rains triggers variable flowering in several tree species (Diaz and Granadillo, 2005). However, the direct effect of climate change on Miombo ecosystem will be less serious than the effect of changed phenology on pollinators and seed-dispersal agents (Corlett and Lafrankie, 1998). Studies elsewhere have shown that some species differentially respond in terms of growth and/or phenology to change in the timing of soil wetting (Tissue and Wright, 1995; Priya and Bhat, 1999). At the species level, recent observed evidence shows that climate change has already caused changes to the distribution of many plants and animals (Campbell et al 2009).

51. **Succession processes and community dynamics:** The totality of changes in distribution, structure, phenology etc. is likely to be reflected in succession processes and community dynamics. Once again data for the miombo woodlands is limited, but there are reports of changes in other vegetation types. For example long-term observational data on increasing rates of tree turnover in the Amazonian forests reflect the effects of increased atmospheric CO₂ on tree growth (Phillips et al. 2008; Lloyd and Farquhar 2008). In the Alps following glacial retreat, succession involved different species and dynamics than had previously been observed (Cannone et al. 2008). Also, rainfall amounts and distributions were the key factors for community dynamics and species dominance in Californian grassland (Hobbs et al. 2007a). Currently, the evidence that dynamics in host-pathogen related to influence of climate change is growing, not only for plant diseases but also for animal and human diseases (Purse et al. 2005; e.g. Haines et al. 2006). Also, the impacts of climate change have increased the range of tick-borne disease Theileriosis (East Coast fever (ECF)) in sub-Saharan Africa, and the Northern Cape and Eastern Cape provinces of South Africa, Botswana, Malawi, Zambia and eastern DRC. Collectively, these changes will affect the flow of ecosystems goods and services and the ability of the ecosystem to support economic development and livelihoods.

52. Given the heavy dependence on natural resources in the region, the impact of climate change on humans will be compounded by climate change-induced alterations of agriculture, water supply and disease. For example, it is projected that climate change may reduce the ability of the woodlands to regulate water flow, reduce the effectiveness of provisioning services such as fisheries, food, fuel and fibre; and critically reduce the ability to sequester and/or retain carbon (Campbell et al 2009, O'Neill et al. 2008; Arnason 2007; Brander 2007; MA2005a). This further threatens natural systems that are already fragile and livelihoods, food intake and health of people who are already vulnerable, often triggering a vicious cycle (Smith and Troni, 2004; Reid, 2004). For instance, when climate change and variability alters the distribution, availability and access to some of their livelihood systems, the rural communities tend to change their livelihood options. Some of the coping strategies have been charcoal making, brick making, illegal logging and beekeeping.

53. As reported by IIED (2008) and numerous other reports, Tanzania has already encountered major impacts of climate *change* and variability on agriculture. This is in the form of recurrent droughts, floods, increasing crop pests and diseases and seasonal shifts (URT, 2007). In 2006 a major drought triggered serious food and power crises in the country, costing the economy an upwards of US\$ 200 million in food imports and distribution. In semi-arid areas of Tabora and Dodoma increasing temperature and decreasing rainfall is estimated to reduce maize by between 80% and 90% and therefore threaten the main source of food for millions of Tanzanians (Jones and Kiniry, 1986; Mwandosya et al., 2008). Quantifying this impact, IIED (2009) argued that climate change will trigger a 0.6 to 1% decline in GDP by 2030; and by 2085, the decline in GDP will range from 5 to 68% depending on the severity of climate impacts.

54. Communities in the Tabora and Rukwa regions perceive climate as rainfall (good or bad), temperature and drought. This was clearly demonstrated during the PPG (focus group discussion) in Itebulanda and Maboha village. Farmers reported that harvests for major crops have declined steadily in the last 30 years as rains become less abundant and poorly distributed. The trend is considered to have changed over the past 10 or so years, due to a general decrease in amounts of rainfall. At the same time it was reported that temperatures have considerably increased in recent years.

55. Several impacts were reported to have resulted from the changing climate. Community members in Itebulanda village reported that the abundance, vigour and productivity of some traditional crop varieties are

declining because of the changes and uncertainty of rainfall and increased incidence of drought. They tend to succumb to drought and dry out before they flower, a situation that is causing some traditional varieties to become extinct.

56. In Maboha village the major perceived impacts of climate change reported included: (i) Low crop productivity because of recurrent drought; (ii) Delayed onset of rains that affects production during the season; (iii) Drying of water wells that caused water shortage, for example in 1996/1997, 2000/2001 and 2006/2007. It was reported that in that season women were most affected because they had to travel long distances in search of water. This called for the involvement of men in the search for water. (iv) Unusually heavy rains have been destroying crops and infrastructures (e.g. roads), for instance in 2009/2010; (v) Low honey production in periods with drought, for example in 2006/2007; (vi) Decline in fisheries activities during drought periods.

57. All respondents to the PPG questionnaire reported that the levels of poverty among community members have increased because they are no longer able to produce enough food. As a result, community members attributed the expansion of shifting cultivation to the fact that old fields are getting exhausted more rapidly, with consequent increase in deforestation. In addition, they reported diminishing water sources as a result of the changing climate, and an increase in incidences of wild fires due to decreased rainfall and lengthening of the dry seasons.

58. Forest degradation also has a huge impact on carbon sequestration. CIFOR (2009) reported that a modest deforestation rate of 50,000 hectares a year equates to a loss of 3.5 million tons of carbon per year for above ground biomass alone. The figure is much higher when below ground biomass and loss of carbon due to degradation are included⁶. It is estimated that 50–80% of the total system's carbon stock in the miombo woodlands is found in the top 1.5 m belowground (ibid). Although the impact of land use conversion on belowground carbon and nitrogen stocks within the woodlands has not been examined extensively in the past, studies are starting to emerge that show how the soil carbon profile reacts to conversion to agriculture, the continuation of agriculture, and the ability of the soil carbon budget to recover following abandonment. A study carried out in Chimaliro Forest Reserve and surrounding villages in Kasungu, Malawi showed the following important results: i) that surface carbon levels in Miombo soils varied from 1.2 to 3.7%. Agricultural soil carbon was significantly depressed with surface layers ranging from 0.35 to 1.2% carbon; ii) Unexpectedly, fallow carbon and nitrogen levels continued to be significantly repressed (surface soils 0.65–2.3% C), pointing out the possible unsustainability of the current agricultural management cycle dominant in the area; iii) On average, agricultural soils contain 40% less soil carbon than the natural Miombo woodlands; iv) Soil carbon declined logarithmically with depth within all land use types; v) Clay content was significantly positively correlated with soil carbon in the top 40 cm and therefore areas of higher clay content contained elevated carbon levels. These statistics are likely to apply to the Tabora region.

59. The long-term solution to the threats affecting biodiversity, ecosystem and livelihoods in the Miombo region as a whole is the adoption of sustainable-use management practices for resources harvested by local people for subsistence and local economic growth, and better regulation of commercial activities. A management strategy is needed that fully recognizes the fact that Miombo woodlands will continue to provide, for many decades to come, the key inputs to rural livelihoods in the face of commercialisation and change. The key then lies in ensuring that rural households and commercial tobacco farmers modify their productive practices to make them compatible with biodiversity conservation, while respecting development needs and cultural norms. A number of productive options exist which have the potential to contribute to this long term solution. To ensure sustainability, a management model must be based on sound understanding of the miombo ecological framework and sustainability, management options that ensure sustainable use, effects of macro-economic and inter-sectoral influences on management and delivery of ecosystem goods and services, optimal local institutional arrangements in the context of increasing resource scarcity and changing markets.

60. The government, tobacco industry and the people of the western region have embarked on better management of the miombo woodlands but the effectiveness of their efforts is being hampered by policy, knowledge, capacity, skills, markets and technology barriers, described in detail below.

⁶ Carbon and Biodiversity: A demonstration Atlas. UNEP / WCMC: 2008.

61. **Policy barriers:** The policy barriers in Tanzania originate largely from the history of development of the forestry sector. Like the rest of the region (and the world), until relatively recently forestry took the form of topdown government approaches focused on the introduction of new technologies. This was characterized by establishment of village woodlots, planting fast-growing species, and the demarcation of protected forest areas from which local people were excluded. Indigenous species, local agroforestry systems, and traditional resource management practices, as well as institutions for communal forest stewardship, were often ignored. Decisions about forest management were taken in centralized government offices, far from the people affected by the policies, or more typically, decisions were not taken at all. In Tanzania for example huge areas of miombo were gazetted as forest reserves, but there were no institutions established or developed to manage the areas, consequently, no tradition of management *per se* was developed and the focus remained on regulation and revenue generation for the state.

62. However, Tanzania has worked hard in the last two decades to reverse this situation and several reviews have reported that the country is very advanced in development and implementation of a policy enabling environment for community based forestry. For example, the country has embraced decentralization of natural resources management enshrined in the Forestry policy (1998) and the forest act (2002). The forest and land policy are closely aligned and implementation of the instruments is impressive with large numbers of villages and big forest areas already covered (Blomley and Ramadhani 2006). Village Forest Reserves are fully devolved in many places and communities are receiving full revenue rights (Wily and Dewees 2001). Despite these efforts, there are localized barriers. As a developing country, Tanzania and the miombo countries need to provide a policy environment that balances economic development, woodland modification, demands for new agricultural land, and the longer term costs of the loss of woodland cover. There are unfortunately few tools available to planners to fairly assess these costs and benefit, or explain how they should be weighted in the policy process. In addition, the technical information available also does not take into account the new reality that much of the management will be undertaken by local people. In Tanzania, this situation is exacerbated by the fact that national policies are still sectoral in both content and context, despite the recognition of the decentralized district as the centre of mainstreaming processes. Such sectoralism has led to contradictions, gaps and duplication.

63. A range of regulatory instruments designed to prevent over-exploitation of forest resources and to raise revenues for resource management inadvertently undercut livelihood opportunities for local producers and traders. For example, there are many policies that prohibit the harvesting of forest products for commercial purposes from state-owned forests. Ironically, these restrictive institutions have not been very successful in preventing resource degradation; in many cases they have had the opposite effect by removing the responsibility for management from the actual users. In addition, revenue generation by the state has been limited due to weak revenue collection systems.

64. For example, studies of PFM⁷ (Participatory Forest Management) however show that the strategy (PFM) offers an effective tool to convert the current charcoal sector from largely an illegal trade to one that allows for sustainable charcoal production with economic benefits to rural communities, in addition to the substantial conservation benefits it yields. Its effectiveness is however hindered by yet more policy barriers. For example, separate departments in the Ministry of Natural Resources are advocating for villagers to develop separate Village Forest Areas and Separate Wildlife Areas, with different modalities, rights and responsibilities. This situation is made worse by poor implementation of national policies due to weak enforcement of agreed regulations and procedures (e.g. land-use planning guidelines, forestry rules, and both village and district bye laws). This poor enforcement is driven by low levels of institutional / individual capacity, at national and local levels to seek

⁷ Tom Blomley and Hadija Ramadhani: SLSA newsletter Issue 17 (Nov. 2005), Khanya-African Institute for Community Driven Development (Khanya-aicdd)

sustainable resource management. As a result both biodiversity and livelihood values of the Miombo woodlands are poorly mainstreamed into district planning and economies.

65. When well implemented CBFM provides opportunities for generating tangible and sustainable livelihood impacts while improving ecosystem resilience and flow of ecosystem goods and services. Indeed, pilots from Iringa District where CBFM models were piloted in the late 1990s, shows that forest areas managed under JFM and CBFM are recovering compared with forests managed by government alone, or under open access regimes. Wide scale adoption of CBFM and indeed the effectiveness of the current pilots is being reduced by many challenges including inadequate enforcement of existing laws and bye laws against forest degradation and deforestation; entrenched corrupt practices and lack of good governance in the forest sector; low level of environmental education among community members that could help in further protection of forest resources; long and tedious process in defining and demarcating areas to be under CBFM regime; lack of political will due to conflicting sectoral interests in forest and other natural resources use; lack of coordination between sectors and within sector (PPG reports, 2010).

66. The miombo woodlands region in particular is plagued by weak governance and inadequate enforcement of NRM policies, rules and regulations at the local level. For example key informants interviews revealed that tobacco farmers have always been advised by the tobacco companies to plant own trees before cutting naturally occurring ones for curing tobacco. The tobacco company also provides farmers with tree seedlings along with inputs for tobacco production. Despite such effort not all seedlings distributed to farmers are planted, survival rates are low, and the use of planted tree for tobacco curing is very low. Although most informants attributed the low adoption to the fact that the tobacco companies provide seedlings for exotic tree species which they claim are inefficient for tobacco curing, the fact that there is no enforcement of rules on tree cutting from the natural forests makes it easy for the farmers to flout the rules, ignore the seedlings and carry on deforesting natural forests. Similarly, while many families have been assisted to build improved brick kilns, a high percentage have opted to use the improved kilns as dwelling places and carry on with the inefficient curing processes. Indeed more than 50% of the respondents in the pilot villages reported that they were not aware of the existence of the bye laws that govern management of forest resources in their area. Only 27% of those who knew about the bye laws thought they were effective with a further 43% regarding them to be only moderately effective, while 30% perceived the bye laws as not effective. This was a more pronounced concern in Maboha village where community members (35% as compared to 28% in Itebulanda village) seemed to be unhappy with the invasion of the forestland by migrant livestock keepers who are being given permission to occupy the forest by village leadership.

67. Most respondents reported that local level resource governance and participation of the community in CBFM were weakening. Community involvement in forest management has largely been through engagements in forest patrols particularly through Village Game Scouts (VGS). Similar type of forest management was reported in Maboha village. It was claimed that in the past most villagers were involved in preventing and/or controlling bush fires and preventing unauthorised cutting of trees in the forest. Participants claimed that the pattern has changed in recent years because some village leaders are breaking the regulations, and have been allowing some people to encroach the forests.

68. **Marginalisation of the forestry sector:** Although forest resources play crucial roles to local livelihoods and contribute significantly to national economies the forestry sector is generally marginalized in the national policy arena and budgeting process with few resources to support sustainable management, develop appropriate technical information and enforce regulations (Barany et al. 2004; Mlay et al. 2003). Forestry spending has to be mobilized in the face of many competing priorities such as health, education, transport, as well as agriculture. The national extension service is primarily for agriculture, and only tackles forestry issues in an adhoc manner. Lack of resources means that the forestry departments are unable to effectively implement forest policies, have limited capacity for regulation, and provide limited services to smallholders and communities.

69. The charcoal sector falls partially between a number of Ministries, including the Ministry of Energy and Minerals (MEM), the Ministry of Natural Resources and Tourism (MNRT), the Ministry responsible for Local Government and the Ministry responsible for the Environment. All of these Ministries are subject to common

national policies that impact the charcoal sector, but few concrete strategies and actions have been developed. This despite the fact that charcoal is hugely destructive to the environment, causing high rates of deforestation, carbon dioxide emissions, and water catchment and biodiversity losses.

70. **Capacity and knowledge barrier:** The greatest barrier to adoption of production practices that are friendly to biodiversity and promote ecosystem resilience is the poor understanding of the miombo woodlands compounded by low individual and institutional capacity at national and local levels. Although the miombo woodlands have been described many times, their ecology, silviculture and management potential are still not well understood. Miombo woodlands have a unique problem of having a low inherent productivity because they are located on some of the poorest soils in Africa. Because the woodlands have low productivity, returns to active management will generally be low, thus providing few incentives to actively manage forests. Nevertheless for the rural poor, the woodlands need to be managed for multiple outputs; but management of miombo for multiple outputs is not easy for two interrelated reasons: one, the silviculture of managing for multiple outputs is poorly understood; and two, because the complexity of the management system increases when multiple stakeholders have interests in managing for different outcomes. The problem is that it is not easy to manage multiple resources (Chidumayo et al. 1996). There are likely to be multiple trade-offs in managing different resources, and there are numerous information gaps on the species concerned. The main technical management issues in miombo woodland largely relate to harvesting, regeneration, coppice management, fire management and grazing management. Because of the diversity of uses of miombo woodland, the intensification of any one particular management strategy is likely to affect the production of other woodland products.

71. Despite the great needs, most government authorities responsible for planning have limited capacity for cross-sectoral planning and adaptation to climate change. Local institutions such as the village environment council and religious institutions have limited capacity, cohesion and political clout, reducing their ability to exert significant influence on the Government in relation to technical support, marketing, finance and resource tenure issues. Most resource users have limited knowledge of SFM techniques, and have few incentives for adopting improved practices. There is limited extension service support, and no effective mechanisms for identifying and sharing lessons on SFM and best practices. Information sharing is therefore haphazard and gaps in knowledge and awareness are numerous. As a result, there is no integrated “Miombo development plans / programmes” that are able to monitor land-use and receive planned immigration and channel this into sustainable productive enterprises that allow the ecological and social benefit streams from productive miombo woodland to continue. The Miombo woodlands however continue to receive immigrants from other over-populated areas of Tanzania, and resource management planning and practices are not able to deliver sustainable management guidelines or best practices for people or the habitat.

72. Specifically, there are inadequate skills and knowledge on soil fertility management, in the face of declining soil fertility, inaccessible finance for fertilizers and shortening fallows. Focus group discussion with village communities in Itebulanda and Maboha village indicated that productivity of maize can be improved from a low of 5 tons per acre without application of fertilizers to a high of 15 ton when NPK is applied at the recommended rate of 25 kg N per ha. The study however revealed that communities have little knowledge of fertilizer application, particularly as part of broader soil fertility management package. The problem of the miombo soils is the inherent infertility, which cannot sustain crop productivity for more than three seasons without replenishing mineral nutrients. Fertilizer is expensive compared to actual return on investment. While organic residue management could provide an alternative to fertilizers, their effectiveness is reduced by the rapid decomposition of organic matter due to high temperatures.

73. There is also inadequate knowledge, capacity and policies to deal with adaptation to climate change (both the issues and possible adaptation mitigation interventions). Due to low levels of research, there is inadequate knowledge of how key characteristics of the woodlands will change with a changing climate such as distribution, phenology, population structure, species composition etc; or how these factors will interact to influence productivity and flow of other ecosystem benefits. The miombo are rich in insectology. Combined with the high temperatures, this is already a problem to post harvest management of agricultural produce.

74. **Limited livelihoods and market barriers:** Despite the importance of the non timber forest products of the miombo to the local and national economies, financial returns to the local communities and national coffers are still limited. This is largely due to the inability of the markets to integrate ecosystem services (e.g. BD conservation, sequestration, hydrological regulation) values into the pricing system, compounded by poor processing and inaccessibility to local and international markets. The miombo woodlands provide four types of ecosystem services to the international community: carbon sequestration, watershed protection, biodiversity maintenance, and aesthetic qualities of the landscape related to tourism. With the exception of tourism, the communities who are expected to forego immediate benefits associated with degrading the woodlands are not being adequately compensated for the positive externalities to off-site beneficiaries. There is therefore no incentive for land managers to take the continued provision of these critical services into consideration in day to day decision making.

