

**CONSULTANCY TO REVIEW POLICIES AND REGULATIONS ON CHARCOAL
AND HOW TO PROMOTE A SYSTEMS APPROACH TO SUSTAINABLE CHARCOAL
PRODUCTION AND USE IN MALAWI**

FINAL DRAFT REPORT

By
Stephen Mutimba - Lead Consultant
Judith Kamoto Phd – National Consultant

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Acronyms

ADP	Agricultural Development Program
ASWAp	Agriculture Sector Wide Approach
CAADP	Comprehensive Africa Agriculture Development Program
CARE	Cooperative for Assistance and Relief Everywhere International
CARLA	Climate Adaptation for Rural Livelihood and Agriculture
CBFM	Community Based Forest Management
CCCU	Charcoal Industry Coordination Unit
CDM	Clean Development Mechanism
CHAPOSA	Charcoal Potential in Southern Africa
CU	Concern Universal International
CUI	Concern Universal
DEA	Department of Environmental Affairs
DEO	District Environmental Officer
DFO	District Forest Officer
BEST	Biomass Energy Strategy - Malawi
BWB	Blantyre Water Board
EAD	Environmental Affairs Department
EDO	Environmental Development Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
ESCOM	Electricity Supply Corporation of Malawi
FAO	Food and Agriculture Organization
FD	Forestry Department
FGD	Focussed Group Discussion
FGLG	Forest Governance Learning Group
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GIZ -	Deutsche Gesellschaft für Technische
PRoBEC	Zusammenarbeit (GTZ) - Programme for Biomass Energy Conservation
GIS	Geographic Information Systems
GJ	Giga-Joules
GoM	Government of Malawi
Ha	Hectare
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HOBK	Half Orange Bricks Kilns
ICPS	Improved Charcoal Production System

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ICRAF	World agroforestry Centre
IHS	Integrated Household Survey
IMF	International Monetary Fund
MARGE	Marchéage et Gestion de l'environnement
MCC	Millennium Challenge Corporation
MFNR	Ministry of Forestry and Natural Resources
MGD	Malawi Growth and Development Strategy
MK	Malawian Kwacha
MINAGRI	Ministry of agriculture and livestock – Rwanda
MINECOFIN	Ministry of Finance and Economic Planning - Rwanda
MINILOC	Ministry of local government, good governance, Community Development and social affairs - Rwanda
MINIRENA	Ministry Of Natural Resources - Rwanda
MIRTD	Malawi Industry Research and Technology Development
MPEI	Malawi Poverty and Environment Initiative
Mt	Metric ton
MUREA	Mulanje Renewable Energy Agency
MW	Mega Watts
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptations Program of Action
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NSO	National Statistical Office
PAs	Protected Areas
PEI	Poverty and Environment Initiative
PES	Payment for Ecosystem Services
PHC	Population and Housing Census
REDD⁺	Reduced Emissions from Deforestation and Forest Degradation
RETs	Renewable Energy Technologies
SCP	Sustainable Charcoal Production
SEI	Swedish Environmental Institute
SFM	Sustainable Forest Management
SHI	Self Help International
SHS	Solar Home Systems
SLM	Sustainable Land Management
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAs	Traditional Authorities
UN	United Nations
UNDP	United Nations Development Programme

UNHABITAT	UN Agency For Human Settlements Providing Adequate Shelter For All
UNFCCC	United Nation Framework Convention on Climate Change
US	United States
USAID	US Aid For International Development
VC	Value Chain
VCM	Voluntary Carbon Market
VNRMC	Village Natural Resource Management Committee
WSMP	Wood Fuels Supply Master Plan



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EXECUTIVE SUMMARY

This report is the outcome of an assignment commissioned by the UNDP Malawi Country Office (the Client) on behalf of the Environmental Affairs Department, who contracted two consultants (Stephen Mutimba and Judith Kamoto (PhD) to ‘Review the policies and regulations on charcoal and how to promote a systems approach to sustainable charcoal production and use in Malawi.’ The rationale of the assignment is that charcoal is widely used as a cooking fuel in the country and all indications are that it will continue to play an important role in the future energy mix of Malawi, despite being regarded as one of the major drivers to deforestation, forest degradation and biodiversity loss. Consensus therefore is that there is a need to revisit the charcoal production value chain at policy and practice level, adopting a ‘systems- wide approach’ for sustainable forest management and sustainable charcoal production in the country. Sustainable charcoal production that emphasizes on sustainable forest production/management will ultimately reduce pressure on current stocks of forests and provide a sustainable raw material base for charcoal production. This will in turn reduce the pressure that charcoal production exerts on forests. In addition, there is need to seriously consider other forms of energy (‘alternatives’) for household energy needs. The study has been initiated by government in order to examine and review policies and regulations regarding charcoal production, marketing and to identify options that can modernize the charcoal industry in the country.

The value of charcoal produced in Malawi is estimated at US\$57 million while firewood is estimated at US\$117.2 million. Overall, it is estimated that the forestry sector’s contribution to the country’s GDP is 6.1%. Studies have also indicated that the charcoal industry is one of the largest in Malawi; if the product was exported, the annual foreign exchange income to the country would be comparable to that of tea and sugar, Malawi’s two main exports. However, Malawi’s high population density and uneven distribution of population has resulted in biomass scarcity in some areas. The Northern Region has 44% of forests but only 13% of the population. About 26% of forests lie in the Central Region, which has 42% of the population, while 30% of forests lie in the Southern Region, where 45% of the population lives (Zulu 2010). Urbanization has resulted in more intensive use of charcoal: between 1994 and 2008, the share of urban households using charcoal rose from 24% to 33%, while the share using firewood dropped from 66% to 56%. Demand for firewood and charcoal exceeds sustainable supply in areas surrounding major urban centres: the catchment areas of Blantyre, Lilongwe, Limbe and Zomba.

Given how rapidly Malawi is losing its forests, synergies between traditional and modern bioenergy need to be explored to combine improved market competitiveness with energy security goals and conservation of forests and land resources. For this to happen there is need to put in place measures to overcome barriers to wide scale adoption of sustainable charcoal production in Malawi, among which include:



- Inadequate enabling policy, legal and institutional framework to support sustainable charcoal production
- Lack of awareness of the legal status of charcoal by the majority of the population, and the consequent insecurity from constant threat of bans on several parts of the charcoaling chain.
- No official recognition of charcoal production and marketing by national energy or forestry officials because of its link to a sustainable source. Charcoal can be produced legally from a sustainable source, but to date no single individual or organisation has been issued with a licence to produce charcoal, since the bureaucracy involved are impracticable.
- Various aspects of the charcoal value chain are under different ministries/ departments and therefore different policy instruments, with complications for coordination.
- No institutional framework that can coordinate the implementation and replication of the steps of sustainable charcoal locally or nationally.
- Inadequate knowledge on the existence, the functioning and maintaining improved charcoal production techniques.
- Inadequate institutional initiative and lack of political will at the highest level to formulate and implement practical legislation on controlling the production, movement, sell and use of charcoal because of the realities on the ground. Charcoal is an issue that has always been swept under the table as if it does not exist. In official cycles it is treated as a “sensitive” issue. However, doing something about it is better than doing nothing, because maintaining the status quo is dangerous for the forest stocks of Malawi. It is better that the “sensitivity of charcoal production” is looked at with a sustainable forest management lens, which will lay a foundation for sustainable charcoal production.

A window for addressing the above issues is available through the “Government and UNDP/GEF Private Public Sector Partnership Project on Sustainable Land Management (SLM Project)” in the Shire River Basin whose goal is the provision of the basis for economic development, food security and sustainable livelihoods while restoring the ecological integrity of the River shire Basin”. This project is working to reduce land degradation in the Shire River basin through improved institutional, policy and payment for environmental services arrangements.

This consultancy report is a component of the larger project and has revisited the charcoal production chain at policy and practice level and given recommendations on how the government can adopt a systems- wide approach for sustainable charcoal production (SCP) that is consistent and supports Sustainable Land Management (SLM). It has been initiated by government in order to examine and review policies and regulations regarding charcoal production, marketing and identify options that can modernize the industry.

This report gives an analysis and recommendations based on the study of the existing charcoal value chain in Malawi. In short, while making observations of the socio-cultural and economic dynamics that come into play in the charcoal industry, the report zeroes in on the analysis of investments needed at every stage of charcoal trade (value chain) beginning with land (either the

acquisition of or land rent); establishment of woodlots/trees or 'energy' crops specifically for charcoal production; purchase of improved and efficient technologies; packaging and transportation to consumers. The benefit of this approach is an attempt to analyse factors needed to increase sustainable charcoal production and incomes of producers by meeting the demands of consumers through coordinating the sequence of production stages in the chain that will be marked by predictable value growth at every stage and lead to an acceptable product by regulators (read government) and consumers. The major stages in charcoal value chain include; establishment of wood, conversion of wood to charcoal, charcoal vending/retailing and charcoal consumption. To ensure success and sustainability along the VC, there is need for clear policy and regulatory frameworks at the local and national level, which ensure the stability and predictability of the investment climate and the returns on investment for sustainable charcoal producers, this is in sync with the specific objective of the project which is "To reduce land degradation in the Shire River Basin through improved institutional, policy and Payment for Ecosystem Services (PES) arrangements."

Although the project is focusing on the middle Shire river basin, lessons learnt would be up-scaled to the entire Basin and to the whole country through the planned River Shire Development Authority, which is to be developed through the project. This is practical given the fact that the Environmental Affairs Department (EAD) of the Ministry Environment and Climate Change Management is coordinating the four-year program.

Implementation is taking place in four selected districts of **Blantyre, Neno, Balaka and Mwanza** involving Traditional Authority, local authorities and stakeholders, as well as the departments of Forestry, Energy, Climate Change & Meteorological Services, Land Resources Conservation, Agricultural Extension, Irrigation and Water Development and Planning coordinated at the district by Environmental Development Officer (EDO). Strengthening linkages with the private sector such as ESCOM, Blantyre Water Board, Southern Region Water Board, as well as NGOs is highly recommended by the report.

Majority of charcoal producers in the districts surveyed (Blantyre, Balaka, Mwanza and Neno) are subsistence farmers who produce agricultural goods mainly for "own consumption." Such production is characterized by low productivity, high risk, application of the simplest traditional methods and tools and high uncertainty. The main motivating force in most of the peasant's life is the maximization, not of income, but rather survival. When the production intention is survival and not improving income, then adoption of improved methods and technologies for production is most unlikely. This is because the tendency in such circumstances will be to practice what is well known by the farmer or producer. A new product therefore, that requires reallocation of resources, will be perceived as risky. Like any other commodity, investigating the sequence of charcoal production and marketing in all its facets is a key to systematic improvement. This approach not only provides a convenient means for achieving a country's development goals by adding to the knowledge, innovative insights and technology to each link, but also enables policy makers to create favourable



framework conditions, which promote competitive enterprises, sustainable jobs and income for local people. Furthermore, it allows impact-oriented monitoring of initiated policy actions. A number of charcoal value chain characteristics arising from this scenario are therefore common to most African countries.

In Malawi, Charcoal production is concentrated in miombo woodlands. Predominantly the source of wood for charcoal production is the natural standing miombo forests. These forests occur on customary land and public land (as Forest Reserves). Charcoal producers prefer species that produce dense charcoal. These are preferred because the major application of the charcoal fuel is cooking; either for domestic or commercial purposes in restaurants and hotels. The charcoal production sector is male dominated although women take an active role. Reasons for male dominance could include the fact that technology is not gender responsive, and therefore requires excessive manual labour; the majority of charcoal producers do not own land from which charcoal is produced. During field work about 50% of respondents cited the lack of land hence hindering planting of wood for charcoal. Charcoal production is dominated by the less educated (80%). Access to information and appreciation of technology is therefore very low. Most people involved in charcoal production are predominantly poor without capacity of investment in high cost efficient and eco-friendly technologies.

Conversion of wood to charcoal or Carbonization in all the four-targeted districts is made using traditional methods. The production method involves tree felling, stem cross-cutting, kiln building by piling logs and covering with soil, wood carbonization and kiln breaking to recover the charcoal. A detailed narrative of the process of traditional charcoal production is outlined. **Efficient kilns such as the Cassamance kiln** was developed in Senegal and is an earth mound kiln equipped with a chimney. This chimney, which can be made out of oil drums, allows a better control of air flow. **Retort technology** is the standard method of production for industrial charcoal in western countries, but due to high investment costs it is not viable for traditional subsistence charcoal makers. The **Adam Retort**, also known as the Improved Charcoal Production System (ICPS), is one of the most efficient means of producing good quality charcoal. Efficiency can be as high as 40% and noxious emission can be reduced by 70%. The recently innovated **Sam1 Brick Retort** is also described in the report.

Packaging, transportation and marketing of charcoal as well as cost structures are described in the report and improvement measures recommended.

Governance Along the Value Chain

The Malawi charcoal value chain is broadly governed at three levels; i) central governance level led by forestry department, ii) local government through district forest office (DFO) and iii) local community through Village Natural Resources Committees (VNRC). At central governance level, the Forestry Department (FD) provides policy guidance and oversight to the production and consumption of forest products. FD works in close collaboration with other departments such as the

Department of Environmental Affairs (DEA) and Department of Energy. It also works closely with Non-government Organizations, Development Partners and the Private Sector, who provide financial and technical support. At local governance level, the District Local Government takes a lead in control of the charcoal value chain. The local government responsibility is coordinated by the District Forestry Officer (DFO) in close liaison with the District Environmental Officer (DEO), which gets guidance from FD headquarters. At the local level Village Natural Resources Committees (VNRC's) made up of resource users including harvesters, traders and consumers of the relevant forest products are supposed to promote planned harvesting and regeneration of the forest resources. However, tenurial rights over natural resources and assigning authority and responsibility to this group has yet to happen.

Developing a Sustainable Value Chain

The above scenario presents a very compelling argument for the formalization of the charcoal value chain, which involves putting in place explicit rules, procedures, and norms that prescribe the rights and obligations of the individual or entity that populate the chain. This is because property rights and formalized titles motivate people to make longer-term investments, which contribute to sustainable behaviour. With specific reference to the woodfuel sector, they cite the forestry code and land tenure law as among the most important regulatory frameworks that needs to change although policies in other sectors, such as trade, structural adjustment, poverty reduction, debt, agriculture, infrastructure, energy and mining also often intervene with forest policy objective and therefore need to be addressed as well. However, there is the need to ensure that formalization of forest products does not end up having adverse consequences when new regulations criminalize extraction practices, marginalize harvesters, enable or promote corruption, and obstruct effective Customary law.. There is need to take into account that the charcoal value chain is complex and is often interlinked not only with energy but also with many more sectors including forestry, agriculture, health, transport etc. Hence, shaping a charcoal policy is not an isolated exercise, but requires inter-agency communication and cross sector coordination.

Financing Sustainable Charcoal Along the Value Chain

In spite of the charcoal subsector's huge economic and social importance, it hardly attracts investments from government and private sector. Most financing is at the project level and often by development partners. Besides the lack of government investment in charcoal, formal banking institutions are reluctant to provide financing for actors in the sector. This is because the charcoal sector is largely informal with many unchecked taxes both official and unofficial. The majority of actors in the sector lack business and technical skills. Furthermore, although charcoal is one of the key sources of revenue to the local governments and at the same time a source of employment and income to many households; it is generally perceived as an illegal activity by the authorities and there are no allocations for streamlining the sector at local level. The lack of standards in the sector has also hinders market development and a formal market infrastructure is grossly lacking. It is therefore very difficult to plan, regulate and effectively monitor the charcoal sector. This makes charcoal production and marketing difficult to finance and collect revenue.



In order to ensure a sustainable environmental management, better quality charcoal and improved incomes for the people in the charcoal industry, there is need for external financing. Forming of association, technology promotion and extension services would go along way in attracting finance. The sources of financing could include:

1. Conditional grants to local authorities from the national government.
2. Sloughing back percentages from revenues and forest produce
3. Encouraging NGOs and development partners to fund research and technology dissemination and commercial banks issuing concessionary loans and grants.
4. Carbon Finance

In addition for any external or private sector to financing, there is need for a clear charcoal policy and legal and institutional frameworks just like any other forestry/agricultural commodity. Readily accessible reliable information and data on the charcoal value chain and improved infrastructure in the production, transport and marketing as well as removal of taxes and duties on proven efficient charcoal producing equipment (e.g. retorts that are specific for charcoal making) would incentivize the private sector, including carbon finance from the carbon market.

In chapter 4, the report has outlined ways in which the government and key other sector players can intervene, through regulatory, guidelines and practical measures, to ensure that charcoal becomes an energy resource that can fulfil its true potential by being more sustainably produced, harvested and utilised. The report recommends eight steps that sustainable charcoal production should undergo in order to be fully acceptable as an ecologically green energy:

Certification: The procedure by which official authorised bodies, or officially recognized bodies, provide written or equivalent assurance that charcoal production, transportation and consumption systems conform to agreed requirements.

Compliance: The state of conforming or practising within an agreed framework of charcoal production, transportation and distribution

Audit: Systematic and functionally independent examination to determine whether activities and related results comply with planned objectives

Assessment: The examination of available resources including raw materials, production process, enforcement capacity, in order to determine the expected optimal output of an area.

Labelling: Written, printed or graphic matter that accompanies the charcoal, for the purpose of information and distinction

Authorising office: Recognised local personnel in charge with the issuance of licences, audits and assessments, monitoring production and ensuring compliance

Certified charcoal: Charcoal that is labelled showing proof of compliance with the set standards of production

Standard: An acknowledged and accepted measure of comparison

The report has also recognized the need to put in place rules that will ensure that there are proper harvesting and regeneration plans, waste minimization through efficient charcoaling, use of labels

that are clear, unambiguous and easily recognized thus differentiating sustainable charcoal from charcoal from un-sustainable sources. The certification scheme will therefore be useful in identifying charcoal that come from well managed sources thus ensuring constant supply for current and future generation.

The report recommends the formation of Charcoal Cooperatives as the smallest charcoal production unit allowable in the country. Exceptions will be made on large scale individual producers who prefer to operate as separate entities. The Charcoal Cooperatives and large scale separate entities will be registered at the district office at no cost and will be required to obtain periodical charcoal producing licences at a fee

Demerits and Constraints to charcoal rules and certification

Countries such as Kenya and Rwanda have put in place charcoal rules and certification schemes. The experience from these countries is that, despite the fact that certified charcoal is socially, environmentally, and socially sensitive, it is expensive and unable to compete with bush charcoal because of costs that goes into packaging, labelling and monitoring of indicators set up for charcoal production. Besides high cost of charcoal, other constraints likely to be encountered include uncertainty of domestic markets for certified charcoal; lack of local certification expertise (there is also the cost that goes into assessment of the charcoal as well as cost of improving management practices to comply to certification standards); and lack of awareness among stakeholders such as charcoal producers and consumers, government officials, NGOs, and private sector among others. Nevertheless, there is need for support for certified charcoal by creation of awareness to stakeholders on the economic, social, and environmental benefits of certified charcoal. There is for government to put in place measures to allow time for the development of markets for certified charcoal; and creation of effective partnerships for capacity building along the value chain of certified charcoal.

Social Sustainability: The project's target is charcoal producers including peasant farmers, pastoral communities and others. For the project to be successful, these groups must directly experience the benefits of the project in order for them to champion the project strategy and be the primary agents of change at the local level in terms of ensuring a paradigm shift from use of earth mounds to Cassamance and more sophisticated retort kilns. Capacity Building Required to Ensure Charcoal Producers Adopt New Techniques in Charcoal Production is articulated in the report.



1 INTRODUCTION

1.1 Background of the Assignment

This report is the outcome of an assignment by the UNDP Malawi Country Office (the Client) who contracted two consultants (Stephen Mutimba and Judith Kamoto (PhD) to ‘Review the policies and regulations on charcoal and how to promote a systems approach to sustainable charcoal production and use in Malawi.’ The rationale of the assignment is that charcoal is widely used as a cooking fuel in the country and all indications are that it will continue to play an important role in the future energy mix of Malawi, despite being regarded as one of the major drivers to deforestation, forest degradation and biodiversity loss. Consensus therefore is that there is a need to revisit the charcoal production value chain at policy and practice level, adopting a ‘systems- wide approach’ for sustainable forest management and sustainable charcoal production in the country. Sustainable charcoal production that emphasizes on sustainable forest production/management will ultimately reduce pressure on current stocks of forests and provide a sustainable raw material base for charcoal production. This will in turn reduce the pressure that charcoal production exerts on forests. In addition, there is need to seriously consider other forms of energy (‘alternatives’) for household energy needs. The study has been initiated by government in order to examine and review policies and regulations regarding charcoal production, marketing and to identify options that can modernize the charcoal industry in the country.

1.2 Country Background and Overview

Malawi is a landlocked country with a total area of 118,484 sq. km (11.8 million hectares), of which 9.4 million hectares is land, the remaining 2.4 million hectares, about 20%, is covered by water contained in 4 lakes and several rivers; the largest water mass is Lake Malawi, which is 568 km long and 16-80 km wide. The others are lakes Chilwa, Malombe and Chiuta; and rivers Shire and its tributaries. Forest cover in Malawi is about 3.4 million ha (36.2% of the surface area), of which 1.1 million ha (33%) is primary forest and 0.2 million ha (6%) is plantations ref). However the department of forestry has put the forest cover in the country as 28%. It is estimated that these forests have total carbon storage of 322Mt, of which 260Mt (80.7%) is above ground biomass while 62Mt (19.2%) is below ground biomass¹.

Malawi has a population of 13.1 (by extrapolation using population growth rates it is around 15) million people (NSO, 2008) and at current annual population growth rate of 2.8 per cent, the country’s population is estimated to double in the next 25 years. The agricultural sector is

¹ Carbon in Tropical Rain Forests profiles by Mongabay.com

dominated by subsistence and rain-fed food production systems that are greatly challenged by land degradation and declining soil fertility. More than 90% of the people in the rural area comprises of resource-poor communities who predominantly engage in subsistence agriculture.

1.2.1 Geographic, demographic and socio-economic status of the country

Malawi is a republic in south eastern Africa, located south of the equator between latitudes 9 degrees and 45 minutes and 17 degrees 16 minutes and from longitudes 33 degrees and 35 minutes. The country is bordered on the north by Tanzania, on the east, southeast and south by Mozambique, and on the west by Zambia. Malawi extends about 835 km north to south and varies in width from about 80 to 160 km. The total area of the country is 118,484 km², with nearly one-fifth of it covered by water, mainly Lake Malawi and three other smaller lakes (Undated).

According to Index Mundi, Malawi's economy is predominantly agricultural, accounting for one-third of GDP and 90% of export revenues; about 80% of the population live in rural areas. The economy depends on substantial inflows of economic assistance from the IMF, the World Bank, and individual donor nations. In December 2007, the US granted Malawi eligibility status to receive financial support within the Millennium Challenge Corporation (MCC) initiative. The government faces many challenges including developing a market economy, improving educational facilities, facing up to environmental problems, dealing with the rapidly growing problem of HIV/AIDS, and satisfying foreign donors that fiscal discipline is being tightened. Since 2009, however, Malawi has experienced some setbacks, including a general shortage of foreign exchange, which has damaged its ability to pay for imports, and fuel shortages that hinder transportation and productivity. Investment fell 23% in 2009, and continued to decline in 2010 (Index Mundi, 2012).

The World Bank's Doing Business 2013 is a document that provides an aggregate ranking out of 185 countries on the ease of doing business based on indicator sets that measure and benchmark regulations applying to domestic small to medium-size businesses through their life cycle. Economies are ranked from 1 to 185 by the ease of doing business index. According to this document, as of 2012, Malawi is ranked as shown below using the indicated economic parameters below:

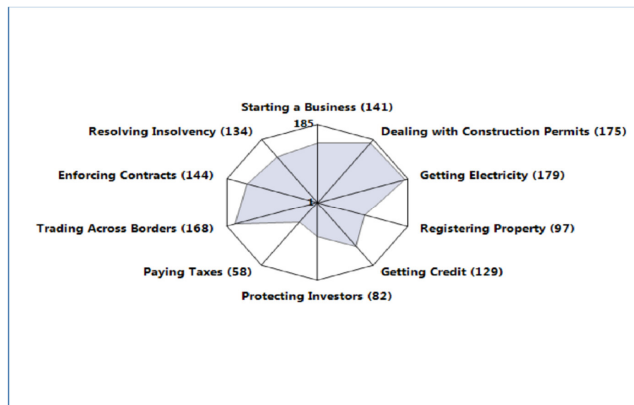


Figure 99: Malawi Economic Parameters

1.3 Malawi's Energy Profile

Recent BEST² study reported annual per capita energy consumption in Malawi of about 11.4 Giga-Joules (GJ) in 2008. This compares to an average of 80 GJ/c for upper-middle income economies and over 200 GJ/c in high income economies. BEST has categorised Malawi as a low and inefficient energy consumer. According to the Energy Policy 2003, Malawi's energy balance is dominated by biomass accounting for 97% of production. 59% of this biomass is used in its primary form as firewood (52%) and residues (7%), the remaining 41% is converted into charcoal in traditional earth moulds at very low thermal efficiencies (less than 10%) compared to modern charcoal carbonisation kilns (for example, Cassamance Retorts, Bee-Hives, Mark V) whose efficiency is estimated at between 20 to 35%. The only major indigenous sources of commercial fuels are coal (55,000 tonnes in 2000), uranium deposits at Kayerekera in northern Malawi and electricity (almost all hydropower with an installed capacity of 304 MW in the year 2000). About 97% of the petroleum products are imported. Other renewables have so far made little contribution. The application of Renewable Energy Technologies (RETs) including solar home systems (SHS), biogas, wind energy plants, mini and micro-hydros, is a relatively new phenomenon. This low uptake has largely been due to relatively high up-front costs, the absence of appropriate institutional delivery mechanisms and a poor track record, exemplified by large numbers of non-operative systems. For instance, of the estimated 5,000 SHS (Solar Home Systems) installed to-date, only 50% are in working condition. Malawi completely relies on imported refined petroleum products – petrol, diesel and kerosene (or paraffin), posing energy insecurity as this has effects on transport,

² Government of Malawi 2012: Biomass Energy Strategy

businesses, as well as households as more than half of households use paraffin as their main source of lighting (National Statistical Office 2012).

1.3.1 Economic Significance of the Biomass Energy Industry

Biomass is the main source of energy in Malawi, of which 59% is used in its primary form as firewood (52%) and residues (7%), while the remaining 41% are converted into charcoal. The annual sustainable supply of all biomass is estimated at 42.4 million cubic metres of solid wood equivalent. This is about 2.7 times current demand of energy in Malawi (Kambewa and Chiwaula, 2010).

Studies have indicated that the charcoal industry is one of the largest in Malawi; if the product was exported, the annual foreign exchange income to the country would be comparable to that of tea and sugar, Malawi's two main exports (Kambewa *et al.*, 2007). Biomass makes significant contributions to the national economy although this is underestimated in official statistics. The value of charcoal produced in Malawi is estimated at US\$57 million while firewood is estimated at US\$117.2 million. Overall, it is estimated that the forestry sector's contribution to the country's GDP is 6.1%. The total demand for biomass energy is estimated at 8.92 million total wood equivalent or about 13.38 million cubic metres of solid wood (BEST, 2009). The BEST study estimates that overall, unsustainable natural resource use costs a minimum of MK 26.6 billion a year (US\$ 191 million) which is approximately 5.3% of the country's 2007 total GDP. Unsustainable charcoal alone cost the country an equivalent of MK 6, 089 million, equivalent to US\$ 44 million or 1.2% of GDP in 2007. Apart from increased revenue as a result of improving carbonization technologies, the carbon finance mechanism has also been identified as an avenue which could potentially be used to enhance community participation in forest conservation through sustainable charcoal. It is estimated that the total potential value of annual carbon payments for sustainably produced charcoal is approximately MK 2,451,131,387 (US\$ 16,790,250).

1.3.2 Linking Biomass Energy and Deforestation/Land Degradation

According to MFNR 1993, land cover under forest in Malawi in 1960 was about 50%; in 1972, it reduced to 45% and by 1990 it was 41%. However, according to BEST study, the area under agriculture (intensive and extensive) has increased substantially between 1991 and 2008 to now cover 70% of the country. This is only a 14% rise since 1991 and has not been as great as the estimated increase in cropping area (74%).³ On the other hand, 669,000 hectares of forest and woodland plus 152,000 hectares of grassland have been lost since 1991, the majority converted to agriculture and a small amount (7,700 ha.) to miscellaneous uses, mainly urban development. BEST estimated that forests, woodlands and plantation covered 21% of Malawi land area in 2008, whilst the UN Food and Agriculture Organization (FAO) estimated forest cover at 34% as of 2010. This conflicting statistics calls for ground truthing since Forest Resources Mapping and Biomass

³ The cropped area rose from 1,999,600 ha in 1991 to 3,480,300 in 2008, according to Ministry of Agriculture cultivation and productivity statistics from BEST report



Assessment has not been done since 1990. Considerable forest cover was lost to large estates opened in the 1970s for cash crops, particularly tea and tobacco. The situation was exacerbated by the increased demand for fuelwood for processing of flue-cured tobacco (Jumbe and Angelsen 2011). The fuelwood and charcoal industries are also important employers, accounting for an estimated 133,000 jobs and 2% of the labour force (Openshaw 2010). Reconciling the socioeconomic and environmental impacts of biomass use in Malawi is therefore a major challenge. However, from the foregone, charcoal is not the main driver of deforestation and land degradation. Land use change to agriculture and settlement and population are the root causes of deforestation. Forest loss arises through the combination of population growth and poverty, which leads to low-productivity (slash-and-burn) agriculture, while at the same time wood is the only affordable source of energy for the expanding population. Continual agricultural expansion into forested areas is always accompanied by expanded use of woody biomass.