75. The situation is compounded high levels of poverty combined by the low margins for investing in active management of the miombo woodlands. The absolute income of most rural households is so low that cash constraints push decisions towards high preferences for rapid exploitation. While woodlands are quite important for subsistence products they are less important for cash income. Because of their nature, a tree has to be felled to fetch money. Under these circumstances, communities show strong tendency to discount the future and the need to secure immediate survival is greater than that of ensuring conservative use. Households needing to secure cash often choose to over-use and, if necessary, deforest.

76. The development of a vibrant local economy is further complicated by inadequate access to credit facilities. Currently, the available credit facilities are tied to tobacco and cotton production. Limited availability of agricultural inputs. Focus group discussion in the study villages revealed that limited access to input for food crop production has contributed to high dependence on tobacco production in order to get inputs which are shared with food crops. This was also reported to be a deterrent to reforestation abandoned tobacco fields. In the absence of fertilisers for food crops, farmers use these fields, taking advantages of fertiliser residues from tobacco farming. Moreover, fertilizer meant for tobacco is often spread over to food crops, making it inadequate for either. This is compounded by the high cost of fertilisers, even when it is available in the local market.

77. Cooperatives could improve access to inputs; but nearly all the cooperative societies are also geared to cash crops, mainly tobacco. For example PPG assessments revealed that Maboha village had no primary cooperative society or credit facility; and that while farmers understand the importance of such cooperatives, the conditions requirements for their establishment were a hindrance. For instance, respondents reported that the tobacco companies required the village to guarantee an annual produce of tobacco of no less than 200,000kg as a condition for registering a cooperative. This is well beyond them.

78. The situation described above is in spite of the fact that innovative biodiversity-rich farming systems complimented by high value NTFPs can reduce the need for land clearing, limit agricultural expansion and reduce both deforestation and forest degradation. Most of the NTFPs are naturally occurring and are therefore organic. Despite the current global demand for organic products, there has been little promotion of demand for such NTFP products, such as honey, vegetables, etc. Yet, while there is some information on fuelwood and honey production, information on many other miombo products, such as edible insects, mushrooms and other edible products is extremely limited. There is little marketing of these unique products and the supply chains are ephemeral, lacking a certification and verification process needed to provide traceability. The management model needs to build on a clear understanding of how such products enter the market, trends in commercialization and the socio-economic and environmental impact of these processes. Understanding of the temporal dimensions of markets and marketing channels, their contributions to livelihood strategies and gender differentiation, their impacts on local institutional arrangements and on woodland structure and function is however very limited.

79. There are lessons emerging from trade in natural products such as baobab products, marula, etc., particularly from southern Africa (PhytoTrade), that would be useful for the NTFPs of the miombo, but there is little sharing of such information. In the absence of information on markets prices offered for many products act as disincentives to sustainable harvesting and use. Revenue collection by government and councils from the little trade

occurring is haphazard and ineffective. These barriers compound the adoption of Payment for Ecosystem Services (PES), as described below.

80. **Inadequate opportunities for PES, particularly linked to sustainable charcoal:** Beyond achieving the objectives of conservation proper, PES can potentially provide important additional and regular income flows, or other material benefits, for cash-poor forest-dwelling communities. PES schemes thus have the potential to create ‘win-win’ situations for people and the environment. A key problem has been the lack of buyers for environmental services from Miombo woodlands in the country. There are limited returns to communities from tourism revenues and the benefits of CBNRM are not adequate in the face of the abject poverty and the cost benefit analysis reveal a higher short-term opportunity cost for conservation than degradation. Sustainable charcoal provides an opportunity for PES in Tanzania.

81. Charcoal will remain a growing dominant source of energy for cooking for the urban households sector for the foreseeable future in Tanzania. PPG studies estimated that the pilot wards produce more than 400 tons per year. Engaging in sustainable charcoal would provide a financial incentive for SFM. Sustainable charcoal refers to charcoal that has been produced from sustainably managed woodlots, woodlands or forests combined with improved processing and utilization techniques, where the conversion along the charcoaling chain is as efficient as the current levels of technology allow (ESD, 2007). Sustainable charcoal concept aims at minimizing material and energy losses at all stages of the charcoaling chain. In this case, wood obtained from sustainably produced biomass resource is harvested using efficient ways ensuring minimum waste is generated. The wood is then converted into charcoal using improved and efficient kilns after which proper handling is ensured during packaging, storage and transportation to minimize waste. The generated charcoal is consumed using improved cookstoves such as the Kenya Ceramic Charcoal (KCJ), and finally, the charcoal dust is used as fertilizer.

82. Sustainable charcoal can earn carbon credits under the CDM (and voluntary markets). Measurement of emissions mitigated through sustainable charcoal can be done in accordance with the CDM approved baseline and monitoring methodology AM0041 -“Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production” – UNFCCC CDM EB⁸. This methodology recognizes sustainable charcoal as a double mitigation technique because it reduces the amount of methane from carbonization as well as reducing amounts of wood being converted to charcoal, by increasing efficiencies. Where sustainable charcoal includes planting of trees in woodlots and/or incorporation into agroforestry practices, it introduces a third mitigation aspect through the creation of carbon sinks. Emissions reductions from the carbon sink are however too complex to calculate for most rural areas in Malawi due to deficiencies in baseline data and annual growth and production characteristics of the species used for charcoal production.

83. In the short term, significant emissions reduction can however be achieved through the use of improved efficiency kilns, improved conversion techniques, drying of raw material used for charcoal, improved stacking of kilns, reduced wastage of materials through improved kiln operations and wood sorting skills combined with use of improved and more efficient cookstoves. It is reported in literature that adoption of such improved practices can lead to 25-40% reduction in the quantities of wood needed to produce similar quantities of charcoal⁹. By earning carbon credits (co-finance) and providing other social benefits, sustainable charcoal can provide an incentive for SFM..

84. Yet there are many barriers to sustainable charcoal adoption in Tanzania in general and in the pilot wards in particular, that have so far hampered the adoption of the concept. These barriers include lack of an enabling policy or institutional arrangements for a system wide adoption and regulation. On policy: Despite its high contribution to the national energy budget, there is still no official recognition of charcoal production and marketing by national energy or forestry policies. The forests and woodlands are therefore not being managed to support charcoal as a legitimate product. Various aspects of charcoal are under different ministries and therefore different policy instruments. Charcoal is not taxed in a similar manner to other sources of energy: consumers are therefore paying

⁸ CDM Approved Methodologies; UNFCCC Publications

⁹ TAFORI 2010: Charcoal production activity compromise environmental Compliance, conservation and management strategies in Tanzania: http://inece.org/conference/9/papers/Uisso_Tanzania_Final.pdf

less than its actual cost, particularly because the cost to the environment in lost ecosystem services is not factored in its pricing; the government also loses considerably large amounts of revenue that could be utilized to support sustainable production. In 2002, it was estimated that the charcoal business generated revenues of more than Tshs. 200 billion (\$200 million) and that more than 70,000 people from rural and urban areas were employed in the charcoal industry. Despite the magnitude of this industry much of it is not legal, nor is its production, trading and consumption technologies efficient enough.

85. On institutions – there is no institutional framework that can coordinate the implementation and replication of the steps of sustainable charcoal locally or nationally. Several institutions interact with different aspects of charcoal; each with its own priorities and interests. Although coordinated interactions among these actors would be beneficial to sustainable charcoal as an incentive for SFM, currently there is no authority or agency providing guidance or technical support on issues such as rules and regulations for handling sustainable charcoal. Consequently, there are no skills, systems or policies for the adoption of sustainable charcoal.

86. Tanzania is however part of the UN REDD program pilot countries and it is creating a capacity and policy enabling environment for a systematic engagement with sustainable forest management carbon systems at a national level. While this program will deal with national level issues, there are still local level barriers that may hinder actual piloting and community engagement, such as local institutions, skills, and organization to ensure governance and compliance monitoring, avoid leakage and secure permanence as well as ensuring equitable distribution of benefits.

Part II: The Strategy

Project Rationale and Policy Conformity

87. The government proposes to resolve these problems through a pilot project that mainstreams Sustainable Forest Management into the production systems in the central part of Tabora Region with activity spreading to Rukwa, Kigoma, and Singida Regions in the west part of the country. The overall Goal of the project is that “Sustainable Forest Management secures ecosystem and biodiversity values while providing a buffer to the Congolian Rain forest, ensuring food security and sustainable livelihoods. To achieve this, biodiversity conservation has to be mainstreamed into economic planning and development, so that agricultural productivity and sustainable livelihoods are improved while simultaneously improving the ecological integrity of the ecosystem, including securing its productivity from negative effects of climate change. The objective of the project is “To enable miombo dependent communities to adopt productive practices that are favorable to biodiversity conservation, reduce carbon emissions from land use change and improve livelihoods”. The project’s immediate focus is an area of 133,400 hectares covering 4 wards (Usunge, Imalamakoye, Mbola, Inyonga) in Urambo, Uyui and Mpanga districts. It will target 12,530 households spread over 28 villages (annex 2 provides detailed statistics at village level). The objective will be achieved through 4 components that address the barriers with a further component providing project management.

Component 1: Enabling Policy for SFM and up scaling

88. The project will support efforts by communities and Government to develop policy and legislative instruments in favor of conservation friendly land uses, including formulation of policy and procedures for the regularization of charcoal and better implementation of current biodiversity friendly policies. Building on the policy review undertaken during the PPG, this outcome will ensure stakeholder participation in formulating policy recommendations for the improved harmonization of sector policy in support of mainstreaming SFM friendly practices for better environmental management and economic development. The component will make the considerably progressive environment management policies in the country more effective by removing the policy contradictions that still exist, including contradictions between national policies and local bye laws. More importantly, it will strengthen legislation mechanisms for effective implementation and enforcement at the local level. It will also increase the awareness and understanding of the policies and their implementation mechanisms amongst the local communities and land users, hence promoting implementation. Similarly, it will strengthen local bye laws and the coordination between these and local needs. Specific outputs and activities are outlined below:

89. **Output 1.1: Policy regulatory framework and institutional arrangements support Sustainable Forest Management:** Under this output the project will facilitate a comprehensive participatory review of the current policies, especially the legal and institutional implementation mechanisms to identify weaknesses in both policies and implementation mechanisms and recommendations for improvement. The project will then lobby the relevant authorities for the adoption of the recommendations. To improve chances of the adoption of the recommendations, the project will seek synergies with other national and local level policy initiatives, feeding the “evidence-based” recommendations to the identified processes. Policy recommendations will in particular seek to increase the incentive for better management of Woodlands: The potential of markets for woodland products and services to improve local value-added can increase the incentive for better management of woodlands by CBFM. This potential can be enhanced through various policy and regulatory mechanisms. The mechanisms include simplification of the regulatory regime to reduce transaction costs for poor producers, and developing a framework for providing greater support for producer organizations and user groups. Forest regulatory regimes have acted, in many aspects, as a trade barrier limiting, competition, restricting market entry, keeping producer margin low and consumer prices high. A simplified regulatory regime which favours the capacity of producers to manage woodlands could contribute to expanding market (World Bank, 2008).

90. Specific activities will include: Review CBFM/JFM, NRM, PES and energy policies, identify overlaps, contradictions and formulate recommendations for harmonization; Produce policy briefs and disseminate to lobby for the adoption of recommendations for harmonization; Produce abridged versions of sectoral policies and disseminate to the communities to increase understanding of relevant policies; Link the project to the national PES Legal Framework formulation process to provide inputs based on project experiences; develop Policy and legal framework to address subsidy in alternative energy and appliances; link policy recommendations to ongoing policies initiatives.

91. **Output 1.2: Local level implementation of policies and bye laws improved:** Inadequate enforcement of laws governing NRM, SFM, CBFM/JFM and other environmental processes is a major obstacle to institutionalization of SFM in Tanzania. The project will strengthen local (regional and district) enforcement structures for better coordination and mainstreaming of SFM into national development planning. The project will therefore build on the PPG studies to further review the traditional resource governance mechanisms and identify areas of synergy or contradictions with the national policies. It will then promote the adoption of integrated development planning through training of relevant district staff and participatory planning processes, involving relevant stakeholders at regional and district levels. The Village Environment Management Committees will be particularly targeted in order to identify (and implement) measures to improve enforcement of local environmental management bye laws. Specific activities will include: identification of relevant bye laws, review and identification of areas of conflict, weaknesses and strengths; Formulation of recommendation for improvement, harmonization and effective enforcement; dissemination of results, formulation of approaches for lobbying and lobbying relevant sectors/institutions/communities for adoption; Facilitating integrated district development planning that mainstreams SFM; Training relevant regional/district technical officers, ward and village level leaders on integrated planning that mainstream SFM in a coordinated manner; Identification of traditional institutions in the region and empowering them to support SFM programs; Reviewing and documenting relevant traditional rules and regulations for NRM/SFM and identifying strengths and weakness for NRM governance.

92. **Output 1.3 National policy for regulating sustainable production, processing and marketing of charcoal in place:** In conjunction with output 1.1, the project will facilitate key stakeholders to undertake a comprehensive review of the policies that regulate charcoal at the various stages (from tree to charcoal to kitchen) and identify a policy and legal framework that will promote sustainable charcoal production¹⁰. In addition to legalizing charcoal, the policies will provide guidelines on channeling taxation revenue collection from legalized charcoal production into the creation of a more sustainable industry; as well as guidelines on zoning of land for sustainable charcoal production. They will also provide standards for the production, processing and marketing (such as certification). Finally, they will recognize governance structures (such as charcoal producers or traders

¹⁰ This will be coordinated with the GEF SLM project on Kilimanjaro, which has a similar output. Implementation of the Kilimanjaro project is set to begin in 2011.

associations), etc. specific activities will include review of all existing policies as regards to charcoal, identification of gaps and contradictions in policy, legislation and implementation mechanisms, formulation of recommendations for improvement and lobbying for the adoption of the recommendations.

Component 2. Strengthening skills and capacities for knowledge based CBFM/JFM, integrated soil fertility management and land use planning

93. The project will provide technical support to relevant authorities (municipal, local and central government) for land use planning, enabling productive and conservation initiatives to be zoned according to factors such as ecological suitability, fragility and tenure. It will also assist local communities to develop and apply regulations for natural resource management, such as the specification of zones for extraction and protection of woodlands and NTFPs, the definition of permissible levels of extraction for NTFPs and wood for energy (charcoal and wood fuel), taking into account provisions for regeneration; rules for the use of fire for honey production, hunting and pasture renewal; rules on permissible use of the dambos; and the definition of allocations for extraction between different stakeholders (community members and outsiders) so as to ensure the equitable distribution of accruing benefits. Training and facilitation will also be provided to community-based organizations in order for them to play an increased role in enforcing norms and regulations. This will be backed up by strengthened capacities for resource monitoring among producer groups, community organizations and local governments. Resource users will be provided with skills to implement the integrated resource management plans and to monitor the impacts as well as in the use of monitoring information for adaptive management. This will be achieved through the following outputs.

94. **Output 2.1: Integrated soil fertility management improved to increase productivity and reduce shifting cultivation tendencies and deforestation:** Under this output, the project will build on the PPG findings to facilitate the formulation and implementation of a comprehensive soil fertility management program, which will increase agricultural productivity sustainably, thereby reducing the need for new fields, and the pressure on the woodlands. Actual activities will include the following: supporting action research on integrated soil fertility package; to be accomplished by identifying and bringing on board all soil fertility stakeholders including researchers for IRA, Tumbi and Ukiriguru to collate and package all information of soils and fertilizer (organic and inorganic) management practices. This information will be mainstreamed into extension package and for ensuring that soil fertility considerations are integrated and adequately addressed by the District Agricultural Development Plans (DADPs). Other activities will be to define and assign roles for each stakeholder in addressing soil fertility management issues. This will be supported by a training program for farmers on appropriate use of soil management practices. The delivery of the training program will be supported by increasing the capacity of local researcher and extension staff to be able to provide the right information to farmers. It will also be complimented by creation of an incentive scheme as well as a financing mechanism on fertilizers where by farmers can borrow some resources particularly for fertilizers.

95. The project will also promote conservation agriculture and agro-forestry. Intercropping food crops with tree stands will be promoted to improve biophysical resilience and promote income diversification. This has been reported as one of the most promising options for helping communities adapt and become resilient to the impacts of climate change. It can also be used to link forest fragments and other critical habitats, as part of a broad landscape management strategy to improve the ecological integrity of wildlife habitats. In addition, agroforestry practices will be integrated into forestry and biodiversity management for the provision of livelihood support products such as timber, woodfuel, fruits, etc., thereby minimizing the exploitation of protected areas.

96. Most respondents claimed that the species issued by the tobacco company were inappropriate and that they had no knowledge of tree planting measures and therefore do not have the skills needed to adopt SWC measures. The project will work with the tobacco companies and the extension service to improve the dialogue between the stakeholders and increase the participation of community opinion in selecting tree species. It will also broaden the tobacco related tree planting drive to include a more comprehensive agroforestry package that meets the needs for improving soil fertility and land productivity as well as provision of wood, timber and other NTFPs (in conjunction with the output on improving enforcement of local level bye laws on environmental management).

97. This work will be complemented by support to crop diversification and use of improved varieties to address two inter-related problems: One, since maize is the staple food crop, nearly all farmers grow it even when their land is unsuitable for maize. Second, although improved varieties of many crops are available, farmers continue to use local land races, compounding the problem of growing unsuitable crops, particularly maize. PPG assessments showed that although land suitability is an important predictor of productivity, decisions on what crops to grow are not based on technological information of land suitability alone. Rather, they are influenced by the fact that productivity does not translate directly into value. Farmers will choose a crop which has a ready market and a promise of good prices, even when that crop is unsuitable. They will also choose a crop-mix to minimize exposure to risks from climate, pest, disease, market fluctuation and others. The implication of this is that even if the land suitability study clearly favors one crop, it may be in the farmers' interests to manage several. The project will build on these findings to widen the assessment and increase understanding of the most 'valuable' crops in a given locality. This information will then be used to support best crop mixes balancing the technical and socio-economic needs, in particular promoting the idea of local trade.

98. **Output 2.2: Joint Forest and community based forest management supported and at least 500ha of community forest being managed under this regime:** Each village in the pilot wards has a Village Environmental (or Village Natural Resources Committee) that carries the overall management responsibilities of community/village forests. Under this output, the project will build on the PPG findings and the lessons outlined above to strengthen both CBFM and JFM through the following set of activities: Land use planning and zoning of CBFM areas, promoting devolution of rights and responsibilities for woodland management to communities and supporting stronger enforcement of bye laws (in conjunction with component 1), training on NRM, JFM and CBFM for resource users, local communities and technical officers, facilitating re-institution of wildlife corridors and village Ngitiris, and rehabilitation of particularly degraded forest patches. Land use planning is a pre-requisite for the success of CBFM. The project will support development of management plans based on management zoning, to achieve the optimal use of the forest resources. The delineation of management zones will be based on an evaluation of miombo woodlands' purpose and significance, its exceptional resource value (e.g. miombo conservation, appropriate uses and management objectives). It will also consider the capacity of land/area to support appropriate uses. When combined with stronger enforcement of bye laws, the Ngitiris will reduce illegal activities in the miombo forest, and increase revenue collection.

99. Some patches of the woodlands, particularly neglected tobacco fields are so degraded that further recovery will not happen without active management. The project will work with the communities to identify such areas to implement a program of recovery. Such a program will involve identification of cost effective rehabilitation techniques, identification of suitable species and techniques for the rehabilitation of the selected pilot sites, demonstration of the importance of water harvesting as the basis for regeneration, monitoring changes in species richness, composition and total density of plants over time in the pilot sites, capturing and dissemination of lessons, and upscaling. In particular, the project will explore the use of these sites for planting quick growing species for sustainable charcoal production (in conjunction with output 3.3). The project will work with academic and research institutions that have conducted similar initiatives such as WWF, ICRAF, etc. In particular, the project will support the careful mix of indigenous and exotic species to overcome the criticism of the current tree planting drive; that is only geared towards meeting tobacco curing needs. In addition, it will support the close supervision to ensure that tree seedlings provided are actually planted and nurtured and that survival rates increase.

100. **Output 2.3: Adoption of energy saving tobacco barns supported to reduce pressure on woodlands and deforestation:** The PPG studies reported that field tests on impacts of improved tobacco barns showed that on average one acre of tobacco field would, depending on the size of the barn, need about 45m³ per hectare; however, with improved barns the amount could be 14m³ per hectare, leading to a saving of 31m³ of wood per hectare of tobacco cured through improved barns). It also reported that 95% of the tobacco is currently being cured using traditional barns with only 5% being cured using improved barns. The project can lead to at least 40% adoption in the use of improved barns with an average kiln efficiency of 70%. Under these conditions the project would lead to direct emissions reductions of up to 1.7 million tCO₂e (see calculations in the Global environment benefits section). PPG studies also reported that the Tobacco companies operating in the region provide loans to farmers for the

construction of improved barns and offer a higher price for tobacco cured by these improved barns (\$2.98/kg versus \$2.39/kg respectively).. PPG studies also reported that the Tobacco companies operating in the region provide loans to farmers for the construction of improved barns and offer a higher price for tobacco cured by these improved barns (\$2.98/kg versus \$2.39/kg respectively).

101. Despite the foregoing, adoption of improved barns was at a low of 5%. The low adoption rate is due to a complex set of reasons ranging from the fact that some farmers used the improved barns as houses instead of using them for tobacco curing; some farmers reported that the loans were too expensive or that they could not qualify for the loans. The key enabler for non-compliance however, is the fact that there are no penalties for those who do not comply. The project will therefore build on the PPG studies to deepen the understanding of the local conditions and to identify a program of rewards and penalties for enforcing adoption of improved curing barns. It will in particular facilitate stronger collaboration between the tobacco companies and the Division of environment to strengthen the enforcement of environmental bye laws, including formulation of relevant bye laws if needed, to enforce compliance. Specifically, the project will adopt the following measures to increase adoption: **Improve monitoring of compliance with the requirement to use improved barns** – the greatest barrier to adoption of the improved barns is inadequate enforcement of environmental bye-laws. As a result some farmers obtain loans for such barns from the Tobacco Company but use the barns for other purposes (such as dwellings). The project will work with the Division of environment to strengthen the enforcement of environmental bye laws, including formulation of relevant bye laws if needed, to enforce compliance.

102. **Increase number of farmers accessing loans for the construction of improved barns from the Tobacco Company** – the project will also facilitate access to loans for construction of improved barns from the tobacco company. The TTL (Tobacco Company) is eager to increase the number of farmers curing tobacco with the improved barns since this also yields a higher quality of tobacco (and fetches a higher price). Once the division of environment insists on better enforcement of environmental bye-laws, the project will then work with the environmental and CBFM management committees to monitor farmer compliance; this will provide the guarantee needed by the tobacco companies to provide loans to more farmers.

103. Other measures will include introduction of stiffer fines and penalties for tobacco farmers who misuse the tobacco curing barns or loans provided for the construction of such barns; increasing the price difference between tobacco cured from traditional barns and that cured using improved barns (most likely by lowering the price for the former); increasing technical support to farmers related to better construction and use of improved barns. This will include training a group of technicians in kiln building, management, use and maintenance. These technicians will be availed to farmers at a small fee. These measures will be supplemented by a program of tree planting on farms, with increased enforcement to use fast growing species for tobacco curing instead of the slow growing miombo species. Continued enforcement of this practice will be secured through capacitation of the local CBFM and environmental management committees combined with a program of fines for non compliance (see output 2.1).

104. **Output 2.4: Use of updated weather data/information in decision making increased in the pilot wards (co-finance):** Impacts of climate change are becoming evident in the woodlands especially through the variations in weather patterns and its influence on the productivity of the land. The linkages between the changing conditions, climate change and the required adaptation actions are however not clearly understood especially by the local community. Although the use of up to date weather information is critical to adaptation, PPG studies found that farmers rarely use the information provided by the Tanzania weather services, either because it was difficult to reach or was perceived to be inaccurate. The project will work with the government department responsible for weather information to improve the processes for the collection, interpretation and dissemination of weather data to increase its adoption in localized decision making. Specific activities will include the provision of modern automated weather stations (co-finance) as well as updating the old ones to improve reliability of weather prediction and climate change monitoring by Met department (being done through the REDD program); awareness raising on the linkages between climate change and changes to the production systems and the importance of using weather data in production related decisions; Facilitate dissemination of weather information through appropriate means such as cell phones, radio, TV, schools, leaflets, etc.

105. **Output 2.5: M&E and communications systems formulated and being used to support adaptive management:** A participatory M&E system will be designed and implementation facilitated to monitor uptake of SFM and climate change initiatives and their impacts on ecosystem health and improvements in livelihoods. The M&E system will link closely with the Regional Miombo Woodlands Network, in order to monitor the impacts of better management of the Tanzania woodlands on the Regional Level. This is necessary because the miombo project area has in the past acted as a buffer to the Congo rain forests. It will therefore be important to monitor whether the better management causes leakage by transferring pressure on forest resources to the other forests in the region. The M&E system will be complemented by a communication strategy for promoting SFM techniques, adaptation and ecosystem, through dissemination of lessons and good/best practices. The baseline information collected will be used to identify indicators of ecosystem health and changes in livelihoods. Both the monitoring and communication strategies will have an appropriate feed-back mechanism from which ideas will be identified for improving on the process. Activities will include participatory identification of indicators, setting up monitoring systems, collecting data and analyzing it to identify project impacts and lessons for adaptive management.

106. Other activities will include the establishment of an SFM regional communication section within the project linked to the Regional Information Officer; undertaking a stakeholder assessment and matching the information needs and dissemination avenues to the various stakeholder groups; developing communication messages suited to the various stakeholder groups and disseminating lessons/best practices accordingly, through radio programs, newspapers, websites, internet, seminars, workshops, demonstrations (Farmer field school techniques), etc. monitoring dissemination, uptake and impacts of the communication; Using feedback for adaptive management of the project and the communications strategy.

107. **Component 3: Adoption of Sustainable charcoal and energy switch reduce pressure on woodlands and deforestation¹¹:** To facilitate large scale improvements in charcoaling processes, the project will facilitate the adoption and use of a combination of legal, institutional and financial instruments to encourage adoption of sustainable charcoal, uptake and use of efficient technologies and energy switch, as part modernization of the charcoal industry in Tanzania. It will therefore ensure that charcoal producers and resource owners in the pilot wards are provided economic incentives for sustainable charcoal through markets and sale of ecosystem services (in conjunction with component 4), that key stakeholders strengthen capacities for sustainable charcoal (in conjunction with outcome 2), that technology for efficient production, processing and consumption of charcoal is adopted locally (in conjunction with outcome 2), and that local level governance to support sustainable charcoal is improved (in conjunction with outcome 1). The project will collaborate with similar initiatives (on charcoal) to lobby for a stronger legislation for ensuring the adoption of technology for efficient production, processing and consumption nationally. Specific outputs are described below:

108. **Output 3.1: Support to sustainable charcoal production delivered:** Under this output, the project will promote the adoption of sustainable charcoal concept in the pilot wards, which produce up to 10,000 tons per year. It will therefore facilitate the formation of charcoal associations and the provision of skills to adopt improved charcoaling technologies (such as improved kilns, improved processing and packing). The project will facilitate development of the extension package for managing the miombo woodlands as a source of charcoal, borrowing from experience of countries such as Sudan and Madagascar that have a sustainable charcoal policy. It will then facilitate delivery of the extension package in pilot wards and formulation of a strategy to expand training in the other districts in the two regions. In addition, the project will support the Forest Department and the Renewable Energy institute (TATEDO) to train officers of other relevant departments on sustainable charcoal. It will support District governments to lead better planning of the charcoal business through the District Environment Plans (DEPs) and to feed into national planning processes including ensuring woody biomass (on private/public lands) are valued appropriately in the national accounts.

109. To address local level governance for charcoaling, the project will facilitate review of traditional land and resource management institutions and their suitability for providing governance for sustainable charcoal production

¹¹ Definition and justification for sustainable charcoal as well as measurements of emissions reduction from its adoption are provided in the barrier analysis section

(in conjunction with outcome 1). Majority of the charcoal producers do not own the trees/land they use for charcoal production; charcoal producers Associations may therefore be separate from Forest Associations. Building on the lessons learnt from the Kilimanjaro SLM project (which has an outcome on sustainable charcoal), this output will work through charcoal associations to increase awareness of producers on their rights and responsibilities under the legislation. The charcoal associations will also be vehicles for disseminating information on better conversion methods and sustainable forest management principles. In conjunction with component 4, the project will facilitate access to loans to invest in better production technologies. Specific activities will include supporting local governments and communities to review existing local regulations and to make them more accommodating of sustainable charcoal production (ordinances and byelaws), strengthening capacity for the implementation of the revised regulations by both communities and local government.

110. **Output 3.2: Sustainable charcoal linked to carbon finance (UNDP Co-finance):** As explained above, sustainable charcoal is carbon neutral because the carbon emitted during production and consumption can be sequestered by trees that are planted, or allowed to continue growing (by coppicing instead of felling). Thus taking traditional earth kilns as a baseline, every one ton of sustainable charcoal produced offsets nine tons of carbon dioxide (or nine units of CO₂) (ESD 2006). Given that the pilot wards produce up to 10,000 tons of charcoal per year using unsustainable methods, a switch to sustainable methods can mitigate up to 13,600 tons per year (assuming only a 40% adoption rate and a 60% efficiency in the use of improved practices); this would lead to 40,800 tons in three years). At current prices in the informal Verified Emissions Reductions (VER) markets of US\$ 5 per ton of CO₂, the pilot wards could potentially earn up to USD 204,000 in three years from the sale of carbon credits, in addition to the sale value of charcoal. The project will work with institutions with expertise on carbon finance such as ICRAF and the Energy for Sustainable Develop (ESD, now CAMCO) to provide capacity and methodologies for measuring carbon stocks and monitoring and verifying trends. Specific activities will include development and implementation of an incentive package for the adoption of sustainable charcoal, conducting market research on the charcoal production and consumption chain, setting up and supporting operations of the charcoal associations, establishing and maintaining woodlots for charcoal production, particularly in conjunction with agroforestry practices on croplands, organizing and supporting charcoal producers and landlords into market oriented associations, research/assessment on species suitability for woodfuel, undertake an assessment of the factors affecting tree husbandry (access and control/ownership, labor availability, land tenure, cultural issues); define and apply criteria for selecting local entrepreneurs to establish tree nurseries and facilitate start up (acquisition of seedlings, training on tree husbandry, etc.); facilitate establishment of communities, individuals and institutional woodlots; facilitate formation of charcoal producers associations and provide them with training on sustainable harvesting for improved charcoal production.

111. Marketing of carbon credits can however be tricky, especially where aggregation will be required. The project will facilitate formation of an institution to support the charcoal associations to sustain the adoption of principles agreed during the project implementation, and to be a vehicle for the continued negotiation and sale of carbon credits. The institution will have a governance structure likely to constitute 4 or 5 trustees representing different Government, UNDP GEF, NGOs and the local communities. This institute will be responsible for aggregating emissions from the various charcoal association groups and spearhead transaction of carbon services from rural areas. It will therefore set the terms and conditions for exchange of carbon services, oversee the administration of payments to communities and farmers, oversee the provision of technical services and monitoring, hold technical service providers and finance administrators accountable to project participants, and commercialization of carbon.

112. **Output 3.3: Institutional set up for coordinating the transformation of the charcoal industry facilitated:** Charcoal issues are currently spread between several ministries. The transformation of the charcoaling sector from the current unregulated, low source of government revenue to a more streamlined sector providing an incentive for sustainable forest management will require stronger coordination. The project will facilitate the formation of a Regional Charcoal Coordination Body, which will eventually facilitate the formation of a national body. Working with all relevant stakeholders, particularly Forest Division and the Energy Department, the government body will spearhead the “cleaning of the charcoaling industry. In particular, it will identify ways of

improving revenue collection from taxation of charcoal along the market chain. It will also promote awareness of the impacts of unsustainable charcoal as well as the potential positive impacts of adoption of cleaner more sustainable methodologies. It will undertake the following:

- Promote national level improvement of charcoal production, transportation and marketing promote community and private sustainable management of woodlots for charcoal production;
- Set up a certification system designed to differentiate sustainable charcoal from traditional charcoal.
- Monitor the industry and provide policy guidance on how to improve the sustainability of charcoal as an important source of energy;
- Devise an effective method of charcoal revenues collection and plough back some of this revenue for sector's development.
- Promote large scale use of more efficient kilns combined with more efficient stoves.
- Organize and empower small scale charcoal producers to use efficient kilns and form marketing associations.
- Support farmers within peri-urban and nearby rural areas to establish woodlots for charcoal production.
- Ensure sustainable management of charcoal production from general and village forests.
- Demarcation of the forest into annual blocks indicating clearly the allowable sequence of harvesting cycles.
- Promote use of by-products of sustainable timber and agricultural production.

113. **Output 3.4: Mitigation through improved energy switch** - The Tabora and Rukwa regions are host to several public institutions such as boarding schools, hospitals, prisons, and university campuses. Collectively these institutions consume huge quantities of woodfuel and charcoal annually. At the same time, the vast majority of human waste is discharged untreated into the environment, contributing to methane emissions. There is a huge potential for substitution of energy source from wood to methane from human waste, leading to mitigation. The project will therefore facilitate the switch from wood/charcoal to methane in public institutions. In doing so, it will link these public institutions with the National UN REDD program (UNDP/UNEP/FAO), and the UNDP MDG Carbon initiative, which will assist them to develop a project to improve energy efficiency through conversion of human waste to methane combined with adoption of improved kilns and stoves. Working together with the rural energy institute, the MDG Carbon will help the project to replicate a project in Rwanda, which has successfully developed a similar initiative for boarding schools. The MDG/Rwanda project is providing appropriate energy solutions to the schools by pairing a solar-powered water treatment plant with an integrated biogas system that converts human and kitchen waste into methane for cooking and fertilizer for gardening. Kitchen stoves are equipped with supplementary high-efficiency wood burners to minimize the consumption of non-renewable fire wood required as a supplement to the primary methane fuel. The Rwanda project has signed carbon sale agreement for and will earn carbon credits for sale in future.

Component 4: Markets and technology support expansion of livelihood options to reduce pressure on agriculture and natural resources and increase income in the pilot wards:

114. Deforestation in Tanzania is fuelled by limited livelihood options available to local farmers, coupled with low levels of investments into SFM due to limited access to credit. Devolution of rights and management responsibility to communities need to be supplemented by tangible benefits from the forest in order to provide incentives to protect the resources/miombo and to manage it sustainably. Success in forest management devolution will therefore be sustained when coupled with creating broader rural livelihood opportunities. In addition to linking sustainable charcoal to carbon finance (component 3), the project will improve local economic development through identification of viable income generating options such as food processing, niche markets for specialized NTFPs, increasing markets and profit margins of currently traded products, etc. Specific outputs are described below.

115. **Output 4.1: High value non-timber forest products (NTFP) and agribusiness identified and developed (including markets):** The potential for the development of initiatives that develop NTFPs such as mushrooms, honey and edible insects is significant in miombo woodlands. The woodlands already support some income generating activities but are plagued with quality issues, inadequate financing and inability to reach lucrative

markets. Information gathered during PPG from Itebulanda, Mbola and Maboha villages (annex 3) showed that there is potential to build alternative or BD friendly products incomes from horticulture, poultry keeping, dairying, soap production, processing of cooking oil from sunflower, groundnuts, simsim and oil palm, establishment of tree nurseries, honey and beeswax processing, candle making from beeswax, grain milling, godowns construction, formation of wildlife management areas (WMAs) clothes sawing marts, fish (processing, preservation and transportation). BD friendly products from these activities include: vegetables fruits, poultry meat and eggs, milk and butter, soap, cooking oil, seedlings, high quality honey, lighting candles, maize flower and husked rice, storage facilities, garments, dried and frozen fish, and meat and money from WMAs. Markets for the products were shown to be available in the villages, but they were inadequate, and will need to be supplemented especially when production is accelerated.

116. The project will build on these PPG findings¹² to identify further NTFPs that can support income generation and support adoption. This will build on the positive linkages and lessons generated through the highly successful GEF project in Kenya, which demonstrated that financial incentives (provided through commercial insects) delivered improved livelihoods as well as global environmental benefits¹³. Proposed Activities include: Assess Income Generating Activities (IGA) - including NTFPs and agri-business and select best bets for piloting (mopane worms and locusts pizzas, fish farming, bee keeping, handcrafts, cultural tourism, eco-tourism, indigenous poultry farming etc); Undertake value chain analysis to identify potential markets and factors hindering successful adoption; Undertake market survey (nationally, locally, regionally, internationally) to identify regular and niche markets for specialized products from the miombo woodlands such as mushrooms and edible insects, etc. and the market needs; Domestication of high value non-timber forest products e.g. mushrooms, medicinal plants; Provide market information by establishing linkages between identified markets and specialized producers (and others) to disseminate market information; conduct training needs assessment and deliver training and other support to improve local capabilities to engage in business; facilitate formation and operationalization of producer cooperative societies to act as channels for marketing of agricultural products and purchasing of farm inputs in bulk (thus reducing transport costs); and, support compliance with the certification requirements for honey production, processing and sale. Tanzania already has a certification protocol in place for honey sold outside the country. However, many producers do not comply with the strict rules of certification and are therefore not accessing this lucrative market.