1.3.3 Energy access and biomass scarcity

Malawi's high population density and uneven distribution of population has resulted in biomass scarcity in some areas. The Northern Region has 44% of forests but only 13% of the population. About 26% of forests lie in the Central Region, which has 42% of the population, while 30% of forests lie in the Southern Region, where 45% of the population lives (Zulu 2010). Urbanization has resulted in more intensive use of charcoal: between 1994 and 2008, the share of urban households using charcoal rose from 24% to 33%, while the share using firewood dropped from 66% to 56% (Jumbe and Angelsen 2011). Demand for firewood and charcoal exceeds sustainable supply in areas surrounding major urban centres: the catchment areas of Blantyre, Lilongwe, Limbe and Zomba (Yaron et al. 2011).

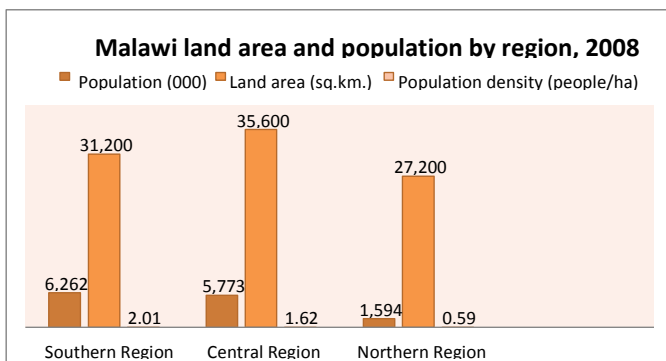


Figure 10492: Malawi land area and population by region, 2008

Source: Population projections from national census (Government of Malawi, 1998). Areas from national biomass study (Government of Malawi, 1993).

Table 1: Malawi land area and population by region, 2008

Population	Southern Region	Central Region	Northern Region	Total
Rural population ('000)	5,147	4,814	1,343	11,304
Urban population ('000)	1,116	959	251	2,326
Total population ('000)	6,262	5,773	1,594	13,630

Source: Population projections from national census (Government of Malawi, 1998). Areas from national biomass study (Government of Malawi, 1993).

Basing on **Figure 2** and **Table 1**, it is evident that Southern Malawi is the most populous region and with the highest population density (people per Ha) in the country despite not having the largest land area. The target districts (Balaka, Blantyre, Mwanza and Neno) are located in the Southern region of Malawi.

1.3.4 Infrastructure and institutions

As with many countries in sub-Saharan Africa, institutional support related to both traditional biomass and modern bioenergy remains weak; an autonomous Biomass Energy Agency has been proposed in order to build institutional capacity (MARGE 2009). Although such an agency is not yet formed, the Energy Ministry has initiated a task force to develop a long-term bioenergy strategy. At the same time, support for modern bioenergy is constrained by a lack of consistent policies and institutions to provide clear market signals for investors (Jumbe et al. 2009). Nor have policies matured for promoting cogenerated electricity from surplus sugarcane bagasse and cane trash, which could help diversify the future energy mix away from hydropower and traditional biomass. Such diversification could also avoid or reduce the switch to large scale coal-fired electricity that is planned. Given how rapidly Malawi is losing its forests, synergies between traditional and modern bioenergy should also be explored to combine improved market competitiveness with energy security goals and conservation of forests and land resources. The options include *agro-forestry*, *greater use of agricultural residues* and *fuel-switching to biogas and ethanol*. Improved energy access and use of bioenergy co-products also contributes to rural livelihoods and food security since biomass scarcity often constrains agricultural development

The BEST study projected that the demand for charcoal in Malawi will double in the next 15 years and therefore any successful strategy for tackling deforestation will have to address how to produce and market charcoal from sustainably grown wood. The UNDP's Poverty-Environment Initiative (PEI) report estimates that adding carbon payments (estimated at US\$6/ tCO₂e) makes things more attractive to producers to engage in more sustainable charcoal production.

The Malawi PEI study concluded that a holistic solution that addresses the whole charcoal supply chain is needed rather than a technical fix in any one area. For instance, improved charcoal kilns can play a useful role in reducing the 2.25 million cubic meters excess demand for fuelwood in



urban catchment areas but by themselves are likely to provide less than 15% of this excess demand. It also concluded that subsidizing electricity consumption will not only fail to solve the charcoal problem but is also anti-poor. It found that there is potential increase in charcoal revenue both for the Government and the charcoal industry players. For example, due to the illegal nature of the trade, the annual estimated value of bribes paid on charcoal in 2008 was MK 1.3 Billion (US\$9 Million) (Ref: BEST 2009).

1.4 Project Summary and Context

1.4.1 The Shire River Basin

The Shire River Basin is an important economic hub of Malawi. Apart from providing water for irrigation, domestic use and livestock, the basin is home to many people, game, and birds and is the most important source of timber and non-timber forest products. All the electrical power that the country depends on is generated within the basin. However, its contribution to the country's economy is seriously undermined by heavy environmental degradation taking place in the basin.

Malawi's Shire Valley is highly vulnerable to climatic hazards and deforestation in the catchment has reduced the catchment's capacity to ameliorate floods and droughts, whilst increased sedimentation is impacting on irrigation and hydro-electric power generation (Edwards *et al.*, 2010). Charcoal is a main contributor to the environmental degradation taking place. Regeneration of the feedstock is not considered part of the charcoal production business. Procedures for obtaining permits and licenses are unclear creating opportunities for unethical collusion between producers and local level law enforcers.

The Shire River Basin covers over 3.1 million ha and directly or indirectly influences the livelihoods of over 5.5 million people in the southern region of Malawi. The Shire River is of vital economic importance to Malawi as it is the source of over 98% of the country's power generating capacity, supplies water to major urban centres such as Blantyre and Limbe, supports a locally significant artisanal fishery, and supplies irrigation water for valuable crops.

The Basin has the highest hydropower potential (600 MW) in all of Malawi and the Electricity Supply Corporation of Malawi (ESCOM) has installed 280 MW on it. The current national requirement is about 350MW, only about 7% of the urban dwellers are connected to the grid, hence due to the deficit of 70MW there is a scheduled load shedding/ cut-off of even the connected 7% making the call for charcoal even greater since there is hardly any alternative energy sources in the country especially for cooking. The Blantyre Water Board (BWB) has its water treatment work on the Shire River and provides over 90% of the requirement for the commercial City of Blantyre. Similarly, the Southern Regional Water Board which supplies potable water to towns and villages in the densely populated southern region gets almost all its raw water from the Shire River.

The river also supports abundant fisheries, and provides freshwater for irrigation in Malawi's plantations such as Illovo Sugar and for domestic and industrial uses. In the Shire River Basin a large number of people depend for their livelihoods on the burning and selling of charcoal. Consumption of charcoal in the nearby Blantyre City alone is estimated to be around 1.06million ton per year and this is equivalent to cutting 36 ha of trees each day of the year. Charcoal production and opening up of land for agriculture are the major contributing factors to deforestation

and hence environmental degradation that is adversely affecting the current electricity generation from the Shire river, by silting the weirs for the power generation at the three sites on the river and therefore need to be addressed urgently if the goals of the MGDS are to be realized. Unfortunately, charcoal production remains quite traditional, with inefficient wood conversion to charcoal of between 12 and 15%, thereby exacerbating the problem. There are several barriers to the wide scale adoption of sustainable charcoal production in Malawi, among which include:

- Lack of an enabling policy or institutional arrangements.
- Lack of awareness of the legal status of charcoal by the majority of the population, and the consequent insecurity from constant threat of bans on several parts of the charcoaling chain. No official recognition of charcoal production and marketing by national energy or forestry officials because of its link to a sustainable source. Charcoal can be produced legally from a sustainable source, but to date no single individual or organisation has been issued with a licence to produce charcoal, since the bureaucracy involved are as good as impracticable.
- Various aspects of the charcoal value chain are under different ministries/ departments and therefore different policy instruments, with complications for coordination.
- No institutional framework that can coordinate the implementation and replication of the steps of sustainable charcoal locally or nationally.
- Inadequate knowledge on the existence, the functioning and maintaining improved charcoal production techniques
- Inadequate institutional initiative and lack of political will to implementing the legislation on controlling the production, movement, sell and use of charcoal because of the realities on the ground. Charcoal is an issue that has always been swept under the table as if it does not exist. In official cycles it is treated as a “sensitive” issue. However, doing something about it is better than doing nothing, because maintaining the status quo is dangerous for the forest stocks of Malawi. It is better that the “sensitivity of charcoal production” is looked at with a sustainable forest management lens, which will lay a foundation for sustainable charcoal production.

1.4.2 Private Public Sector Partnership on “Sustainable Land Management” Project in the Shire River Basin

In order to address the above issues, Government and UNDP/GEF developed the Private Public Sector Partnership Project on Sustainable Land Management (SLM Project) in the Shire River Basin whose goal is the provision of the basis for economic development, food security and sustainable livelihoods while restoring the ecological integrity of the River shire Basin”.

This project is working to reduce land degradation in the Shire River basin through improved institutional, policy and payment for environmental services arrangements. This consultancy is a component of the larger project and aims to revisit the charcoal production chain at policy and practice level adopting a systems- wide approach for sustainable charcoal. It has been initiated by government in order to examine and review policies and regulations regarding charcoal production, marketing and identify options that can modernize the industry.



Specifically, the objective is: “To reduce land degradation in the Shire River Basin through improved institutional, policy and Payment for Ecosystem Services (PES) arrangements.” The objectives will be achieved through 4 key outcomes:

- Policy and institutional arrangement for basin-wide SLM, including preparatory work for the establishment of the River Shire Development Authority
- Payment for ecosystems to provide financial incentives for SLM
- Improving knowledge and skills at all levels to support SLM;
- Crop insurance providing the basis for increased access to credits as well as increased use of up to date weather information in decision making for improved livelihood systems.

The project is focusing on the middle Shire river basin. Lessons learnt would be up-scaled to the entire Basin and to the whole country through the planned River Shire Development Authority, which is to be developed through the project. The Environmental Affairs Department (EAD) of the Ministry Environment and Climate Change Management coordinates the four-year program. Implementation is taking place in four selected districts of **Blantyre, Neno, Balaka and Mwanza** involving local authorities and stakeholders, as well as the departments of Forestry, Energy, Climate Change & Meteorological Services, Land Resources Conservation, Agricultural Extension, Irrigation and Water Development and Planning coordinated at the district by Environmental Affairs (EDO). Linkages with the private sector such as ESCOM, Blantyre Water Board, Southern Region Water Board, as well as NGOs will be established. The study complements other components of the SLM project, notably a major component that seeks policy alignment for SLM by looking at the status quo of charcoal, the problems and challenges associated with charcoal production and how to move forward with sustainable charcoal production while conserving forest and environmental integrity.

1.4.3 Overview of the Target Districts

The 2008 population census estimated that districts located South of Malawi account for 48.8% (approximately 5,858,035) of the country’s population making Southern Malawi the most populous region (45%) in the country followed by Central (42%) and Northern (13%) regions. The population of Balaka, Blantyre, Mwanza and Neno districts were unanimously approximated at 1,519,572 with an estimate of 850,960 (56%) rural residents and 699,864 (46%) urban residents. The Southern region average annual population growth rate is 2.4%. Mwanza has the highest annual population growth rate in the country (4.1%) whereas Blantyre rural has the lowest annual population growth rate in the country (1%). Livelihoods of rural residents in the aforementioned districts are dependent on natural resources with agriculture and the charcoal sector being key contributors to the respective district’s economies. However, due to continuous unsustainable exploitation, production and consumption, natural resources in Blantyre, Mwanza, Neno and Balaka Districts are declining rapidly due to degradation thus need for urgent action to reverse the existent situation. Rapid population growth, and high poverty level are notably major problems in Blantyre, Mwanza, Neno and Balaka Districts. The ever increasing charcoal demand from Blantyre contributes to rapid forest loss within its vicinity and the districts that produce and supply charcoal.

In ascending order, Neno, Mwanza, and Balaka distribute the largest quantity of charcoal to Blantyre.

Table 2: Overview of the four districts at a glance

District	Forested Area (ha)	Population	No. of House holds	Land tenure system (ha)	Forest size (ha)	Charcoal producers
Balaka	211.716	316,748	75,656	Public: 54 Customary: 188.062 Private: 10.300	23.29 Ha	-
Blantyre Urban	2,200	661,444	154,782	Land area: Public: 114966.72 Customary: 84,665 Private: 2016.96	5406 Ha	-
Blantyre Rural	1179,200	338,047	80,879		8000 Ha Total: 13,406 Ha	-
Mwanza	82,600	94,476	22,018	Public: 15,694 Customary: 21570.95 Private: 5461	12,311.8 ha	2,565
Neno	146,900	107,317	25,415			6,404
Total	1,411,111.72	1,518,032	358,750			

Source: various

I. Mwanza District

Mwanza District (15°6'19S, 34°52'29E), located on the Southern part of Malawi is bordered by Neno district to the North-East, Chikwawa district to the South, and the Republic of Mozambique to the North-West. This district was split into two in 2003 resulting to Mwanza and Neno Districts. It is approximately 83Km (by road) from Blantyre City. Mwanza area covers 826 Km² and has a population of 94,476 (with 41 persons/km² population density) of which 52% are women and 48% are men. This district has the highest population growth rate (4.1%) in the country (PHC 2008). Lastly, the average household size in this district is 4.4 persons with a household number of 22,018. High poverty level (61%) in the district is attributed to overdependence on natural resources and high unemployment rate. The district has two forest reserves covering 15% (12,178 ha) of the districts total area. Thambani forest reserve is the biggest and oldest gazetted forest reserve and occupies 1/3 of the forest cover in the district. In addition, 'man-made' village forests occupy 133.8 ha thus increasing the total forest cover in the district. The 'man-made' village forest is an initiative to cater for the increasing demand for forest products in order to minimize deforestation of natural forests. The vegetation in Mwanza is mainly Miombo woodland.' This type of woodland is "dry



deciduous and semi-deciduous dominated by the genera *Brachystegia* (Tsamba), *Julhernadia* (Mchenga) and *Isoberlinia* (Ntondo)". Miombo woodland which sometimes coexist with montane grassland create an ecosystem that forms a habitat for variety of rich biodiversity. Mwanza River and Nkhwibvi River located in Mwanza border area and Mwanzaboma respectively are the main rivers in this district. The areas surrounding the rivers area characterised by sandy clay, loam to clay, of good depth, good drainage and good structure. The district has at least seven types of minerals; Coal, Corundum, Zircon, Uranium, Mica, Blue Sulphur, Black Tomaline. The most abundant of the aforementioned minerals are Corundum and Zircon (Geological Survey Department 1999).

Land Tenure Systems: Land tenure systems in the district are of three types; **(a) Customary Land;** this is the most common type of land tenure in this district and is estimated to cover 79% of productive land. In this case, the community owns land and both subsistence and commercial activities take place on this land. In addition, 'man made' village forest areas also occupy part of this land; **(b) Public Land;** this is land owned and managed by the government. Most of this land is occupied by public facilities and forest reserves. It covers 19% of the land in this district; **(c) Private/ Leasehold Land;** this is customary land that is leased to individuals or companies for 99 years. Most of this land is used for either/or subsistence and commercial agriculture. It forms 2% of the land in this district.

Economic Activity: Agriculture is a dominant economic activity in this district (farmers constitute 57.1% of the population). An acre is the average holding per family. Crops grown in this area include: maize, root and tuber crops, sorghum, millet, cotton, tobacco, paprika, chillies, citrus fruits (such as tangerines, lemons, and grape fruits) and vegetables. In addition, fish and livestock farming are common practices. Examples of livestock kept; poultry, goats and pigs.

Biomass Energy: Mwanza District has an estimated 2,565 active charcoal producers (54% are women) thus, it is ranked the second top charcoal producer after Neno District. Charcoal in this district is mainly transported by road through humans, bicycles and vehicles (ICRAF 2009). Human transport involves manual carrying of charcoal on the back or head whereas use of beasts of burden entails using animals such as donkeys. Large quantities of charcoal produced in this district are usually transported to Blantyre through Chemusa, Ndirande and Mondoni markets (Kambewa et al., 2009). Biomass contributes immensely to the economy of this district however, it has impacted adversely on the environment due to unsustainable exploitation, production (low efficiency traditional earth kilns) and consumption (ICRAF 2009).

II. Neno District

Neno (16°10'S 35°10'E) is a district in Southern Malawi occupying an approximate land area of 1469 Km² (Malawi Government 2007) with a population density of 74 persons per Km² (PHC 2008). It is bordered by Ntcheu district to the North, Balaka and Zomba districts to the Northeast, Blantyre district to the East, Chikwawa district to the South, Mwanza district and the Republic of Mozambique to the Southwest and West respectively. This district was established in 2002 when

Mwanza district was split into two. It is approximately 89Km (by road) from Blantyre. According to the most recent census, Neno District has a population of 107,317, out of which 48% are male and 52% are females (National Statistics Office 2010). This district's household number is estimated to be 25,415 with an average household size of 4.3% holding an average of 1.05 ha. It has an estimated annual population growth rate of 2.7% (PHC 2008).

Topography and Climate:- The district is characterised by mountainous, hilly, ragged terrain and steep slopes exceeding 1200m above sea level and low lying areas in the Shire valley with altitudes ranging from 250 - 500 meters above sea level thus explains the difference in agroecological zones in the district e.g. high altitude areas are rocky and have shallow highly weathered kaolinitic clay soils while the Shire valley has sandy clay loam soils with alluvial deposits and higher soil organic matter. Neno District experiences sub-tropical climate characterized by wet and dry seasons. Its annual rainfall ranges between 500 – 1200mm and usually occurs from November - March whereas the mean annual temperature ranges between 8°C - 32°C in high altitude areas and low altitude areas in the Shire valley respectively.

Natural Resources:- Miombo woodlands is the commonest vegetation type. It is dry deciduous and semi-deciduous dominated by the genera *Brachystegia*, *Julbernardia* and *Isobertinia*. Common tree species found are *Sterculia quinquiloba*, *Brachystegia boehmii*, *Burkia africana*, *Pterocarpus angolensis*, *Adansonia digitata*, *Zizyphus mauritiana*, *Diospyros mespiliformis* and *Combretum imberbe*. In some regions, Miombo woodlands grow together with montane grassland thus creating rich ecosystems.

Land Tenure:- There are three types of land ownership: (a) Public land (b) Customary land and (c) Private land. Forest resources are on customary land.

Economic Activity:- 90% of the population in Neno practices agriculture mainly on customary land which is usually allocated to individuals and overseen by the chiefs (The Plan Vivo Foundation 2011). The average household size, 4.3% (PHC 2008), holds an average of 1.05 ha (The Plan Vivo Foundation 2011). This district is divided into two agroecological zones; upper Neno and lower Neno where the former has favourable climate and soils for agricultural production. The crops grown include; maize, Irish potatoes, wheat, pigeon peas, vegetables, millet, fruit and tree crops like macadamia, mangoes and citrus. The low lying lower Neno is not as productive as the Upper Neno but has great agricultural potential since major rivers flow through it thus can be channelled to supply water for irrigation. The main food and cash crops grown in this region are maize and cotton respectively (The Plan Vivo Foundation 2011). Bee keeping, livestock farming e.g. cattle, goats, pigs, poultry e.t.c are practised in both ecological zones.

Biomass Energy:- Poverty in this district is high with 56% of the people living below one dollar per day (ibid) as a result, a large portion of the population do casual jobs and depend on natural resources such as firewood, charcoal and agriculture for their livelihood. Charcoal is a dominant economic activity in this district since it accounts for 57% of the charcoal produced and sold in Mwanza and Blantyre. In addition, Neno is ranked the top charcoal producer having an estimated 6,404 charcoal producers (ICRAF 2009). Examples of areas where charcoal is produced in this



district are; Neno Hills and areas along the Lisungwi River (Kambewaetal., 2007). Charcoal is mainly transported via road by either people carrying manually; by loading on animals such as donkeys; by use of bicycle and vehicles (ICRAF 2009). Charcoal that goes to Blantyre usually passes through Chemusa, Ndirande and Mondoni markets (Kambewaetal., 2007). The main environmental problem in this district is deforestation caused by a combination of multiple factors such as rapid population growth, increased demand for forest products, high poverty levels thus overdependence on natural resources escalating to natural resource degradation e.t.c. However, charcoal sector is the main threat to forests and tree composition in forests in this district due to unsustainable exploitation, production techniques (particularly the dominant low efficiency traditional earth kilns) and consumption. This scenario is evident in the Neno Escarpment and Thuma West Forest Reserve where preferred tree species for charcoal making have been exhausted leaving low quality woodlands (Kambewaetal., 2007).

III. Blantyre District

Blantyre district (15°47'10"S 35°0'21"E) is located in South Malawi and covers 2,012 Km² of which 64,455 ha is used for agriculture, 10,237.2 ha for urban development and 6972.7 ha for forestry. It is bordered by Mwanza District in the North, Zomba in the North East, Chiradzulu in the South East, Thyolo in the South and Chikwawa in the West. Blantyre is divided into two; Blantyre urban (city) and Blantyre rural. In spite Lilongwe being the capital city of Malawi, the city of Blantyre is the country's central business and industrial district thus the nation's economic stronghold. The population of Blantyre City (220Km²) was estimated to be 661,444 with 51% males and 49% females. The annual population growth rate is 2.8% (PHC 2008) whereas the average population density is 3,006 per square kilometre (NSO 2008). Blantyre rural (1,792 Km²) has a total population of 338,047 of which 49% and 51% were male and female respectively. The annual population growth rate is 1.0%, lower than Blantyre City. Poverty level is extremely high compared to Blantyre urban.

Topography and climate: Blantyre district experiences tropical continental climate characterized by two seasons; rainy season (November - April) followed by light showers (May – July) and dry season (May –October). The mean annual rainfall is 1,122 mm whereas the mean annual temperature ranges between 13 -21°C. The strategic location of Blantyre at the eastern edge of the Great Rift Valley creates three main topographical features which are; hill plateaus, ridge and the natural drainage system. This topographic features range from an elevation of approximately 780 - 1,612 m above sea level. Hills are the most dominant physical features in Blantyre district e.g Michiru, Soche, Ndirande, Mitsidi, Mpemba, Chilaweni, Mpingwe and Bangwe hills. These hills are sources of streams and rivers in the district e.g Mudi, Nasolo, Lirangwe, Mwamphanzi, Naperi, Likhubula, Linjidzi, Lunzu streams and the Shire River which marks the boundary between Blantyre and Mwanza. Subsequently, a drainage channel with nine catchment areas (Likhubula, Lunzu, Mombezi, Khombwe, Mudi, Chisombezi, Limbe, Luchenza and Mwamphanzi) is formed.

Blantyre has three main types of soils; the dark clay or reddish brown clay loam soil; clayey alluvium deposits and residual soils.

Natural Resources:-Residents of urban Blantyre depend on piped water (80%) however,as aforementioned, Blantyre has diverse water sources ranging from boreholes,streams to rivers which cater for rural Blantyre and low income urban dwellers.Blantyre's natural resources have been adversely depleted due increased demand mainly attributed to rapid population growth, high poverty levels,agriculture and development. Savannah is the most dominant vegetation in this district.Due to unsustainable clearance of trees for agriculture, development and forest products such as charcoal, firewood, timber e.t.c the district has few existent natural forests for instance, the remaining natural forests are confined conservation areas e.g. Michiru, Soche and Bangwe Mountain. This forest plantations and reserves cover 15,058.2ha.Government plantation forests are most dominant, mostly planted with exotic species of eucalyptus and pine trees. The indigenous forests, mostly composed of Brachystegia woodland are found on customary land under Traditional Authorities (TAs).

Land tenure in Blantyre district is categorized into three (UN_HABITAT 2010); **(a) Public land**; it is owned by the GoM. Forest reserves, public amenities e.g schools, hospitals, roads e.t.c are situated on this land. It covers 48% of Blantyre district land area; **(b) Private land / Leasehold land**; it is owned by either individuals/companies through acquisition of land title deed through legal procedures of land purchase or individuals/companies obtain lease for 99 years. It covers 40% of Blantyre district land area; **(c) Customary land**; this is communal land that is managed by traditional leadership, subject to the overall direction of the District Commissioner. The community may be permitted to undertake subsistence and/or commercial activities. Village forest areas are located on this land. It covers 12% of Blantyre district land area.

Economic Activity: Subsistence and commercial agriculture is practiced by 80% of the population living in rural areas for livelihood sustenance. Despite 69% of the population residing in urban centres, agriculture still plays a crucial role as large acres of land are cultivated in areas surrounding the city. Maize is the main food crop. The main cash crops are cotton and tobacco. Other crops grown include; cassava, sweet potatoes, Irish potatoes, pigeon peas, groundnuts, sunflower, soya beans, rice, chilies, cowpeas, velvet, grams, dolicus, French beans; fruits and vegetables such as, tomatoes, onions, cabbage, leafy vegetables, tangerines, lemons, peaches, guavas, mangoes, bananas, paw paws, custard apples and granadilla e.t.c . Livestock kept include: cattle, goats, poultry, pigs, sheep, guinea fowls and rabbits e.t.c

Biomass Energy: Blantyre is the top consumer of charcoal as established by Urban Charcoal Consumption Survey carried out in 2007.For instance, 70% of charcoal produced from Neno and Mwanza districts (largest charcoal producers) is consumed in Blantyre. Other sources such as The Republic of Mozambique, Blantyre rural, Balaka, Chikwawa, Mulanje and Zomba districts continually supply charcoal to Blantyre district (Kambewaetal., 2007).



The mode of charcoal transport ranges from manual carrying by man and beasts of burden to loading on bicycles and vehicles. Charcoal transported from Neno and Mwanza districts mainly goes to Chemusa, Ndirande and Mondoni markets. Despite charcoal being an important economic activity, it has led to adverse forest deforestation within Blantyre district and districts that supply charcoal to Blantyre. Unsustainable exploitation, use of low efficiency traditional earth kilns during production and unsustainable consumption heighten the severity of this crisis.

IV. Balaka District

Balaka (15°00'S 35°00'E), a district in Southern Malawi was established in 1998 after Machinga district was split into two. It covers land area of 2,193Km² and is bordered by Ntcheu to the North, Mangochi to the East and Machinga, Zomba and Mwanza to the South. It is 125 Km (by road) from Blantyre. The 2008 population census estimated Balaka's total population at 316,748 of which 52% are women and 48% are men. The population density is 144persons/Km² whereas the annual population growth rate and average household size is 2.3% and 4.2 respectively.

Topography and Climate: Three main topographical features characterize Balaka district namely; plateaus, ridges and natural drainage primarily attributed to its location on the Eastern edge of the Great Rift Valley. This district experiences humid sub-tropical climate characterized by dry season (June - August) and wet season (October – April). The average annual rainfall is 900mm whereas the mean annual temperature ranges between 13.3°C – 32.5°C with July and October being the coldest and hottest months respectively.

Natural Resources: The total land area in this region is 211,716 Ha of which only 96,557 Ha is productive. Forest cover in this district is 11% of the total land area. There are three main types of land tenure systems in this district: Customary land (188,062 Ha); Public land (54 Ha) and Private/Leasehold (10,300 ha). Balaka district is endowed with minerals such as monazite, limestone, gemstones, and gold however, their exploitation is done on small scale. The soil in the area is high in gleysols, histosols, fluvisols, waterlogged soils with poor drainage and anaerobic conditions. There is diversity in water resources thus residents of this district access water from underground sources e.g. boreholes and piped surface water. However, due to rapid massive deforestation, water resources are declining due to rampant destruction of catchment areas and siltation/sedimentation of water bodies. Ever increasing demand for forest resources, high poverty levels and unsustainable exploitation of forest resources have led to widespread deforestation. Subsequently, gazetted forests in this district are non-existent except for a forest situated on a 54 Ha piece of land in Ulongwe that is managed collaboratively. The Village Natural Resource Management Committee (VNRMC) is an institution established to respond to this crisis. VNRMC is mandated to enact and implement initiatives aimed at increasing forest cover. At the moment, reforestation has been done on 1,585 Ha.

Economic Activities: Agriculture is the back-bone of Balaka's economy with a large portion of the population practicing subsistence farming. Examples of food crops grown include; maize, rice,

groundnuts, roots and tubers. Cash crops include cotton, tobacco, tomatoes and pulses. Livestock farming is also practiced with cattle, goats, poultry, sheep and pigs being the most dominant. Fish farming is practiced in this area mostly for income generation.