117. Output 4.2: Access to financial services increased to support adoption of agribusiness and trade in NTFPs as well as use of inputs for agriculture: Unlike other rural landscapes in Tanzania, farmers in the pilot districts have some level of interaction with financial institutions and cooperatives. However, these are only dedicated to the cash crops, largely tobacco. Under this output the project will facilitate broadening of micro-finance institutions' (MFI) engagement in the region's agricultural, particularly through cooperatives. PPG findings indicated a high level of awareness amongst community members of the critical role played by cooperatives and access to credit in improving local production and economic development. The project will build on this awareness and the presence of several credit schemes to motivate financial institutions to develop financially viable products that suit the specific needs of the farmers, beyond tobacco. The project will also undertake a capacity needs assessment and design a capacity building programme to ensure that agriculturalists and local entrepreneurs and their local institutions have the basic capacity needed to engage with the financial service providers. Specific activities will include an assessment of needs for micro-finance and credits, identifying current challenges to both providers and potential beneficiaries, identifying potential sources and negotiating rules of engagement, supporting establishment of viable packages and piloting provision to selected community groups and individuals, monitoring uptake, use and payment, clearly distilling lessons, facilitating use of the lessons to establish a viable and thriving local level financial markets.

¹² Annex 4 outlines potential NTFPs from the four pilot wards

¹³ Terminal Review (2008) -- UNDP/GEF Developing Incentives for Community Participation in Forest Conservation Through the Use of Commercial Insects in Kenya (CIP)

Risks and mitigation factors

Detail and Severity	Mitigation
Pressure from continued influx of immigrants causes greater damage to the woodlands than can be fixed through SFM - M	The conflicts that generated a huge influx of immigrants in the region have abated, and it is now less likely that the region will experience another wave of immigrants. However, by strengthening enforcement of local environment byelaws, the project will enhance the adoption of improved SFM and biodiversity friendly practices by existing or new immigrants, which will increase productivity of the land, reducing further need for clearing additional land just to maintain food security.
There is a risk that the current political will for long-term SFM processes is overpowered by short-term economic considerations largely driven by easy availability of cash incomes from the sale of tobacco and charcoal in the face of low incomes from alternative BD friendly income generating activities– M	<p>This risk is mitigated by activities aimed at reducing the impact of tobacco and charcoal on deforestation as described below:</p> <p>Reducing deforestation driven by the tobacco industry</p> <ul style="list-style-type: none"> i) Increasing capacity for enforcement of SFM friendly practices in tobacco farming including the adoption of efficient tobacco curing barns and use of planted fast growing species over slow growing miombo species in tobacco curing. It is noted that the tobacco company requires farmers to grow 500 trees per hectare of tobacco cultivated, makes available credit for the construction of improved barns, and, pays a higher price for tobacco cured using the improved barns. The lack of enforcement of environmental laws and bye-laws and therefore lack of an reward and punishment regime has reduced incentives for general compliance. ii) Building capacity and generating political support for stronger enforcement of environmental policies (particularly bye-laws) at the local level; iii) Increasing incomes from BD friendly options such as horticulture, trading in sustainably harvested NTFPs, increasing crop production from soil fertility management practices; iv) Broadening access to credits and micro-finance to support other production process (currently credit is only available for the production of tobacco, and not for the support of BD friendly alternative income generating activities); v) Reducing deforestation driven by charcoal production: vi) Support adoption of sustainable charcoal (definitions in para 53 onwards) by providing skills and institutional organization required for effective adoption of the concept; vii) Support to adoption of methane instead of woodfuel for cooking in public institutions in Tabora and Rukwa; viii) Linking sustainable charcoal producers to carbon markets (via capacity and institutional arrangements required for long-term engagement)
Increase in prices could lead to overharvesting, but only if it is not managed within the sustainable harvest content - L	The project will increase capacity for implementation of bye laws which will mitigate the risk of a price increase without considerations for sustainability
Climate change may reduce the effectiveness of SFM technologies – M	The project is building capacity for adaptation to climate change and ensuring that the country mainstreams adaptation in national policy. In addition, the ability to predict weather and to disseminate weather information will be increased. The disaster risk reduction strategy will also be revised to include responses related to adaptation.
The impact of the civil servants reform undertaken in the 90's was to reduce number of technical staff throughout the country. Tanzania is still suffering from inadequate staffing, particularly in some regions. There is a risk that this low staff numbers will be compounded by high staff	The project strategy for boosting capacity in the Regional and Local governments will be to work with other relevant institutions, such as CBOs. The project will cultivate partnerships with institutions that can provide additional capacities (such as Institute of Resource Assessment (University of Dar es Salaam), etc.

turn-over, negatively impacting the rate of implementation - M	
Livestock movement could continue in the project area causing more degradation – L	The risk will be mitigated through strengthening of planning and local level governance; which will have capacity for monitoring livestock movements and to ensure that these movements are coordinated and in line with sustainable resources management.
Better management of the woodlands in western Tanzania might cause leakage by transferring the pressure on rain forests in the Congo Basin.	The project does not have the resources to mitigate this risk effectively; however, it will link its monitoring to the Regional Network on Miombo Woodlands. Monitoring information will be shared with the region through this network, and used to adapt management regimes.

PART III: Management Arrangements (1-3 pages)

118. The project will be implemented over a five year period, commencing in 2011. The GEF implementation agency (IA) for the project will be the UNDP Tanzania Country Office. The project will be executed under UNDP National Implementation Modality (PIM) procedures. The Government through VPO will have overall responsibility for the project; however, given the scope of the project, this responsibility will be delegated to the Ministry of Natural Resources and Tourism (specifically to the Division of Forests and Bee keeping). Actual field activities will be coordinated by the Regional Secretary for Tabora, in collaboration with the Regional Secretary for Rukwa, with technical assistance from the Institute of Resource Assessment (IRA - University of Dar es Salaam) as needed for the implementation of specific project outcomes. The lead RAS (Tabora) will ensure that project implementation involves all other relevant stakeholders, including research/academic institutions, NGOs and government ministries. Specific implementation guidance is outlined in the sections below.

119. **Project Steering Committee (Outcome Board):** The Project Steering Committee (PSC) will be responsible for providing overall policy guidance and direction to the project. The PSC will be responsible for making management decisions for the project when such guidance is required by the Project Manager. These decisions will include making recommendations to UNDP and the Implementing Partner for the approval of project plans and revisions. In the event that consensus is not reached at the Steering Committee, the final decision shall rest with the UNDP Resident Representative.

120. The PSC will ensure that required resources are committed and arbitrate on any conflicts within the project or negotiate a solution to any problems between the project and external bodies. In order to ensure UNDP's ultimate accountability, the Committee's decisions shall be made in accordance with standards that ensure best value for money, fairness, integrity, transparency and effective international competition. Specific responsibilities of the Steering Committee shall include:

121. **During implementation:** Steering Committee will provide overall guidance including policy and functional guidance as well as direction to the project, ensuring it remains within any specified constraints. It will also address project issues as raised by the Project Manager; provide guidance and agree on possible countermeasures/management actions to address specific risks; conduct regular meetings to review the Project Quarterly Progress Reports and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans. It will also review Combined Delivery Reports (CDR) prior to certification by the Implementing Partner; appraise the Project Annual Review Report, make recommendations for the next Annual Work Plan (AWP), and inform the RR about the results of the review; review and approve the end of project report and make recommendations for follow-on actions; and, assess and decide on project changes through revisions.

122. **At project closure,** the Steering Committee will ensure that all Project deliverables have been produced satisfactorily; review and approve the Final Project Review Report, including Lessons-learned; make recommendations for follow-on actions to be submitted to the Outcome Board; and, notify operational completion of the project to the Outcome Board. The PSC will be constituted by representatives of the government (VPO and Ministry of Natural resources and Tourism - Div of Forests and Bee Keeping), Regional Administrative Secretaries

for Tabora and Rukwa regions, UNDP Country Office (Tanzania), UNDP-GEF and community leaders. Specific roles and responsibilities of each member are outlined below.

123. **Division of Forests and Bee Keeping** will be the Government Cooperating Agency, and will also be responsible for overall project implementation. This is the Directorate that provides oversight over the National SFM issues. The Division will perform the functions of the Executive at the Project Steering committee. The Permanent Secretary in charge of the Division or her/his nominated representative will therefore chair the Steering Committee meetings and ensure government ownership of the project. S/he will also ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes and that the project gives value for money, ensuring a cost-conscious approach to the project.

124. **The Regional Administrative Secretaries (RAS) for Tabora and Rukwa Regions** or their representatives will sit on the Project Steering Committee representing the participating districts in the regions. The two RAS will ensure that district environmental action plans integrate and mainstream project initiatives and SFM issues, thereby securing sustainability of impacts. District planning processes that are led by the District Executive Directors will also be made sensitive to SFM issues through the participation of the region at Steering Committee meetings. This way, local government entities will benefit from capacity development initiatives for SFM mainstreaming undertaken through the project. Beneficiary community groups in the pilot districts will benefit from interventions that empower them and provide for their engagement in sustainable livelihood activities.

125. **The UNDP (UNDP-CO and UNDP GEF):** UNDP will be responsible for provision of resources as well as technical expertise to the project, drawing on its knowledge networks and pool of experts, and through external sourcing. It will also be responsible for project assurance, ensuring that the project is implemented in accordance with the rules and procedures for managing UNDP projects. In particular as a member of the Steering Committee, UNDP will promote and maintain focus on the expected project outputs; arbitrate on, and ensure resolution of any conflicts; contribute opinions on Steering Committee decisions especially in relation to proposed programmatic changes. UNDP will therefore ensure that any standards defined for the project are met and used to good effect; and monitor any risks that might affect the implementation of the project.

126. **Project Assurance:** The Project Assurance role supports the Project Steering Committee (Project Board) by carrying out objective and independent project oversight and monitoring functions. This role ensures that appropriate project management milestones are managed and completed. UNDP will undertake this role to ensure that the project remains relevant, follows approved plans, and continues to meet planned targets with quality. In performing this role UNDP will check a number of key aspects, including maintenance of thorough liaison between the members of the Project Board (PSC); beneficiary needs and expectations are being met or managed; risks are being managed; adherence to the Project Justification (Business Case); project fit with the overall Country Programme and UNDAF; the right people are being involved; the project remains viable. Other assurance responsibilities during implementation will be to ensure that the scope of the project is not “creeping upwards” unnoticed; that internal and external communications are working; that applicable UNDP rules and regulations are being observed; that any legislative constraints are being observed; that adherence to UNDP monitoring and reporting requirements and standards are maintained; that quality management procedures are properly followed; and, that Project Board’s decisions are followed and revisions are managed in line with the required procedures.

127. **During implementation of the project** the specific responsibilities of UNDP will also include ensuring that the logs in Atlas are regularly updated; that critical project information is monitored and updated in Atlas, using the Activity Quality log in particular; ensuring that Project Quarterly Progress Reports are prepared and submitted on time, and according to standards in terms of format and content quality; that Combined Delivery Reports (CDRs) and Fund Authorization and Certificate of Expenditures (FACE) are prepared and submitted to the Project Board and Outcome Board; and, to perform oversight activities, such as periodic monitoring visits and “spot checks”. At Project closure, UNDP will ensure that the project is operationally closed in Atlas; that all financial transactions are in Atlas based on final accounting of expenditures, and, that project accounts are closed and status set in Atlas accordingly.

128. **Project Manager/Coordinator:** The Project Manager will be responsible for the day-to-day management and decision-making to ensure successful implementation in the field. This will include preparing and revising work-plans; planning and organizing project review meetings; providing technical feedback to the Project Steering Committee; ensuring that project activities are carried out within the financial limitations of the budget; supervising the technical and administrative support personnel and coordinating project activities with stakeholders as needed.

129. The Project Manager/coordinator's prime responsibility will be to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. S/he will be appointed jointly by the Implementing Partners (DFB/IRA) and the Executing partner (UNDP). The specific responsibilities of the Project Manager are: overall project management; manage the realization of project outputs through planned activities; provide direction and guidance to project teams/responsible parties; liaise with the Project Board and UNDP to assure the overall direction and implementation of the project; identify and obtain any support and advice required for the management, planning and control of the project; be responsible for project administration; and, liaise with any suppliers.

130. **During implementation of the project,** the project manager will plan the activities of the project and monitor progress against the initial quality criteria; mobilize goods and services to initiate activities, including drafting TORs and work specifications; monitor events as determined in the Monitoring & Communication Plan, and update the plan as required; manage requests for the provision of financial resources by UNDP, using advance of funds, direct payments, or reimbursement using the FACE (Fund Authorization and Certificate of Expenditures); monitor financial resources and accounting to ensure accuracy and reliability of financial reports; manage and monitor the project risks as initially identified in the Project Brief appraised by the LPAC, submit new risks to the Project Board for consideration and decision on possible actions if required; and, update the status of these risks by maintaining the Project Risks Log.

131. S/he will also be responsible for managing issues and requests for change by maintaining an Issues Log; prepare the Project Quarterly/ Midterm Progress Reports (progress against planned activities, update on Risks and Issues, expenditures) and submit the report to the Project Board and UNDP; prepare the Annual review Report, and submit the report to the Project Board and the Outcome Board; based on the review, prepare the AWP for the following year, as well as Quarterly Plans as required.

132. At Project Closure, the project manager will prepare the Final Project Review Reports to be submitted to the Steering Committee and the Outcome Board; identify follow-on actions and submit them for consideration to the Project Steering Committee; manage the transfer of project deliverables, documents, files, equipment and materials to national beneficiaries; prepare final CDR/FACE for signature by UNDP and the Implementing Partner. The Project coordinator will be supported by an Administrative and Finance Assistant and a Project Driver. Terms of Reference for the Administrative Assistant are appended to this Project Document.

Audit Requirements

133. The project will be audited on a yearly basis for financial year January to December as per NEX procedures and Global Environment Facility requirements. The audit will be conducted by the National Auditor or any other local auditor recognized by both GoT and UNDP-CO.

4. Part IV: Monitoring and Evaluation Plan

134. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be performed by the project team and the UNDP Country Office (UNDP CO) with support from UNDP/GEF. The Strategic Results Framework/Matrix presented in Annex I provides indicators for project implementation along with their corresponding means of verification. These will form the basis upon which the project's Monitoring and Evaluation system will be built.

Project Inception:

135. A Project Inception Workshop will be held within the first 3 months of project start with those with assigned roles in the project organization structure, UNDP Country office and, where appropriate/feasible,

Regional Technical Policy and Programme Advisors as well as other stakeholders. The Inception Workshop will be crucial to building ownership of the project results and to plan the first year annual work plan. It will address a number of key issues including:

136. Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and Regional Coordination Unit (RCU) staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

137. The IW will also be a forum to finalize the first annual work plan as well as review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks; Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget will be agreed and scheduled; Discuss financial reporting procedures and obligations, and arrangements for annual audit; and, plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures will be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

Quarterly Reporting:

138. Project Progress will be monitored quarterly using the UNDP Enhanced Results Based Management Platform. The risks identified at project design will be entered into ATLAS and monitored quarterly. The risks related to weather fluctuations, charcoaling and micro-finance are all rated critical under the Enhanced Results Based Management Platform on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical). These will therefore be monitored very carefully and information used to adapt project management. Quarterly Project Progress Reports (PPR) will be generated in the Executive Snapshot, using the information recorded in Atlas. Other ATLAS logs will be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annual Reporting

139. Annual Project Review/Project Implementation Reports (APR/PIR): Annual Project Progress will be monitored and captured through this key report, which comprehensively combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative); the project outputs delivered per project outcome (annual); the lesson learned/good practice; the AWP and other expenditure reports; the risk and adaptive management; and, the ATLAS Quarterly Progress Report. Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

140. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Steering Committee may also join these visits. A Field Visit Report/Back to Office Report will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Steering Committee members.

Mid-term of project cycle:

141. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation, expected to be mid-2012. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term.

142. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

143. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The Terminal Evaluation will also provide recommendations for follow-up activities and will be accompanied by a management response which will be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

144. During the last three months of implementation, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

145. Results from the project will be disseminated within and beyond the project intervention zone through a number of existing information sharing networks and forums, in particular, the National SFM Dialogue process. In addition, the project will participate, as relevant and appropriate, in UNDP/GEF sponsored networks, organized for Senior Personnel working on projects that share common characteristics, which may be of benefit to project implementation through lessons learned. Through these electronic networks, the project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identifying and analyzing lessons learned is an on-going process, and the need to communicate such lessons as one of the project's central contributions is a requirement to be delivered not less frequently than once every 12 months. UNDP/GEF shall provide a format and assist the project team in categorizing, documenting and reporting on lessons learned. Project resources under Output 2.7 have been allocated for these activities.

146. A detailed list of activities to support of M&E, Learning and sharing is presented in table xx. Most activities in the M&E work plan are not separately budgeted and will be mainstreamed into the work plans and resourcing dedicated to achieving the three Outcomes as specified in the Budget Summary table above. The costs of the mid-term and final evaluations have been allocated equally to the budgets of the three Outcomes in that table.

Legal Context:

147. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA) and all CPAP provisions apply to this document. Consistent with the Article III of the SBAA, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner. The implementing partner shall put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried and assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

148. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement. **The implementing partner** agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267(1999). The list can be accessed via [http://www.un.org/ Docs/sc/committees/1267/1267ListEng.htm](http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm). This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Table 2: Indicative M & E Work plan and corresponding Budget

M&E activity	Responsible Parties	Budget US\$¹⁴	Time frame
Inception Workshop	Project Coordinator, UNDP CO UNDP GEF	No Cost	Within first three months of project start up
Inception Report	Project Team UNDP CO	No Cost	Immediately following Inception Workshop
Internal Progress monitoring by Implementation team	Project Coordinator will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	No Cost	Start, mid and end of project
Monitoring visits to check and verify Project Progress and Performance (measured on an annual basis)	Oversight by Project GEF Technical Advisor and Project Coordinator Measurements by regional field officers and local IAs	No Cost	Annually prior to APR/PIR and to the definition of annual work plans
APR/PIR	Project Team: UNDP-CO: UNDP-GEF	None	Annually
TPR and TPR report	Government Counterparts, UNDP CO, Project team, UNDP-GEF Regional Coordinating Unit	30,000	Every year, upon receipt of APR
Steering Committee Meetings	Project Coordinator, UNDP CO	20,000	Following Project IW and subsequently at least once a year
Periodic status reports	Project team	15,000	To be determined by Project team and UNDP CO
Technical reports	Project team Hired consultants as needed	10,000	To be determined by Project Team and UNDP-CO
Mid-term External Evaluation	Project team, UNDP- CO, UNDP-GEF Regional Coordinating Unit, External Consultants (i.e. evaluation team)	30,000	At the mid-point of project implementation.
Final External Evaluation	Project team, UNDP-CO, UNDP-GEF Regional Coordinating Unit External Consultants (i.e. evaluation team)	40,000	At the end of project implementation
Terminal Report	Project team, UNDP-CO External Consultant	None	At least one month before the end of the project
Lessons learned	Project team, UNDP-GEF Regional Coordinating Unit	10,000	Yearly
Audit	UNDP-CO, Project team	10,000	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP Country Office, UNDP-GEF Regional Coordinating Unit (as appropriate), Government representatives	No Cost	Yearly
TOTAL indicative COST ¹⁵		US\$ 165,000	

¹⁴ Excluding project team Staff time

¹⁵ Excluding project team staff time and UNDP staff and travel expenses

Audit Clause:

149. The implementing agency will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a legally recognized auditor, or by a commercial auditor approved of by both UNDP and the Government.

Incremental reasoning and expected global, national and local benefits

Baseline:

150. There are quite a number of projects that have tried to introduce or start new income generating activities in Miombo woodland ecosystem or in similar conditions. The Ministry of Natural Resources and Tourism, with support from UNDP, JAPAN, the Earth Institute of Colombia and Jane Goodall Institute is implementing Millennium Village Program, an income generating project in the Masito-Ugalla ecosystem. With a total budget of nearly US\$ 37 million, the project aims to increased crop production, reduced encroachment of forest and reduce reliance of communities on tobacco income. The initiative involves 15 villages in the Malagasi – Moyovozi Ramsar Site (SIMMORS) and 14 villages in Kigoma and Urambo Districts. Lessons emerging from these NRM based projects show that new income generating activities in Miombo woodland ecosystem are possible and can be an important source of incomes and livelihood, but need a great deal of support with improving product identification, processing (quality) and marketing (accessing lucrative markets).

151. Additional evidence from the Millennium Village showed that improving soil and water management combined with use of better seeds and fertilizers, and supported by a more empowered extension service increased the yield of maize by 3 to 4 times per acres. Such achievement is also associated with provision of subsidies on agricultural input in particular seeds and fertilizer to a total of 5,950 farmers involved in the project.

152. The World Bank and DANIDA are supporting better agriculture production in Tanzania to alleviate poverty. This is being done within the Agriculture Sector Development Program (ASDP), which is a US\$ 2.5 million project with an objective of building community ownership and district capacity for increasing soil fertility and crop yields. This follows a recently concluded World Bank program on Participator Agricultural and Empowerment Program (PADEP). With a budget of nearly US\$ 2.5million, the program used community based projects, improvement of livelihoods and environmental conservation, capacity building to increased food and income at community level.

153. The Tanzania Leaf Tobacco Company (TLTC) is supporting tree planting by tobacco farmers, through the Association of Tanzania Tobacco Traders (ATTT) and Alliance One Tanzania Tobacco Limited (AOTTL). The company has a Tree Planting policy, which requires tobacco farmers to plant at least 500 tree seedlings per ha, which they are supposed to use for tobacco curing. The company works through the farmer cooperative societies which grow tree seedlings sold to the farmers at Tsh. 100/- per seedling. The company also grows seedlings for fast growing species such as *Cacia siamea*, *Albizia rebekei*, *acasia craskapa* *Senna siamea*, *Acacia nilotica*, through “Seed Farm”, a subsidiary which also provides fertilizer to tobacco farmers at subsidized prices. This work is supported by ICRAF through the Tumbi Agricultural Research centre. In addition, the company provides loans for constructing brick kilns, which have better efficiencies in tobacco curing.

154. The Swiss Development Corporation is supporting two large projects; one on improving post harvest management practices (USD 7 million) and one on support to sustainable charcoal processes for charcoal originating in the districts immediately neighbouring Dar es Salaam. The government of Norway is supporting a national REDD preparedness program.

155. An analysis of the baseline shows a suite of activities that will continue to support participatory forest management to improve food security through the extension service and particularly by non-government players. However, these baseline activities will fail to address the persistent barriers described in this document that impede

the uptake of improved SFM and the mainstreaming of biodiversity conservation to improve the ability of the miombo to support better livelihoods thereby providing a buffer zone to the Congolian rainforests. Without the GEF alternative, the current unplanned, uncoordinated expansion of agriculture and over harvesting of wood resources without adequate consideration for sustainability or adaptation to climate change will continue to have a deleterious effect on the state of biodiversity and livelihoods, and the buffering zone effect will be lost, along with the ability of the woodlands to sequester carbon.

156. The short term gains in increased food productivity obtained by farmers coupled by the increased influx of immigrants from overpopulated areas and the seemingly “cost-free” wood to the tobacco industry and charcoal production will continue to drive the over-exploitation of the miombo woodlands as long as the policy and capacity barriers are not addressed. Without the GEF project, the productivity of the miombo woodlands will not be protected against the negative effects of the changing climate. Perhaps even worse, the policies on decentralization and participatory forest management will remain the theoretical basis for the conservation and sustainable use of forest resources as weak capacities coupled by weak political support will hinder its implementation. The baseline project on sustainable charcoal (SDC) does not address policy issues, or the taxation procedures, thereby reducing the long-term sustainability of any improved practices that will result from it.

157. In the alternative scenario, the GEF project will remove the barriers to ensure that knowledge based CBFM/JFM, soil fertility management and land use plans form the basis for mainstreaming SFM and biodiversity conservation in the productive landscape. By imbedding the improved practices, particularly of sustainable charcoal into policy, the project will create an enabling environment for replication and long term sustainability of impacts. It will also increase incomes from NTFPs to support local economic growth. Collectively, these measures will reduce the pressure on the miombo woodlands, reducing the rate of deforestation and maintaining, indeed improving, the potential for carbon mitigation. This will also increase the ability of the ecosystem to provide services such as biodiversity conservation, water catchment, sequestration and support to livelihoods. Preliminary calculations show that the combined activities will catalyze the mitigation of at least 1.7 million tCO₂e in ten years (see ER calculations).

Expected Global and National Benefits:

158. The miombo woodlands provide a wide range of ecosystem goods and services to local, national and global communities: locally they provide raw materials for both the rural poor who depend on forest products to meet basic livelihood needs, and for industry’s demand for timber and non-timber products. They also provide energy for the local people as well as people living in the towns and cities (in the form of wood and charcoal). They also provide soil formation services as well as water catchment (in dambos) (more detailed description of global significance is provided in section 1 – paragraphs 9-15). As reported by Williams et al¹⁶ (2008) re-growth of miombo woodlands after clearance for agriculture is very slow rarely recovers the defining miombo species, even in fields that had been abandoned for over 25 years. Where fire disturbance on the abandoned farms is a factor, then more fire resistant species may dominate instead. This means that conserving existing miombo woodlands is vital for maintaining the defining species, and their rich associated fauna.

159. *Carbon storage and regulation of the global climate:* Although miombo woodlands have lower wood carbon storage than other tropical forests, they are nevertheless a significant storage due to the extensive nature of the biome. As explained in the background, recent studies confirmed that the woodlands provide considerably high carbon stocks at about 60-80 tons per hectare¹⁷ (average for all strata), and an average of 19 tons per hectare for wood stem¹⁸; soils in undisturbed natural miombo woodlands contained considerably higher carbon stocks than disturbed soils or vegetation (stems), storing more than 100 t C ha⁻¹, whereas no abandoned farm soil exceeded 74 t C ha⁻¹, and no stem wood stock on abandoned farms exceeded 33 t C ha. They also found that recovery of soil and vegetation carbon stock after clearance was slow; while recovery of stem carbon was evident after a few decades,

¹⁶ Williams et al: Forest Ecology and Management 254 (2008) 145–155

¹⁷ Carbon and Biodiversity: A demonstration Atlas. UNEP WCMC 2008.

¹⁸ Williams et al, 2008: Forest Ecology and Management 254 (2008) 145–155

the soil stocks do not accumulate following abandonment over a few decades, and no abandoned farm soils exceeded 74 t C ha⁻¹.

160. The project will build capacity for mainstreaming SFM in order to conserve remaining woodlands to protect soil and vegetation carbon. To ensure that local communities can meet agricultural needs without permanent loss of woodlands, the project will provide approaches to increase crop output at low cost, e.g. agro-forestry and intercropping, combined with adoption of sustainable alternative income generating activities, which are expected to reduce the pressure on the natural resources and reduce deforestation. By reducing deforestation in over 133,000 hectares, the project will contribute to the maintenance of the carbon stock already held by the miombo woodlands. In addition, adoption of improved tobacco curing barns and sustainable charcoal and energy switch by public institutions will result in considerable emissions reductions (ERs). Direct ERs from adoption of improved tobacco curing barns over a baseline of 8,000 hectares of tobacco in the pilot villages is expected to **be up to 1,703,680 tCO₂e with an cost abatement unit of 0.50/tCO₂e**, which is very cost effective (see calculation below). ERs for the adoption of sustainable charcoal and adoption of methane in public institutions will be calculated during the inception period and reported at MTE. This is because their calculations require further data to be gathered during inception, including numbers and types of improved charcoal kilns, numbers of charcoal producers who will join the sustainable charcoal producers associations, etc. It is however noted that these two are not financed from CCM.

Calculations of emissions reductions under the Miombo Woodlands SFM Project

161. Direct emissions reductions will result from adoption of improved kilns in the 8 pilot villages: It is however noted that the guidelines provided in the GEF Emissions calculator manual relate to ERs from fossil fuel use and electricity, and are difficult to apply in biomass related projects. A simpler calculation was used as explained step by step below. Direct emissions were assumed to be those resulting from adoption of improved tobacco barns in the 8 pilot villages.

- For tobacco curing, the facts are that:
 - 95% of the tobacco currently being cured using traditional barns with wood harvested in the woodlands (hence not-sustainably harvested) while the remaining 5% is done using improved barns;
 - On average one hectare of tobacco field needs about 45m³ of fuel wood per hectare; however, with improved barns the amount could be 14m³ per hectare, leading to a saving of 31m³ of fuel wood per hectare of tobacco cured through improved barns);
 - The project can lead to at least 40% adoption in the use of improved barns with an average of 70% efficiency (hence each ton of tobacco cured with improved barns leading to a saving of 21.7m³ of wood, not the 31m³ that can be obtained under ideal conditions);
 - In Tabora region, there was about 25,000 ha of tobacco by 2010, 8,000 of it in the 8 pilot villages;
 - While UNEP/WCMC Carbon and Biodiversity Demonstration Atlas of 2008 reported that the miombo woodlands of Tanzania harbor about 60-80 tons of carbon per hectare of woodland (average of all strata), calculations are done using the lower estimate by Williams et al (2008)¹⁹ of 19 tons per hectare in wood stem carbon.
 - **The specific gravity of trees in the miombo woodlands is estimated to be 0.66²⁰**
 - The volume of harvestable wood for charcoal in miombo woodland was estimated to be 35 m³ per hectare in Eastern Tanzania²¹; this is assumed to be the same quantity that is harvestable for tobacco curing;
 - The lifetime of an improved tobacco curing barn is more than 20 years with regular maintenance; however, a value of 10 years will be used to discount potential losses from poor maintenance.

Direct emissions from outcome 2 (calculated in three steps):

Step 1: Emissions per year under Business as usual in the 8,000 hectares of tobacco being produced in the 8 pilot villages:

¹⁹ Williams et al: Forest Ecology and Management 254 (2008) 145–155

²⁰ Malimbwi, R.E. et al. 1994. Estimation of biomass and volume in Tanzania. Journal of Tropical Forest Science 7(2): 230-242

²¹ Malimbwi R.E. and Zahabu E., Faculty of Forestry and Nature Conservation, Sokoine University of Agriculture, Tanzania -- The analysis of sustainable charcoal production systems in Tanzania <http://www.fao.org/docrep/012/i1321e/i1321e10.pdf>

- i) Quantity of wood needed to cure 95% of 8,000 ha of tobacco = $(0.95 * 8,000) * 45 = 342,000 \text{ m}^3$
- ii) Quantity of carbon from $342,000 \text{ m}^3$ of wood = $342,000 * 0.66 = 225,72$ metric tons per year

Step 2: Emissions with 40% adoption of improved barns operating at 70% barns (kiln) efficiency (meaning that 40% of the 8,000 hectares of tobacco is cured at 23 m^3 per ha²² instead of 45 m^3 per ha);

- i) Quantity of wood required to cure 40% tobacco cured at 23 m^3 per hectare = $0.4 * 8,000 \text{ ha} * 23 \text{ m}^3 / \text{ha} = 73,600 \text{ m}^3$ of wood (b);
- ii) Quantity of wood required to cure the other 55²³% of tobacco still under traditional barns = $0.55 * 8,000 \text{ ha} * 45 \text{ m}^3 / \text{ha} = 198,000 \text{ m}^3$ of wood (c);
- iii) Total quantity of wood used to cure tobacco with the project = $b + c = 73,600 + 198,000 = 271,600 \text{ m}^3$ of wood
- iv) Quantity of carbon from $271,600 \text{ m}^3$ of wood = $271,600 * 0.66 = 179,256$ metric tons of carbon per year

Step 3: Lifetime tons of C saved

- i) Benefit in one year = $225,720 - 179,256 = 46,464$ metric tons per year
- ii) Benefits over ten years converted from C to CO₂ units = $46,464 * 10 * (44/12) = 1,703,680 \text{ tCO}_2\text{e}$
- iii) ICER (TDA) becomes $1,703,680 * 0.5 = 851,840 \text{ tCO}_2\text{e}$
- iv) The Indirect ERRs will range from 851,840 to 5,111,040 tCO₂e

162. Direct Post Project CO₂ Emission Reductions – there are currently no plans to set up a revolving fund to financially support further expansion of tobacco curing barns; however, the possibility will be explored during the project inception period, and if adopted, the ERs will be revised in the inception report and reported at mid-term review.

163. **The Unit Abatement Cost (UAC) for this project = $855,000 / 1,703,680 = \$0.50 / \text{tCO}_2\text{e}$.** The above emissions reductions figures could be higher if the loss of soil carbon due to conversion of woodlands to farmlands was taken into account. As explained in other sections, this figure would be significant given that soils have significantly higher carbon than wood stem in the miombo woodlands, and that on average converting woodlands to agriculture leads to 23% reduction in soil carbon (Williams et al (2008)²⁴. Tanzania is part of the UN REDD program and has reserved over 20% of its territory as forest reserves, game reserves and national parks, thus acting as both an area of storage and as potential sequestration of Carbon dioxide²⁵.

164. *Biodiversity:* At the global level, forests contain as much as 90% of terrestrial biodiversity, with tropical forests being particularly important in terms of both species richness and their concentration of endemic species (Brooks *et al.* 2006). As described in the background section, the miombo woodlands are biologically rich and diverse with up to 8500 vascular plant species, 4,590 them endemic, together with 35 endemic mammals, 51 endemic birds, 52 endemic reptiles, 25 endemic amphibians and an unknown number of endemic invertebrates. The antelopes are especially diverse and include Eland, Impalas, Gazelles, Oryx, Gerenuk, and Kudu. Other important animals include Buffalo, Wildebeest, plains Zebra, Rhinos, Giraffes, Elephants, and Warthogs. Up to sixteen grazing and browsing species may coexist in the same area. The species-rich herbivore trophic level also supports a diverse set of carnivores, including cats (lions, leopards, cheetahs, servals), dogs (jackals, wild dogs), and hyenas.

165. The Malagasi basin is home to more than 20,000 water birds, estimated to constitute more than 1% of the individuals of several water bird species, including the shoebill *Balaeniceps rex*, the Wattled Crane *Grus carunculatus*, the *Ardea goliath* and the *Egretta alba* (2%) (SIMMORS, 2000; URT, 2001). Although most birds are reported to be residents exhibiting restricted movements, the region hosts long distance migrants, which usually

²² It is unlikely that tobacco farmers in the neighboring villages will achieve 100% efficiency in the use of improved barns; a 70% efficiency would reduce wood requirements from 45 m^3 per hectare to 23.3 m^3 per hectare – calculated by subtracting 70% of 31 from 45; thus = $(45 - (.7 * 31)) = 23.3$ – rounded up to 23

²³ Discounting the 5% who are already using improved barns)

²⁴ Carbon and Biodiversity: A demonstration Atlas. UNEP / WCMC: 2008: Williams et al, 2008: Forest Ecology and Management 254 (2008) 145–155

²⁵ Ministry of Natural Resources and Tourism, 2001

come in the wetlands during summer and return to the north at the end of winter, including the white pelican and many other important birds. By mainstreaming SFM and strengthening JFM/CBFM in the four pilot wards, this project will reduce the pressure on the miombo woodlands and improve the conditions for biodiversity conservation in over 133,000 hectares of productive landscapes. This area is expected to be doubled through upscaling.

166. *Tourism* – The miombo woodlands aesthetic qualities are the basis of an important and globally known tourism industry, representing a significant and substantial revenue development opportunity for local economies. Benefit flows to communities from tourism are still too low to provide an incentive for conservation, despite the spread of ecotourism.

Table 11: Benefits Summary

Benefits	Baseline	Alternative	Increment
Global benefits	Weak enforcement of existing regulations and ineffective management of miombo woodlands and related wetland areas. GOT has limited capacity to ensure continued flow of ecosystem goods and services from the miombo woodlands (including biodiversity conservation, carbon sequestration, provision of aesthetics for tourism, soil formation and fertility)	Agreed management strategy that provides a framework for woodlands conservation action by all players Joint-management resulting in increased role of local communities in managing forest resource use and access. Communities have incentives to regulate forest use and access for their own benefit.	Woodlands management strategy focuses efforts by many stakeholders to solve conservation and livelihood conflicts/problems in the miombo woodlands. Collaborative management results in improved management and monitoring of biodiversity, reduction in emissions and other forest resources. Ecological stability of woodlands is increased; biodiversity and the climate are less threatened.
National and local benefits	Open access to the miombo woodlands is endangering their ecological integrity, their functions and ability to deliver ecosystem goods for local economic development (soil fertility, wood, poles, biodiversity, watershed protection and indigenous cultural uses). Communities within the woodlands are poor and use unsustainable farming and forest resource harvesting practices. No ecosystem based approach to adaptation, hence increased vulnerability to the effects of climate change, on already vulnerable community	Social transformation of forest woodland communities through effective partnerships in co-management of forests and increased security of resource tenure. Enhanced alternative livelihood options reduce unsustainable use of land and forest resources. Increased access to tradeable NTFPs and increased access to markets, increasing incomes and building social capital.	Pressure on the woodlands is reduced, deforestation is slowed down, forest cover is retained, globally significant biodiversity is protected and ecosystem services are maintained; Increased food productivity and income for households, reduced vulnerability to climate change and incentives for sustainable forest resource management and protection.