Biomass Energy: A large portion of the population in this district is dependent on natural resources for their livelihood. This is attributed to the high poverty level in the district thus 89% of the total population in Balaka use woodfuel exclusively for cooking and 98% of rural residents use biomass energy primarily as the main source of energy. Charcoal production is a key economic activity in Balaka district however; it has led to degradation of natural resources. Due to unsustainable charcoal production and consumption coupled with rapid population growth and high dependency on natural resources, deforestation is now a serious environmental issue in this area. Charcoal is commonly transported manually on the head or back; on bicycles, vehicles, beasts of burden, and train. Charcoal produced in Balaka is distributed to Blantyre and other urban centres. In addition, Balaka also consumes charcoal produced from other districts e.g. some charcoal from Senzani is sold in Balaka Township. However, it is important to note that Balaka district is not a major charcoal consumer.

1.5 Study Approach and Methodology

The assignment was carried out using an applied research approach that involved both qualitative and quantitative methods and techniques. A mixed methods approach including: (a) literature review and analysis; (b) interviews; (c) case studies; (d) economics analysis; and (e) email and telephone inquiries was employed. The policy and related documents reviewed included but not limited to:

- a) Policy documents and their legislation:
 - Forest Policy
 - Energy Policy
 - National Environmental Policy
 - The Malawi Growth and Development Strategy (MGDS) (2010)
 - Other policies: Land policy, decentralization policy/Local Government Act, and business-related policies (including Micro, Small and Medium Enterprises Policy, Cooperative
- b) Development Policy (1997), and Fair Trade and Competition Act. (b)Legal Documents
 - Forest Act 1997
 - Energy Regulation Act 2004
 - Water Sources Act 2012
 - Environmental Management Act 1996
 - Irrigation Act 2001
 - Local Government Act 1998
- c) International policy documents (e.g., conventions on biological diversity, desertification, climate change and Malawi's official documentation and plans)



- d) Research and publications on charcoal. These included a range of published information and grey literature based on studies on charcoal in Malawi and other countries, and these were reviewed for possible lessons.
- e) The consultants also conducted consultative meetings, Focussed Group Discussion (FGDs), household surveys; field visits to charcoal producing districts and interviews with business people along the charcoal supply chain. The selection of respondents took into account the need for balanced gender representation by including women in the different categories, since they are currently known to participate in the charcoal production. The disaggregation by gender helped to capture the variations in challenges, opportunities and strategies to achieve resource enhancement.
- f) In addition to literature review, discussions with key informants were undertaken. Previous and on-going work by different organisations that relates to charcoal production, resource management and tree planting was considered under the selection of key informants.
- g) **Case studies** were also undertaken in consideration of any best practice that would be encountered in the field.
- h) The consultants also reviewed the old commercial charcoal production system in Malawi to understand why it failed, as well as obtain views of the market response to charcoal from pine and other non-hardwood species which are traditionally favoured for charcoal.
- i) **Stakeholder Analysis:** The information gathered from focus groups and, key informants and other sources was used in conducting a stakeholder analysis. An analysis of stakeholders in the charcoal value chain was conducted using a stakeholder analysis matrix. The stakeholders were distinguished based on whether they are formal or informal
- j) The team also conducted **value chain analysis** that helped illustrate the current situation regarding markets, value adding activities, prices and costs and distribution of value along the value chain. A checklist of questions was developed for this, whose purpose was to update and compare with information from previous studies (e.g., Kambewa et al., 2007) while seeking entry points for interventions.

2 POLICY AND LEGAL FRAMEWORKS SITUATIONAL ANALYSIS

2.1 Overview

This section provides detailed analyses of the national and specific sector policies and laws in relation to forest management and implications for sustainable charcoal production. For example, Malawi's National Forest Policy (1996) and the Forest Act of 1997 provide an enabling framework for promoting the participation of communities and the private sector in forest conservation and management. A supplement to the Forest Policy in 2003 reinforced Community Based Forest Management and aims to eliminate the restrictions on harvesting forest products by communities, which ultimately promotes collaboration in forest resources conservation (Government of Malawi, 1996).

2.2 Analysis of Policy and Legal Framework

2.2.1 The Malawi Constitution

The Malawi Constitution of 1995, Section 13 (d) calls upon the state *"To manage the environment responsibly in order to prevent the degradation of the environment, provide a healthy living and working environment for the people of Malawi, accord full recognition to the rights of future generation by means of environmental protection and the sustainable development of natural resources and conservation and enhancement of biological diversity of Malawi"*. When we analyse this provision, we reckon the constitution as a strong environment and natural resources related legal framework. The constitution recognizes the contemporary paradigm of sustainable development by embracing principles of environmental protection, sustainable natural resource use and the conservation of biodiversity. Obviously, the forest policies are in line with the call for environmental protection and sustainable development, which have been underscored in the Article 2 of the UNFCCC. Therefore efforts to manage forests resources sustainably are supported by the constitutional provision. Thus, the constitution should serve as the overarching guidance in redressing sector-specific policy gaps.

2.2.2 National Environmental Policy (2004) and Environmental Management Act (1996)

The mandate for the National Environmental Policy (NEP) is derived from the Constitution of Malawi, 1995 with guiding principles contained in Section 13(d) articulated in the previous statement. In 1994, the government undertook a broad-based consultative process to develop the *National Environmental Action Plan* (NEAP), which identifies key environmental problems,



their underlying causes and appropriate responses at the policy and other levels⁴. The NEAP was followed in 1996 by the *National Environmental Policy* and the ***Environmental Management Act (EMA)***, which marked a significant departure from previous policies and laws. Whereas in the past the government was the sole manager of natural resources, the new policy and act pave the way for the devolution of management powers to individuals, communities, user associations and other entities.

In summary, the overall goal of the policy is to promote sustainable social and economic development through the sound management of the environment and natural resources. The specific policy goals address issues of environmental security for health and well-being of people, sustainable utilisation and management of the country's natural resources, long-term self-sufficiency in food and energy, ecosystem integrity and sustainable environment and natural resources management. The policy promotes the rights of every person to a clean environment while also at the same time stating that every person has a duty to promote sustainable utilisation and management of the environment and natural resources, including taking legal action against any person whose activities or omissions have or are likely to have adverse effects on the environment. Specific to the Forest sector, the NEAP seeks to sustainably manage forestry resources so as to maximize benefits to the nation. The guiding principles and strategies that are related to charcoal include:

- Promote sustainable utilization and management of the country's natural resources and encourage, where appropriate, long term self-sufficiency in food, fuel wood and other energy requirements.
- Sustainable fuel wood production may not only be economically efficient, but can also make a contribution to the arrest of global warming
- Alternative energy systems to fuel wood shall be developed for both rural and urban communities.
- Private sector participation in the energy sector development shall be promoted.
- Environmental externalities of all energy sources shall be identified and incorporated into policy design and project costing.

Strategies for enhancing Energy Include:

- Strengthen the coordination of energy sector developments and improve the energy planning capability of those agencies involved in energy matters.
- Promote energy saving and renewable energy technologies.

⁴The nine key environmental issues identified were: soil degradation; threats to forests, fisheries and water resources; threats to biodiversity, including wildlife; human habitat degradation; unsustainable population growth; climate change; and air quality issues. Causes of these problems were identified and solutions proposed.

- Optimise use of thinning from forests and more efficient technologies for the production of charcoal.
- Explore means to make electricity more affordable and accessible in order to reduce the dependency on fuel wood.
- Promote private and commercial enterprise in electricity generation and distribution and other sources of energy.
- Promote environmentally friendly energy technologies to reduce greenhouse gas emitting fuels.
- Increase rural electrification programmes to provide electricity to rural areas as to reduce pressure on fuel wood.
- Subject all energy projects to stringent EIA in accordance with the provisions of the EMA.
- Develop and promote alternative energy sources to fuel wood and technologies in order to reduce the use of fuel wood and enhance carbon sinks.
- Provide economic incentives and the necessary legal framework and technology to encourage and facilitate rural communities and fuel wood using sectors to be self-sufficient in fuel wood requirements.
- Promote the sustainable utilization of forest resources by practicing conservation in the use of forest products, improving specifically the efficiency of fuel wood conservation, recycling paper through incentives and regulations and substituting fuel wood with alternatives such as paraffin, solar energy, biogas, electricity and coal where feasible.

The EMA on the other hand provides general principles that mandates any persons to take all necessary and appropriate measures to protect and manage the environment and to conserve natural resources and to promote sustainable utilization of natural resources in accordance with EMA and any other written law relating to the protection and management of the environment or the conservation and sustainable utilization of natural resources. It provides for the **right to a decent environment, environmental incentives, environmental protection orders that include revoking any license issued under this section or vary any condition attached to the license if the activity in respect of which the license is issued constitutes any rent, actual or potential hazard to the environment or natural resources or if the licensee violates any condition endorsed on the license. In addition it provides powers to inspectors to enter at any reasonable time, any premises to examine any activity, which the inspector reasonably considers to be detrimental to the environment or natural resources. This EMA supports implementation of many sector specific Acts including the Forest Act.**

The NEAP AND EMA recognizes the trade-offs between economic development and environmental management. It recognises that if natural resources are not well managed can become a constraint to socio-economic development. In the Shire River Basin, charcoal production is one of the major causes of forest degradation and hence environmental degradation and this has become a constraint to socio- economic development of the country because it impacts heavily on electricity generation. Inadequate electricity supply affects sustainable forest management. This



cycle needs urgent attention. The implementation of the policy is, however hampered by lack of the required legal framework and institutional arrangements to support the aspirations.

2.2.3 The National Forest Policy and Forest Act

The forest sector plays a key role in a number of areas. It provides for environmental management such as provision of clean water sources, sustainable livelihoods of both urban and rural population, aesthetic values and cultural values. Despite the important roles above, their use for livelihoods and development results in forest deforestation and degradation. Forest conversion causes deforestation through land use whereby forests are converted into cropland or rangeland. Deforestation is a major concern presently growing at 2.8% annually translating into an estimated loss of 50, 0000 hectares of forest per year (GoM 2003⁵). Other activities such as roads, rail and dam construction in addition to settlement also contribute to deforestation. In addition weather events such as high temperatures and high wind velocity and low relative humidity during dry season negatively exacerbates bush fires that destroy plantations and natural forests.

Malawi has responded to the concerns above in the forest sector by developing a national forest policy (1996) Forest Act (1997) and CBFM supplement to the policy (2003). The Policy goal is to sustain the contribution of the national forest resources to the quality of life in the country by conserving the resources for the benefit of the nation. The policy objectives, among others include to provide an enabling framework for promoting the participation of local communities and the private sector in forest conservation and management, eliminating restrictions on sustainable of essential forest products by local communities, and promoting planned harvesting and regeneration of the forest resources by Village Natural Resources Committees (VNRC's) The aim was to empower rural communities to make independent decisions on management of forest resources by providing tenurial rights over natural resources and assigning authority and responsibility. These objectives were clear intents of the policy marking a major shift from centralised control of forest management to CBFM. The policy promised to redress the problems caused by a highly centralised system of government decision-making on forest management.

The Forestry Act, 1997 (Cap. 63:01) provides for participatory forestry, forest management, research, education, forest industries and protection and rehabilitation of environmentally fragile areas. The Act among other issues seeks to protect trees and other resources in forest reserves, conserve and enhance biodiversity, protect and facilitate management of trees on customary land, promote community involvement in the conservation of trees, promote sustainable utilization of timber and other forest produce and protect fragile areas such as river banks and water catchment. The Policy and Act has specific clauses addressing specific issues related to charcoal production and use and these include:

⁵GoM 2003: Initial national Communication to the UNFCCC. This figure is based on this communication.

Section 1.1 (Preamble): The importance of forests and trees in improving human welfare is increasingly recognized worldwide. Both natural and man-made forests play an important role in providing basic human needs (fuel, food fodder fibre and pharmaceuticals), employment, income and foreign exchange, hence contributing to socio-economic development.

Estimates based on the mean January to April 1993 prices indicate that the 1993 retail value of urban annual consumption was about MK370.8 million for **Fuelwood** and MK16.4 million for **charcoal**.

Section 1.3 (Preamble): In Malawi, forests and trees meet the nation's requirements for **fuelwood** and poles and for most of the timber required for construction, joinery and board manufacturing. Furthermore, the existing plantations have the potential to meet the nation's pulp and paper needs. The rural dwellers, who make up the majority of the population, rely to a large extent on forests for their needs in the form of **fuelwood**, bush meat and other foods, construction materials, agricultural tools and medicinal plants.

Section 1.4 (Preamble): About 90 per cent of the nation's energy requirements is satisfied by **woodfuels** derived from natural and planted forests and trees on farms. The 1993 estimate of per capita city-dwellers' fuelwood consumption was 2.0 solid m³ while 1.1 solid cubic metre was the average per capita rural **fuelwood** consumption. Human population growth rate is 3.2 per cent per year resulting increased pressures to cultivate forestlands, graze livestock and meet growing energy needs.

Section 1.5(Preamble): Currently some 38.6 per cent of the country's land area is under forest cover. This figure is made up of national parks and wildlife reserves (11.6 per cent), forest reserves and protected hillslopes (10 per cent) and the remaining 17 per cent by natural woodland on customary land. The extent of deforestation is continually increasing with agricultural expansion, overgrazing, **woodfuel** gathering, commercial logging and large-scale industrial **woodfuel** use for tobacco curing, lime burning, brick making, etc. The total forest cover is, however, estimated to be declining at 1.0-2.8 per cent per year with much higher deforestation rates in certain areas.

Section 1.6 (Preamble): There are 98,000 hectares of state plantations of which 54 per cent are managed for future development of pulp and paper industry. The remaining 46 per cent is equally shared between pine timber and eucalypt **fuelwood** and pole production. There are also 273 retail nurseries scattered throughout the country.

While the overall mandate of forests and tree management is the responsibility of the Forestry Department, there are other organizations that establish and manage plantations for **fuelwood** timber production. The total known wood output of timber products is currently at 53,200 cubic metres. However, demand exceeds supply, and this situation has been occasioned by restrictive utilization policies.

In addition to preamble statements of the policy, a number of Strategies also specifically address charcoal related issues such as



Section 2.3.2.5: Introduce marketing and pricing policy reforms that provide industrial woodfuel users with incentives to invest in tree planting and woodland management

Section 2.3.11: Reducing dependence on woodfuel as a source of energy

Section 2.3.11.1: Promote methods and techniques for the utilization of alternative sources of energy to substitute woodfuel.

Section 2.3.11.2: Develop, adapt and promote use of woodfuel saving devices

The Forest Act addresses the following: **Charcoal Licensing: Section 81 (1)** states that no person shall make or sell charcoal from indigenous timber or tree except pursuant to a licence issued under this section. (2) Upon application in the prescribed form, a licensing officer may, here the officer finds that he making of charcoal shall utilize plantation timber or indigenous timer or trees consistently with the applicable forest management plan or forest management agreement or forest plantation agreement, issue a licence to make charcoal in such quality and from such timber or trees as may be specified in the licence.

Suspension of a licence: Section 51 states that the Director of Forestry may, at any time that it appears to him that there has occurred or is about to occur a violation of any provision of this *Act* or of any condition of a licence, order the suspension of any or all operations under any licence until the licensee has taken necessary measures to remedy or prevent the violation.

Permit for wood using and wood processing industries: Section 82 states that no person shall engage in commercial processing of any wood or forest produce without a permit from the Director of Forestry and such commercial wood processing industries shall include:

Utilization of and trafficking in indigenous timber from private land: Section 83. (1) States that no indigenous wood shall be moved from any private land to any place outside the private land without a permit issued by the Director of Forestry. Any revenue realized from the removal of the indigenous wood from leasehold land should all accrue to the village natural resources management committee in the area. **(2)** States that no indigenous endangered tree species shall be cut down without the written permission of the Director of Forestry. **(3)** States that indigenous wood may be used on a sustainable basis for any purpose within the demised area without the written permission of the Director of Forestry.

Management of forest fires: Section 41. Charcoal production also relates to forest fires. The forest Act is concerned with fire management. The Act is very clear on its prohibition, declaration of fire protection areas and the assistance to be rendered in fire fighting. It declares that, “No person shall light or cause to be lit a fire in any village forest except with the authorization of the management authority subject to the provision and conditions of the forest management agreement. Any person who lights a fire in or near a forest reserve, protected forest area or village forest area shall take all necessary precautions to prevent the fires escaping from control and shall be liable for any

damage to the forest reserve, protected forest area or village forest area caused by any failure to take such precautions". Fire is a good management tool, but if it is uncontrolled it's the cause of forest in many parts of Malawi including the Shire River Basin. The law allows fire only under the provisions and conditions of forest management agreement, which has to do with controlled fire burning as a management tool.

Conclusion: Despite all this, current efforts to control forest fires as well as charcoal making and use are either inadequate or have failed. *The law must emphasize the role of local leaders and communities in fire control and management, which is currently missing. On charcoal production, modalities to implement (enforce) the Forest Act pronouncements along the value chain should seriously be detailed.*

However, the Forest Policy 1996 is currently being revised and might be finalized by end of 2013. The **National Forestry Policy of Malawi, 2013 (Draft)** is aligned to the 2002 National Land Policy by among other things recognising that both rural and urban areas will be subject to planning and management controls that will promote sustainable forestry management. It also aims to reduce overdependence on wood fuel, promote efficient use of wood fuels as a way of reducing the rate of deforestation. Realising that biomass will remain a significant source of energy for the foreseeable future the new policy is realistic and advocates the promotion of sustainable charcoal production (Nanthabwe 2013).

What is New: Perhaps what is new and significant in the new draft policy is the inclusion of emerging issues such as climate change, Payment for Ecosystem Services (PES), Reduced Emissions from Deforestation and Forest Degradation (REDD⁺), Clean Development Mechanism (CDM) and HIV and AIDS (Nanthabwe 2013), that may have a profound effect on sustainable forest management.

2.2.4 The Energy Policy

Access to clean, affordable and sufficient energy for all is an important prerequisite for a nation's development. Energy occupies the centre stage in almost all daily production activities. Malawi, with the current population of about 14 million people, uses a variety of both commercial and non-commercial energy sources. However, 93% of the population does not have access to modern energy services (IHS, 2005). The main source of energy for Malawi is biomass energy, which has led to the degradation of the environment (forests, soils, water resources including river catchment areas especially in hills and mountains), therefore affecting stream flow and ground water recharging process. The continued high dependence on biomass energy is the major cause of deforestation and forest degradation in Malawi, yet the energy policy's pronouncements do not strongly reflect this fact. According to the **National Energy Policy, 2003**, the energy sector is aimed at achieving the following long-term strategic goals:

- Make the energy sector sufficiently robust and efficient to support the government's socio-economic agenda of poverty reduction, sustainable economic development and enhanced labour productivity;



- Catalyse the development of a more liberalised, private sector-driven energy supply industry in which pricing would reflect the competition and efficiency that would have developed through the reformed process; and
- Transform the country's energy economy from the one that is overly dependent on biomass (93 per cent) to one with high modern energy component to its energy mix. A biomass commercial mix target of 50 per cent is set for the year 2020.
- The main objective of the energy policy (2003) is to provide reliable and affordable energy for economic development of the country. The objectives of the energy policy include: improving efficiency and effectiveness of the commercial energy supply industries; improving the security and reliability of energy supply systems; increasing access to affordable and modern energy services; stimulating economic development and rural transformation for poverty reduction; improving energy sector governance; and mitigating environmental, safety, and health impacts of energy production and utilisation.

Gap: It is however silent on the promotion of sustainable production of biomass energy such as charcoal despite the fact that biomass energy will continue to contribute significantly to energy supply in the country.

This gap in the National Energy Policy is addressed in the **Malawi Biomass Energy Strategy of 2009** whose overall objective is to ensure a sustainable supply of affordable wood fuels. Its three specific objectives are to:

- Increase the supply of sustainable wood fuels;
- Increase the efficiency of energy use; and
- Create the institutional capacity to manage the biomass energy sector.

The strategy acknowledges the overdependence of Malawi on biomass energy in particular wood fuel and charcoal that are produced unsustainably and the need for interventions to manage the biomass energy sector. *It is recommended that these progressive objectives of the strategy should be taken on board when undertaking Sustainable Land Management project activities in the Shire River Basin.*

2.2.5 Wildlife Policy

Wildlife conservation efforts in Malawi are mainly concentrated in forest areas designated as protected areas (PAs), which cover about 21% of the land area of Malawi. However, the PAs are increasingly becoming vulnerable to anthropological threats exerted on the forests (habitat for wildlife) and wildlife resources. The level of poaching, illegal harvesting of trees resources (as woodfuels) and lighting of bush fires in Protected Areas is a growing concern in Malawi. The Liwonde and Lengwe National Parks and other PAs in the Shire River Basin are highly vulnerable. The goal of the Wildlife Policy (2000) is to ensure proper conservation and management of wildlife in order to provide for sustainable utilization, equitable access and fast sharing benefit from wildlife resources for both present and future generations. Some of the objectives relevant to sustainable charcoal production include: to ensure the adequate protection of representative ecosystems and

their biological diversity through promotion and adoption of appropriate land management practices that adhere to principles of sustainable use; to enhance public awareness and understanding of the importance of wildlife conservation and management and its close relationships with other forms of land use; and to take the necessary legislative steps as well as pertinent enforcement measures to curtail the illegal use of wildlife.

The Wildlife Act do prohibit the setting of bush fires and prescribe penalties for none compliance. Charcoal production results in loss of tree resources and uses fire for production. Once the fire is set, it is left unattended for days. This fire can go out of control and cause more damage to the forest and wildlife resources. Raising awareness on fire issues is vital for the wildlife sector. The SLM project can learn from such awareness campaigns and apply them in sustainable charcoal production initiatives in the Shire River Basin.

2.2.6 The Malawi National Land Policy (2002)

Land is the backbone of human survival in this world. Most livelihood activities depend on land based resources. In Malawi land provides for agricultural activities, human settlement, mining activities and hence its importance cannot be overemphasized. However, Malawi has relied on a colonial Land policy since its independence in 1964 until in 2002, when a new Land policy was developed. Due to lack of a policy direction for a very long time a number of challenges inland governance were experienced and these needed urgent attention. The Land Policy (2002) was therefore developed to ensure tenure security and equitable access to land, to facilitate the attainment of social harmony and broad based social and economic development through optimum and ecologically balanced use of land and land based resources. Of particular importance to sustainable forest management and indirectly sustainable charcoal production were its objectives that include:

- To promote tenure reforms that guarantee security and instil confidence and fairness in all land transactions
- To promote decentralized and transparent land administration
- To extend land use planning strategies to all urban and rural areas
- To establish a modern land registration system for delivering land services to all
- To enhance conservation and community management of local Resources
- To promote research and capacity building in land surveying and land
- Management

The Land policy (2002) provides clear jurisdiction over customary land and its management is clearly laid out. This is important for forest management as mandates, responsibilities and authorities provided by the Forest Act over forests are reinforced. In addition, the National Physical Development Plan was prepared to guide the preservation of the nation's agricultural land potential, particularly the best arable lands. The plan also formulates land use measures to facilitate agricultural and other sectoral developments. It provides a spatial framework for the coordination of



sectoral development projects and balances space requirements for all competing uses of land. The plan clearly states that *Villagers will be sensitized during the land use planning process to provide and establish fuel-wood plantations to meet the demands for wood energy. Fragile areas such as steep slopes, wetlands and areas susceptible to flooding will be zoned to prevent or minimize the adverse environmental impact of cultivation and other developments. If implemented, the plan will definitely help in reducing the impacts of forest degradation as a result of energy demands on customary land.*

The policy has made recommendations on a number of other areas including land access and tenure reforms, land access for non-citizens, land use planning and registration and land administration and dispute settlement. The National Land Policy in its current state provides adequate safeguards for ensuring sustainable land use and land based resources.

2.2.7 Agriculture and Food Security

The mission of the Ministry of Agriculture and Irrigation is to promote economic growth by raising farm incomes, employment and household food security through the development of partnerships and promotion of private sector investment for increased agriculture productivity, diversification, commercialization and the sustainable use of the nature resources. Land Resources Conservation Policy of 1999 recognizes that forests are threatened due agricultural activities and seeks to ensure that the ways in which food is produced and distributed should be environmentally friendly and sustainable.

However, the emphasis on tobacco growing by the estate subsector led to the conversion of a lot of customary land to private leaving the smallholder farmers with limited land holding sizes and some pushed to cultivate in marginal and sometime unsuitable areas. Expansion of tobacco growing brought with it problems relating to deforestation and the liberalization of tobacco growing meant increased hectareage under tobacco and increased demand for trees for barn construction and tobacco curing. The loss of biomass due to wood harvesting for tobacco curing alone is estimated at 84,826 cubic meters per annum. On the other hand the food self-sufficiency policy pursued meant that everybody had to be a maize producer; this led to dominance of maize on the landscape every year often under traditional and unimproved type of management often with limited fertilizers.

Among the many programmes in the agriculture sector, the ASWAp provides a beacon of hope on sustainable land based resources including forest management. It focuses on sustainable land and water utilisation putting emphasis on conservation agriculture, **afforestation, protection of fragile land and catchment areas, and on rehabilitation of degraded agricultural land.** This provides an opportunity to integrate fast growing agroforestry species, which can be used for charcoal production in farmer's fields. If well implemented it can go a long way in supporting sustainable forest management, which is the foundation of feedstock supply for charcoal production.

2.2.8 Other Policies relevant to sustainable forest management/ Charcoal Production

The Gender Policy (2008), the Mining Policy and the Local Government Act have sections that impact on SFM hence SCP. The Gender Policy has one of its objectives as to strengthen gender mainstreaming in the natural resources and environmental sector in order to achieve equality and

sustainable environmental development. Among its strategies, it seeks to promote energy saving technologies to reduce women's time and energy on the multiple roles; and create awareness on alternative and clean sources of energy. Thus there is room for synergies with the Forest Policy and Act in promoting sustainable forest management initiatives

The Mining policy promotes quarrying and mining operations, which in many instances result into Environmental pollution or land degradation. For example, sand quarries increase soil erosion in riverbanks and valleys; Stone quarries in forest areas leads earth movements and forest degradation and deforestation. Small-scale brick making operations create open pits relies on fuelwood for curing. These activities affect SFM, which is the source of feedstock supply for SCP. However, the mining policy does not provide avenues that support sustainable forest management.

2.3 Analysis of the specific projects, plans and programmes relevant to charcoal

2.3.1 The Vision 2020

Vision 2020 launched in 2000 has been an overarching policy framework guiding the long-term development ambition for Malawi. It emphasizes long-term strategic thinking, shared vision and visionary leadership, participation by the population, strategic management and national learning. The Vision 2020 states that “by the year 2020 Malawi as a God fearing nation, will be secure, democratically mature, **environmentally sustainable**, self-reliant with equal opportunities for and active participation by all, having social services, vibrant cultural and religious values and a technologically driven middle-income economy”. While the Vision 2020 has remained the overarching strategy charting development goals along **the policy of sustainable development**, critical strategic issues of forest management have not been emphasized. Nevertheless the Vision 2020 is strategically useful as it envisages the long-term ambition of achieving sustainable development. This creates a great opportunity to embrace strategies that would allow addressing sustainable forest management and subsequent sustainable charcoal production.

2.3.2 Malawi Growth and Development Strategy

Government of Malawi developed a Malawi Growth and Development Strategy (MGDS) I for the period 2006 to 2011. This was a medium-term strategy for reducing poverty and achieving growth-led economic development and achieving the Millennium Development Goals. The strategy had nine priority areas within priorities. One of the nine priorities within priorities was ***Managing Climate Change, Natural Resources and Environment***.

The MGDSII covering the period 2011 to 2015 will retain management of climate change, natural resources and environment as one of the key priorities. However, it must be noted that the elevation of environment and climate change management amongst the nine priorities amongst priorities of Government is yet to be matched with action in terms of implementation of specific programmes supported by national budgetary allocations. However, this has been followed with creation of a specific Ministry for Environment and Climate Change Management, which will provide the basis for budgetary allocations. Commentators, in the sector, are of the view that elevation of



environmental and climate change issues in the MDGS and in the naming of the Ministry will relegate the profile of forests and their management.

In 2009, Government of Malawi completed the formulation of a strategic framework for responding to climate change⁶. It aims at making Malawi better able to plan for and respond to the challenges that climate change poses for sustainable economic development and national food security. At this stage it is difficult to ascertain the effectiveness of this framework as implementation has just started. However, there are activities that aim to promote sustainable forest management such as REDD+, CDM and Payment for Ecosystem Services (PES) schemes/mechanisms. PES schemes can incentivize local communities to invest afforestation and reforestation, which can provide feedstock supply for charcoal production on a sustainable basis.