Cost effectiveness

167. Deforestation and forest degradation are the second largest global source of anthropogenic carbon dioxide emissions. It is widely acknowledged that reducing emissions from these sources is potentially faster and cheaper than reducing emissions from fossil fuel combustion because it does not involve large-scale changes to existing infrastructure. To secure long term conservation of biodiversity and carbon stocks in the miombo woodlands, the communities dependent on them must have incentives to utilize them sustainably to meet current development needs while improving the ecological integrity of the ecosystem; this is the only way to ensure that the ecosystem will continue to provide the goods and services required for economic development and healthy livelihoods to the current and future generations. The cost effectiveness of this project is therefore considered along three critical

functions it currently provides: maintaining carbon stocks; maintaining biodiversity and securing livelihoods. Although data on costs of replacing these functions is not readily available, the discussion attempts to compare the value of the woodlands against the costs of setting up protected areas to protect more of the biome, the cost of physical rehabilitation of the degraded woodlands and the potential costs of resettling destitute communities who would have to migrate if the woodlands lost their ability to produce food..

168. **On maintaining carbon stocks:** As reported by Williams et al (2008), the miombo woodlands are unique in that although they are rich in biodiversity, carbon stocks and potential for supporting livelihoods, these properties are very easily lost once the woodlands are cleared. In the analysis undertaken in Nhambita in Mozambique, it was demonstrated that undisturbed woodlands have higher soil carbon content than stem vegetation, registering a median of 57.9 t C ha⁻¹ 119.0 (+/- 8) in soils against that of 19.0 (+/- 8) (t C ha⁻¹) for stem wood. The median for both soil and stem wood declined considerably in disturbed (abandoned) agricultural plots with soil median declining by 23%.

169. Bond et al (2010)²⁶ reported that an analysis of the opportunity costs of avoiding deforestation in the eight countries with tropical forests that account for 70 per cent of the global emissions from forests had revealed that it would cost between US\$1 and US\$2/t CO₂ to totally eliminate deforestation. (Kinderman et al., 2008 (quoted by Bond et al – *ibid*) reported that to halve the emissions from deforestation between 2005 and 2030 would require a payment of between US\$10 and US\$21/t CO₂; which would entail payments of between US\$17 and US\$28 billion per annum from developed to developing countries. This project will lead to direct emissions reductions of at least 1.7 million tCO₂e at a Unit Abatement Cost (UAC) of 0.50/tCO₂e which is significantly cost effective.

170. **Biodiversity and setting up additional protected areas for the miombo woodlands:** The miombo woodlands already host over 100,000 hectares of protected areas and indeed GEF has financed a large number of fairly successful Protected Areas Projects. Protected areas in the miombo woodlands will however only contain (and protect) a limited sample representation of biodiversity in the biome. Majority of the biodiversity will always be outside the protected areas where the needs of the resident communities cannot be wished away; but where projects can build on the development needs, institutions and traditions of the communities to mainstream conservation friendly processes into the productive sector. Indeed, almost two thirds of Tanzania's 33.5 million hectares of forests and woodlands are on public lands. Several studies have demonstrated that recovery of miombo woodlands biodiversity after clearance for agriculture is very slow and rarely recover the flagship species, even in fields that had been abandoned for over 25 years. This particularly difficult in areas where fire disturbance is frequent, as is often the case in agricultural areas. In such cases, more fire resistant species may dominate instead. In this project, the emphasis is on ensuring conservation by mainstreaming sustainable forest management into the production systems, testing the potential of markets, policies and capacities in ensuring "utilization-based conservation". This will always be needed to complement protected areas and to ensure conservation of the majority of the biodiversity found outside of protected area boundaries, while improving the ecological integrity of ecosystems for the continued supply of goods and services necessary for human survival.

171. **Livelihoods:** Given the inherent infertility of the miombo woodlands the land can only support two or so cycles of crops without addition of organic or inorganic fertilizers. Integrated soil fertility management is critical since return on investment for inorganic fertilizers is often too low to sustain it's except for cash crops. Mainstreaming SFM (through CBFM/JFM, soil fertility management, improved biomass energy processes and NTFPs) provides a cost effective means of increasing the ability of the woodlands to provide services to both livelihoods and conservation, particularly when compared the cost of physically rehabilitating the very fragile woodlands. When done right, this can accomplish conservation at a fraction of the cost of establishing, maintaining and keeping the communities away from protected areas. Fisher et al calculated the opportunity cost of conserving forests and argued that using the funds available for REDD+ to reward people for conserving forests would be ineffective at reducing emissions, because in many cases forest clearance would simply be displaced elsewhere (leakage). Specifically, in countries with under-developed markets such as Tanzania — where in some areas people

²⁶ Bond, I., Chambwera, M., Jones, B., Chundama, M. and Nhamumbo, I. (2010) *REDD+ in dryland forests: Issues and prospects for pro-poor REDD in the miombo woodlands of southern Africa*, Natural Resource Issues No. 21. IIED, London.

cannot buy the food and fuel they need — restricting access to forests would force people to either clear forests in other areas or face increased poverty. Even where there are well-functioning markets, leakage could still occur if crop yields can't be increased quickly enough to meet demand. They therefore concluded that boosting agricultural yields on existing farms is a more socially acceptable way of stemming forest loss than simply restricting agricultural expansion⁴, because, in theory, it allows increased demand for food to be met without displacing forest loss or adding to the poverty of local people.

Linkages with GEF Financed Projects

172. The project will benefit from UNDP-GEF's past work in forestry, SLM and biodiversity management in Tanzania, including the Eastern Arc Mountains, Selous-Niassa Game Reserve connectivity, the World Bank Marine and Coastal programme, the new Kilimanjaro SFM project, the recently approved coastal forests project, the new support to Tanzania National Parks, and the UN-REDD programme. Lessons will also be drawn from other forest conservation activities in the area including the WB/DANIDA supported Community Forest Programme and the UNDP-GEF SFM projects world-wide.

173. The project is highly complementary with a number of national and regional GEF projects (table 3 below). The Project development was coordinated with the other GEF initiatives in the country to avoid any duplication and overlap between the initiatives, and to optimize synergies. This project will also be closely aligned to the Regional Miombo Network, particularly through the participatory monitoring system. This will allow the project to monitor whether the improved management in western Tanzania transfers the pressure to the Congo rain forests. This information will be shared widely to support adaptive management in the region and its forests.

Table 3: Linkages to other projects

Project Name	Focal Area	IA	Description and Linkages
Marine and Coastal Programme (MACEMP)	Mainland Tanzania and Zanzibar	WB/GEF	Geographical linkages, lessons learned
Tanzania National Parks – Protected Area expansion	Southern Circuit Tanzania	UNDP/GEF proposed	Geographical linkages, lessons learned
Capacity for SLM, Kilimanjaro region	Kilimanjaro region	UNDP/GEF	Thematic – landscape land use planning, markets and livelihoods (lessons learned)
Mainstreaming agro biodiversity into agriculture in Ethiopia	Ethiopia, regional and global markets	UNDP/GEF	Thematic linkages – using markets to encourage mainstreaming good practices (to ensure sustainability while increasing harvesting)
Tanzania Coastal Forests Project	Tanzania	UNDP / GEF	Thematic (forestry) linkages, lessons learned
Eastern Arc Mountains	Tanzania	UNDP GEF	Thematic (forestry) linkages, lessons learned
Selous- Niassa Game Reserve Corridor Project	Tanzania, Mozambique	UNDP GEF	Geographical linkages, lessons learned, thematic linkages
Coastal Forests Project	Indonesia	UNDP/GEF	Thematic (forestry) linkages, lessons learned

Stakeholder Analysis

174. A wide range of stakeholders are benefiting from the miombo woodlands and form a core team of the stakeholders who need to be intimately involved in the project implementation. PPG studies grouped the stakeholders into seven categories described below; all the groups were involved in the PPG consultations and are listed in annex 4.

175. **Local communities:** Local communities that collect forest products and get services from surrounding Coastal Forests include individual households, groups of village forest products traders, Village Natural Resources Committees, and Village Councils (Village governments). PPG and numerous other studies have documented the extent to which these groups depend on the miombo resources, which they obtain for free to sustain their subsistence livelihoods. These include firewood, poles, thatch grass, ropes, mushroom, wild fruits, insects, traditional medicine, tooth brushes, honey and wild animals. More than 98% of village households in the pilot districts depend on firewood collected from the miombo woodlands as the main sources of energy for cooking (and sometimes lighting) with no affordable substitute in the foreseeable future. More than 80% of the tobacco farmers harvest wood from the woodlands for curing tobacco, even where tree planting is supported with incentives. Some of the products are sold to the local market, often to middle men and women who provide links to the larger district markets. The District Council collects revenue from such sales, but this not systematically, and often depend on the proximity of the traders to the District Headquarters.

176. Many villages have Village Natural Resources Committees, whose objective is to enhance natural resources management, through the Joint Forest Management (JFM) or Community Based Forest Management (CBFM) principles.²⁷ Members of these groups benefit through training, recognition by the community and income earning through approved legal forest trades for example sale of confiscated forest products from illegal traders. Some groups of villagers engage in the production and sale of saw logs and sawn timber on a small scale using traditional tools (axe and pit saw). Most of the trade is however illegal.²⁸

177. **Local Government:** Local government is allowed to collect forest revenue from sale of forest products originating from LAFRs and 5 % revenue from central government forest reserves products originating from their districts. In return, the local governments assist in coordination of extension services, law enforcement; promotion of tree growing and management of local government forest reserves for the conservation of biodiversity. Recent policy changes allow local governments to manage central government forest reserves within their districts although much of this is happening without formal agreements as would be defined in a Memorandum of Understanding (MOU) with FBD.

178. **Regional Secretariats:** Regional secretariats are under the Prime Ministers' Office. They form a coordination link between the Central Government and the District Councils on policy formulation, conservation and management of the Coastal Forests.

179. **Government Sector Ministries:** Various sector ministries are involved directly or indirectly in conservation and management of the miombo woodlands covering: policy formulation, sector planning and budgeting, law enforcement, revenue collection, information systems, extension, research, training, monitoring and evaluation and coordination of other stakeholders. Experience has shown a growing number of stakeholders have realized that the achievement of their sector policy objectives is influenced by sustainable conservation of the Forests in the country, itself enhanced by multi-sectoral coordination. SFM has therefore been recognized as necessary for the achievement of goals stated in national development policies and programs such as Mkakati wa kukuza an kupunguza umaskini Tanzania (National Strategy for Growth and Reduction of Poverty) (MKUKUTA), and MDGs.

180. **Commercial Forest Product Dealers (Private Sector):** Although miombo woodlands are not rich in the common timber species, there is still some timber/poles extraction happening, led by the private sector. The private sector consists of individuals, groups or companies with high investment capital and business skills and who are largely outsiders, often not integrated in the local miombo woodlands communities. Their objectives are geared towards the realization of rapid profits from clearing miombo woodlands, sometimes with little consideration for sustainability or biodiversity conservation. Whilst there are legitimate businesses working in this sector, a

²⁷ MNRT. 2001. Tanzania National Forest Programme 2001-2010. Ministry of Natural Resources and Tourism. Forestry and Beekeeping Division; MNRT. 2007. Community- Based Forest Management Guidelines for the Establishment of Village Land Forest Reserves and Community Forest Reserves. Ministry of Natural Resources and Tourism Dar es Salaam.

²⁸ WWF. 2007b. The Dar es Salaam Charcoal Project. A project proposal to begin resolving the environmental crisis caused by charcoal. WWF – Tanzania.

significant number of organizations' business is illegal and revenue collected by the government is reported to be below 5 percent of the true value of the products harvested.

181. **Tobacco growing companies:** A large percentage of the country's tobacco is grown in the region. Although tobacco is not a very environmentally friendly crop, the Tanzania Leaf Tobacco Company has invested considerable amount of resources in promoting sustainability and environmental management, largely through tree planting initiatives and support to improved tobacco kilns. Tree seedlings are issued alongside loans or fertilizer packages for tobacco while loans for constructing improved tobacco kilns are issued to members of cooperatives.

182. **Community Based Organizations (CBOs) and Non- Governmental Organizations (NGOs):** Several national CBOs and NGOs operate within the miombo woodlands assisting in awareness raising and extension services, financing of forestry and environment activities, promoting gender empowerment and revenue collection. Some of the active NGOs include: WWF, Mitandao ya Jamii ya Usimamizi wa Misititu Tanzania (Community Network in Forest Conservation in Tanzania) (MJUMITA) and Tanzania Natural Resources Forum (TNRFF).

Country Ownership: Country Eligibility and Country Drivenness

183. **Eligibility for GEF Funding:** Tanzania ratified the Convention on Biological Diversity on 8th March 1996 along with the Framework Convention on Climate Change. Tanzania is eligible for technical assistance from UNDP. The UN Convention on Biological Diversity (CBD) considers mainstreaming of biodiversity friendly practices in the productive sector as an important supplement to the protected areas, since more than 50% of the biodiversity exists outside protected areas. The Global Environment Facility (GEF) is the main funding mechanism for providing assistance to developing countries to facilitate them to achieve the targets set out within the CBD – to which they are signatories. This project will address the 2010 target related to the conservation of the world's forests, through SFM.

184. **Fit with GEF Focal Area Strategy:** The project will contribute to BD SO 2 and SFM Strategic Objectives 1 and 2. These are 'To mainstream biodiversity in production landscapes' (BD SO2), to reduce pressures on forest resources and generate sustainable flows of forest ecosystem services (SFM SO 1) and to strengthen the enabling environment to reduce GHG emissions from deforestation and forest degradation and enhance carbon sinks from LULUCF (SFM SO2). It will also contribute to Climate Change Strategic Objective 5: Promote conservation and enhancement of carbon stocks through sustainable management of land use, land-use change, and forestry.

185. An SO2 approach is appropriate given the high levels of dependency of local populations on natural resource use, ruling out the establishment of extensive areas of exclusive protected areas, and the fact that threats to BD stem from production activities. The project further adopts SP4 and SP5 strategies thus: Strengthening the Policy and Regulatory Framework for Mainstreaming Biodiversity, by modifying how the Government interacts with local communities in support of BD friendly options, including the incorporation of BD criteria and regulations into programmes of technical, financial and marketing support by providing information to decision makers on the potential benefits that this could generate; and strengthen governance structures in local communities and capacities in local and national Government for planning and regulating resource management (SP4); and, Fostering markets for biodiversity goods and services by assisting producers to develop viable small business with market access for BD-friendly forms of production (SP5). Collectively, these results will reduce pressure on the woodlands and reduce deforestation. This will increase the connectivity of the biome, contributing to restoration of habitats for biodiversity. It will also carbon storage capabilities of the woodlands, enhancing ecosystem services to climate modulation.

Sustainability

186. Sustainability has been a major consideration throughout the development of this project. There are two key interlinked challenges to assuring sustainability.

187. **Institutional Sustainability:** The project strongly emphasizes building institutional capacities in FBD, DCCFF, District administrations, NGOs, CBOs and community/village level resource management institutions to

sustain management of forest resources within the overall management of the landscape beyond the lifetime of the project. The experience of FBD, district authorities and community-based associations working in partnership to establish and maintain CBFM forest reserve sites for the production of mutually agreed benefits will establish a foundation for continuing collaboration in the future. Strengthening capacity of the local institutions to enforce implementation of bye laws, combined with raised awareness on the existence of, and importance of implementing bye laws will go a long way in ensuring sustainability.

188. The project will also invest in developing skills of local community leaders and other key stakeholders to mobilize community members for participatory planning, implementation and monitoring of the project implementation. The communities will be facilitated to form cooperatives which will ease engagement with financial institutions as well as access to inputs. The project will develop a body of knowledge and experience with participatory management practices among local and national government authorities.

189. **Financial Sustainability:** The project recognizes that SFM is unlikely to be sustained in the long-term unless poverty levels are reduced, primarily through increasing financial returns from sustainable use related activities. The project aims to increase the profitability of sustainable use through four strategies:

- Increasing food production sustainably
- Carbon Financing from sustainable charcoal;
- Expanding income generating activities from NTFPs;
- Increasing access to financial institutions.

190. **Carbon Finance:** The project will facilitate provision of financial incentives for the adoption of sustainable charcoal through the sale of carbon credits accrued from emissions reductions from improved charcoaling processes. This is in recognition of the fact that sustainably produced charcoal is unlikely to fetch a premium price as long as other countries (or districts) continue to produce regular charcoal. Carbon finance therefore provides an additional income stream to complement the price of charcoal. This is also a mechanism to counter the potential danger of increasing charcoal production (and deforestation) from increased profitability if the increased income was purely from the direct sale of the charcoal. The project will therefore explore market based incentives and link communities to the voluntary carbon finance market to provide an additional income stream as an incentive to sustainable charcoal and improved woodland management. The prospect of carbon finance in Tanzania is increased by its participation in the UN REDD programme, and the commitments expressed by the Government to the process. This project will form a partner to the REDD program, in response to the recommendation for local level piloting in order to test the concept, the issues of payments, leakage and tenure arrangements.

Replicability

191. The Project is incorporating good SFM practices generated in the region, which is a replication of other initiatives. Replicability of its own initiatives will be ensured through several avenues: policy reform, capacity for landscape planning, knowledge generation for adaptation and the use of market transformation to encourage trading in sustainably harvested products. All of the lessons will be captured and disseminated through the M&E and communications systems.

Table 15: Replication Action Plan

Outcome	Needs/Opportunities for Replication	Project Strategy for Replication
<p>Outcome 1: The policy, regulatory and institutional arrangement support sustainable forest management in the miombo woodlands.</p>	<p>Several GEF projects being implemented in the country will support policy harmonization with a view to making the countries policy more biodiversity friendly. The Kilimanjaro SLM project will test the sustainable charcoal and carbon finance policies, as well as landscape planning and strengthening of local level implementation of bye laws. This second testing of the approach, if also successful, can be replicated for other ecoregional scale GEF projects globally. This outcome will also help build the capacity of civil society and the government agencies and hence they will be able to replicate the enhanced capacity themselves.</p>	<p>Lessons from implementing the protected area systems approach in the Coastal Forests will be documented, captured, and disseminated in technical papers and scientific products. The approach will also be promoted at relevant international meetings and technical protected area events. It is expected that the capacity build internally will be used to spread the lessons learned across the work of the FBD Tanzania mainland. The country is in the process of setting up a National Dialogue on SLM/SFM process, facilitated by the GM and the GEF SLM project. It is also in the process of formulating an SLM Investment Framework; relevant lessons from all four outcomes will be integrated into the national dialogue and the financing strategy.</p>
<p>Outcome 2: Strengthening skills and capacities for knowledge based CBFM/JFM, integrated soil fertility management and land use planning</p>	<p>CBFM/JFM is an important management tool for the entire miombo woodlands but the low inherent soil fertility and the nature of the woodlands and its inhabitants has presented a problem to increasing productivity of the land without causing further damage to the ecosystem. Further, soil infertility is not being effectively overcome through the current level of soil fertility management practices. There is no long-term monitoring to support adaptive management. This outcome will provide additional lessons on these critical issues (amongst others), and advance the sphere of knowledge.</p>	<p>As with the above, the approach to replication will be to capture the detailed lessons learned and the results of implementing this outcome and to make these available as broadly as possible. Mainstreaming integrated soil fertility information through the District Development Planning process and the extension services will provide a clear avenue for replication. Material generated for training for both land users and technical officers will be made available to other districts in the region to support replication. Finally, the involvement of the IRA, an institute of the University of Dar es Salaam, will provide an avenue for integrating lessons from the project into higher level learning, which is an effective means of replication. It is expected that the capacity and networks build in and with the private sector, communities, CSO and government departments will be used to spread the lessons learned across the country and the region.</p>
<p>Outcome 3: Adoption of Sustainable charcoal and energy switch reduce pressure on woodlands</p>	<p>Biomass energy will continue to be the main source of energy in Tanzania for the foreseeable future. Charcoal production, use of wood for cooking and curing tobacco is all being done using highly inefficient methods and technologies. This outcome will work with stakeholders to improve charcoaling process and link it to carbon credits; it will also facilitate the switch from wood to methane made from human waste in public institutions and support compliance with the use of improved tobacco curing procedures.</p>	<p>As above; in addition, linking sustainable charcoal to the voluntary carbon markets will provide an additional income stream, which will be an incentive for uptake by communities outside of the pilot wards. This project will also be linked to the REDD initiative, which is dealing with the issue of payment for ecosystem services (sequestration) at the national and regional level. Lessons will be captured and shared with the national initiative, while seeking to incorporate (and locally test) many of the lessons being generated by it.</p>

<p>Outcome 4: Markets support expansion of livelihood options to reduce pressure natural resources & increase income.</p>	<p>This outcome will test the concept of increasing trade in natural resources at the local level without causing further overharvesting. This is necessary because SFM cannot be sustained in the long term unless returns from investments in improved practices (CBFM/JFM, integrated soil fertility management) are complemented by income from non-consumptive sources. This will ensure that the value of standing forests/trees are greater than (or at least perceived to be greater than) the immediate benefits of deforesting.</p>	<p>As in outcome 2</p>
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Annex 1: SECTION II: STRATEGIC RESULTS FRAMEWORK (SRF) AND GEF INCREMENT

Project strategy	Objectively Verifiable Indicators				
	Indicator	Baseline	Target	Verification	Risks/assumptions
Goal	Sustainable Forest Management secures ecosystem and biodiversity values while providing a buffer to the Congolian Rain forest, ensuring food security and sustainable livelihoods.				
Objective: To provide land users and managers with the enabling environment (policy, financial, institutional, capacity) for climate resilient SFM adoption in the miombo woodlands	Extent of land mainstreaming SFM principles in land use	Currently there is limited mainstreaming of SFM principles into land use in the 133,000 ha of pilot wards; the same applies for the rest of the districts and the region.	By the end of the project, management of 133,000 ha (pilot wards) mainstreaming SFM principles and another 150,000 ha benefiting indirectly from upscaling of lessons through the districts and regional planning and extension structures as well as the SLM project facilitated National Dialogue on SLM/SFM (and the soon to be formulated SLM Investment Framework)	CBFM/JFM reports, Project M&E reports, observations, Extension agents	Short term gains from deforestation can be overcome through increasing benefits from more sustainable management, combined with stronger implementation of bye laws
	Extent of woodland under active JFM/CBFM in the project area and extent benefiting from upscaling	Although currently there is about 500 ha of woodlands under CBFM/JFM, none of it is being managed in accordance with the principles of CBFM due to low levels of compliance; so effective baseline is less than a 100ha.	Over 500 ha managed under active CBFM/JFM principles (project pilot area) and another 500 ha impacted by up-scaling during the project's 5 yrs; the additional 500 will benefit through upscaling (using channels explained above)	Project M&E reports, observations, Extension agents reports	
	Reduction in the rates of deforestation	Currently estimated to be over 10% per annum ²⁹ ; there are several seriously degraded patches of woodlands, particularly the abandoned tobacco fields	At least 25% recovery in highly degraded patches and woodlands around the villages as measured by regeneration (recruitment) and improvements in species index and population structure for forests/woodlands	Department of forests reports; project monitoring reports	
	Improvement in household welfare for a minimum of 40% of the 12,000 households in pilot wards, as measured by 30% increase in household income; And 40% reduction in number of food insecure days;	More than 90% of households are below the UN poverty line; however, specific baseline household incomes and number of food secure days will be established during the inception period.	5% increase in household income for 40% of households by year 3, and 30% increase by end of the project; 20% reduction in food insecure days for 40% of households by year 3 and 40% increase by end of the project	Reports from the participatory M&E system;	

1. ²⁹ this figure needs to be confirmed

	Emissions Reductions from adoption of improved tobacco curing barns, sustainable charcoal and methane cookers	Currently tobacco curing uses 45m3 per hectare of tobacco instead of 14m3 that can be achieved through improved barns. This is leading to total emissions of about 185,649tons of carbon per year in the 8 pilot villages alone (producing about 8,000 hectares of tobacco. Unsustainably produced charcoal releases a minimum of 9 tons of Carbon; the 10,000 tons of charcoal produced in the wards releases about 90,000 tons of carbon per year.	At least 70% reduction in wood used in tobacco curing for at least 40% of the tobacco cured (on average) leading to direct ERs of 170,368 per year (for ten yrs totalling to 1,703,680tCO2e); further ERs are expected from sustainable charcoal and methane adoption. This will be calculated during the inception period and reported at MTE	Reports of the participatory monitoring system; Reports from the Tobacco company; Reports of the carbon project, particularly related to sales of carbon credits	Adoption of improved tobacco curing barns requires stronger enforcement of environmental regulations by the local government; there is a risk that this does not happen because local leaders are unwilling to risk becoming unpopular or that politicians interfere with the enforcement because it might have ramifications for their political carriers. Selling carbon credits (co-finance) will serve as an incentive for adoption of sustainable charcoal (in addition to the enforcement of local environment regulations). The project will target the voluntary market. There is a risk therefore that although voluntary markets are recovering after the financial crisis of 2008, the demand for carbon credits will decline if the Kyoto protocol is not renewed or is not replaced by another binding mechanism
Outcome 1: Policy and institutional support	Number of policies mainstreaming SFM	All policy statements mention importance of SFM but don't have details of how SFM will be ensured	At least 3 policies revised to mainstream SFM principles and so provide a better policy environment for SFM;	Policy discussion papers and briefs; project monitoring reports	Policy processes tend to be slow in developing countries. Speeding up the process, especially of formulating legislative frameworks will be necessary for achievement of this indicator
	Number of bye - laws reflecting national policies being effectively implemented at the local level	Policy implementation very weak due to weak judiciary and inadequate understanding of, and buy-in for the policies by local communities	Legislation and institutional arrangement guiding policy implementation for at least 3 key policies are influenced by project results and overtly recognize SFM principles; Local level governance of SFM improved by incorporation of traditional regulations into bye laws with clear implementation mechanisms At least a 100% increase in number of people reporting to be aware of the NRM/ SFM/ CBFM polices and bye laws; At least a 100% increase in number of people actively abiding by the NRM/ SFM/ CBFM polices and bye laws;	Policy discussion papers and briefs; project monitoring reports	Decentralisation has gone a long way in creating a stronger policy implementation environment. However, local level compliance is sometimes discouraged by rent seeking. The returns on compliance have to match the suffering for non-compliance for this to be effective.

Outcome 2: Strengthening skills and capacities for knowledge based CBFM/JFM, integrated soil fertility management and land use planning	Woodlands being managed under effective CBFM/JFM	Although currently there is about 500 hectares of land declared to be under CBFM/JFM, none of it being managed in accordance to the principles of CBFM in practice; thus the effective baseline is less than 100	By the end of the project, at least 500 ha of woodlands being managed under functional ³⁰ CBFM/JFM	Community based M&E reports; extension work plans and reports; Project monitoring reports	Short term gains from deforestation can be overcome through increasing benefits from more sustainable management, combined with stronger implementation of bye laws
	Percentage of staff and land users with updated skills for climate resilient SFM	The two regions (Tabora, Rukwa) have line ministry technical staff with training in forestry, agriculture, energy and trade. However, few staff members have integrated the technical skills to adequately support SFM by land users. A very small percentage of the land users have received training from the baseline projects described in the GEF incremental section; exact baselines will be established during the training needs assessment (at inception)	By year 2, at least 50% of the technical officers and land users requiring capacity improvement have received skills (training and materials) to enhance their capacity for integrated soil fertility management, CBFM/JFM and adaptation to climate change	Training reports; extension work plans and reports; Project monitoring reports	Regional and local government retains adequate staffing numbers
	Increase in tree density on farms, degraded areas under rehabilitation and woodlands under CBFM/JFM	This baseline will be established through the participatory M&E system to be formulated under outcome 2.5 and reported in the PIRs	At least 25% increase over the baseline (by the end of the project)	Stratified random sampling techniques and findings reported in the project M&E reports	
	Percentage of community engaging in SFM practices	Currently less than 10%	At least 50% increase in number of farmers consistently applying 3-5 integrated soil fertility management practices	Extension services work plans and reports, participatory M&E reports, project monitoring reports	The increased crop yields and incomes from the income generating activity provide adequate incentives to overcome reticence and short term decision making tendencies.
	Change in crop yields	Maize yields currently at less than a third of potential (5tons/ha versus 15tons/ha). Baseline yields for other indicator crops will be established as soon as these are selected per village (at inception)	At least 25% increase in agricultural produce for key crops as a result of improved integrated soil fertility management and other agricultural practices (which increase soil fertility and soil-water use by crops)	Extension work plans and reports; participatory M&E reports; project monitoring reports	That project interests micro finance institutions and farmers uptake of improved practices; The increased crop yields and incomes from the income generating activity provide adequate incentives to overcome reticence and short term decision making tendencies.
	Quantity of carbon mitigated	Currently 95% of tobacco grown by small scale farmers	At least 40% adoption of improved tobacco barns in pilot	Extension work plans and reports;	The tobacco company and the local government cooperates in the

³⁰The participatory M&E system to be defined under outcome 2 will refine this indicator and test practical ways to monitor it.

		using inefficient traditional kilns that consume 45m ³ of wood per ton of tobacco instead of the 14 m ³ /tons for improved barns;	villages and an additional 30% in neighbouring villages leading direct ERs of 1.7 million tCO ₂ e (see calculations in the GEB section)	participatory M&E reports; project monitoring reports	enforcement of CBFM, SFM and other environmental management bye-laws
	Percentage of population using weather information in decision making	Currently less than 10% due to mistrust of the weather information and inadequate dissemination of same	<ul style="list-style-type: none"> At least 25% increase in number of farmers using weather information for decision making (co-fin); 	Participatory M&E reports	Co-finance program of work on improving weather prediction and information dissemination comes through; land users can overcome mistrust of weather information
Outcome 3: Adoption of Sustainable charcoal and energy switch reduce pressure on woodlands	Number of operational charcoal associations engaging in sustainable charcoal	Currently none	<ul style="list-style-type: none"> At least 10 charcoal associations are active and facilitating their members to adopt and comply with sustainable charcoal principles by the end of the project (half that by year 3). 	Project monitoring reports, charcoal association reports.	
	Quantity of carbon mitigated from adoption of sustainable charcoal	Pilot villages producing an average of 10,000 tons of charcoal per year using largely traditional and inefficient methods	<ul style="list-style-type: none"> By the end of the project, more than 40% of charcoal being produced via sustainable means, saving upto to 20% of wood needed to make the wood (the ERs to be derived from this savings will be reported at MTE.) 	Project monitoring reports, charcoal association reports.	Voluntary carbon credit markets can be identified and linked to the charcoal makers to provide the additional incentive for sustainable charcoal (in addition to stronger enforcement of local NRM bye-laws
	Institutional coordination of charcoal processes	Currently no specific institution to coordinate charcoal processes, responsibilities spread across a number of ministries with no specific coordination	<ul style="list-style-type: none"> By year 3, an institution to support regional level charcoal coordination in place and functioning; discussions for national replication started by the end of the project 	Project monitoring reports, charcoal association reports.	National REDD program is successful; Government collaborate with local environment management committees to enforce compliance with environmental bye-laws;
	Energy switch from wood to methane in public institutions	Many public institutions use electricity, LPG or wood. The specific baseline for those using methane gas from human waste will be established during the inception, but it is likely to be less than 4	At least 4 public institutions adopt methane generated from human waste for cooking;	Project monitoring reports	
Markets and technology support expansion of livelihood options in miombo	Number of new viable business as an avenue for energizing local economic development	Limited opportunities for markets due to very few agro processing businesses, hence agricultural produce difficult to market	At least 2 agri-processing business established and making contribution to local economic development and SFM	District Trade records and project monitoring reports	Private sector buys into the project and engages in the micro-finance provision.
	Volume of trade in	There is currently some	By the end of the project, volume of	District Trade	As above

woodlands to reduce pressure on agriculture and natural resources and increase income	SFM/BD friendly income generating products	trading in NTFPs but the volumes vary from village to village. Exact baselines on volumes of trade will be established during the inception, but it is expected to be quite low.	trade in SFM/BD friendly income generating products increased by at least 50% from the currently low baseline.	records and project monitoring reports	
	Access to micro-finance and credits	Tobacco farmers currently accessing credit but only for the cash crop (tobacco). Generally less than 25% of farmers have access to micro-finance and credits outside of the tobacco context	<ul style="list-style-type: none"> At least 35% increase in number of farmers accessing micro-finance and credits for food crops by the end of the project; 	Project monitoring records	As above
	Number of producer cooperatives actively facilitating access to inputs and markets	Currently the only cooperatives relate to tobacco farming and marketing	At least 3 non-tobacco cooperatives established and facilitating operations for production of other crops (depending on needs identified during project inception)	Project monitoring records	That individual farmers will overcome individualism and see the benefits of the cooperatives

SECTION III: Total Budget and Work plan

GEF Component/Atlas Activity	Res Party (IA)	SoF	Atlas Budget Account Code	Input/ Descriptions	USD Year 1 (2011)	USD Year 2 (2012)	USD Year 3 (2013)	USD Year 4 (2014)	USD Year 5 (2015)	Total (USD)	Budget Notes
Outcome 1 – policies		GEF	72100	Contractual Services - Companies	50,000	30,000	20,000	10,000	5,000	115,000	1
		GEF	71600	Travel	10,000	5,000	5,000	1,000	1,000	22,000	2
		GEF	74200	Audiovisual and printing production	10,000	1,000	1,000		2,000	14,000	3
		GEF	75700	Training, and conferences	20,000	10,000	7,000	7,000	5,000	49,000	4
Sub-component Total					90,000	46,000	33,000	18,000	13,000	200,000	
Outcome2 Knowledge based CBFM/JFM and land use planning		GEF	72100	Contractual Services - Companies	90,000	90,000	80,000	80,000	61,000	401,000	5
		GEF	71200	International consultants	20,000	20,000	10,000	0	0	50,000	6
		GEF	71300	Local Consultants	20,000	20,000	10,000	10,000	10,000	70,000	7
		GEF	74100	Professional Services -	1,000	2,500	2,500	2,500	2,500	11,000	8
		GEF	71600	Travel	20,000	20,000	20,000	20,000	10,000	90,000	9
		GEF	74200	Audiovisual and printing production	10,000	10,000	10,000	5,000	5,000	40,000	10
		GEF	75700	Training, and conferences	49,000	47,500	47,500	47,500	46,500	238,000	11
Component 2 Subtotal					210,000	210,000	180,000	165,000	135,000	900,000	
Outcome 3 Sustainable charcoal, biogas and improved tobacco kilns		GEF	72100	Contractual Services - Companies	100,000	100,000	80,000	70,000	30,000	380,000	12
		GEF	71300	Local Consultants	0	0	0	0	0	0	
		GEF	71200	International Consultants	20,000	10,000	10,000	10,000	0	50,000	13
		GEF	71600	Travel	10,000	10,000	10,000	5,000	5,000	40,000	14
		GEF	74200	Audiovisual and printing production	10,000	10,000	10,000	5,000	1,000	36,000	15
		GEF	75700	Training, and conferences	30,000	30,000	30,000	30,000	20,000	140,000	16

		GEF	74100	Professional Services	5,000	5,000	4,000	3,500	2,000	19,500	17	
		GEF	74500	Miscellaneous Expenses	1,000	1,000	1,000	1,000	1,000	5,000	18	
Total Component 3					176,000	166,000	145,000	124,500	59,000	670,500		
Outcome 4: Markets and local economic growth		GEF	72100	Contractual Services - Companies	90,000	90,000	90,000	60,000	60,000	390,000	19	
		GEF	71300	Local Consultants	20,000	20,000	15,000	15,000	8,000	78,000	20	
		GEF	71200	International Consultants	10,000	10,000	10,000	0	0	30,000	21	
		GEF	71600	Travel	15,000	15,000	10,000	10,000	10,000	60,000	22	
		GEF	74200	Audiovisual and printing production	10,000	10,000	6,000	5,000	1,000	32,000	23	
		GEF	75700	Training workshops, conferences	20,000	20,000	20,000	15,000	10,000	85,000	24	
		GEF	72200	Equipment and furniture	7,000	7,000	5,000	5,000	1,000	25,000	25	
Component 4 Subtotal					172,000	172,000	156,000	110,000	90,000	700,000		
Project Management												
		GEF	71400	Local Consultants	45,000	45,000	45,000	45,000	45,000	225,000	26	
		GEF	71600	Travel	7,000	6,000	6,000	6,000	6,000	31,000	27	
		GEF	72800	Equipment	10,000	1,500	5,000	1,000	1000	18,500	28	
	Outcome 4 Subtotal					62,000	52,500	56,000	52,000	52,000	274,500	
	Project Grand Total					710,000	646,500	570,000	469,500	349,000	2,745,000	