2.3.3 National Adaptations Program of Action (NAPA)

The NAPA was developed recognizing that the affected majority are least resilient to cope with the impacts of climate change and its adverse effects. The NAPA identified five priority areas and these are:

- a) Improving community resilience to climate change through the development of sustainable rural livelihoods,
- b) Improving agricultural production under erratic rains and changing climatic conditions,
- c) **Restoring forests in the Upper and Lower Shire Valleys and other catchments to reduce siltation and associated water flow problems,**
- d) Improving Malawi's preparedness to cope with droughts and floods, and
- e) Improving climate monitoring to enhance Malawi's early warning capability and decision-making and sustainable utilization of Lake Malawi and lakeshore areas resources.

A thorough scrutiny of the NAPA priorities suggests that very little has happened since its development. There is lack of implementation of the priorities identified, whether due to funding or otherwise. The CARLA project seeks to operationalize priority three on restoring forests in Shire River Basin. Implementation started in 2012 and a number of Village Nurseries have been set up for afforestation activities. However, most afforestation programmes are not evaluated to show the survival rates of trees planted. Most records indicate number of trees planted and this is not a good measure/indicator of achievement of sustainability of forest management.

2.3.4 The National Forestry Programme

The Government of Malawi launched the Tree Planting and Management for Carbon Sequestration and other Ecosystems Services in January 2007. The overall objective of the programme is to increase the area under forest cover in Malawi in order to enhance carbon sequestration and other ecosystem services that may contribute to the reduction of greenhouse gases in particular, and carbon dioxide in the atmosphere. Under the programme Government will identify potential local

⁶National Programme for Managing Climate Change in Malawi, Ministry of Development Planning and Cooperation and Ministry of Natural Resources, Energy and Environment;

and international buyers of carbon and the funds generated from carbon sales will be utilized for **reforestation and other programmes on environment**. Monetary incentives are provided to farmers, an equivalent of US\$130.00 per hectare per year. However there have been challenges in identifying farmers who can be able to allocate enough land, typically 1 to 5 hectares of land for forest. Moreover, Government of Malawi has not yet been able to identify the carbon buyers. Reforestation and afforestation are some of the measures that would provide feedstock supply for sustainable charcoal production while increasing carbon uptake by forests.

2.3.5 Poverty and Environment Initiative (PEI)

The *Malawi Poverty and Environment initiative (MPEI)* has been embarked on with the aim of enhancing the contribution of the sustainable management of natural resources to poverty reduction, pro-poor economic growth and achievement of the MDGs. Thus, while achieving these goals the MPEI is closely linked to concerns over sustainable natural resources management. MPEI coordinates with disaster risk reduction, sustainable land management and climate change initiatives. Nevertheless, the MPEI does not clearly draw comprehensive strategies on charcoal production but supports policy initiatives in the Forestry sector. The current review of the forest policy is being supported with MPEI among other funding programmes.

2.3.6 Food Security and Sustainable Rural Livelihoods Programmes

Malawi has developed the Agricultural Development Program (ADP), which emphasizes on Sustainable Land use Management (SLM). SLM represents a conceptual and operational framework that promotes food security and rural development that **sustains natural resources and ecosystems**. At the African Continental level, SLM also features prominently in the Comprehensive Africa Agriculture Development Program (CAADP). In addition to that, TerrAfrica platform has been developed at continental level to facilitate coalition building, knowledge development and investment in SLM. **Although, there is no direct link to sustainable charcoal production, it is implied that SLM can sustain natural resources use including forest management that supplies feedstock for charcoal production sustainably.**

2.4 Synergies and conflicts between existing developmental policies and plans and charcoal production

The EMA provides guiding principles to all the sectors in environment and natural resources management. There is a consistent theme through-out most of policies and Acts reviewed above on the need for sustaining the natural resource base. Most of these allude to the need for intensifying afforestation and reforestation initiatives. If these initiatives can be done in the realm of sustainable forest management, then the feedstock supply, which can sustain charcoal production, may be guaranteed. However, if the opposite is true, then the synergies cannot be harnessed for sustainability sake.

It is clear from the forest and energy legal frameworks that the mandate for energy regulation is confused. The institutional framework for the energy sector is weak and fragmented; frequent changes in central coordination have contributed to institutional fragmentation and a lack of



consistent policies. The Energy and Forest sector were one before splitting. The Energy Department has focused on other forms of Energy other than that from Biomass (e.g. charcoal), this mandate has been left in the hands of the Forestry department. The DoF is more concerned with charcoal because of the source of wood for charcoal production. The Forest Act clearly specifies that the wood for charcoal production must be from a sustainable source, hence confiscation of the product throughout the value chain.

The other challenges that exist are the housing of the legal instruments governing energy subsectors - electricity, liquid fuels and gas, biomass, renewable energy and coal - in different institutions that often do not synchronise their activities. Regulatory institutions are also fragmented and, since the energy market is small, in some instances institutions have only one monopoly to regulate, a costly arrangement.

To overcome these challenges the intention of the Government of Malawi is to put in place institutional and legal instruments that will adequately support its reforms and generally improve energy sector coordination. Specific interventions include: the formulation of an Energy Framework Law in the form of an Energy Regulation Act and related sub-sector legislation, including the Electricity Act, the Rural Electrification Act, the Liquid Fuels and Gas Act, the Coal Act, the Biomass Act, and the Other Renewable Energy Services Act, to provide a legal basis for improved energy sector governance. However, the law is yet to be formulated. Table below summarises the opportunities and challenges of charcoal production in the Energy sub sector:

Table 3: Opportunities and challenges in the energy sub-sector

OPPORTUNITIES	CHALLENGES
<p>) Resource Potential:biomass is still readily available free of charge, excess wood in some parts of the country (North); flows from agriculture and industrial residues plentiful</p> <p>) Economic Potential:emerging cash biomass markets availability of alternatives to firewood and charcoal</p> <p>) Governance and InstitutionalArrangements: enabling environment exists which includes: Environmental Policy, 1996 Environment Management Act, 1996 Forestry Policy, 1997 Forestry Act, 1997 Land Policy, 2002 Decentralisation Policy, 1999; Private Enterprise (Privatisation) Act, 1996 availability of efficient charcoal carbonisation technologies; availability of efficient biomass end use technologies; willingness of donor community to support improved environmental management initiatives;</p>	<p>a) Technical Challenges</p> <p>dependence on inefficient traditional charcoal carbonisation technologies; dependence on inefficient biomass end-use technologies increased pockets of woody biomass scarcity in parts of the country, (e.g. South and major tobacco growing areas).</p> <p>b) Economic challenges</p> <p>biomass is a free resource under customary law which makes market regulation impossible; greater use of residues which could be used for agricultural purposes. multiplicity of end-uses for biomass (e.g. cooking, repellent, food preservative, etc)</p> <p>c) Environmental, health and safety challenges</p> <p>deforestation and environmental degradation; air pollution;</p>

<p>Malawi signatory to UN Conventions on Desertification, Biodiversity, Climate Change; access to CDM and GEF financing; forests identified as sinks for GHG emission under UN Conventions; existence of a functioning Forestry Department.</p>	<p>health and safety hazards from smoke, carbon monoxide, other fumes and open fires; GHG emissions from carbonisation and use of charcoal and firewood, which contribute to climate change.</p> <p>d) Governance and Institutional challenges</p> <p>Fragmented Absence Politically incorrect messages sent in support of charcoal production and trading; Land use conflicts in agriculture, forestry and energy; Problems in enforcing existing Forest & Environment Laws.</p>
	<p>a) Social and Cultural challenges</p> <p>Engrained mind-sets in support of biomass as a special fuel for preparing specialised dishes for its aromatic properties.</p>

2.5 Review of Existing Literature on Improved Charcoal Production in Malawi

Kambewa et al., 2007 established that production of charcoal in Malawi takes place in small scale (less than 30 bags per month), medium-scale (30-100 bags per month) and large-scale (Kambewa et al., 2007). This study also found out that small scale, medium scale and large scale producers account for 35%, 27% and 38% respectively of the total charcoal coming into the market.

Table 4: Malawi's Major Feedstock Sources

<i>Source</i>	<i>Portion of charcoal produced (%)</i>
Forest Reserves and National Parks	60
Customary land	40
Mozambique	2 (comes into Malawi)

Source: Kambewa et al., 2007

Charcoal production was deemed one of the key drivers of deforestation and forest degradation however, due to lack of strict charcoal regulations, efforts to protect forests are almost futile due to the ever increasing rate of charcoal demand coupled with high exploitation rate of feedstock which supersedes the resource base (Kambewa et al., 2007). The above situation is also accelerated by the traditional kilns, which are the most dominant production techniques thus vindicating several research studies which have established that traditional kilns are inefficient and wasteful.

The study also found out that charcoal is packaged in maize sacks that weigh between 38Kg – 60Kg. The weight of charcoal is determined by the tree species used, fan palm leaves (*Borassus* spp) or twine ropes are woven on top of the sack so as to increase the capacity of the sack and in order to attract customers, big charcoal blocks are put on the woven upper part (Mutu) of the sack. In



addition, depending on the locality, the persons responsible for charcoal packaging may be the buyers who hire manpower for charcoal packing or the producers. The average cost of packing charcoal then in Blantyre was MK30 per bag. Transportation costs are catered for by the charcoal buyer. The most dominant modes of transport are; bicycles, motor vehicles, oxcarts (rural areas) and human transport (head and back). Train is also used in some parts of the country (Kambewa et al., 2007). Due to high probability of charcoal confiscation, traders often sell their charcoal to the first and nearest urban center.

Once charcoal reaches the retail market, it is repacked in small units e.g. small plastic bags. One sack of charcoal produces 30 – 90 smaller packs (one pack costs between 20 – 25 MK). In addition, charcoal purchased in small packages tended to be more costly for the consumers in the long run thus, indirectly, low income earners pay more since this is the quantity they can afford thus frequently purchased

Charcoal in Malawi is mainly produced for commercial purposes thus play an important role in sustaining people's livelihood. Despite its negative effects on the environment, the charcoal sector continues to expand. This is attributed to but not limited to high costs of alternative energy sources, high caloric content than firewood e.tc. Due to the realization that charcoal production and use is unending several efforts have been made to improve sustainability of these sectors. The main approaches taken by most projects in Malawi to solve charcoal problems are:

1. Increasing feedstock supply e.g. afforestation and reforestation projects, agroforestry, and sustainable natural resource management.
2. Promoting adoption of efficient charcoal production techniques e.g. improved kilns
3. Promoting adoption of efficient consumption technologies e.g. energy efficient cook stoves
4. Promoting alternatives to char coal e.g. briquettes

A number of projects seeking to improve sustainability of the charcoal sector have also been implemented in Africa and Sub Saharan Africa. Below is a brief case study of Swedish Environmental Institute (SEI) project titled: "Charcoal Potential in Southern Africa" (CHAPOSA) which was implemented in Southern Africa: Lusaka in Zambia, Maputo in Mozambique and Dar-es-Salaam in Tanzania. Popularly known as CHAPOSA 2000, the project sought to investigate the trends in deforestation and forest depletion in areas supplying three urban centers in Southern Africa: Lusaka in Zambia, Maputo in Mozambique and Dar-es-Salaam in Tanzania. Additional objectives were to identify indicators of over-exploitation and increase the understanding for the reasons of charcoal production." This project uses sustainable forestry measures, improved kilns and improved cook stoves to enhance sustainability of the charcoal sector.

The project generated useful information that was (is) utilized to improve the charcoal value chain.

Projects key findings were:

- Forests are rapidly declining in the study areas. This is partly attributed to charcoal production and land conversion to agriculture.

- Introduction of improved technologies reduce exploitation of forest resources and the quantities utilized for consumption by 2020 however, this can be fully actualized if the technologies are introduced in large scale
- Charcoal is a major income earner for rural residents

The Key recommendations were as follows:

- Promote natural resource management
- Introduce a licensing charcoal system
- Introduce energy efficient stoves
- Employment creation in the field of natural resource management and sustainable smart agriculture will reduce overdependence on charcoal

Malawi BEST was developed to ensure sustainability in the biomass sector with emphasis on: promoting sustainable biomass energy supplies; promoting widespread accessibility and adoption of modern cooking fuels and efficient biomass combustion technologies by households and small enterprises; build the capacity of institutions so as to implement this strategy for sustainable management of the biomass sector.

Biomass is the main source of energy in Malawi. Unsustainable exploitation of feedstocks and consumption of biomass energy accelerates forest degradation and deforestation (BEST 2009). It is important to note that charcoal is not a key driver of deforestation however, it is a contributor (Kambewa et al., 2007). BEST established that the main sources of feedstocks in Malawi are: woodlands, forests or plantations, and farms.

In ascending order, the most utilised charcoal production techniques in Malawi are; Earth mound, pit kilns and brick kilns (BEST 2009). Malawi BEST notes that in spite of being the most utilized technique, the Earth mound is the most inefficient of the aforementioned technologies however several research studies have shown potential for improvement of this kiln's efficiency and currently some regional charcoalers have registered average conversion efficiencies of about 23% (by weight).

Malawi BEST 2009 established that transportation of biomass energy is carried out on an informal basis with 51% of the transporters utilizing manual means and 49% using motorised means. In addition, 80% of manpower is utilized to transport woodfuel manually whereas the remaining portion (20%) provides labour for transporting wood fuel via motorised means. Lastly, the most popular forms of transport are: bicycle, head – loading and vehicles. Boats and train are also used in some parts of the country (BEST 2009).

Findings by BEST show that trade of woodfuel commences at or in proximity to the production site and later at the urban centres. In addition, some traders and transporters purchase charcoal directly from production sites and resell in the urban centres. Charcoal consumers, middlemen and traders are the main charcoal buyers (BEST 2009).

After rigorous examination of supply and demand of biomass energy, with emphasis on wood, in Malawi's three regions and its main urban catchment areas, BEST made some recommendations. Below are some of the findings and recommendations put forth:-



Table 5: Malawi BEST Findings and Recommendations

Findings	Recommendations
<ul style="list-style-type: none"> • Biomass is the most dominant form of energy utilized in Malawi and its consumption is forecast to continue decades to come. In addition, biomass energy is important for the county's economic growth. • Non-issuance of production and transport licences promotes illegal charcoal trade. • Deforestation and forest degradation is rampant 	<p>The Government of Malawi should adopt “a more proactive and supportive stance to establish a framework of incentives and disincentives for the private sector to behave more sustainably and to diversify and scale up its investments in the biomass sector.”</p> <p>Below is an outline of measures that can increase wood supplies in Malawi:-</p> <ol style="list-style-type: none"> 1. Design a Wood fuels Supply Master Plan (WSMP): Examples of the projected outcomes of this initiative are: <ul style="list-style-type: none"> ➢ Accurate and an up-to-date forest resource inventory and demand assessment in existing wood products and potential urban areas of supply ➢ Easily understood and implementable methodologies and tools for each step of WSMP design. This will also incorporate “tools for developing plans for co- management or Village Forest Area management” ➢ Capacity building of national, local staff and community members on how to use this methodologies and tools. ➢ Increased participatory community forest management. This will involve all key stakeholders in the forest sector. 2. Design and implement District Woodfuel Management Plans. This plans can be actualised through the following actions e.g. : “Rehabilitation and better management of existing forestry resources; Increasing the productivity of forest resources (e.g. agroforestry, Farm tree planting initiatives and Tree planting in woodlots etc.); Professionalising the charcoal value chain (e.g. Creation of professional charcoaling groups, Uniform charcoal transport tax etc.) 3. Modernise and strengthen charcoal flow Monitoring and Control This will involve: “improving the transport permit system for forest products, setting up of the control system etc.” 4. Enhance production of cost effective alternative forms of energy This can be actualised through use if incentives

Source: Malawi BEST 2009

A recent study by Forest Governance Learning Group established that there is high demand for charcoal produced from indigenous species compared to that from plantations. In addition, its findings show that Malawi is committed to promoting sustainability of its biomass sector. This is reflected through numerous efforts to introduce energy efficient technologies e.g in 1986, Malawi Stoves Programme introduced ceramic cooks stoves in Blantyre and the project was (is) successful. Lastly, it is important to note that, fuel purchase and cooking is a responsibility assigned to women whereas charcoal production is a reserve for men (Vermeulen, 2000).

Biomass energy is not a major driver of deforestation however, it is an activity that comes in due to land use change. It is important to understand that changes in land cover do not result due to imbalance between supply of charcoal and feedstocks but due to failure to implement sustainable wood production in a coppice system in and around charcoal production sites (Arnold et al. 2006). Therefore, in-order to promote sustainability of the Malawi's charcoal sector, the Forest Governance Learning Group recommends:

- Promotion of the charcoal market chain through halting decriminalization of charcoal production. This initiative will increase financial returns accrued by the poor charcoal producers.
- Promote participatory community forest management
- The forest department should:
 - Enact a regulation under the Forestry Act that clearly defines the role of VNRMCs in sustainable charcoal production
 - Promote distribution of tree seedlings that can be used for commercial purposes and charcoal production
 - Develop a data base at the district level which will record information such as: quantities of charcoal traded, costs of charcoal at each stage of the charcoal value chain etc. In addition, this information should be used to promote economic status of the poor charcoal producers

Malawi is classified among nations with the highest deforestation rates in Southern Africa. It has a recorded annual deforestation rate of 2.4% (FAO 2001 cited in UNEP 2002). Findings of a recent research study by the Government of Malawi shows that overdependence on natural resources by Malawians (89%) is attributed to high population growth coupled with high poverty levels. In addition, notable factors that impede sustainable forest management include: ineffective forest management institutions, ever increasing demand for forest products such as wood fuel and timber and rapid expansion of agriculture (GoM 1998a).

Several research studies have found out that there is an increasing trend in demand for wood fuel and this is mainly attributed to the relatively cheap price of wood fuel compared to alternative fuels (NSO, 2000).

A recent report by Mngoli recommended implementation of the following interventions so as to enhance sustainability of forests and the charcoal sub-sector:-

- Promote participation of the youths and women in environmental conservation activities (i.e environmental awareness, sensitization, capacity building initiatives e.tc)



- Enhance capacity building and community empowerment on matters of environmental conservation
- Incorporate environmental concerns in government policies
- Incentivize people involved in implementing environmental conservation initiatives

2.6 Stakeholder Analysis of the Charcoal Industry in Malawi

Since charcoal trade is deemed illegal in Malawi, stakeholders in the industry do not come in the open and do not often interact. This is because there are formal and informal stakeholders in the industry. The formal stakeholders are those who purport to adhere to the Forest Policy and Act which provides for charcoal production from a sustainable source whereas the informal stakeholders in the industry operate 'clandestinely' without due regard to the Policy and Act. These stakeholders can be broadly categorized as follows:-

- (a) Government Departments
- (b) Local population/communities
 - Charcoal producers
 - Charcoal vendors
 - Charcoal Retailers
 - Charcoal consumers
- (c) NGOs
- (d) Donors and Development partners
- (h) Private sector

2.6.1 Government Departments

The Ministry of Natural Resources, Energy and Environment are mandated to provide policy guidance and direction on all matters concerning Malawi's natural resources, energy, and environmental management. The Ministry of Finance and Economic Planning is also a key stakeholder as it is charged with fiscal planning and government revenue collection at the national level. Sub-national stakeholders include the districts, municipalities, town councils, and village governments. The main Government departments with a stake in charcoal industry include Department of Forestry, Department of Energy Affairs and the Environmental Affairs Department (EAD) and the Ministry of Defence (The Police and the Army). The main mandate of government departments is the formulation, implementation and enforcement of policies. As far as the Charcoal industry is concerned, Government departments are involved either directly in charcoal projects and/or indirectly through the development and management of natural resources projects.

The Forestry department is the custodian of the policy on charcoal production. It provides licence and transfer of produce certificates to charcoal producers upon satisfying the conditions set in the Forest Act. It regulates production through confiscation of charcoal produced illegally. The forest department often targets producers in their confiscation campaigns. They have forest guards in designated roadblocks, and with the help of the police they also confiscate charcoal from transporters/vendors and consumers.

The Forestry department has also been directly involved in promoting afforestation and reforestation activities and has supported wood energy projects that promote use of energy saving stoves. In the 1980s and 1990s the Forest department runs a commercial charcoal production industry in the Vipha pine plantations. Charcoal was produced from pine trees using the half orange kilns. However, the commercial entity collapsed because of competition from charcoal produced from wood from indigenous tree species. Consumers preferred charcoal produced from indigenous wood species than exotic pine species because of their calorific value and burning characteristics.

The Department of Energy Affairs, apart from policy guidance on biomass energy use, also provides technologies that efficiently use charcoal while maintaining forests. The main difference in policy guidance between Energy Affairs and Forest Department is that the former does not consider charcoal as a driver of deforestation but as an important part of the energy mix in the country. As such Energy Affairs department has been active in the demand-side management and for instance has been active in the provision chitetezombaula, rocket stoves and other cooking devices that use less wood/charcoal to cook food.

The EAD, on the other hand, which commissioned this report through the project it is implementing that promotes sustainable Land Management. As described earlier this project has components that support sustainable charcoal production in the shire valley, especially targeted districts of Balaka, Mwanza, Neno and Blantyre. EAD has recognized the importance of charcoal in the socio-cultural life of Malawi people and as such would like to use the project to put in place pilot measures that can initiate and enhance sustainable charcoal production (SCP) practices. Since EAD is also charged with promoting Carbon financing through the Clean Development Mechanism (CDM) and the Voluntary Carbon Market (VCM), the department sees an opportunity in implementing a carbon project that streamlines the charcoal industry through the charcoal value chain. EAD is supporting NGOs through information provision on CDM and VCM, There has been wide response on developing CDM technologies that relate to the charcoal industry (e.g. chitetezombaula and rocket stoves). These have become popular with NGOs because of the potential for carbon financing.

The Ministry of Defense, that is the police and the Army are involved on an adhoc basis in enforcement of regulations and are often invited by the Department of Forestry. The Army is rarely used in charcoal confiscation campaigns but in the protection of some forest Reserves. The Department of forestry signed a Memorandum of Understanding with the Army to protect some forest Reserves from illegal charcoal producers. Now and again the Army is called to help in enforcement of the regulation. The police provide security to forestry officers on charcoal confiscation campaigns. In addition, the police help Forestry guards to check licenses, Transfer of certificates to ensure that the charcoal being transported is produced following the regulations as stipulated in the Forest Act. In roadblocks, the police service helps the Forest department in confiscating charcoal from producers, transporters, vendors and consumers.

The mandates of various Government departments seem to overlap and sometimes conflict in practice. There are unclear mandates between the Forestry department and the Department of Energy Affairs in terms of the charcoal industry. Ideally the Forestry department is supposed to be



concerned with the production side, i.e. forest management, charcoal production and transportation to consumers. The Energy affairs department is supposed to be concerned with demand side management including providing policy guidance on the transportation and marketing of charcoal provision of efficient carbonization technology as well as efficient cook-stoves while promoting alternative energy to charcoal.

However, in practice, the Energy Affairs Department is very thin on the ground, does not provide any policy guidance on the transportation and marketing of charcoal. On the other hand, the Forest Department is very active in as far as policing and confiscating what they consider as illegal charcoal. Interestingly, it is only charcoal transporters who are targeted. Charcoal vendors seem to enjoy certain rights and are not as harassed as transporters, so it seems as though charcoal is only illegal during transportation. This is a situation that prevails in most of sub-Saharan Africa where charcoal is an important part of the energy mix.

Other challenges existing in government departments include lack of monitoring systems on the impacts of often uncoordinated and isolated projects on the sustainability of charcoal industry, lack of coordination of activities by the different sectors, implementation of policy, lack of capacity for technology development and transfer, duplication of activities by the different sectors and lack of assessment of the natural resource base and its economic value for the charcoal industry.

There is need for establishing a Charcoal Industry Coordination Unit (CCCU) possibly at the EAD that will coordinate all the government's charcoal activities. The aim of such a Unit will be to provide high-level policy and lobby for political support at the highest level of government to ensure that charcoal industry activities are sustainable and do not impact negatively on the environment in Malawi. In addition, the unit will leverage financial support to the charcoal industry; the Unit will also assist in coordinating and harmonizing on going and future activities in order to resolve conflicting mandates among Government Departments and other players in the charcoal industry.

2.6.2 Local population/communities

The Local communities are involved in the management of forests, especially forests on customary land. These are communities that live close to the forest resource. They are engaged in afforestation and reforestation activities for provision of wood as alternative energy source to charcoal. The local communities are also involved in various projects that promote efficient use of tree resources through energy saving technologies executed by Government departments and NGOs. Unfortunately most of the communities are not aware of the regulations that guide the charcoal industry in Malawi. There is need for proper communication strategy for the industry.

In addition to those communities living in close proximity with the forests, there are also sub categories as follows:-

Charcoal producers: These are local producers that cut wood from forests and produce charcoal. They include both men and women, although the majority are men. The majority of producers produce charcoal illegally from customary land forests and forest reserves. They are responsible for

forest degradation in the SLM project area. Some charcoal producers are also transporters and vendors.

Charcoal transporters/Vendors: These are local or urban individuals. The local individuals are mostly producers, who transport the charcoal from production site to local markets using bicycles or oxcarts as modes of transport. At the market, they sell the charcoal at wholesale price to retailers who in most cases are women or directly to consumers in bulk along roadsides.

The urban transporters or vendors, come from urban areas, which are outside the local community. They use vehicles to transport charcoal from production sites to urban and city markets. The charcoal is sold in bulk at wholesale price, in other cases is sold directly to consumers.

Charcoal retailers: These are men and women who buy from vendors and repackage the charcoal into small packages for local consumption.

Charcoal consumers: These buy charcoal from producers, vendors and retailers. They are mostly urban and city dwellers. They drive the demand and supply of charcoal. Indirectly there are responsible for the degradation of forests that result from charcoal production because they provide the market incentives.

2.6.3 Non-Governmental Organizations

Several national Non-Governmental Organizations (NGOs) are involved in the implementation of forest management activities and use of efficient stoves. These NGOs operate at the national and community level. Some of the NGOs are: Concern Universal International (CUI) Concern Universal (CU) Self Help International (SHI), GIZ PROBEC; Mulanje Renewable Energy Agency (MUREA)

Concern Universal International (CUI) is implementing a project in Balaka district: the project promotes afforestation and reforestation activities in bare hills using the water basin approach. It provides efficient cook stoves for efficient wood energy use.

SHI and CU are providing efficient stoves (chitetezoMbaula) and trying to access carbon credits for some communities in Balaka that are involved in tree planting, crop diversification and biomass use (including charcoal) for energy provision.

PROBEC and MUREA are involved in developing technologies for efficient energy use. The technologies developed are tested through projects implemented by the organizations concerned in partnership with other NGOs and government institutions. These have been responsible for the production and testing of chitetezombaula and rocket stoves.

2.6.4 Donors and Development Partners

The range of donors active in the charcoal industry includes multi and bi-lateral donors. Donor



organisations have been providing financial support to aid efforts on the charcoal industry directly or indirectly. These include the UNDP funding the Sustainable Land Management project, GIZ funding energy efficient technology projects (ProBEC and MUREA), IrishAid funding CDM related activities through use of efficient stoves (chitezomabula) in Balaka and other districts with CU and SHI and USAID funding CUI on afforestation, reforestation and energy use.

2.6.5 Private sector

The charcoal industry has not attracted many private sector firms. There is only one company, the Malawi Industry Research and Technology Development (MIRTD in conjunction with the Department of Energy Affairs have developed technologies for efficient use of biomass energy).

3 CHARCOAL VALUE CHAIN

3.1 Overview

Value Chain (VC) is a term, which has been defined variously. Kaplinksy and Morris (2000) defined VC as the full range of activities which are required to bring a product or service from conception through the different phases of production, delivery to final consumers, and final disposal after use. Perhaps a simpler definition is derived from Wikipedia, which states that VC is *a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market*. The value chain approach is an important tool in understanding related enterprises' activities from production to consumption, and the functions of the actors (operators) and relevant supporters. It can be used to understand the relationships between businesses in the chain and market players, the role of specific market functions and the rules that govern the production and marketing chains (Care International, 2012). An advantage with this is that the effect of upstream and downstream events are taken into account and linked.

Taking the above definitions and applying them to charcoal means that an analysis of investments needed at every stage of charcoal trade beginning with land (either the acquisition of or land rent); establishment of woodlots/trees or 'energy' crops specifically for charcoal production; purchase of improved and efficient technologies; packaging and transportation to consumers, can be analysed. One of the benefits of a charcoal VC is that, it is an attempt to increase producer incomes by meeting the demands of consumers through coordinating the sequence of production stages in the chain that will be marked by predictable value growth at every stage and lead to a better product. The major stages include in charcoal value chain include; establishment of wood, conversion of wood to charcoal, charcoal vending/retailing and charcoal consumption. To ensure success and sustainability along the VC, there is need for clear policy and regulatory frameworks at the local and national level, which ensure the stability and predictability of the investment climate and the returns on investment for sustainable charcoal production. Proper policies and regulations are crucial to reduce real and perceived risks by potential investors in order to motivate investment. Figure 3 below illustrates the existing charcoal value chain in most of sub-Saharan Africa.



3.2 Characterization of the Malawi Charcoal Value Chain

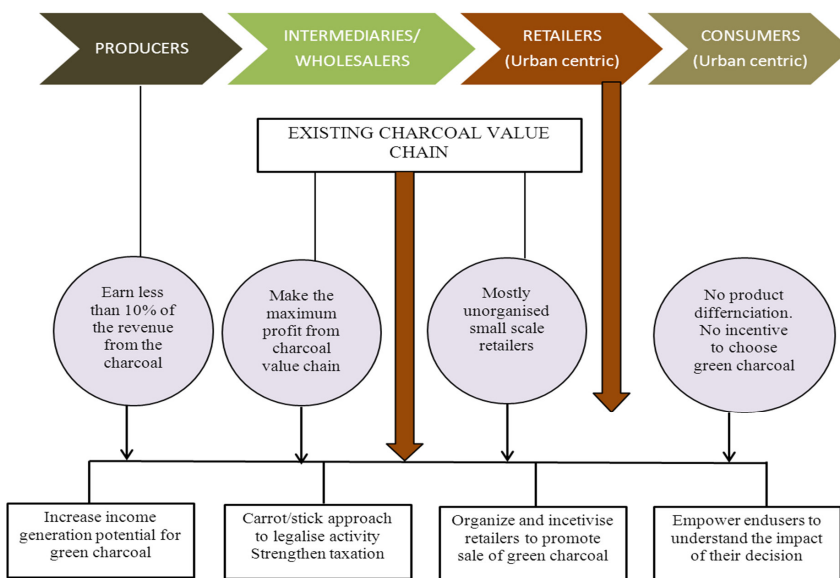


Figure 3: Existing Charcoal Value Chain. Adopted from the NAMA Study UNDP 2012

The significance of the charcoal sub-sector in sub-Saharan countries' economy and energy mix has led to a paradigm shift from emphasizing the potential environmental dangers of charcoal production to focusing on the income-generating role of charcoal in rural areas, and the correlation between charcoal production and poverty. Khundiet *al.*, 2010 argue that there is no single solution to the charcoal problem, ultimately, the solution to the charcoal dilemma should focus on a constellation of measures: enforcement targeted in environmentally sensitive areas, fee collection along the value chain, investments in tree planting and improved technologies, and efforts to develop viable and affordable alternatives to wood-based fuels for consumers.

Majority of charcoal producers in the districts surveyed (Blantyre, Balaka, Mwanza and Neno) are subsistence farmers who produce agricultural goods mainly for "own consumption." Such production is characterized by low productivity, high risk, application of the simplest traditional methods and tools and high uncertainty. The main motivating force in most of the peasant's life is the maximization, not of income, but rather survival. When the production intention is survival and not improving income, then adoption of improved methods and technologies for production is most unlikely. This is because the tendency in such circumstances will be to practice what is well known

by the farmer or producer. A new product therefore, that requires reallocation of resources, will be perceived as risky. “In economic statistics, farmers are likely to prefer a technology that combines a low yield with a low variance, to the alternative technology that may promise a higher yield but also present the risk of unpredictable variance” (Todaro 1991).

Although charcoal is a prime source of energy in most African countries including Malawi, mostly subsistence farmers and rural labourers who are after eking out an income for survival produce it. This state of affairs is partly due to inadequate policy guidelines and structural governance deficits in the management of this resource. Like any other commodity, investigating the sequence of charcoal production and marketing in all its facets is a key to systematic improvement. This approach not only provides a convenient means for achieving a country’s development goals by adding to the knowledge, innovative insights and technology to each link, but also enables policy makers to create favourable framework conditions, which promote competitive enterprises, sustainable jobs and income for local people. Furthermore, it allows impact-oriented monitoring of initiated policy actions. A number of charcoal value chain characteristics arising from this scenario are therefore common to most African countries. These are:

1. *Unregulated/illegal setting*: where any laws exist, there is scant respect for the restrictions relating to wood harvesting, charcoal burning, transport and trade;
2. Corruption is rampant and systemic as a result of the illegal nature;
3. Inefficient conversion technologies are the logical consequence of the unregulated & insecure setting, clandestine operation and overall capacity deficits;
4. Charcoal production is typically a poor man’s business leading to exploitation by middlemen and other large-scale dealers;
5. In the public perception, charcoal is discriminated against as “dirty” and economically unattractive which hinders strategic planning as well as mobilization of investment capital;
6. Free access to raw material leading to deforestation and degradation, which further discredits the merits of charcoal as a source of energy;
7. The charcoal business displays a decidedly oligopolistic structure with profits concentrated in the hands of a few intermediaries, engaged as transport agents or wholesalers (see illustration of this for two of Malawi’s two biggest cities in Table 6 below). Women are typically disadvantaged even though they do the heaviest tasks along the value chain;
8. As a result, Charcoal operators are reluctant to formalize their businesses, as they cannot perceive the benefits

3.3 Analysis of the Current Charcoal Value Chain for Malawi

This section analyses the current stages and activities of the charcoal chain in Malawi and makes recommendations on how it can be improved in order to make it a sustainable charcoal value chain. The stages analysed include: Wood/biomass production, conversion of wood to charcoal also known as carbonization or charcoal production, charcoal trade (wholesale and retail), and charcoal consumption. The analysis looks at the social, economic, cultural and political dynamics that come to play at every stage.



3.3.1 Charcoal Production

In Malawi, Charcoal production is concentrated in miombo woodlands. Predominantly the source of wood for charcoal production is the natural standing miombo forests. These forests occur on customary land and public land (as Forest Reserves). Charcoal producers prefer species that produce dense charcoal. These are preferred because the major application of the charcoal fuel is cooking; either for domestic or commercial purposes in restaurants and hotels. The preferred and common tree species used for charcoal production included Chinama, Mpakasa, Mthethe, Mpalankhanga, Chitimbe, Nthombozi, Namphini, Tsamba, Nkhunthe, Mchenje, Mombo and Muwanga, Kachumbe, Mlauliwu and Mlaundi. These species produce charcoal of high calorific value because of the density of wood. However, due to scarcity of these species, any specie is used to make charcoal. In Blantyre, Traditional Authority Kunthembwe, reported that the communities are digging tree stumps to make charcoal

The charcoal production sector is male dominated although women take an active role. Reasons for male dominance could include the fact that technology is not gender responsive, and therefore requires excessive manual labour; the majority of charcoal producers do not own land from which charcoal is produced. During field work about 50% of respondents cited the lack of land hence hindering planting of wood for charcoal. Charcoal production is dominated by the less educated (80%). Access to information and appreciation of technology is therefore very low. Most people involved in charcoal production are predominantly poor without capacity of investment in high cost efficient and eco-friendly technologies.

Recommendations: Alternative fast growing species should be introduced. Bamboo, which is abundantly and commonly available in the country, is specie that has very high potential for charcoal production. It is fast growing and a highly renewable resource; unlike timber, it can be harvested every year. Bamboo makes excellent charcoal with high potential meeting both rural and urban energy needs for heating and cooking, as a commercial cooking and heating fuel, as an industrial fuel, and also for making products such as activated carbon. Other benefits of Bamboo include:

- Can be planted at the Shire River bank for stabilization and erosion control
- It is a quick energy-demand solution since Bamboo is fast growing and would be able to supply adequate energy in the shortest time possible.
- Reduce the exploitation of woody species for timber by encouraging the use of Bamboo for construction and in the furniture industry.
- Can also be a source of income and divert attention from charcoal production in the areas

3.3.2 Carbonization Technologies

Conversion of wood to charcoal or Carbonization in all the four-targeted districts is made using traditional methods. The production method involves tree felling, stem cross-cutting, kiln building by piling logs and covering with soil, wood carbonization and kiln breaking to recover the charcoal.

A detailed narrative of the process of traditional charcoal production involves cutting down of trees, which are then split into small pieces. A pit is then dug about 100 cm deep, 7 to 10 meters long and 1 to 2 meters wide. The length depends on the amount of wood cut. In other cases no pit is required. Then cut wood is staked from the bottom of the pit, going up according to the size of the trees. A layer of grass follows each layer of wood. Some grass is used to cover the staked wood and mud is smeared around the formed mound of wood and grass. Two holes (openings) are left on the sides of the mound, to allow smoke escape when the mound is lit with fire. Then fire is set. The charcoal producers have to monitor the mound for 2 to 3 days or more depending on the size of the kiln until the charcoal. The kiln is broken to recover the charcoal. The charcoal is ready for packaging, once recovered.



Figure 1114 Earth-mound and pit kilns

The Forestry Research Institute of Malawi recognised the dangers of traditional methods of charcoal production. They conducted carbonisation research using *Acacia polyacantha* (Mthethe) species in Salima district. The technology used was half orange kiln (fig 3). The recovery rate recorded was 17.84% (Chanyenga 2004). However, the research was not concluded due to lack of resources.

In a similar effort, the Forestry Department, introduced commercial charcoal production from pine plantations in the viphya plantation of northern Malawi. The production was based on the half orange kiln. However, production stopped because the commercial entity was operating in losses. The consumers preferred charcoal from miombo woodlands than from pine. Pine charcoal was reported to be expensive, burning fast and therefore requiring more for cooking or heating at any single time of use. The pine charcoal was reported not to last for long in a cook stove. Although the source of wood was in abundance, the viphya commercial charcoal entity faced stiff competition from miombo woodlands charcoal and the commercial entity collapsed.



Figure 12.125: Carbonisation using Half Orange kiln

Wood fuel preparation: Huge billets are predominantly used leading to enormous losses due to the production of large quantities of charcoal fines resulting from the stiff thermal gradients during pyrolysis. Species mix during carbonisation is very common. Different species have different chemical and physical compositions; this leads to different carbonisation characteristics and rates. When different species are mixed, it will lead to production of excessive charcoal fines and at the same time un-carbonised pieces of wood. Mixing tree species during carbonization should be discouraged.

The **Cassamance kiln** was developed in Senegal and is an earth mound kiln equipped with a chimney. This chimney, which can be made out of oil drums, allows a better control of air flow. In addition, the hot flues do not escape completely but are partly redirected into the chimney of the kiln, which enhances pyrolysis. This reverse draft allows faster and more uniform carbonization than the traditional earth mound kilns yielding a higher quality of charcoal and efficiency which ranges between 18 and 25% according to the level of expertise by the operators. Comparative tests of the Cassamance kiln and traditional mound kilns confirmed the advantages in terms of efficiency and the shorter carbonization times due to the enhanced hot flue circulation (Meulecasamancaise PERACOD Mundhenk, 2010). The other advantage is its ability to carbonize billets with large diameters. The major disadvantage of this kiln type is that the PIC which includes CO, CH₄, and HC cannot be condensed at those temperatures and inevitably escapes to the atmosphere. The other disadvantages are that it requires some capital investment for the chimney and it is more difficult to construct compared to the traditional earth mound kilns.



Figure 13136: Cassamance Retort

Retort technology is the standard method of production for industrial charcoal in western countries, but due to high investment costs it is not viable for traditional subsistence charcoal makers. In the retort method, the wood charge is placed in a closed container known as the "retort". This has a tightly closed door, and some means to allow tar and other gases to escape. The retort is heated from the outside and air is not allowed to enter it. Because the heating is external, poor quality biomass that would not be converted into charcoal can be used. This type of biomass could be the leaves and the very tiny branches from the harvesting of wood for charcoal. This increases the overall useful charcoal yield.

When the wood in the retort has been heated to the right temperature, carbonization begins and heat and by-products are given off and little additional outside heat is required at this stage. The gaseous by-products can be channeled through the fire box to provide the additional needed heat to complete the carbonization process. Since the by-products contain PIC, their channeling into the fire box provides the opportunity to completely burn them to CO_2 and H_2O . The resultant effect is that the dangerous GHG are reduced tremendously. The other advantage of the retort technology is that it minimizes the crushing of the lump charcoal as a result of handling during the harvesting process compared to earth covered kilns. Many designs for small scale charcoal producers now exist and two of these will be piloted.

The **Adam Retort**, also known as the Improved Charcoal Production System (ICPS), is one of the most efficient means of producing good quality charcoal. The kiln returns the wood gases back to the carbonization chamber, burns the volatiles and a high proportion of the tar components almost completely and uses the heat for the carbonization process. Efficiency can be as high as 40% and noxious emission can be reduced by 70%. In addition, the production cycle is completed within 24 to 30 hours. The retort is suitable for semi-industrial production.

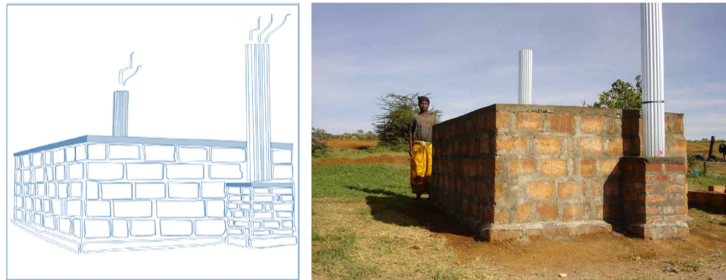


Figure 1447: Adam Retort

Disadvantages of the Adam Retort include: it is a stationary kiln, investment costs exceed US\$ 1,000 depending on location and special skills are required for construction. Nevertheless, the Adam Retort has been introduced in several countries (Senegal, Madagascar, Peru, etc.) on a pilot basis. Currently, the method is being further refined for up-scaling.

The recently innovated **Sam1 Brick Retort** operates in a manner similar to the Adam Retort. The major difference is that the fire box is within the retort as opposed to the external fire box. The heat losses to the walls of the fire box are minimized. The result is that it takes a shorter time and less fire wood to be fired. However because the fire box is directly under the retort, the retort is slightly higher than the Adam retort for the same capacity. But the retorts take the same quantities of cement, sand and bricks.

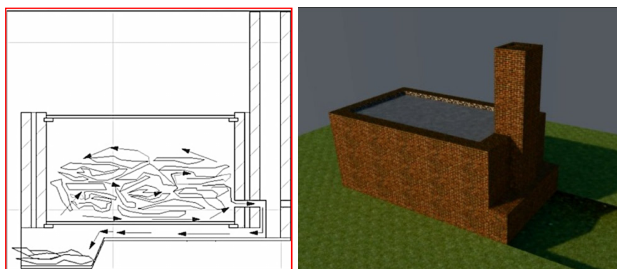


Figure 15158: Cross-sectional View and Architectural Impression of the Sam1 Brick Retort

3.3.3 Packaging, Transportation and Marketing

In Malawi, in all cases the packaging is in gunny bags. 50kg or 90kg sized gunny bags are used to package charcoal (Plate 1). The weight printed on the bag is an indication of size and not the weight of the charcoal. The producers use such bags for convenience since there are no standard packages for charcoal. Most times these bags are overloaded. Because charcoal is friable, the overload coupled with the poor roads from the charcoal production sites, ends crashing the useful charcoal to powder and fines. For instance, it was found that between 15 %–35% of a 70kg bag of charcoal in Kampala is charcoal fines, which are normally regarded as waste (NAMA Study 2012)

To avoid such waste:

- There is need for better packaging by using three ply boxes and also providing for wooden compartments on the tracks to avoid charcoal crashing under its own weight.
- Charcoal could be transported in the gunny bags on bicycles to a central point (A charcoal Market) within the district. At this point the re-packaging into boxes could be done. Then all the charcoal fines and powder can be collected packed in appropriate boxes and sent to a briquetting factory.



Figure 16169: Packaging of charcoal in carton boxes and gunny bags adopted from Bagabo 2012

Charcoal transport: Bicycles dominate charcoal transportation during the day and by trucks during the dark. Bicycles are often used to carry one to three bags at times, as this is not illegal. In most cases it is done where the markets are within short radius, and where the road is relatively good and motorable.



Figure 10: Bicycle transport and small scale retailers

Public vehicles transport charcoal on return routes from official assignments

Drivers of commercial vehicles transport charcoal on return routes of their deliveries at extremely below market prices.

Cost of Transport: The areas surrounding major towns are deforested and /or highly degraded, which means that charcoal must be transported for long distances, attracting high prices at retail markets. To cut down on the transport costs, the practice is to overload whatever mode of transport and this compromises the quality of charcoal. The trucks used are mainly very old and in bad mechanical conditions. This results in high fuel consumption making the final useful energy to be very expensive.

Wholesaling and Retailing: Charcoal is not sold by mass or specific standardised volume. It is by observation and depends on appearance and the person selling. There are no standardised packages and no labels; meaning the source cannot be traced.

It is difficult to know the actual quality (including amount of charcoal fines per bag) and quantity. Bags vary sometimes widely as to the amount of charcoal fines (from 15kg to 35kg) depending on the tree species or mix of tree species used, carbonisation practices employed and handling after carbonisation. It is difficult for the retailer to predict profits ex-ante.

In the four-targeted districts of SLM project, producer's wholesale bags to vendors/retailers, whom may sale whole bag or repack the charcoal in small plastic bags, containers or heaps/piles

The prices at which these are sold vary from district to district and from producer to producer. The prices also vary depending on season of the year being sold. Charcoal is cheaper during the summer months (August Sept, Oct, November) compared to winter months (May June July). In Blantyre and Lilongwe, producers package charcoal in 50Kg or 90Kg sized bags. The packaged charcoal is may be sold to vendors at an average price of MK500.00. The vendors sell charcoal to retailers at an average price of MK 2,500.00. Charcoal pricing is not based on weight but visual assessment.

3.3.4 Charcoal consumption

Biomass energy is preferred among Malawi's rural and urban consumers because it's readily available, easy to access and relatively cheap (affordable) compared to alternative sources of energy.

Charcoal consumers in Malawi can be broadly grouped into; households (charcoal used for domestic use); commercial enterprises (charcoal used in businesses e.g. restaurant motels, artisans) and institutions (e.g. schools, prisons, hospitals). The aforementioned consumers can be urban or

rural residents however; research studies show that the largest consumers of charcoal are urban residents whereas their rural counterparts prefer firewood.

In Mwanza district, a few households were surveyed. Household A: reported to buy a 50kg sized bag with head (which weighs between 35-60kg) according Kambewa et al 2007. The household supplements the charcoal with firewood for cooking. The charcoal lasts a month. The bag costs MK1, 500.00 in summer and MK2, 000.00 in winter. The household uses efficient cook stove (ChitetezoMbaula). ChitetezoMbaula is clay coated with metal casing. Household B buys one 70kg bag/month at MK1, 700.00. Uses similar efficient cook stove as household A. The total number of residents is three. However, they supplement with electricity. Household C buys 2 of 50kg-sized bags with head. The charcoal lasts a month and spends MK3, 000.00/month. Uses ChitetezoMbaula. The total residents in the household are 7 and supplements with electricity.

In Lilongwe city, a household of 6 residents with no connection to the electricity grid and which relies wholly on charcoal indicated that, it uses 4 of 50kg-sized bags with head per month. The bags are bought at MK3, 500.00 each. Therefore the household spends MK14, 000.00. Similar households connected to the electricity grid spend MK16, 000.00/month in electricity bills but supplement with charcoal or gas because of electricity blackouts. From this case alone charcoal seems to be less expensive.

Consumers: For consumers that buy full bags, it is difficult to determine the actual quantity and quality of charcoal they buy. It is therefore difficult to determine value for money. There is need for standardisation to protect the consumers. The conversion technologies are predominantly very inefficient. In addition, there is need to follow exclusive charcoal consumers with daily charcoal consumption recalls for a month to make plausible conclusion and recommendations on charcoal versus electricity use.

3.3.5 Gender and Cook stoves

Malawi's traditional institutions are held in high esteem thus incorporating gender issues in the development plans for scaling up adoption of clean and efficient cook stoves is crucial for successful sustainable interventions in the cooking sector. Therefore, understanding the position of women in the society and gender roles in terms of who does what and to what extent is important since women and men have varying tasks and occupy different statuses.

Malawian women are mandated to perform Reproductive (child bearing and domestic tasks), Productive (work that will generate income) and Community roles (managing of community resources) whereas men perform Productive and Community roles only. This clearly depicts a situation where women have most responsibilities. Despite this, there is great effort to empower women and enhance gender equality by the current President, Joyce Banda. The president launched an energy programme with support from Irish Aid of Ireland Government. Irish Aid is supporting Concern Universal effort in promoting clean and efficient stoves. This initiative when adopted will escalate use of clean and efficient cook stoves thus sustainable use of biomass energy.



3.3.6 Indoor Air Pollution

Adoption of clean and efficient cook stoves by Malawian households will reduce the rates of acute respiratory infections and pneumonia that result due to indoor air pollution. The factors contributing to indoor air pollution include: -

- *Inefficient cooking systems:* The three-stone fire and basic charcoal burner are most common cooking systems in urban and rural Malawi. They foster incomplete combustion of fuels which escalates to indoor air pollution.
- *Cooking fuels:* Firewood and charcoal are the primary energy sources in rural and urban Malawi respectively. During combustion, firewood releases emissions in the form of particulate matter, which can lead to pneumonia and other acute respiratory infections whereas charcoal emits Carbon Monoxide, which puts people at risk of death due to suffocation.
- *Housing structures:* Poorly ventilated houses impede free inflow of fresh air and escape of hazardous emissions thus indoor air pollution.
- The most common cooking gadgets among Malawi's charcoal consumers are: -
- **Three-Stone Fire:** It features three stones that support a pot. A fire is lit between the stones and firewood is continually put in. This technology is easy to construct however it's associated with indoor air pollution and inefficient use of firewood.
- **Charcoal Burner:** It is the commonest technology used by households using charcoal. They are made of ceramic and molded by metal sheets. They are locally made by artisans and distributed to nearby markets.
- **Mud Stove:** It is made up of clay pot with a pot rest above the combustion chamber that supports the pot. It also associated with indoor air pollution.
- **Ceramic cook stoves:** They are made of clay and are deemed energy efficient.

In the recent past, there have emerged several technologies promoting use of clean efficient cook stoves among charcoal consumers. Examples of existing technologies in Malawi are: -

Chitetezo Mbaula: It was designed locally by GiZ-supported technical program, ProBEC. This improved cook stove is among the most utilized improved cook stoves in Malawi. It is energy efficient and can last up to three years.

Fixed Esperanza: It is the most popular 'fixed-in-place' improved cook stove available in Malawi. It is a product of ProBEC. It can last up to five years, however the main challenge is that it's only available where projects have set up operation for production of cook stoves.

Portable Rocket Stove: It is the most populous metal improved cook stove in Malawi

Imported Rocket Stove: This stove saves the most fuel however it's very expensive thus not affordable to commonman.

Institutional Cook stoves: They save fuel by an approximate 70% compared to baseline technologies. They are mostly used in institutions.

3.3.7 Strengthening the Cook stove Value Chain

The disorganized nature of Malawi's cook stoves value chain impedes efficient distribution of clean and efficient cook stove to households. It is therefore important to establish mechanisms in which

this value chain can be strengthened so as to increase adoption of improved and clean cook stoves. In addition, it is notable that Malawi's cook stove designs are out dated and of poor quality. Improvement of these designs will play a crucial role in promoting sustainable consumption of biomass energy, especially charcoal. Improvements can be in designs, material used and sizes. Size of the cook stove will determine how much charcoal a household can use in a day of cooking. Households that use charcoal everyday will use same/similar amount of charcoal for cooking nsima or boiling water for tea. There is wastage, which needs to be checked by better designs based on size. In addition, consumers need to be advised on usage of charcoal based on designs and sizes of clean and efficient cook stoves.

3.4 Cost and Price of Charcoal Along the Value Chain

Kambewa et al., 2007 outlined a cost structure of charcoal in Blantyre and Lilongwe as follows:

Table 6: Cost structure of charcoal in Blantyre (left) and Lilongwe (right) Cities (Adapted from Kambewa et al, 2007)

Location	Producers	Transporters	'Other fees'	Markets	Retailers
Lilongwe	33%	20%	20%	3%	24%
Blantyre charcoal	21%	25%	18%	3%	33%

In retail markets, charcoal is removed from the standard bags and re-packaged in small plastic bags. A 50kg-sized bag can produce 40 small plastic bags and 40 heaps/piles, which are sold at MK70 each. The total earnings from this may average MK6, 800.00, thus the retailers make more than 100% profits. Table 6 and 7 below indicates the variation in price based on size of gunny bag and weight, although producers do not price bag based on weight of charcoal.

Table 337: Mwanza charcoal gunny bags/weights/price

Size ogunny bag	Producer ID	Weight	Amount (MK) @ production site	Amount (MK)@ retail (winter)	Amount (MK) @ retail (summer)
Charcoal bag (90kg) flat	Producer (B)	(70kg)	1,800.00	2,000.00	1,950.00
Charcoal bag (90kg) with head	Producer (B)	(100kg)	2,500.00	4,800.00	4,500.00
Charcoal bag (50kg) flat	Producer A	30kg	800.00	1,700.00	1,500.00
	Producer (B)	(40kg)	(750.00)	1,900.00	(1,700.00)
	Producer C	(35kg)	500.00	1,700.00	1,400.00
Charcoal bag	Producer A	45kg	1,000.00		



(50kg) with head					
	Producer (B)	(50kg)	(1,000.00)		
	Producer C	40kg	1,200.00		
	Producer D	27kg	800.00		1,500.00

Table 448: Retail Prices of Repackaged charcoal in Mwanza District

Retailer ID	Size	Weight	Amount (MK)
A	Plastic bag	1.5kg	70.00
C		1.5kg	100.00
B	Container	3.0kg	200.00
C		3.5kg	250.00
A	Pile /heap	1kg	50.00

In Mwanza retailer A stated that a bag of charcoal is bought at MK1, 800.00 and is repackaged in plastic bags of 1.5kg. This is sold at MK70.00 per plastic bag. The total cash after sales is MK3, 500.00. Retailer A makes MK1, 700.00. This is 99% profit. Retailer B: packs in containers as seen in Plate 2 and sales @MK200.00.

Retailer C: however buys a bag @MK1, 700.00 and is repackaged in plastic bags which are sold at MK100.00. The total cash after sales is MK3, 600.00. Retailer makes a profit of about 99%.

In Lilongwe and Blantyre, the major cities of Malawi, retail prices are high depending on season. The table 9 and Box 1 show the differences in prices.

In Lilongwe city, a retailer who buys a 90kg-sized bag with head weighing 100kg pays MK3, 500.00. The charcoal is repacked in plastic bags, which are sold at MK100/plastic bag. In addition, the charcoal is heaped/piled in small amounts, which are sold at MK70.00/heap (see plate 1). The total cash earned after sales is MK6, 500.00. The price of the 90kg-sized bag with head varies with seasons. In winter, the producers/vendors will sell at MK3, 500.00 on average and in summer @ MK2, 500.00. These are 2013 prices.

Box 1: Cost of charcoal in Lilongwe

Table 559: Charcoal Retail Prices based on Season in Blantyre

Size of gunny bag	Retail MK (Winter)	Retail MK (summer)
Charcoal bag (90kg) flat	3,000.00	1,500.00
Charcoal bag (90kg) with head	6,000.00	4,500.00
Charcoal bag (50kg) flat	3,000.00	2,000.00
Charcoal bag (50kg) with head	4,500.00	3,000.00

The above prices are based on producers, vendors and retailers. However, charcoal is illegalised because of the way it is produced in Malawi. Therefore any charcoal on the market is deemed illegal because it is not produced from a sustainable source recognised by the Forestry Department, according to the Forest Act, 1997. As such the Forestry Department engage in patrols, when resources permits and confiscate charcoal. The confiscated charcoal is sold based on the schedule of prices for forest products. However this varies from district to district as table 10 indicates below:



Table 6610: Sales of Confiscated Charcoal by District Forest Offices (DFOs)

Year	DFO	Number of bags confiscated	Amount (MK) per bag	Total Amount (MK)
2009	Mwanza	540	100	54,000.00
	Blantyre	242	500	121,000.00
	Neno	Not reported	Not reported	Not reported
2010	Mwanza	100	200	20,000.00
	Blantyre	485	500	242,000.00
	Neno	234	500.00	117,000.00
2011	Mwanza	96	200	19,200.00
	Blantyre	222	800	177,600.00
	Neno	74	500.00	37,000.00
2012	Mwanza	122	500	64,000.00
	Blantyre	271	270 @800, 1@300	216,300.00
	Neno	646	500.00-600.00	373,000.00
2013	Mwanza	102	1000	101,000.00
	Blantyre	274	800	219,200.00
	Neno	224	800.00	179,200.00

From the foregoing it is clear that the supply and pricing structure is not organised which creates an information gap.