Budget notes	
1-4	<p>Outcomes 1: Under this outcome, the project will support current efforts to develop policy and legislative instruments in favor of conservation friendly land uses, including formulation of policy and procedures for the regularization of charcoal and better implementation of current biodiversity friendly policies. The budget will be used to make support stakeholder participation in the policy processes (formulation and implementation) for the improved harmonization of sector policy in support of mainstreaming SFM friendly practices for better environmental management and economic development. Specifically, the budget will be used for the following:</p> <p>Budget under note 1- This budget line will be used to contract a local service provider to facilitate the policy review process. The local entity could be a CSO group or an academic institution and will support the focal ministries, private sector, local technical staff, civil society and communities to engage in a comprehensive participatory review of the current policies, especially the legal and institutional implementation mechanisms to identify weaknesses in both policies and implementation mechanisms and recommendations for improvement. The project will then lobby the relevant authorities for the adoption of the recommendations.</p> <p>Budget note 2 - The project will be implemented in four pilot sites that are dispersed throughout the Tabora region; although the government and other co-finance will provide vehicles, cost of transport is high in the country due to the poor state of roads and the public transport system. This budget will support local level travel related to policy work.</p> <p>Budget under note 3 - The training related to policy implementation, testing of charcoal rules, adoption of sustainable charcoal and improving efficiencies along the charcoaling chain will involve a high level of training events, printing and use of audio-visual technology. The budget provided for this (notes 3) will be used to support the production of training materials.</p> <p>The budget provided under budget note 4 will support the delivery of training events and production and dissemination of awareness raising materials related to policy reviews and lobbying for adoption of policy recommendations.</p>
5-11	<p>Budget under notes 5-11 support the implementation of outcome 2. Under this outcome, the project will ensure that knowledge based soil fertility management, CBFM/JFM and land use planning forms the basis for mainstreaming SFM and improving economic development in the miombo woodlands. It will also ensure that a participatory M&E system is designed and implemented to support adaptive management, including linking monitoring systems to forest trends in the region. The project will therefore provide technical support to relevant authorities (municipal, local and central government) to facilitate the improvements. This will be backed up by strengthened capacities for resource monitoring among producer groups, community organizations and local governments. Resource users will be provided with skills to strengthen CBFM/JFM and implement the integrated resource management plans; and, to monitor the impacts as well as in the use of monitoring information for adaptive management. The budgets will be used as follows:</p> <p>Budget note 5 – The tasks under outcome 4 (integrated soil fertility management, training, CBFM/JFM, rehabilitation of degraded abandoned areas) will be conducted by the government technical teams with targeted support from the project management team and international and local consultants as deemed necessary. The budget provided under budget note 5 will be used to complement government co-finance to facilitate the functioning of the government departments responsible for extension, to implement the activities related to the outcome. It will also be used to contract a local organization with expertise on landscape land use planning, CBFM/JFM, ecosystem based adaptation and rehabilitation of degraded lands where necessary. Given the wide variation of technical skills required to implement the outputs and deliver results, it is likely that several organizations will be required ranging from IRA, ICRAF to WWF and CBOs. The details will be provided during the inception period and confirmed in the annual work plans.</p> <p>Budget under note 6 will be used to hire international consultants to support targeted technical support related to landscape planning, CBFM/JFM, adaptation, participatory M&E, training on SFLM, development of material for improving extension package, rehabilitation of degraded sites, etc.</p>

	<p>Budget under note 7 will be used to hire additional local consultants to support the regional government with targeted technical support related to landscape planning, CBFM/JFM, adaptation, participatory M&E, training on SFM, development of material for improving extension package, rehabilitation of degraded sites, etc.</p> <p>Budget under note 8 will be used to pay for additional professional services related to the enforcement of local rules and regulations for CBFM/JFM.</p> <p>Budget under note 9 will be used to support transport for the project implementation, particularly for travel of local and international consultants. This is because the project will be implemented in four pilot sites that are dispersed throughout the Tabora and Rukwa regions; although the government and other co-finance will provide vehicles, cost of transport is high in the country due to the poor state of roads and the public transport system.</p> <p>Budget under note 10 will be used to finance the production of training materials;</p> <p>Budget under note 11 will be used to finance training and awareness raising. Specifically the budget will finance travel by farmers, hiring training venues and other incidentals related to the actual training.</p>
<p>Budget notes 12-18</p>	<p>Budget notes 12-18 will support the adoption of sustainable charcoal and adoption of biogas for cooking in public institutions. The project will therefore organize charcoal producers into charcoal associations, provide them with training and link them to the voluntary carbon markets. It will also provide training and biodigesters and support the adoption of this technique to replace wood. The specific budget will be used as follows:</p> <p>Budget under note 12 will be used to contract a company and/or NGO with experience in payment for ecosystem services, especially on carbon credits related to sustainable charcoal to facilitate the Sustainable charcoal linked to carbon credits. This company will work with the local leadership and communities to establish charcoal associations that lead the production of sustainable charcoal. It will also facilitate the charcoal associations to engage in sustainable charcoal and to improve governance and compliance with the rules and regulations for sustainable charcoal. It will also assist them to establish a system for monitoring compliance as well as receiving and distributing benefits. The company will also work with the public institutions on biogas;</p> <p>Budget under note 13 will be used to hire international consultants to provide targeted technical assistance to the process, particularly those related to the technical aspects of sustainable charcoal and establishment of carbon monitoring processes.</p> <p>Budget under note 14 will be used to support travel by international consultants and others to support the sustainable charcoal and biogas components.</p> <p>Budget under note 15 will be used to finance production and dissemination of training material to support sustainable charcoal and biogas adoption;</p> <p>Budget under note 16 will be used to support formation and capacitation of the charcoal producer associations. This will include training, establishment of bye laws, monitoring of compliance with bye laws etc.</p> <p>Budget under note 17 is to cater for miscellaneous expenses. This is to cater for the difficulty of accurate budging for a project to be implemented in rural Tanzania.</p> <p>Budget under note 18 will be used to finance local consultants to provide additional targeted support to the public institutions related to the adoption of biogas.</p>
<p>19-25</p>	<p>Budgets provided under notes 19-25 will finance implementation of outcome 4. Under this outcome, the will ensure that the viability of the miombo woodlands production system is increased through diversification and financial incentives for SFM. The project will ensure that markets and technology support expansion of livelihood options to reduce pressure on agriculture and natural resources and increase incomes. It will therefore improve local economic development through identification of viable income generating options such as food processing, niche markets for specialized NTFPs, increasing markets and profit margins of currently traded products, engagement with the carbon finance through improved energy efficiency and energy switch, etc. The budgets will be used as follows:</p>

	<p>Budget under note 19 will be used to support the regional government to facilitate the implementation of this outcome. The budget will be used to complement government funds in supporting work planning and implementation by the regional government. It will also be used to contract a local or regional organization to mobilize the private sector to identify and implement measures to increase local level income generating activities in a sustainable harvest manner. Given the wide range of NTFPs and potential for increasing harvesting and trading sustainably, it is likely that several organizations will be engaged; for example Phyto Trade, IRA, ICRAF, WWF, department of trade and industry, etc.</p> <p>Budget under note 20 will be used to contract regional/international consultants to provide targeted technical expertise on incentives for alternative livelihoods (products, production, processing, identifying markets);:</p> <p>Budget under note 21 will be used to hire local consultants to complement the international consultants and support the government agencies (ministries, district staff) and local CBOs on all activities related to the implementation of this outcome. In particular, they will provide support in improving processing and packaging, identifying and linking communities to improved markets, establishing sustainable harvest levels, training on improved business process, etc. .</p> <p>Budget under note 22 will be used to support local transport costs for consultants and others under this outcome. The project will be implemented in four pilot sites that are dispersed throughout the Tabora and part of Rukwa regions; although the government and other co-finance will provide vehicles, cost of transport is high in the country due to the poor state of roads and the public transport system.</p> <p>Budget under note 23 will be used to finance the production and dissemination of audio-visual materials supporting the implementation of outcome 4.</p> <p>Budget under note 24 will be used actual training of the resource harvesting groups interested in or with potential for engaging in trade. The budget will cover cost of local travel, hiring of venues and other localized costs related to facilitating private sector engagement with SFM.</p> <p>Budget under note 24 will support the purchase of equipment related to the production and dissemination of training and communications materials.</p>
26-28	<p>Budgets under notes 26-28 will be used to ensure that the project is managed effectively and delivers all outputs, outcomes and impacts within time and budget. The budget will be used as follows:</p> <p>Budget under note 26 will be used to hire the staff of the Project coordination unit, constituting of a project coordinator, administrative assistant and secretary, support audits and project evaluations;</p> <p>Budget under note 27 will be used to finance two external reviews including cost of ravel, fees, etc.</p> <p>Budget under note 28 will be used to provide operating costs and limited number of equipment such as laptop computers, telephone and stationery;</p>

Annex 2: Specific characteristics of study sites

Region	District	Ward/Cluster	Number of village	Population 2002	Projection 2009 = $p_0(1+r)^n$	HH	Average size	Village	Population 2002	HH	Village size (Ha)
Tabora	Urambo	Imalamakoye	3	10,136	14073	1806	5.6	Itebulanda	4471	1280	
								Imalamakoye	2112		
								Nsenda	3527		
		Usinge	5	14416	20016	2675	5.4	Maboha	1417	406	
								Usinge	8123		
								Kombe	1780		
	Shela							1695			
	Uyui	Mbola cluster	15		30000			Mbola research village (MV1)	6,043	1,083	1,334 km ²
								Mbola scaling up villages (MV2)	23,300	4,616	
	Rukwa	Mpanda	Inyonga	5	10,752		2350	4.6	Kaulolo	450	
Nsenkwa									2163		
Mtakuja									1,891		
Inyonga									1,250		
Kamsisi									646		

Region	District	Ward/ Cluster	Number of village	Population 2002	Projection 2009 = $p_0(1+r)^n$	HH	Average size	Village	Population 2002	HH	Village size (Ha)	
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								Imalamakoye	2112			
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								Usinge	8123			
								Kombe	1780			
								Shela	1695			
	Uyui	Mbola cluster	15	29345	30000			Mbola research village (MV1)	6,043	1,083	1,334 km2	
								Mbola scaling up villages (MV2)	23,300	4,616		
	Rukwa	Mpanda	Inyonga	5	6,400		2350	4.6	Kaulolo	450		
Nsenkwa									2163			
Mtakuja									1,891			
Inyonga									1,250			
Kamsisi									646			

Annex 3: Potential income generating activities per village identified during PPG

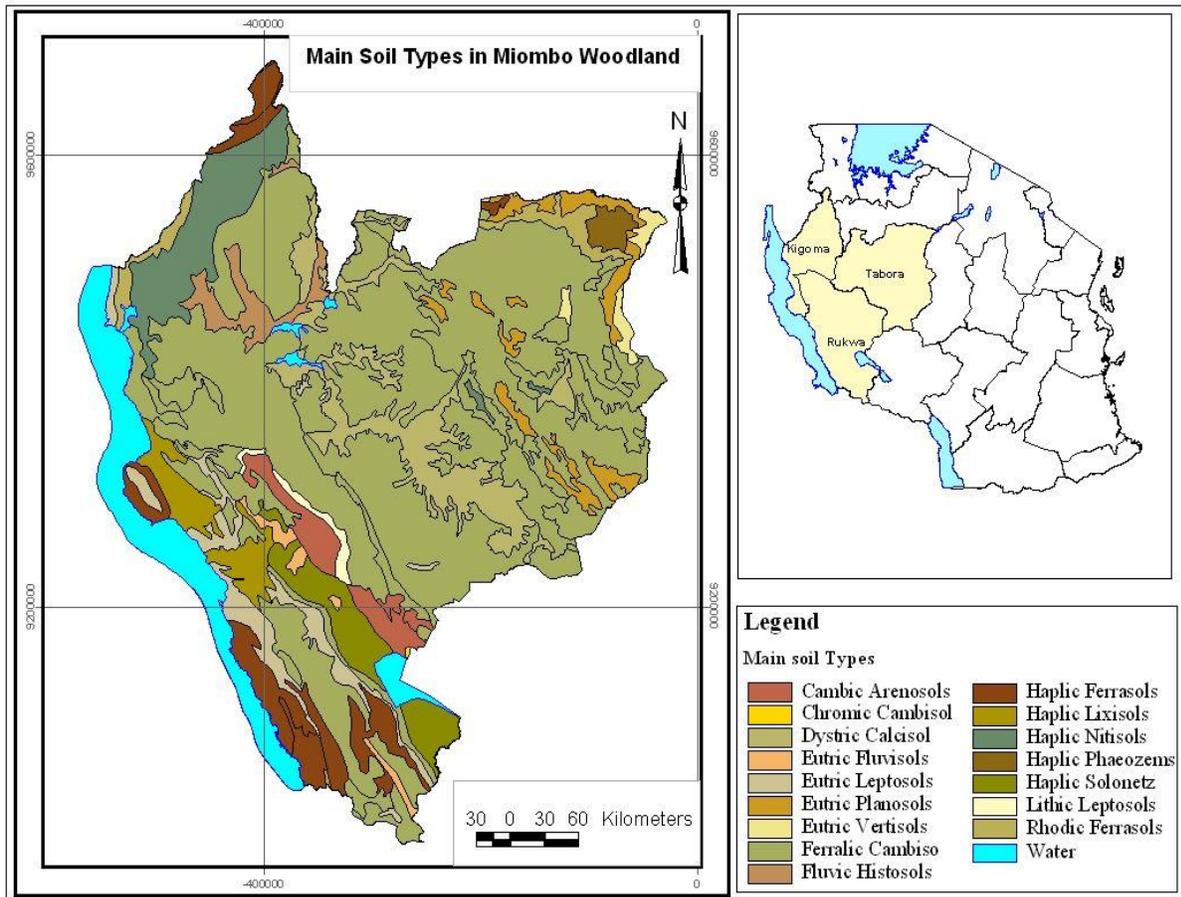
Village or Project Site	Activity	Indicative Cost: Low, Medium or High
Itebulanda	Formation/establishment of micro-credit schemes: Bank/SACCAS/SACCOS	Low
	Dairying: For milk production	High
	Beekeeping: for honey and beeswax production	Low
	Poultry keeping: for meat and eggs production	Medium
	Horticulture: for vegetables and fruits production	High
	Wildlife Management Area (WMA): for meat and cash	Medium
	Shop keeping: for mixed items	Medium
	Godown construction: for storage space	High
	Soap production: for soap	Low
	Grain milling: for flower and rice	High
	Food vending	Medium
Maboha	Fish production processing and storage: for fish	High
	Wildlife Management Area: for meat and cash	Medium
	Formation or establishment of micro-credit Schemes: for Bank/SACCAS/SACCOS	Low
	Food Vending:	Law
	Beekeeping: for honey and beeswax production	Medium
	Oil extraction: for cooking oil	High
	Shop keeping: for mixed	Medium
	Horticulture: for vegetable and fruits production	High
	Tree nursery establishment: for tree seedlings	High
	Soap production: for soap	Low
	Poultry keeping: for meat and eggs	Medium
Grain milling	High	
Mbola	Dairying: for milk production	High
	Horticulture: for vegetables, fruits	High
	Poultry: for meat and eggs production	High
	Shop keeping: for mixed items	Medium
	Beekeeping: for honey and beeswax production	Medium
	Formation/establishment of micro-credit Schemes: Bank/SACCAS/SACCOS	Low
	Godown Construction: for storage space	High
	Soap production: for soap	Low
	Oil extraction: for cooking oil	High
	Food vending	Medium
	Tree nursery establishment	Medium
	Grain milling	High

Annex 4:: List of stakeholders with their roles and responsibilities

Name of Organization	Type of organization	Current Mandate and Mission	Suggested roles & responsibilities	Contacts (Tel. and emails)
Ministry of Natural Resources and Tourism (MNRT)	Government National	Overall administration	Contribution of funds to the project. Technical support.	
Local Government Authority (LGA)	Government Local (District)	Overall administration at local or district level	Assistance in day to day implementation of activities.	District Executive Director
Institute of Resource Assessment (IRA)	Parastatal National	Research	Research and advisory service rendering. Technical support.	Director (IRA)
Ministry of Agriculture Food Security and Cooperatives (MAFC)	Government National	Administration	Technical support.	Principal Secretary
Sokoine University of Agriculture	Parastatal	Research	Research Technical support	Dean, Faculty of Forestry
World Wide Fund (WWF)	NGO National/Regional	Administration	Technical support and fund raising.	Country Director
Agricare	NGO National/Regional	Administration	Implementation provides information on land use plans.	Director
Mwika Wildlife Institute (MWI)	Government National/Local	Teaching	Technical support and research..	Principal
Ministry of Land Housing and Settlements (MLHS)	Government National	Administration	Technical support .	Principal Secretary
Ministry of Livestock Development and Fisheries (MLDF)	Government National	Administration	Technical Support.	Principal Secretary
Sustainable and integrated management of Malagarasi – Moyovozi Ramsar site (SIMMORS) Project	Government Regional	Collects and provides information	Implementation	Project Leader
Millennium Village Program	Few number of technicians and researchers Lack of technical experts in project areas Lack of transport	Increased funding to cover more areas Recruit more researchers and technicians Provide cheap transport to reach many farmers	Increase number of technical staff	

Name of Organization	Type of organization	Current Mandate and Mission	Suggested roles & responsibilities	Contacts (Tel. and emails)
District council (District Agriculture and Livestock Office)	Lack of transport services to reach more farmers Few extension staff with knowledge on soil fertility		Recruit more extension staff with knowledge on soil fertility	
Tumbi Agricultural Research Institute	Lack of resources to carry out research Few experts on soil fertility management Lack of modern laboratory	Recruit 2 more soil scientists Equip Tumbi with modern laboratory	Short course training on soils Further training at Master and Ph.D levels Employ soil laboratory technicians	
ICRAF	Few experts to carry out agroforestry research and extension services	Recruit a soil scientist to work on soil fertility issues	Short courses and training at higher levels	
Tanzania Tobacco Company	Lack of soil scientist in its structure	Train and recruit soil scientist	On job training on soil fertility management Short course training on fertilizer issues	
Institute of Resource Assessment (IRA)	Funding issue to carry out research on soil fertility	Allocate funds to address soil fertility issues in miombo woodlands	Funding research and training	
Sokoine University of Agriculture (soil and Water Management group)	Lack of funds to carry out research on soil fertility Lack of transport	Allocate enough resources to address soil fertility issues in Miombo woodlands	Funding research and training	

Annex 5: Map of Tanzania showing soils of the Miombo woodlands



Annex 6: PPG Studies – see separate document