Table 11: Price of Charcoal along the Value Chain in sub-Saharan countries

Price of Charcoal along the Value Chain in sub-Saharan countries				
Countries	Producer Price Per bag	Middle men Average Sales Price per bag	Govt. Confiscated Charcoal Price	Retail Cost (Roadside Cost) per bag
Malawi	600 MK (\$ 1.3)	1200 MK (\$ 2.6)	800 (\$ 1.76) MK/bag	2000 (\$ 4.4) MK/bag
Kenya	Ksh 1,000 (\$11.77)	Ksh 1,400 (\$16.48)		1500 (\$ 17.66)
Uganda	Ush 27,000 (\$10.43)	Ush 55,000 (\$21.25)		63,000 (\$24.34)
Tanzania	Tsh 8,000 (\$ 4.78)	38,000 (\$22.72)	-	40,000 TZS (\$23.92).
Rwanda	FRw 3120, (\$ 4.71)	FRw 5465 (\$ 8.25)	-	FRw 6152 (\$9.29)
Zambia	ZMK 30,000 (60Kg) (\$6.5)	ZMK 72,000 (60kg) (\$13.370)	-	ZMK 90,000 (\$16.712)
Mozambique	MZN 135.240 (\$ 4.6)	MZN 167.580 (\$5.7)	-	MZN 31.16 US\$ 1.06
Sudan	20ssp (\$4.51)	68 SSP (\$15.32)	-	150ssp (\$33.80)

From Table 5, on average producers and retailers incur more cost than ‘middle men’ – transporters and others. Despite the producer costs being relatively higher than other players in the VC. Despite incurring higher costs, the table 11 shows that the same producers sell their charcoal at very low prices along the charcoal value chain.

3.5 Governance along the Value Chain

The Malawi charcoal value chain in theory governed at two levels – Department of Forestry is responsible for charcoal supply whilst the Department of Energy is responsible for demand side management. However, in practice there are three levels; i) central government led forestry department, ii) local government through district forest office (DFO) and iii) local community through Village Natural Resources Committees (VNRC). At central governance level, the Forestry Department (FD provides policy guidance and oversight to the production and consumption of forest products. FD works in close collaboration with other departments such as the Department of



Environmental Affairs (DEA) and Department of Energy. It also works closely with Non-government Organizations, Development Partners and the Private Sector, who provide financial and technical support. At local governance level, the District Local Government takes a lead in control of the charcoal value chain. The local government responsibility is coordinated by the District Forestry Officer (DFO) in close liaison with the District Environmental Officer (DEO), which gets guidance from FD headquarters. At the local level Village Natural Resources Committees (VNRC's) made up of resource users including harvesters, traders and consumers of the relevant forest products are supposed to promote planned harvesting and regeneration of the forest resources. However, tenurial rights over natural resources and assigning authority and responsibility to this group has yet to happen.

3.6 Developing a Sustainable Value Chain

The above scenario presents a very compelling argument for the formalization of the charcoal value chain. Schureet *al* (2012) define formalization as “the degree to which the supply network is controlled by explicit rules, procedures, and norms that prescribe the rights and obligations of the individual that populate it”. According to the authors, property rights and formalized titles motivate people to make longer-term investments, which contribute to sustainable behaviour. With specific reference to the woodfuel sector, they cite the forestry code and land tenure law as among the most important regulatory frameworks although policies in other sectors, such as trade, structural adjustment, poverty reduction, debt, agriculture, infrastructure, energy and mining also often intervene with forest policy objective and therefore need to be addressed as well. However, there is the need to ensure that formalization of forest products does not end up having adverse consequences when new regulations criminalize extraction practices, marginalize harvesters, enable or promote corruption, and obstruct effective Customary law.

From the foregoing one may erroneously conclude that charcoal policies do not exist at all. As a matter of fact, in almost all African countries including Malawi, a number of policies do exist that influence, or are meant to influence the way the charcoal sub-sector is managed and hence the value chain. What however, is often lacking in these extant policies is that they fail to acknowledge that a proper charcoal policy cannot be designed without considering internal and external effects of the national and international energy development. There is need to take into account that the charcoal value chain is complex and is often interlinked not only with energy but also with many more sectors including forestry, agriculture, health, transport etc. Hence, shaping a charcoal policy is not an isolated exercise, but requires inter-agency communication and crosssector coordination.

3.7 Financing Sustainable Charcoal along the Value Chain

Several studies including BEST 2009 study affirms that wood-fuels are the cheapest source of available energy and are expected to remain so for the foreseeable future. The report also confirms that wood-fuels are the most significantly traded fuels in Malawi, with an estimated 2008 market value of MK 15.5 billion (\$105 million), of which 75% is labour inputs. The growing and trading of wood-fuels accounts for an estimated 1.6% of GDP, rising to 4.4% if the shadow price of collected firewood and crop residues is included. The wood-fuel business employs the equivalent of 130,000

full-time people in growing, production, transportation and trade, over 80% of who live in rural areas.

In spite of the sector's huge economic and social importance, it hardly attracts investments from government and private sector. Most financing is at the project level and often by development partners. Besides the lack of government investment in charcoal, formal banking institutions are reluctant to provide financing for actors in the sector. This is because the charcoal sector is largely informal with many unchecked taxes both official and unofficial. The majority of actors in the sector lack business and technical skills. Furthermore, although charcoal is one of the key sources of revenue to the local governments and at the same time a source of employment and income to many households; it is generally perceived as an illegal activity by the authorities and there are no allocations for streamlining the sector at local level. The local government responsibility coordinated by the District Forestry Office gets guidance from Central government on matters of taxing and licensing assisted by other sectors such as the law enforcement sectors. Hence local government involvement is only to the extent of confiscation and revenue collection. Notably, governance along the value chain misses a link at the lowest local government district level. There is no autonomous office responsible for licensing despite the fact that the forest resources are produced and harvested at that level, hence need for strong governance. This effectively makes charcoal production unattractive to many potential investors and is a deterrent to serious investors in the sector, as they have to await permission and licences from the Director of Forest Department. The lack of standards in the sector has also hindered market development and a formal market infrastructure is grossly lacking. It is therefore very difficult to plan, regulate and effectively monitor the charcoal sector. This makes charcoal production and marketing difficult to finance and collect revenue.

In order to ensure a sustainable environmental management, better quality charcoal and improved incomes for the people in the charcoal industry, there is need for external financing. Private sector respondents as well as from the academia stated that it is the mandate of government to provide financing for:

- Research on suitable tree feedstock and multiplication;
- Improved charcoal production technology promotion;
- Enhancing better management and governance of the charcoal trade in view of its importance as well as
- Standardization, specification and branding.
- At the local level, respondents felt that there was need for financing:
- Awareness raising and dissemination of information,
- Inspection and monitoring throughout the value chain from production, transportation and marketing,
- Forming of association, technology promotion and extension services. The source of financing could include:
 - Conditional grants to local authorities from the national government.
 - Sloughing back percentages from revenues and forest produce



- Encouraging NGOs and development partners to fund research and technology dissemination and commercial banks issuing concessionary loans and grants.
- Carbon Finance
- In order for the private sector to finance the industry, there was need for a clear charcoal policy and legal and institutional frameworks just like any other forestry/agricultural commodity. Readily accessible reliable information and data on the charcoal value chain and improved infrastructure in the production, transport and marketing as well as removal of taxes and duties on proved efficient charcoal producing equipment (e.g. retorts that are specific for charcoal making) would incentivize the private sector, including carbon finance from the carbon market.

4 CHARCOAL PRODUCTION RULES AND GUIDELINES

4.1 Definition of Terms

The 2009 Malawi BEST acknowledges the fact that there is need to simplify charcoal production regulations on private land, in community land and trust land. This section outlines ways in which the government and key other sector players can intervene, through regulatory, guidelines and practical measures, to ensure that charcoal becomes an energy resource that can fulfil its true potential by being more sustainably produced, harvested and utilised.

Certification: The procedure by which official authorised bodies, or officially recognized bodies, provide written or equivalent assurance that charcoal production, transportation and consumption systems conform to agreed requirements.

Compliance: The state of conforming or practising within an agreed framework of charcoal production, transportation and distribution

Audit: Systematic and functionally independent examination to determine whether activities and related results comply with planned objectives

Assessment: The examination of available resources including raw materials, production process, enforcement capacity, in order to determine the expected optimal output of an area.

Labelling: Written, printed or graphic matter that accompanies the charcoal, for the purpose of information and distinction

Authorising office: Recognised local personnel in charge with the issuance of licences, audits and assessments, monitoring production and ensuring compliance

Certified charcoal: Charcoal that is labelled showing proof of compliance with the set standards of production

Standard: An acknowledged and accepted measure of comparison

If wood is removed in an environmentally sensitive way that mimics the natural dynamics there may be little adverse impact. But if trees are harvested in unsustainable way, there will be social, economic, and environmental problems that might be irreversible.

In order to produce sustainable charcoal, there is need to put in place rules that will ensure that there are proper harvesting and regeneration plans, waste minimization through efficient charcoaling, use of labels that are clear, unambiguous and easily recognized thus differentiating sustainable charcoal from charcoal from un-sustainable sources. The certification scheme will therefore be useful in identifying charcoal that come from well managed sources thus ensuring constant supply for current and future generation.

The charcoal production rules and guidelines could be as follows:



4.2 Charcoal Production Rules and Guidelines

4.2.1 General Principles

Principles underlying sustainable charcoal production needs to be put in place and could include:

- i) Local management and ownership:** To allow and enable charcoal producing communities and associations take lead in managing and coordinating proper utilisation of their natural resources in collaboration with government, private and civil society organisations. The local members will take lead to ensure compliance and enforcement is effected through close cooperation with the authorising office.
- ii) Sustainable resource utilisation:** To ensure sustainable resource use through responsible land stewardship, proper harvesting techniques and continuous regeneration of raw materials.
- iii) Waste minimisation through efficient production:** To minimise wastage through recycling, waste reduction and re-use of resources complimenting the adoption of modern efficient production processes.
- iv) Resource accountability:** To ensure proper labelling, packaging and tracking of charcoal to distinguish certified charcoal produce and monitor production dynamics from different areas
- v) Protection of special and environmentally sensitive sites:** To guarantee that charcoal production will not affect negatively on gazetted government forest, water catchment areas, wet lands, protected wildlife sanctuaries and other environmentally sensitive sites.

4.2.2 Charcoal Cooperatives

There is need for a national all inclusive body constituting representatives from Forest Department, Environmental Affairs, Energy Department, Private Sector, Traditional Authority, NGOs, etc to be known as for instance ‘the National Charcoal Regulation/Management Board’, which will be in charge of overall national coordination, policy formulation and certification. A lean secretariat should be put in place shall to be in charge of managing day to day operations.

The Charcoal Cooperatives will be formed and registered at the district level. The Charcoal Cooperatives will be the smallest charcoal production unit allowable in the country. Exceptions will be made on large scale individual producers who prefer to operate as separate entities. The Charcoal Cooperatives and large scale separate entities will be registered at the district office at no cost and will be required to obtain periodical charcoal producing licences at a fee

The Charcoal Cooperatives should have a minimum of seven (7) members.

Each Cooperative will appoint from its member at least, a Chair person, Vice chair, Secretary Treasurer and Supervisory committee.

The main roles of these officials will be:

Chairperson: Overall coordination of group’s activities. He/She will represent the group and shall act as the group’s spokesperson or appoint one instead.

Vice Chairperson: He/she assists the Chair person in managing and supervising the affairs and personnel of the Cooperative, discharging the usual functions of a vice Chairperson of a corporation, and overseeing operations of all committees

Secretary: Drafting of the Cooperative action plan in collaboration with the members and communicating the same to the sector/district authorising office

Treasurer: In charge of the management of the group resources including finances

Supervisory committee: Consist of between 2 to 5 members. The Committee will be in charge of coordinating measures to ensure that uncertified charcoal is not produced from or near their production area. He/ She will liaise closely with other enforcement officers in other cooperatives within the region.

4.3 Registration and Licensing Process

For the cooperative model to work there is need to put in place a simple and transparent registration and licensing procedure such as:

1. Cooperatives should be registered at the local district offices at no cost. The registration process should involve the submission of members' names, contacts and areas of operation. This will be documented in the registration forms issued at no cost at the same offices
2. Charcoal production should commence only after a permit has been issued. These permits will be issued periodically at a fee, and which will vary per district depending on availability of sustainable feedstock.
3. The Charcoal Cooperatives should be made to pay a sustainable fuel wood levy per bag to the authorising local district offices after the charcoal has been sold. Part of this will be factored into the cost of bags issued by the authorising office. Periodic licensing of production will be qualified only after: An **Assessment and Audit**⁷ of the resources has been done to determine:
 - a) Sources of raw materials

Each Cooperative will be allowed to produce a set amount of charcoal from the zone per the licensed period, dependent on the available resources.
Properly labelled bags with tracking numbers will be issued only from the authorising office for a fee
Cooperatives will demonstrate how they will ensure regeneration of resources within their zone.
 - b) Production areas

Charcoal kilning will be done at designated plots only. The Cooperative will invest in efficient kilns supported by the local authorising office using a portion of the revenue generated from the licensing
Production areas should not be adjacent to government gazetted forest or other sensitive ecosystems

⁷ Only applications for renewal of production licences should be subjected to audits



c) Policing and enforcement

The Cooperative, through the Supervisory Committee, will have to demonstrate what actions will be taken to ensure uncertified charcoal is not produced from their zone

d) Collection points

The Cooperative will designate area/areas that will be recognised charcoal depots. Transporters will be allowed to collect charcoal only at these points

Local Action Plan: The Cooperative will present a simple action plan explaining the above. Generic templates/forms for developing such action plans should be made available at the district offices at no cost. These can be photocopied and circulated amongst the Cooperatives.

4.4 Sourcing Raw Materials

- Cooperatives should be encouraged to have a resource regeneration plan, especially in view of long term production
- Utilisation of local fast growing or self-propagating tree and shrub species will be encouraged, and in particular destructive or invasive species
- Raw material will be obtained from private land, communal land, or sector/district land
- Sourcing of raw materials from government gazetted forest areas will not be allowed
- Proof of source and ownership will be necessary before licensing
- Appropriate harvesting techniques will be used, for example, pruning, rotational harvesting

4.5 Production Processes

- Appropriate production zones will be selected and designated for the construction of efficient community kilns
- Production sites will not be in or near gazetted government forest, protected wildlife sanctuaries, wetlands and other environmentally sensitive sites
- The use of efficient kilns and production processes will be promoted and encouraged
- Efforts will be aimed at minimising air, land and water pollution and associated effects

4.6 Policing and Enforcement

- The Charcoal Cooperatives and particularly the Supervisory Committee will take lead to ensure uncertified charcoal is not produced within their sectors
- Enforcement officers within districts will work with police officers at road blocks to check that only labelled charcoal is transported
- Arrests related to contravening the principles above can be done by the Supervisory Committee and culprits surrendered to the local police
- Charcoal cooperative members will be on the lookout for uncertified charcoal producer within their sectors

- Licenses to Charcoal Cooperatives will be revoked if uncertified charcoal production persists within any sector, even if done by individuals who are not members
- The local authorising office will assist the Charcoal Cooperatives in policing and enforcement through sharing resources

4.7 Packaging and Transportation

- Recognised charcoal bags will be issued by the authorising office depending on the results of the resource assessment indicating the optimal amount of charcoal that can be produced in the region as per the agreed standards within the licensing period
- Uniform charcoal bags will be issued directly from the national office to the sector/district boards then to the Charcoal Cooperatives
- Charcoal will be packaged in small 2 kg, 5 kg, 10 kg or 30 kg bags
- Each bag will have a serial number for tracking purposes
- Mass transporters will be registered at the sector/district office and issued with identification sticker/label, which shall be displayed in their windscreen. These will be renewable after a year
- Officers from the authorising sector/district office will carry out random weighing of the packed bags regularly. Non-compliance will attract a penalty or withdrawal of production licences in extreme cases
- All bags will be sealed to avoid re-use in packaging uncertified charcoal.
- Re-use of certified bags will attract harsh penalties. Licences may be revoked in such cases
- Mass transportation of charcoal will not be done at night, i.e. between 7.00 pm and 7.00 am

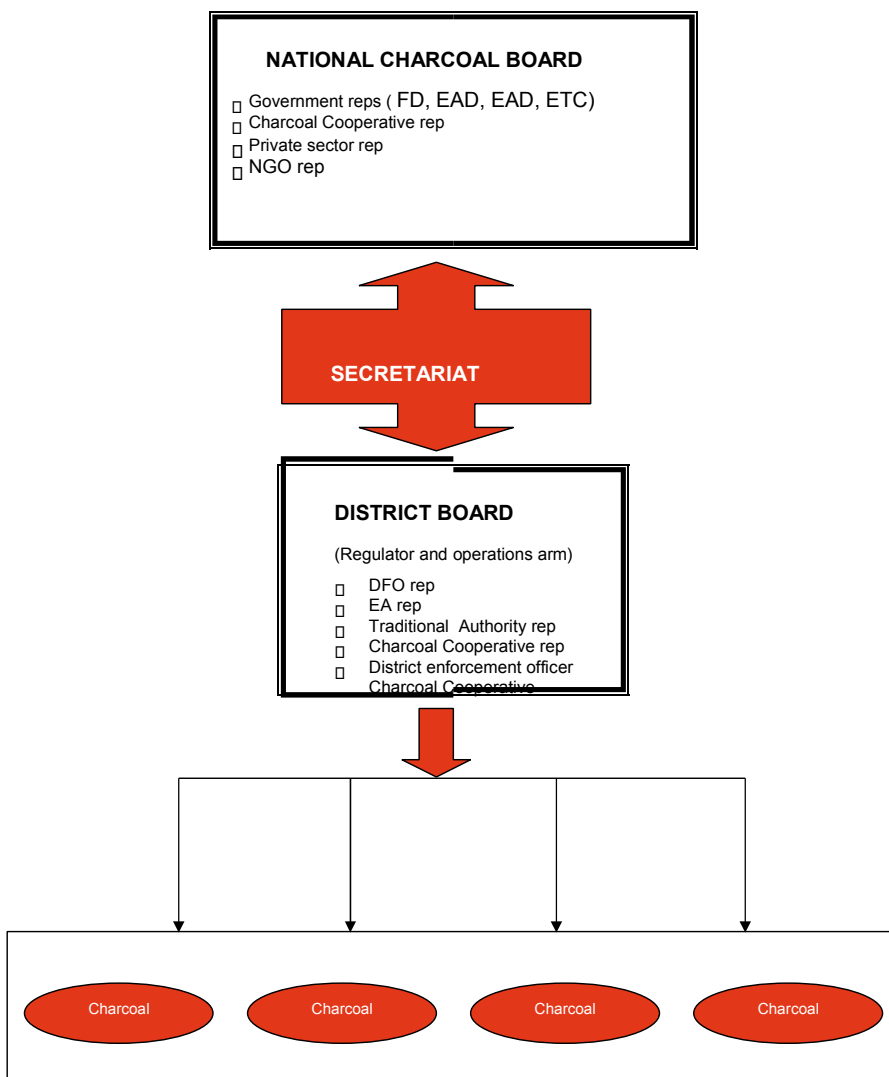
4.8 Distribution

- Charcoal vendors will sell charcoal only from certified sources
- Selling of uncertified charcoal will attract a penalty or withdrawal of trading licences
- Charcoal will be sold in open markets, shops, kiosks, super-market chains, and any other authorised trading point



4.9 National Charcoal Management Model

Figure 11: National Charcoal Management Model



5 CHARCOAL STANDARDS AND CERTIFICATION

5.1 Standards

Field surveys findings have shown that there is need for rules, regulations and guidelines in order to bring sanity to the industry. In addition, there is need for Standards and certification to assist in the professionalization of the industry. For instance, almost all respondents said that charcoal is produced using either pit kilns or earth-mound which are less than 10% efficient. However, none of the respondents could recall any of the charcoal producers using improved kilns such as HOBK (Half Orange Bricks Kilns). Also not known were formally recognized organizations or individuals producing charcoal, commonly referred to as charcoal producers association. Trees for charcoal making are sourced from customary land and Forest Reserves. Local communities in all the four districts rely heavily on these forests for their fuelwood, timber, fencing and other needs. There was no reference to any private forest or household woodlots. As such the forests on customary land are heavily degraded due mainly to over-harvesting for firewood and charcoal. This was very vivid from the denuded landscapes in Blantyre, Mwanza and Neno and confirmed by respondents views that tree for charcoal production are getting scarce. In addition to charcoal, trees are cut for kilning bricks, for beer brewing, to make hoe handles and traditional bee keeping methods.

Charcoal is packaged in sisal or plastic gunny bags and the weight of charcoal ranges from 35 to 65kg. So far no mode of packaging was found that differentiates 'legalized' sustainable charcoal from illegal and unsustainable charcoal.

As defined earlier, Standards are an acknowledged and accepted measure of comparison. What this means is that the National Charcoal Board will put in place Standard measures such as weight of charcoal, types of packages, labels, etc. Such Standards, once agreed with stakeholders, will need to be adhered to.

5.2 Certification

The certification schemes will contain criteria and indicators, which are tools which will guide in monitoring and reporting on status and overall trends in the charcoaling business. The charcoal rules, guidelines and certification schemes will be used by officially authorised and recognized bodies such as qualified Traditional Authority and trained government officers, who will provide written or equivalent assurance that charcoal production, transportation and consumption systems conform to agreed requirements.

5.3 Demerits and Constraints to charcoal rules and certification

Countries such as Kenya and Rwanda have put in place charcoal rules and certification schemes. The experience from these countries is that, despite the fact that certified charcoal is socially, environmentally, and socially sensitive, it is expensive and unable to compete with bush charcoal because of costs that goes into packaging, labeling and monitoring of indicators set up for charcoal production. Besides high cost of charcoal, other constraints likely to be encountered include



uncertainty of domestic markets for certified charcoal; lack of local certification expertise (there is also the cost that goes into assessment of the charcoal as well as cost of improving management practices to comply to certification standards); and lack of awareness among stakeholders such as charcoal producers and consumers, government officials, NGOs, and private sector among others. Nevertheless, there is need for support for certified charcoal by creation of awareness to stakeholders on the economic, social, and environmental benefits of certified charcoal. There is for government to put in place measures to allow time for the development of markets for certified charcoal; and creation of effective partnerships for capacity building along the value chain of certified charcoal.

5.4 Capacity Building Required to Ensure Charcoal Producers Adopt New Techniques in Charcoal Production

Establishment of Tree Plantations for Sustainable Charcoal Production: Provision of incentives for woodlot establishment for charcoal production and investment in the improved charcoal production technologies, is critical for a sustainable production of charcoal in a liberalized economy and the project proposes the following to be pursued;

- i Identification of tree species to be planted that are suitable for charcoal and fire wood production and training of land owners in planting of tree species appropriate for charcoal.
- ii Investment in the training of charcoal producers in modern and efficient charcoal production technologies and processes. These reduce the rate of tree harvesting through increasing the amount of charcoal obtained by as much as threefold.
- iii Training charcoal producers in charcoal handling and packaging, and group marketing.
- iv Provision of credit to those who need it to cushion the effects of change of land use from food/crop production to tree planting for charcoal production.

Inadequate linkages between charcoal producers and relevant governing institutions, donors in the forest and charcoal sector leads to lack of communication on key issues in charcoal production which in the long run makes charcoal business unsustainable. Limited research on the charcoal value chain and limited capacity building of the stakeholders in the charcoal sector create room for unsustainable practices in the charcoal sector.

An overriding reason for the low uptake of improved technology is that interventions in the charcoal sector have been projects either by the government or the NGO sector supported by development partners in most cases. When these actors come in, they fund trainings of a few selected people, provide **free** inputs including tools and kilns and sometimes offer subsidies. When the projects come to an end, the farmers realize that they cannot maintain the improved technologies and quickly revert back to the traditional technologies. If charcoal production is to be done sustainably, there should be a shift from the project-oriented approach of improving charcoal production to an overall national strategy that will address demand and supply holistically. A demand-oriented policy that indicates the role of the government in pricing and market development is required.

Social Sustainability: The project's target is charcoal producers including peasant farmers, pastoral communities and others. For the project to be successful, these groups must directly experience the benefits of the project in order for them to champion the project strategy and be the primary agents of change at the local level in terms of ensuring a paradigm shift from use of earth mounds to Cassamance and more so retort kilns. The project has dedicated substantial resources to capacity building efforts to overcome barriers to adoption of sustainable charcoal practices. The formation of charcoal producer associations have the potential to build social capital which will drive the revitalization of local economic growth through promotion of sustainable practices at the farm level and linkages with market centre.

Gradual introduction of an appropriate technology closely linked with local adaptation and capacity building programmes at community levels. This is in line with stakeholder sentiments and recommendations as well as the literature reviewed. Consumer financing through microfinance organizations will be explored and supportive district level by-laws and ordinances will be implemented. Continued social scientific research on the adaptation and uptake of the technology to identify weaknesses of the current technologies will be an on-going concern. To ensure diffusion and wider dissemination a Knowledge Management System to promote new technology through awareness raising, trainings and workshops, exchange visits, farmer field schools, documentation of best practices and knowledge sharing through simple visual aid manuals and videos of demonstration technologies will be implemented.

Trained charcoal producers/woodlot managers with sufficient knowledge on new charcoal regulations and SFM practices, including use of specified tree species and optimal ecological yield from woodlots plant. This will involve:

- Technical support to over 1,100 private tree owners in the four pilot districts through awareness creation, demonstrations, training and establishment of support structures for the provision of seedlings for enrichment planting and inputs:
- Technical support to silvicultural practices.
- Development of land use and forest management plans including zoning and mapping of forest areas.

Training programmes will be put in place to build capacity of charcoal producers to harvest feedstock, treat feedstock, feed and operate kilns and retorts efficiently. The unit will also be in charge of recording to keep track of amount of charcoal recovered, emission reductions and losses.

Training charcoal producers on the operation of the retorts and kiln and collecting data on greenhouse gas (GHG) emissions

5.4.1 Key Partners to Pilot Sustainable Charcoal Production in Shire Valley

Traditional Authority, local authorities and stakeholders, as well as the departments of Forestry, Energy, Climate Change & Meteorological Services, Land Resources Conservation, Agricultural Extension, Irrigation and Water Development and Planning coordinated at the district by Environmental Development Officer (EDO). Linkages with the private sector such as ESCOM,



Blantyre Water Board, Southern Region Water Board, as well as NGOs will be established. The study complements other components of the SLM project, notably a major component that seeks policy alignment for SLM by looking at the status quo of charcoal, the problems and challenges associated with charcoal production and how to move forward with sustainable charcoal production while conserving forest and environmental integrity.

6 RECOMMENDATION AND CONCLUSION

Charcoal production and trading provides an immediate employment opportunity to people who have no access to land, and are unskilled and unemployed. Current consensus among experts therefore is that biomass including charcoal will continue to play a vital role in the country's energy mix and that the crucial question is how to make charcoal production a viable and sustainable income generating activity.

According to BEST study report, woodfuel (firewood and charcoal) are also the most significant traded fuels, with an estimated 2008 market value of MK 15.5 billion (\$105 million), of which 75% is labour inputs. The growing and trading of woodfuels accounts for an estimated 1.6% of GDP, rising to 4.4% if the shadow price of collected firewood and crop residues is included. The woodfuel business employs the equivalent of 130,000 full-time people in growing, production, transportation and trade, over 80% of whom live in rural areas.

There is therefore need for Malawi Government to give due recognition to the charcoal subsector and assist in professionalizing the industry by putting in place measures suggested in this and many reports that have been generated over the years on sustainable charcoal.

Land: Majority of charcoal producers do not have adequate land and hence cannot put in place a sustainable charcoal practice or invest in retort kilns.

Analysis and Recommendation: This scenario is unlikely to motivate investment in eco-friendly technologies. To attract investments, there is need for:

1. Land use policy that makes it mandatory for community and households in particular to put a side certain percentage of their land for tree cultivation. Zoning land adjacent to the forest to plant trees suitable for charcoal production could be one way of doing this.
2. Traditional Authorities are willing to commit their land for sustainable charcoal production if supported. Provision of the appropriate technologies like seedlings, extension services and financial services, will enhance tree production for sustainable charcoal.
3. During fieldwork, over 20% of respondents stated that knowledge gap is one of the challenges facing sustainable charcoal production. There is need for training and capacity building of charcoal producers to understand the need for high efficiency in wood conversion to charcoal. Introduction of high efficiency production technologies with associated support structures and investment in training to ensure adoption is crucial.
4. There is need for introduction of low cost and high efficiency production technologies with associated support structures and investment in training to ensure adoption.
5. Need for an appropriate financing mechanism is a prerequisite for sustainable technologies to diffuse.
6. There should be consideration for introducing technologies that produce for specialized industrial markets. This will increase awareness to issues of standardisation and the needs of



consumers. Charcoal is still the most valued reductant of the metallurgical industry especially in the reduction of silica to silicon.

7. Promotion of agroforestry, improved fallow and woodlot establishment is the way to keep these producers in the sustainable charcoal industry.
8. Application of the fixed and more efficient brick retorts becomes possible and affordable.
9. During carbonization, wood preparation should be demonstrated and standards should be set according to kiln types.

In order to promote sustainable charcoal production, Kambewaetal., 2007 recommended the following:-

- Management of Miombo woodland on a coppice system
- Promote effective and efficient implementation of sustainable forest policies and regulations
- Promote efficient charcoal production technologies
- Improve the existing production, transportation, consumption procedure/processes e.g promote use of dry wood instead of green wood; promote use of permanent kilns; incorporate improved techniques in the existing production and consumption technologies
- Promote stakeholder participation in forest management

In addition to the above, this report recommends that alternative fast growing species should be introduced. Bamboo, which is abundantly and commonly available in the country, is specie that has very high potential for charcoal production. It is fast growing and a highly renewable resource; unlike timber, it can be harvested every year. Bamboo makes excellent charcoal with high potential meeting both rural and urban energy needs for heating and cooking, as a commercial cooking and heating fuel, as an industrial fuel, and also for making products such as activated carbon. Other benefits of Bamboo include:

- Can be planted at the Shire River bank for stabilization and erosion control
- It is a quick energy-demand solution since Bamboo is fast growing and would be able to supply adequate energy in the shortest time possible.
- Reduce the exploitation of woody species for timber by encouraging the use of Bamboo for construction and in the furniture industry. It can also be a source of income and divert attention from charcoal production in the areas

REFERENCES

- Arnold, J.E.M., Kohlin, G. and Persson, R. (2006) Woodfuels, Livelihoods and Policy Interventions: Changing Perspectives. *World Development* 34 (3): 596-611.
- Blantyre (Malawi) District Assembly.(2002).Blantyre District Socio-Economic Profile.Blantyer District.Government of Malawi.
- Camco Clean Energy (K) (2009). “Developing Sustainable Charcoal Production in the Shire River Basin to Mitigate Land Degradation.”
- Connect4climate, Case study of Malawi.By.MtisungeMngoli. University of Nairobi. P.O Box 30197-00100 GPO. Nairobi, Kenya. Available online at: http://connect4climate.org/images/uploads/resources/LVLA_case_study_on_malawi.pdf
- Edwards *et al.*, (2010). Restoring degraded land in the Shire Valley, Malawi: lessons for community led initiatives that link restoration and the development of sustainable livelihoods. Paper presented at the 18th Commonwealth Forestry Conference (28th June - 2 July 2010). Edinburgh, Scotland, UK.
- Food and Agriculture Organization of the United Nations(2001). “Forestry country profile: Malawi.” Available online at www.fao.org/forestry/site/23747/en/mwi.
- Forest Governance Learning Group (2006). Sustainable Charcoal Production by and for Local Communities. Malawi Policy Brief No. 1.FGLG, Lilongwe, Malawi
- Government of Malawi. 2009. Malawi Biomass Energy Strategy Report. Government of Malawi, Lilongwe. Available online at: http://www.euei-pdf.org/sites/default/files/files/field_pblctn_file/EUEI%20PDF_BEST_Malawi_Final%20report_Jan%202009_EN.pdf
- GoM (2008).Malawi Population and Housing Census. National Statistical Office (NSO), Lilongwe.
- GOM 2003 National Energy Policy for Malawi 2003
- Government of Malawi (GOM) (1998a), ‘State of the environment report for Malawi 1998’, Environmental Affairs Department, Lilongwe, Malawi.
- GoM (1998).Malawi Population Census.National Statistical Office (NSO), Lilongwe, Malawi.
- GoM (1996).Malawi National Forest Policy.Government of Malawi, Lilongwe, Malawi.
- Index Mundi (2012).Malawi Economy Profile 2012.<http://www.indexmundi.com/>



Jumbe, C.B.L. and Angelsen, A. (2011) 'Modeling choice of fuelwood source among rural households in Malawi: A multinomial probit analysis'. *Energy Economics*, 33(5).732–38. doi:10.1016/j.eneco.2010.12.011.

Jumbe, C.B.L., Msiska, F.B.M. and Madjera, M. (2009) 'Biofuels development in Sub-Saharan Africa: Are the policies conducive?' *Energy Policy*, 37(11).4980–86. doi:10.1016/j.enpol.2009.06.064

Kambewa et al. (2007). *Charcoal: the reality – A study of charcoal consumption, trade and production in Malawi*. Small and Medium Forestry Enterprise Series No. 21. International Institute for Environment and Development, London, UK.

Kambewa, P. and L. Chiwaula (2010). Biomass energy use in Malawi. A background paper prepared for the International Institute for Environment and Development (IIED) for an international ESPA workshop on biomass energy, 19-21 October 2010, Parliament House Hotel, Edinburgh. Chancellor College, Zomba, Malawi.

MARGE (2009) Malawi Biomass Energy Strategy. Consultancy study for Government of Malawi and European Union Partnership Dialogue Facility. MarchéageetGestion de l'Environnement, Lilongwe.

Marge/GTZ (2008). "Biomass Energy Strategy (BEST), Rwanda. Field Study Report".

MFNR (1993) Forest Resources Mapping and Biomass Assessment for Malawi. Ministry of Forestry Resources, Department of Forestry, Government of Malawi, and Satellitbild, Lilongwe.

Ministry of Natural Resources, Energy and Environment (2006). Climate of Malawi. Department of Climate Change and Meteorological Services. Available online at: <http://www.metmalawi.com/climate/climate.php>

MPEI (2010). Malawi Poverty and Environment Initiative: Economic Study. With support from the Global Poverty and Environment Initiative of the United Nations Development Programme (UNDP) and the United Nations Environmental Programme (UNEP). Available online at: <http://www.unpei.org/PDF/Malawi-Economic-Forum.pdf>

Mwanza District (Malawi) Executive Committee, Mwanza District (Malawi) Planning and Development Office. 2001. Mwanza District Socio-Economic Profile. Mwanza District. Government of Malawi. Available at: <http://www.scotland-malawipartnership.org/documents/68-MwanzaSEP2006Draft.pdf>

Neno District Assembly.2007. Neno District Socio-Economic Profile.NenoDistrict.Government ofMalawi.Available at:

http://books.google.co.ke/books?id=b9MTAQAAIAAJ&source=gbs_similarbooks

Nyirenda C. (2011). “Project Design Document for the trees of Hope Plan Vivo Project”

Openshaw, K. (2010) ‘Biomass energy: Employment generation and its contribution to poverty alleviation’. Biomass and Bioenergy, 34(3).365–78. doi:10.1016/j.biombioe.2009.11.008.

Programme of Activities Design Document(PoA – ADD) (2013) - Proposed Balaka Improved Cook Stove Clean Development Mechanism (CDM) Project. Available at:

<http://www.nccpmw.org/>

Schure J, et al, (2012) Formalisation of charcoal value chains and livelihood outcomes in Central- and West Africa, Energy for Sustainable Development.Available at:

<http://dx.doi.org/10.1016/j.esd.2012.07.002>

Seidel A.2008.Charcoal in Africa: Importance, Problems, and Possible Solution Strategies. DeutscheGesellschaftfürTechnischeZusammenarbeit (GTZ) GmbH, Household Energy Programme – HERA, Eschborn,Germany.

The World Bank (2013). Economy Profile: Malawi. Doing Business 2013. Smarter Regulations for Small and Medium-Size Enterprises.10th Edition. The International Bank for Reconstruction and Development / The World Bank. 1818 H Street NW, Washington, DC.

UNDP (2012). “Nationally Appropriate Mitigation Action Study on Sustainable Charcoal in Uganda (NAMA)”. Available at:

http://www.mdgcarbonfacility.org/downloads/CharcoalNAMASTudy_9Jan2013.pdf

United Nations Environment Programme (UNEP) (2002), ‘Africa environment outlook: Past, Present and Future perspectives’, <http://www.unep.org/aeo/index.htm>.

Undated. A note on the situation and challenges of environmental statistics in Malawi

Vermeulen, S. (2000) Identifying gaps in our understanding of the firewood sector in Malawi. IIED, London, UK

Yaron, G., Mangani, R., Mlawa, J., Kambewa, P., Makungwa, S., Mtethiwa, A., Munthali, S., Mgoola, W., and Kazembe, J. (2011) Economic Study: Poverty and Environment Initiative. Ministry of Development Planning and Cooperation, Government of Malawi, Lilongwe.

Zulu, L. C. (2010) ‘The forbidden fuel: Charcoal, urban woodfuel demand and supply dynamics,



community forest management and woodfuel policy in Malawi'. *Energy Policy*, 38(7). 3717–30. doi:10.1016/j.enpol.2010.02.050.

ANNEXES

MATRIX ON MALAWI POLICIES (CLAUSES RELEVANT TO CHARCOAL)

	DOCUMENTS	POLICY GOAL, OR OBJECTIVE OR AIM OR RATIONALE	CLAUSES RELEVANT TO CHARCOAL
1	NATIONAL FOREST POLICY (1996)	<p>Goal: To sustain the contribution of the national forest resources to the quality of life in the country by conserving the resources for the benefit of the nation.</p> <p>General Objective: To satisfy the people's many diverse and changing needs, particularly those of the rural people who are the most disadvantaged.</p> <p>The general objectives will, therefore, <i>aim</i> at: Allowing all citizens to have regulated and monitored access to some forest products.</p> <p>Contributing towards improving the quality of life in the rural communities and providing a stable local economy, in order to reduce the degenerative impact on the environment that often accompanies poverty.</p> <p>Establishing appropriate incentives that will</p>	<p>Section 1.1 (Preamble) The importance of forests and trees in improving human welfare is increasingly recognized worldwide. Both natural and man-made forests play an important role in providing basic human needs (fuel, food fodder fibre and pharmaceuticals), employment, income and foreign exchange, hence contributing to socio-economic development. Estimates based on the mean January to April 1993 prices indicate that the 1993 retail value of urban annual consumption was about MK370.8 million for Fuelwood and MK16.4 million for charcoal.</p> <p>Section 1.3 (Preamble) In Malawi, forests and trees meet the nation's requirements for fuelwood and poles and for most of the timber required for construction, joinery and board manufacture. Furthermore, the existing plantations have the potential to meet the nation's pulp and paper needs. The rural dwellers, who make up the majority of the population, rely to a large extent on forests for their needs in the form of fuelwood, bush meat and other foods, construction materials, agricultural tools and medicinal plants.</p> <p>Section 1.4 (Preamble) About 90 per cent of the nation's energy requirements is satisfied by woodfuels derived from natural and planted forests and trees on farms. The 1993 estimate of per capita city-dwellers' fuelwood consumption was 2.0 solid m³ while 1.1 solid cubic metre was the average per capita rural fuelwood consumption. Human population growth rate is 3.2 per cent per year resulting in increased pressures to cultivate forest lands, graze livestock and meet growing energy needs.</p> <p>Section 1.6 (Preamble) There are 98,000 hectares of state plantations of which 54 per cent are managed for future development of pulp and paper industry. The remaining 46 per cent is equally shared between pine timber and eucalypt fuelwood and pole production. There are also 273 retail nurseries scattered throughout the country.</p> <p>Section 1.6 (Preamble) While the overall mandate of forests and tree management is the responsibility</p>



	<p>promote community-based conservation and a sustainable utilization of the forest resources as a means of alleviating poverty, including on-farm trees, and fostering the growing of trees by all sections of the communities in order to achieve sustainable self-sufficiency of wood and forest-derived products. Encourage and enhance community and individual marketing of seeds, seedlings and other forest products. Strengthen and maintain regular reward system for tree planting and improve the public information system.</p> <p>Specific objectives: To provide an enabling framework for promoting the participation of local communities and the private sector in forest conservation and management, eliminating restrictions on sustainable of essential forest products by local</p>	<p>of the Forestry Department, there are other organizations that establish and manage plantations for fuelwood timber production. The total known wood output of timber products is currently at 53,200 cubic metres. However, demand exceeds supply, and this situation has been occasioned by restrictive utilization policies.</p> <p>Section 1.5(Preamble) Currently some 38.6 per cent of the country's land area is under forest cover. This figure is made up of national parks and wildlife reserves (11.6 per cent), forest reserves and protected hillslopes (10 per cent) and the remaining 17 per cent by natural woodland on customary land. The extent of deforestation is continually increasing with agricultural expansion, overgrazing, woodfuel gathering, commercial logging and large-scale industrial woodfuel use for tobacco curing, lime burning, brick making, etc. The total forest cover is, however, estimated to be declining at 1.0-2.8 per cent per year with much higher deforestation rates in certain areas.</p> <p>Section 2.3.2.5 (Strategies) Introduce marketing and pricing policy reforms that provide industrial woodfuel users with incentives to invest in tree planting and woodland management</p> <p>Section 2.3.11 (Strategies) Reducing dependence on woodfuel as a source of energy</p> <p>Section 2.3.11.1 (Strategies) Promote methods and techniques for the utilization of alternative sources of energy to substitute woodfuel</p> <p>Section 2.3.11.2 (Strategies) Develop, adapt and promote use of woodfuel saving devices;</p>
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		Communities and promoting planned harvesting and regeneration of the forest resources by Village Natural Resources Committees (VNRC's).	
2	POLICY BRIEF: NATIONAL FOREST POLICY OF MALAWI (Volume 6, Issue 1),2010	<p>Goal To sustain the contribution of the national forest resources to the quality of life in the country by conserving the resources for the benefit of the nation.</p> <p>General Objective To satisfy peoples' diverse and changing needs, particularly those of the rural people who are the Disadvantaged</p> <p>Aim of objective: Allowing all citizens to have regulated and monitored access to some forest products through enacting a law that removes restrictions to access to the use of forests and forest products and promote equity and participation by local communities; to contribute</p>	<p>About 90% of the nation's energy requirements are satisfied by wood fuels derived from forests, with charcoal being a major source of energy in the urban areas. Forests also provide basic human needs for rural communities who comprise 80% of the population. Apart from firewood they rely on forests for food, construction materials, agricultural tools, pharmaceuticals, employment and income. Forests also provide water shed protection, enhance water resources and habitat for fauna and flora. However, Malawi is facing one of the fastest deforestation rates in the world. Between 1990 and 2010, the country lost an average of 32, 950 hectares or 0.85% per year. In total, during these two decades Malawi lost 16.9% of its forest cover, or around 659, 000 hectares. Forest resources are particularly stressed in the Southern and Central regions where population pressures are greatest. The major factors influencing the situation are the rapid population growth, commercial logging and massive poverty which necessitate cutting down of trees for opening new land for agricultural cultivation and as sources of energy. In 1996, Government of Malawi adopted the National Forest Policy followed by a Community Based Forest Management – A Supplement to the National Forestry Policy in 2003. The Forestry Act was passed in 1997.</p> <p>The policy also identifies and provides strategies for training needs and research and development of usable technologies in collaboration with local and external organizations. In the face of considerable challenges, the policy finally comprehensively considers alternative income generating activities and energy sources so as to divert attention away from forest products.</p>



		<p>towards improving the quality of life through among others introduction of value adding processes,</p> <p>Encouraging agro forestry and providing a stable localeconomy; and</p> <p>Providing incentive measures that will promote community-based conservation and a sustainable utilization of forest resources.</p>	
3	<p>FORESTRY ACT,1997</p>	<p>An Act to provide for participatory forestry, forest management, forestry research, forestry education, forest industries, protection and rehabilitation of environmentally fragile areas and international co-operation in forestry and for matters incidental thereto or connected therewith</p>	<p>(Charcoal Licensing):</p> <p>81.---(1) No person shall make or sell charcoal from indigenous timber or tree except pursuant to a licence issued under this section.</p> <p>(2) Upon application in the prescribed form, a licensing officer may, here the officer finds that he making of charcoal shall utilize plantation timber or indigenous timer or trees consistently with the applicable forest management plan or forest management agreement or forest plantation agreement, issue a licence to make charcoal in such quality and from such timber or trees as may be specified in the licence.</p> <p>(Suspension of a licence)</p> <p>51. The Director of Forestry may, at any time that it appears to him that there has occurred or is about to occur a violation of any provision of this Act or of any condition of a licence, order the suspension of any or all operations under any licence until the licensee has taken necessary measures to remedy or prevent the violation.</p> <p>(Purposes of the Act):</p> <p>3 (b) to augment, protect and manage trees and forest on customary land in</p>

			<p>order to meet basic fuelwood and forest produce needs of local communities and for the conservation of soil and water;</p> <p>3 (e) to promote sustainable utilization of timber, fuelwood and other forest produce;</p> <p><i>(Permit for wood using and wood processing industries):</i></p> <p>82. No person shall engage in commercial processing of any wood or forest produce without a permit from the Director of Forestry and such commercial wood processing industries shall Include <i>(Utilization of and trafficking in indigenous timber from private land)</i></p> <p>83.--- (1) No indigenous wood shall be moved from any private land to any place outside the private land without a permit issued by the Director of Forestry. Any revenue realized from the removal of the indigenous wood from leasehold land shall all accrue to the villager natural resources management committee in the area.</p> <p>(2)No indigenous endangered tree species shall be cut down without the written permission of the Director of Forestry.</p> <p>(3) Indigenous wood may be used on a sustainable basis for any purpose within the demised area without the written permission of the Director of Forestry.</p>
4	NATIONAL ENVIRONMENTAL POLICY (2004)	<p>Overall policy goal: Promotion of sustainable social and economic development through the sound management of the environment and natural resources.</p> <p>Sectoral Policy Objectives: <u>Agriculture and Livestock:</u> To promote environmentally sustainable agricultural development by ensuring sustainable crop and livestock production through ecologically appropriate</p>	<p>5.6 Energy (Guiding principles)</p> <p>(b) Sustainable fuel wood production may not only be economically efficient, but can also make a contribution to the arrest of global warming</p> <p>e) Alternative energy systems to fuel wood shall be developed for both rural and urban communities.</p> <p>(g) Private sector participation in the energy sector development shall be promoted</p> <p>5.6.1. Strategies (Energy) Strengthen the coordination of energy sector developments and improve the energy planning capability of those agencies involved in energy matters.</p> <p>5.6.2. Strategies (Energy) Promote energy saving and renewable energy technologies.</p> <p>5.6.3 Strategies (Energy)</p>



		<p>production and management systems, and appropriate legal and institutional framework for sustainable environmental management.</p> <p><u>Forestry:</u> To sustainably manage forestry resources so as to maximize benefits to the nation.</p> <p><u>Fisheries:</u> To manage fish resources for sustainable utilization and conservation of aquatic biodiversity.</p> <p><u>National Parks and Wildlife:</u> To manage and conserve wildlife resources in National Parks, Wildlife Reserves and those outside protected areas in such a way as to ensure their protection, sustainable utilization, and reduction of people/wildlife conflicts.</p>	<p>Optimise use of thinning from forests and more efficient technologies for the production of charcoal.</p> <p>5.6.4. Strategies (Energy) Explore means to make electricity more affordable and accessible in order to reduce the dependency on fuel wood.</p> <p>5.6.7. Strategies (Energy) Promote private and commercial enterprise in electricity generation and distribution and other sources of energy.</p> <p>5.6.9 Strategies (Energy) Promote environmentally friendly energy technologies to reduce greenhouse gas emitting fuels.</p> <p>5.6.10 Strategies (Energy) Increase rural electrification programmes to provide electricity to rural areas as to reduce pressure on fuel wood.</p> <p>5.6.11 Strategies (Energy) Subject all energy projects to stringent EIA in accordance with the provisions of the EMA.</p> <p>2.0 Policy Goals and Guiding Principles</p> <p>2.2.2 Promote sustainable utilization and management of the country's natural resources and encourage, where appropriate, long term self-sufficiency in food, fuel wood and other energy requirements.</p> <p>4.11.2. Strategies: Develop and promote alternative energy sources to fuel wood and technologies in order to reduce the use of fuel wood and enhance carbon</p>
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	<p><u>Water:</u> To manage and use water resources efficiently and effectively so as to promote its conservation and availability in sufficient quantity and acceptable quality.</p> <p><u>Energy:</u> To meet national energy needs with increased efficiency and environmental sustainability</p> <p><u>Industry :</u> To ensure that industrial activities conform to sustainable management and utilization of the environment and natural resources.</p> <p><u>Mining:</u> To ensure that the development of the country's mineral resources takes place within a framework of sustainable utilization of</p>	<p>sinks.</p> <p>5.2.3 Strategies: Provide economic incentives and the necessary legal framework and technology to encourage and facilitate rural communities and fuel wood using sectors to be self-sufficient in fuel wood requirements.</p> <p>5.2.7. (Strategies) Promote the sustainable utilization of forest resources by practicing conservation in the use of forest products, improving specifically the efficiency of fuel wood conservation, recycling paper through incentives and regulations and substituting fuel wood with alternatives such as paraffin, solar energy, biogas, electricity and coal where feasible.</p> <p>5.6 (Guiding principles) (a) Environmental externalities of all energy sources shall be identified and Incorporated into policy design and project costing.</p>
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		<p>natural resources and management of the environment and the mining industry contributes to the country's economic growth and poverty reduction program.</p> <p><i>Tourism:</i> To sustainably manage and conserve tourist attractions.</p>	
5	NATIONAL WATER POLICY (2005)	<p>Overall Policy Goal; Sustainable management and utilization of water resources, in order to provide water of acceptable quality and of sufficient quantities, and ensure availability of efficient and effective water and sanitation services that satisfy the basic requirements of every Malawian and for the enhancement of the country's natural ecosystems.</p> <p>Objectives; Achieve sustainable and integrated water resources development, conservation and</p>	Null

		<p>management that provides equitable access and use of water to all individuals and entrepreneurs;</p> <p>Ensure the existence of strategic and contingency water resources development and management plans that guarantee availability of water in cases of droughts, floods and population pressures;</p> <p>Ensure that all persons have convenient access to sufficient quantities of water of acceptable quality and the associated water-related public health and sanitation services at any time and within convenient distance;</p> <p>Promote the empowerment of user communities to own, manage and invest in water resources development;</p> <p>Promote public and private sector participation in water resources management, development, supply, and</p>	
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		<p>conservation;</p> <p>Participate in the enactment and implementation of local, regional and international obligations and agreements with regard to exploitation and management of water resources taking due regard of national integrity, security and sovereignty;</p> <p>Facilitate and initiate scientific investigations and research in the occurrence, development, utilization of water resources and disposal of wastewater in order to use the information for sustainable exploitation of water resources;</p> <p>Promote and advocate water and sanitation services' pricing and charging systems that recognize water as both a social and economic good in order to institute cost recovery principles;</p> <p>Promote the mainstreaming</p>	
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		<p>of HIV and AIDS, and Gender activities in the water and sanitation sector;</p> <p>Facilitate development and regular review of policies and regulations that promote water resources development, conservation, management, protection and utilization</p> <p>Promote user-friendly technologies to enable easy access to water and sanitation services by all manner of people.</p>	
6	<p>NATIONAL ADAPTATION PROGRAMMES OF ACTION (NAPA) 2006</p>	<p>Overall goal: Addressing urgent and immediate needs for adaptation.</p> <p>General Objective: To enable Malawi address her urgent and immediate adaptation needs caused by climate change and extreme weather events.</p> <p>Aims: To identify a list of priority activities To formulate priority</p>	<p>Foreword; With its narrow economic base, limited agro-processing industries, over-dependency on rain-fed agriculture and biomass for household energy, Malawi is highly vulnerable to the adverse impacts of climate change and extreme weather events. This situation is exacerbated by increasing poverty among rural communities, increasing population pressure on a limited land resource base, land degradation arising from agricultural expansion and the cultivation of marginal lands, and increasing deforestation to meet the increasing demands for energy, food and construction purposes.</p> <p>The loss of human, natural, financial, social and physical capital, caused by the adverse impacts of climate change, especially floods, drought and landslides, among many other natural disasters and calamities, is of great concern to the Malawi Government, as it strives to ensure sustainable livelihoods for all its citizens. The threat posed by extreme climatic events to food, health, water and energy has been the driving force for the preparation of Malawi's National Adaptation Programme of Action (NAPA).</p> <p>This document has been prepared with the primary objective of identifying and promoting activities that address urgent and immediate needs for adapting to the</p>



		<p>adaptation options</p> <p>To build capacity for adapting to longer-term climate change and variability.</p> <p>To raise public awareness on the urgency to adapt to the adverse effects of extreme weather events.</p>	<p>adverse impacts of climate change among rural communities in vulnerable areas of the country. This will initially focus on the adaptation needs in the agriculture, water, energy, fisheries, land use change and forestry, wildlife, human health and gender sectors.</p> <p>1.4 Vulnerability to climate change Malawi is heavily dependent on natural resources, mainly soils, water, fisheries from inland lakes and fuel wood from forests.</p> <p>2.3 Energy sector (It is stated alongside other proposed interventions by NAPA to counteract the adverse effects of climate change and unsustainable anthropogenic activities on the energy sector, with emphasis on hydro-electric power) Diversification of energy sources, Reforestation of the Upper, Middle and Lower Shire Valleys catchments, Arresting siltation, Reducing dependence on wood fuel, and Efficient use of charcoal and expanded use of ethanol stoves.</p> <p>3.2 Key adaptation needs Presently, adaptation needs have been identified for the agriculture, water, forestry, wildlife, fisheries, human health, energy and gender sectors, as follows: (e) Targeting afforestation and reforestation programmes to control siltation and the provision of fuel wood, and for their benefits, such as sources of alternative cash income, (f) Improving energy access and security in rural areas (e.g., through extension of the rural electrification programme, improved stoves and development of ethanol-based stoves),</p> <p>4.0 Prioritized Adaptation Options Through a consultative process involving public and private sector organizations, including NGOs and civil society, thirty-one adaptation options were identified from the eight sectors to address the urgent adaptation needs, with emphasis on vulnerable rural communities of Malawi. This list was further analyzed and ranked using multi criteria analysis, resulting in a shorter list of fifteen priority adaptation options. These were further ranked and prioritized for urgency, and categorized as high, medium or low.</p>
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			<p>These prioritized options are as follows:</p> <p>5) Targeting afforestation and re-afforestation programmes to control siltation and the provision of fuel wood, and for their benefits, such as sources of alternative cash income</p> <p>6) Improving energy access and security in rural areas (e.g., through extension of the rural electrification programme, energy-efficient stoves and development of ethanol-based stoves)</p> <p>5.0 Identification of Priority and Urgent Needs for Adaptation The members of the NAPA Document Preparation Team, and some members of LEG, assisted in ranking the adaptation needs for urgency using the letters H, M and L, where H=high, M=medium, and L=low. These ranks refer to urgent and immediate need for adaptation under the NAPA implementation paradigm, as given below.</p> <p>(d) Increasing resilience of food production systems to erratic rains by promoting sustainable dimba production of maize and vegetables in dambos , wetlands and river valleys [H],</p> <p>(e) Targeting afforestation and re-afforestation programmes to control siltation, and the provision of fuel wood, and for their benefits, such as sources of alternative cash income [H],</p> <p>(f) Improving energy access and security in rural areas (e.g., through extension of rural electrification programme, improved stoves and development of ethanol-based stoves).</p>
7	MALAWI ENERGY POLICY	<p>Goals; Make the energy sector sufficiently robust and efficient to support GoM's socio-economic agenda of poverty reduction, sustainable economic development, and enhanced labour productivity; Catalyse the establishment of</p>	<p>1.2.1 Links Between Energy and Development But the structures of energy sectors also dictate the possible development paths a country can take. For instance, those that depend on modern forms of energy (for example, electricity, coal and oil) tend to be engaged in energy intensive manufacturing industries. Those dependent on traditional fuels (that is, firewood and charcoal) commonly have economies based on producing low energy intensive, primary commodities and exporting a few unprocessed agricultural products and minerals.</p> <p>Poverty Reduction Access to and improved energy services will directly increase the ability to raise income and enhance the well-being and sense of empowerment of the poor by:</p>



	<p>a more liberalised, private sector-driven energy supply industry in which pricing will reflect the competition and efficiency that will have developed through the reform process; and</p> <p>Transform the country's energy economy from one that is overly dependent on biomass (93%) to one with a high modern energy component in its energy mix. A biomass - commercial energy mix target of 50% - 50% is set for 2020</p> <p>Objectives;</p> <ul style="list-style-type: none"> To improve efficiency and effectiveness of the commercial energy supply industries; To improve the security and reliability of energy supply systems; To increase access to affordable and modern energy services; To stimulate economic 	<p>Reducing drudgery, time and effort spent gathering traditional (biomass) cooking fuels;</p> <p>2.4.1 Energy Resources</p> <p>Malawi is endowed with several sources of energy: biomass, coal, many perennial rivers for hydropower generation, high solar irradiation (estimated at 21.1 MJ/m²/day) is adequate for photovoltaic and photo-thermal applications, wind energy (wind speeds averaging 2 - 7 m/second) for water pumping and other minor applications, hot springs for geothermal power and uranium deposits for nuclear power generation. Petroleum products are exclusively imported.</p> <p>Malawi's energy balance is dominated by biomass. These sources account for 97% of production. Fifty-nine percent of this biomass is used in its primary form as firewood (52%) and residues (7%), the remaining 41% is converted into charcoal in traditional earth moulds at estimated thermal efficiencies of between 12% - 14%. These efficiencies are much lower than those obtained from modern charcoal carbonisation kilns (for example, Retorts, Bee-Hives, Mark V) whose efficiency is estimated at nearly 35%.</p> <p>2.4.2 Uses of Energy</p> <p>In 1996, the annual per capita energy consumption in Malawi was estimated at 12.5 GJ, or 0.29 TOE. This compares unfavourably with the per capita average of 80 GJ for upper-middle income countries and over 200 GJ in high income economies. Much of Malawi's energy is consumed in traditional end-use and conversion technologies (for example, firewood and charcoal cook-stoves, tobacco curing barns) whose efficiencies are relatively low at 10 - 12%. Because access to modern commercial fuels like electricity is very low and because of low per capita disposable incomes, only a very small proportion of Malawian households use high efficiency stoves.</p> <p>As Figure 5 illustrates, the household sector is the dominant energy user, accounting for about 84% of total consumption. The remaining 16% is used in the agricultural and natural resources sector (8%), transport (4%), industry and mining (2%), and other social services (2%). Biomass, principally firewood and charcoal, is its source and accounts for an estimated 93% of demand. Liquid fuels, electricity, coal and other renewables contribute, respectively, 3.5%, 2.3%, 1.0% and 0.2% to the total demand. Rural households account for 58% of woodfuel consumption, urban households use 12%.</p>
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		<p>development and rural transformation for poverty reduction;</p> <p>To improve energy sector governance; and</p> <p>To mitigate environmental, safety, and health impacts of energy production and utilization.</p>	<p>Because they commonly use charcoal, urban households use more firewood per capita than their rural counterparts. Industries such as tobacco and tea estates account for 20%, brick making, fish smoking and other small-scale cottage industries use the remaining 10%. An estimated 48% of woodfuel is from sustainable yield, but 47% is taken from natural woodlands and is therefore unsustainable. The remaining 5% comes from other biomass sources, including crop and industrial residues.</p> <p>OBJECTIVE 2: IMPROVE THE SECURITY AND RELIABILITY OF ENERGY SUPPLY SYSTEMS;</p> <p>Biomass</p> <p>GoM notes that the availability and quality of biomass for energy is declining because of rising pressure on land and forest resources by agriculture, urbanisation and the energy needs of the urban poor. Symptoms of this problem are manifested in the increased distances and time taken by users to collect or buy firewood, the increased use of inferior materials (for example, leaves and agricultural residues), the reduced number of hot meals taken in a day and the increased incidence of eating raw food (for example, fruits and salads). This affects people’s nutritional status adversely and imposes a high opportunity cost in time that could have been used to improve the economic status of the families by, for example, engaging in income generating activities (IGAs).</p> <p>While the DoE will work closely with the Forestry Department in designing measures for improving the security and reliability of biomass supply, GoM recognises that a more sustainable and realistic solution to the fuel wood crisis, which is strongly linked to poverty, lies in finding affordable alternative sources of energy. In this regard:</p> <p>GoM will promote the use of affordable alternative energy sources for all fuel wood users through capital subsidies, tax breaks, technical and institutional support for market priming activities involving RETs industries</p> <p>OBJECTIVE 5: IMPROVE ENERGY SECTOR GOVERNANCE</p> <p>The institutional framework for the energy sector is weak and fragmented; frequent changes in central coordination have contributed to institutional fragmentation and a lack of consistent policies. This problem is compounded by housing the legal instruments governing energy sub-sectors - electricity, liquid fuels and gas, biomass, renewable energy and coal - in different institutions that often do not synchronise their</p>
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			<p>activities. Regulatory institutions are also fragmented and, since the energy market is small, in some instances institutions have only one monopoly to regulate, a costly arrangement.</p> <p>Consequently, it is the intention of GoM to put in place institutional and legal instruments that will adequately support its reforms and generally improve energy sector coordination. Specific interventions include:</p> <p>the formulation of an Energy Framework Law in the form of an Energy Regulation Act and related sub-sector legislation, including the Electricity Act, the Rural Electrification Act, the Liquid Fuels and Gas Act, the Coal Act, the Biomass Act, and the Other Renewable Energy Services Act, to provide a legal basis for improved energy sector governance;</p> <p>Objective 6: Mitigate environmental, safety, and health impacts of energy production and utilization.</p> <p>The use of many non-renewable energy sources contributes to the emission of the GHGs that cause global warming. Some emissions, such as carbon monoxide from charcoal, are major causes of sudden death in unventilated houses. Carbon dioxide and smoke/soot are known to cause respiratory and other diseases.</p> <p>4.2 Households</p> <p>Malawi's Population Census of 1998 counted 2.3 million households, each of which averaged 4.3 people. Eighty four percent of these households are in rural areas, the remaining 16% are urban. Biomass supplies satisfy about 99% of household energy demand. The remaining 1% comes from electricity (for lighting and, to a lesser extent, cooking), paraffin and candles (for lighting). The biomass is principally firewood (80%), charcoal (8.8%) and crop and industrial residues (11.2%). Although it is available, Malawian households do not use coal, principally because of the lack of appropriate end-use appliances and its high cost. Dependence on traditional primary energy sources on this scale is, on the one hand, an indication of abject poverty and, on the other, an extremely high incidence of low-cost traditional biomass conversion technologies, end-use cook-stoves and appliances.</p> <p>Modern infrastructure is minimal in rural areas, yet, apart from being energy demand centres, they also provide sources of energy (firewood and charcoal) and food for urban areas. This means that the two areas face different energy challenges. For instance, while deforestation is a direct issue in the rural areas from which firewood and charcoal</p>
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are supplied, energy pricing may be the central concern in urban areas. This makes it imperative that the MEP must be equitable and sustainable and relevant to the peculiar issues affecting both rural and urban households. Box 1 outlines the opportunities and challenges in the household sector.

Urban Household Energy Demand

The most relevant challenges are: the dependency on biomass from unsustainable sources; dependency on charcoal produced by inefficient carbonisation technologies; reliance on end-use devices with low energy efficiency; limited access to modern energy services; the high cost of end use appliances; adverse impacts of the urban household energy mix on the environment and on health and safety. These issues are discussed below.

Box 1: Opportunities and Challenges in the Household Energy Sector

OPPORTUNITIES	CHALLENGES
Biomass is available free of charge from customary land	Large number of household on biomass and 99% of hc is produced from it
A large population without access to modern forms of energy. This is a potential market for modern energy estimated at 96% for electricity (70% urban and 99.5% rural)	Few affordable options t available
A conducive legislative environment to facilitate empowerment and increase opportunities for private participation. For example, multiparty democracy, Decentralisation Policy, 1999, and Local Government Act, 1999; Investment Promotion Act, 1991; Public Enterprise	Charcoal dependency conversion efficiency (12% Inefficient end-use (traditional cooking sto efficiency of 10%- 12%)



			<p>(Privatisation) Act, 1996; Electricity Act, 1998; and the policies of liberalisation pursued by GoM</p> <p>GoM has adopted Poverty Reduction as its central development goal</p> <p>Malawi has qualified for debt relief through HIPC. This makes more resources available for infrastructural development, including energy</p>	<p>Poor macro-economic conditions, domestic inflation, low currency value</p> <p>Low disposable per capita income</p> <p>Large income distribution inequality</p> <p>Abject poverty (65% living below the poverty line)</p> <p>Environmental, health and safety concerns associated with the use of biomass and liquid fuels in urban households</p>
			<p>1. Dependency on Firewood and Charcoal</p> <p>Like their counterparts in rural areas, urban households in Malawi depend on firewood (84%) and charcoal (65%). Other important sources of energy in urban households are paraffin, candles and electricity (80%, 41%, and 31%, respectively). LPG is used by 1% of urban households and 4% use paraffin for cooking (half use paraffin only occasionally). Some paraffin is used as starter fuel to light charcoal fires. Similarly, LPG is used infrequently as a backup for cooking and illumination. Firewood is used mainly for cooking (76%), water heating (22%) and space heating (2%). Charcoal is used for cooking (48%), ironing (24%), space heating (16%) and water heating (12%).</p> <p>Seventy-nine percent (79%) of urban fuelwood users collect some wood themselves which results in more lopped branches. Forty three percent buy some, and 24% buy all, of their fuelwood. While almost all fuelwood used by rural households is collected free of charge, that used by urban households is purchased. In 1996, the wood consumed by urban households was estimated at 1.241 million tonnes, of which 844,550 tonnes (68%) was in the form of charcoal. Because most urban dwellers live in the four major towns, 86% of the wood was used in them. Most of it (85%) was purchased in local markets, the other 15% was obtained free of charge from local sources.</p>	

Charcoal is more convenient than unprocessed wood and is mainly used by middle and upper income families. But, because of the high incidence of the use of charcoal by urban dwellers, the urban annual per capita consumption of firewood of 1.56m³ is higher than in rural areas (0.85m³). This is because charcoal is produced in traditional carbonisation kilns whose yields are very low (7 tonnes of firewood produce 1 tonne of charcoal). This compares unfavourably with the conversion ratios of other carbonisation technologies - metal kilns (1:4), brick kilns (1:3) and retorts (1:2.5). Nearly all charcoal comes from indigenous wood, which is slow to grow and is harvested from customary lands without replanting programmes. In this light:

GoM will take measures to reduce the dependence on firewood and charcoal by increasing access to affordable and reliable alternative sources of energy.

GoM will undertake to design special energy programmes that include activities that will generate alternative incomes for households currently involved in firewood and charcoal vending.

a) Firewood End-Use Devices

Firewood users still cook on three-stone cookstoves (91%). Only 20% of the traditional metal stoves are used for cooking, but half the households owning improved ceramic cookstoves use them regularly. The factors that influence such choices are unclear. It is possible that firewood users do not find either metal or ceramic stoves very convenient. Since the three-stone stove is free, cost may also be a reason. Given that most households depend heavily on firewood and are using the least efficient three-stone stove, energy losses are very high. To address these dislocations:

GoM will devise promotional strategies aimed at expanding the use of improved ceramic firewood stoves in poor urban households and at reducing the proportion of households using three stone cookstoves to 50% by 2020.

Table 2: The Efficiency of Different Household End Use Devices

Fuel Type	End Use Device	Efficiency
Firewood Cooking Devices	Traditional 3-Stone	10 - 14%
	Traditional Metal Stove	20%
	Improved Ceramic Stove	30%
Charcoal Cooking Devices	Traditional Metal Stove	21%



				Improved Ceramic Stove	35%		
			Briquette Cooking Devices	Traditional 3 Stone	14%		
				Traditional Metal Stove	20%		
				Improved Ceramic Stove	35%		
			Paraffin Cooking Devices	Single Wick-Stove	35%		
				Pressure Stove	45%		
			LPG Cooking Devices	10-Pound Budget Top	45%		
				9.5 kg 2-Burner Stove	45%		
			Electricity Cooking Devices	1-4 Hot Plate Cooker	65%		
			Lighting Devices	Candles	1.57 lumer		
				Traditional Paraffin Lamp	0.21 lumer		
				Wick Lantern	0.21 lumer		
				Electricity – Candescent Lamp	0.10 lumer		
				Electricity - Fluorescent Lamp	n.a.		
			<p>Source: Arpaillage (1996) “Urban Household Energy Demand Side Strategy” (Department of Energy, Lilongwe) for end-use efficiency of devices using firewood, charcoal, LPG, electricity and paraffin; CEEDS (2000) “Biomass Briquette Extension Production and Marketing Evaluation” Report (UNDP, Lilongwe) for briquettes end-use device efficiency</p> <p>Charcoal End-Use Devices</p> <p>A survey shows that 72% of charcoal consumers have recently switched from metal to improved ceramic charcoal stoves, only 25% still use metal stoves. The rate of use of the ceramic stoves is estimated at 90%. This is a very encouraging development, which needs to be consolidated if efforts to reduce charcoal utilisation are to be sustainable. The remaining challenge is the strong household preference for indigenous hardwood based charcoal, which directly increases deforestation. To circumvent these problems, GoM will:</p>				
			for the sake of efficiency continue to promote improved ceramic charcoal stoves for				

			<p>urban household use through publicity campaigns, institutional capacity and technical support to NGOs</p> <p>actively promote the use of charcoal from sustainable sources including government plantations</p> <p>3. Access to Modern Energy Services Urban household energy consumption consists of biomass 94%, electricity 4% and paraffin 2%. Only about 30% of the urban and 0.5% of the rural population has access to grid electricity. This is attributed to many factors, the most important of which include: physical limitations imposed by the paucity of power lines; low disposable incomes and the high incidence of poverty in urban areas (51%); high first cost requirements (for example, reticulation, capital contribution and connection charges); high cost of imported end-use appliances (for example, cookers and fridges). The situation is similar in the case of liquid fuels and gas. Although 80% of urban households have access to paraffin, it is only used in small quantities by poor households, mainly for lighting (94%), very few use it for cooking (2%) and the remaining 4% use it for a combination of household chores - cooking, lighting, refrigeration and starting biomass fires. Urban households do not use coal in Malawi and their access to RETs has been hindered by high up-front costs, lack of credit and poor delivery. Therefore: GoM is committed to increasing urban household access to modern energy by reviewing fiscal policies to allow a reduction in first costs, including those for end-use appliances.</p> <p>4. Access to Low Cost Technologies Since urban poverty is acute, it could take a very long time before people can afford to make use of modern forms of energy. In this regard: GoM is determined to increase access to modern energy services by promoting the use of low cost technologies including pre-wired boards and load limiters in the electricity sector, paraffin and gas stoves in the liquid fuels and gas sector and coal stoves.</p> <p>5. Mitigating Impact of Energy Production and Utilization on Environment, Health and Safety Studies have shown that biomass users are exposed to extremely high levels of particulate emissions. These have adverse effects on health, including causing acute respiratory illness in women and children. Dependency on woodfuel also leads to</p>
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			<p>environmental degradation, soil erosion and desertification.</p> <p>4.2.2 Rural Household Energy Demand The incidence of poverty among rural households is very high at 61% and the availability and quality of modern infrastructure, including schools, hospitals, electricity, liquid fuel and gas outlets and roads is generally low. Most people are smallholder farmers, making their living from low levels of agricultural production and off-farm casual work (ganyu). Those in formal employment are usually ganyu labourers on commercial estates or engage in firewood and charcoal production and marketing. It is estimated that nearly 55,000 farmers are involved in off-farm employment as biomass producers and roadside wholesalers. Acute poverty means that most rural houses are temporary structures of unburned bricks thatched by grass. Such structures restrict the possibilities for providing modern energy services.</p> <p>4.3 Agriculture and Natural Resources About 8% of all energy and 12% of commercial energy is used by the agricultural and natural resources sector. Nearly 60% of the solid fuel used in this sector comes from biomass residues (cotton seed husks, bagasse, saw dust, rice husks etc.); 25% is fuelwood and the remaining 15% is coal. Agro-industrial production of most export crops, such as tobacco and tea, relies almost exclusively on fuelwood. This sector also accounts for just over 20% of fuelwood usage, second only to households. Agriculture is pursued both commercially and for subsistence.</p> <p>5.6 Biomass Supply Industry (BSI) Malawi's energy balance is dominated by biomass (firewood, charcoal, agricultural and industrial wastes), which account for 97% of the total primary energy supply. More than a third (34%) of biomass resources are obtained from agricultural and industrial residues. Although the use of residues for energy has a large opportunity cost for agriculture, its impact on deforestation is virtually non-existent. The energy sector's contribution to deforestation is related to the wood obtained from unsustainable sources on customary lands for charcoal production and firewood. But even here customary land contributes only 37% of all biomass used. The remainder is obtained from sustainable yields on government plantations (10%), forest reserves (15%) and private plantations (3%). The real challenge for biomass is the existence of isolated deficits, concentrated mainly in the South, where population densities are high and the demand for wood is greatest, and some tobacco growing areas in the Central and Northern Regions. Related to this are the problems of getting woody biomass from areas with a</p>
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			<p>surplus because of the high cost of transport and the difficult terrain.</p> <p>Biomass presents a number of special challenges in marketing: laws governing land tenure have allocated 80% of land to customary holding in which the private ownership of land and resources is prohibited, although Malawians have usufruct rights and wood resources are available free of charge. A small stumpage fee is imposed when wood is harvested for commercial purposes under the Forest Act, 1997. Enforcement of this law has been weak and in many instances wood is illegally harvested free of charge. The biomass market lacks any formal structures with a large number of individual vendors involved in harvesting, transportation and marketing. It is estimated that it employs nearly 55,000 individuals jointly generating MK880 million per annum. Because biomass is traded through informal structures, revenue is neither recorded in national accounts nor taxed.</p> <p style="text-align: center;">5.6.1 Deforestation: Causes and Effects</p> <p>The contribution of energy to deforestation is largely in the form of uncontrolled tree felling for curing tobacco and the rise in opportunistic trade in firewood and charcoal, particularly since the dawn of multi-party democracy.</p> <p>The Forestry Department estimates that the country's deforestation rate is 2.8% per annum. The effects of agricultural expansion and ways to slow it down would need to be addressed. This could be done by raising farm productivity and slowing the rate of population growth. Agricultural productivity, a problem for the Agriculture Policy, should be given adequate attention not only to improve and diversify farm yields, but also to ensure a sustainable supply of wood products and to protect the environment. These interventions will run into various structural problems. Most forest products, firewood, charcoal, fruits and bamboos, are grossly undervalued at roadside markets. If the true market value for these products was used, communities would want to protect and manage trees and at the same time reduce the demand for firewood and charcoal. Price incentives would encourage tree planting by communities and thus reduce the pressure on natural woodlands. Studies have shown that the only people who can protect and replant trees cost-effectively are local communities. Planting by authorities is expensive and difficult to manage on the required scale. As long as wood prices remain low and levels of responsibility remain unclear, local people will have little interest in planting or protecting trees and consequently, sustainable wood production is virtually impossible.</p> <p style="text-align: center;">Opportunities and Challenges</p> <p style="text-align: center;">Box 5: Opportunities and Challenges for Biomass Supply Industry</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">PORTUNITIES</td> <td style="width: 50%; text-align: center;">CHALLENGES</td> </tr> </table>	PORTUNITIES	CHALLENGES
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			<p>a) Resource Potential biomass is still readily available free of charge excess wood in some parts of the country (North); flows from agriculture and industrial residues plentiful</p> <p>b) Economic Potential emerging cash biomass markets availability of alternatives to firewood and charcoal</p> <p>c) Governance and Institutional Arrangements enabling environment exists which includes: Environmental Policy, 1996 Environment Management Act, 1996 Forestry Policy, 1997 Forestry Act, 1997 Land Policy, 2002 Decentralisation Policy, 1999; Private Enterprise (Privatisation) Act, 1996 availability of efficient charcoal carbonisation technologies; availability of efficient biomass end use technologies; willingness of donor community to support improved environmental management</p>	<p>a) Technical Challenges dependence on inefficient traditional charcoal carbonisation technologies; dependence on inefficient biomass end-use technologies increased pockets of woody biomass scarcity in parts of the country, (e.g. Southern and major tobacco growing areas).</p> <p>b) Economic challenges biomass is a free resource under customary law which makes market regulation impossible; greater use of residues which could be used for agricultural purposes. multiplicity of end-uses for biomass (e.g. cooking, heating, socialisation, insect repellent, food preservative, etc)</p> <p>c) Environmental, health and safety challenges deforestation and environmental degradation; air pollution; health and safety hazards from smoke carbon monoxide, other fumes and open fires; GHG emissions from carbonisation and use of charcoal and firewood, which contribute to climate change.</p>
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			<p>initiatives; Malawi signatory to UN Conventions on Desertification, Biodiversity, Climate Change; access to CDM and GEF financing; forests identified as sinks for GHG emission under UN Conventions; existence of a functioning Forestry Department.</p>	<p>d) Governance and Institutions challenges fragmented and informal market structures; absence of linkage with national accounting system; politically incorrect messages sent in support of charcoal production and trading; land use conflicts in agriculture, forestry and energy; problems in enforcing existing Forest Environment Laws .</p> <p>Social and Cultural challenges Engrained mindsets in support of biomass as a special fuel for preparing specialised dishes for its aromatic properties</p>
			<p><i>Source: DoE (2000) National, Regional and Principal Secretaries Workshops</i></p> <p>GoM recognises that because of the fragmented and informal nature of the BSI market and given that woody biomass is virtually a free resource, formalisation of the market would have to start from changes in land tenure policies. GoM will closely monitor the implementation of Land Policy in order to draw synergies for the BSI and thus develop appropriate interventions. The present Energy Policy will confine interventions to those areas directly related to the utilisation of biomass for energy. In this regard:</p> <p>GoM will ensure the efficient utilisation of biomass in an environmentally sound and sustainable manner by promoting, through market priming activities:</p> <p>The use of efficient charcoal carbonisation technologies ;</p>	



			<p>The use of non-indigenous wood for charcoal production from sustainable sources;</p> <p>The use of efficient biomass end-use technologies through civic education;</p> <p>Training and research in production, use and marketing of biomass technologies;</p> <p>Stakeholder participation, including local communities, in producing and marketing biomass technologies.</p> <p><i>GoM will promote alternatives to firewood and charcoal, including gelfuel, biomass briquettes, biogas and other renewables through market priming initiatives and fiscal incentives.</i></p> <p>5.7.1 Opportunities and Challenges for Other Renewable Energy Sources Supply Industry (ORESSI)</p>				
			<table border="1"> <thead> <tr> <th data-bbox="790 727 1227 762">OPPORTUNITIES</th> <th data-bbox="1227 727 1650 762">CHALLENGES</th> </tr> </thead> <tbody> <tr> <td data-bbox="790 762 1227 1270"> <p>Resource Potential</p> <p>Wind speeds of 2 – 7 m/s adequate for water pumping</p> <p>Annual solar radiation 21.1 MJ/m²/day for PV, PTC applications</p> <p>Perennial rivers with hydropower potential 1000MW</p> <p>Geothermal springs for geothermal power generation</p> <p>Large biomass stocks and flows for biogas, bioenergy generation</p> <p>Large animal population for biogas generation</p> <p>Technical</p> </td> <td data-bbox="1227 762 1650 1270"> <p>a) Technical Challenges</p> <p>lack of local capacity in manufacturing, distribution, installation and maintenance of RETs;</p> <p>lack of information on the efficacy of RETs.</p> <p>b) Economic Challenges</p> <p>high first costs (largely from taxes);</p> <p>lack of dedicated financing mechanisms</p> <p>very small industry</p> <p>small niche market</p> <p>limited delivery modes.</p> </td> </tr> </tbody> </table>	OPPORTUNITIES	CHALLENGES	<p>Resource Potential</p> <p>Wind speeds of 2 – 7 m/s adequate for water pumping</p> <p>Annual solar radiation 21.1 MJ/m²/day for PV, PTC applications</p> <p>Perennial rivers with hydropower potential 1000MW</p> <p>Geothermal springs for geothermal power generation</p> <p>Large biomass stocks and flows for biogas, bioenergy generation</p> <p>Large animal population for biogas generation</p> <p>Technical</p>	<p>a) Technical Challenges</p> <p>lack of local capacity in manufacturing, distribution, installation and maintenance of RETs;</p> <p>lack of information on the efficacy of RETs.</p> <p>b) Economic Challenges</p> <p>high first costs (largely from taxes);</p> <p>lack of dedicated financing mechanisms</p> <p>very small industry</p> <p>small niche market</p> <p>limited delivery modes.</p>
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			<p>existence of technically mature & commercially viable RETs</p> <p>c) Economic fiscal measures (e.g. waiver of duty/surtax on RET); donor willingness to promote RETs CDM and GEF resource availability for RETs 96% population without access to modern energy services</p> <p>d) Governance and Institutional Arrangements NSREP as focal point for RETs activities enabling environment exists which includes: Environmental Policy, 1996 Environment Management Act, 1996 Forestry Policy, 1997 Forestry Act, 1997 Private Enterprises (Privatisation) Act, 1996 Malawi signatory to UN Conventions on Desertification, Biodiversity, Climate Change;</p>	<p>c) Governance and Institutional Challenges lack of clear government policy on RETs; lack of system standards and industry code of practice; lack of regulatory framework</p> <p>d) Social and Cultural Challenges gender insensitivity; unacceptability of systems using human waste.</p>
			<p>6.2 Energy Pricing The biomass business is informal with thousands of individual operators. This makes it difficult to regulate its prices. Biomass energy prices depend on supply and demand, but the Government will ensure that the woodfuel stumpage prices stipulated in the Forestry Act (1997) are at a level that guarantees production costs recovery. They will give producers an incentive to grow trees and users an incentive to conserve.</p>	



			<p>6.10.2 Energy Efficiency in Households and Institutions</p> <p>Over the years, various improved stove designs for charcoal and firewood have been introduced, but some of them have not been sustainable due to cost and other factors. To improve energy efficiency in households and institutions, such as schools and hospitals, GoM will:</p> <p>Promote energy efficiency awareness in households and institutions, which will include intensifying civic education on DSM, the use and pricing of the different services, particularly electricity.</p> <p>Promote the introduction of a domestic appliance efficiency labelling through legislation. Promote the use of energy efficient appliances and fuel efficient cooking technologies in rural areas through support of market priming activities.</p>
8	<p>ENERGY REGULATION ACT, 2004</p>	<p>Goal Establish an Energy Regulatory Authority to regulate the energy sector</p> <p>Objectives: To define the functions and powers of the Energy Regulatory Authority To provide for licensing of energy undertakings, and for matters connected therewith and incidental thereto.</p> <p>Total number of clauses: 45</p>	<p>PART II - ESTABLISHMENT OF THE ENERGY REGULATORY AUTHORITY: ONSTITUTION, FUNCTIONS, POWERS AND DUTIES;</p> <p>4 (2) f: Members of the Authority shall be persons who have adequate knowledge and experience in any one or more of the following functional areas</p> <p>Energy technology and standards or renewable energy Technologies</p> <p>9 (1) The Authority shall have power to regulate the activities of the energy industry in accordance with this Act and the Energy Laws and without limitation to the generality of the foregoing, shall carry out the following functions:-</p> <ul style="list-style-type: none"> (a) receive and process licence applications for energy undertaking; (b) grant, revoke or amend licences granted under this Act and Energy Laws; (c) approve tariffs, and prices of energy sales and services; (d) monitor and enforce compliance by licensees with licences granted under this Act and the Energy Laws; (e) develop and enforce performance and safety standards for energy exploitation, production transportation and distribution; (f) prescribe and collect fees, charges, levies or rates under this Act and Energy Laws; (g) arbitrate commercial disputes under this Act and Energy Laws; (h) Recommend reforms to this Act and the Energy Laws as the Authority may deem desirable; (i) Resolve or mediate consumer complaints against licensees; and (j) do all such things as are necessary or incidental or conducive to the better carrying

			<p>out of the functions of the Authority provided for in this Act and Energy Laws.</p> <p>9 (2) In exercising its powers and functions under this Act and the Energy Laws, the Authority shall be independent of interference or direction of any other person or authority, and shall:</p> <p>(a) promote the interests of consumers of energy with respect to energy prices and charges and the continuity and quality of energy supply;</p> <p>(b) monitor the efficiency and performance of energy undertakings, having regard to the purposes for which they were established;</p> <p>(c) in conjunction with other relevant agencies, monitor the levels and structures of competition within the energy sector in order that competition in and accessibility to the energy sector in Malawi is promoted;</p> <p>(d) facilitate increasing access to energy supplies;</p> <p>(e) promote energy efficiency and energy savings;</p> <p>(f) promote consumer awareness and education;</p> <p>(g) promote the integrity and sustainability of energy undertakings and seek to ensure that energy undertakings, whilst providing efficient service, are able to finance the carrying on of the activities which they are licensed or authorized to carry on;</p> <p>(h) in conjunction with other relevant agencies, formulate measures to minimize the environmental impact of the exploitation, production, transportation, storage, supply and use of energy and enforce such measures by the inclusion of appropriate conditions to licences held by energy undertakings;</p> <p>(i) promote the exploitation of renewable energy resources;</p> <p>(j) take all such measures as are necessary to fulfill the above purposes through regulations to be made under this Act or the Energy Laws.</p> <p>(3) The Authority shall, in undertaking its regulatory tasks, regulate in a manner that is transparent, cost effective and fair.</p> <p>(4) The Authority may advise the Government on matters affecting the energy sector generally and energy undertakings specifically.</p> <p>PART IV - REGULATION OF THE ENERGY SECTOR</p> <p>28 (1) No person may establish, operate, carry on or be involved in any manner in an energy undertaking in Malawi, without a licence issued by the Authority.</p>
9	NATIONAL	Goals	CHAPTER 4



<p>BIODIVERSITY STRATEGY AND ACTION PLAN, 2006</p>	<p>Actively protect, conserve and maintain protected areas, mountains and species within them; promote restoration of degraded and vulnerable ecosystems and habitats and recovery of rare and threatened species.</p> <p>Enhance and improve biodiversity knowledge base through research; strengthen and build human and infrastructure capacity for effective information dissemination and research.</p> <p>Enhance agricultural production through active protection and management of agricultural biodiversity and support initiatives that encourage fair and equitable sharing of benefits arising from the use of the genetic resources.</p> <p>Enhance community understanding and appreciation of biodiversity, and support</p>	<p>Theme 1</p> <p>In 1975 about 47% of Malawi was classed as forest but this was reported to have reduced to 28% in 2000. With the everincreasing population and deforestation rate of 2.8% per annum, Malawi's forest cover is likely to reduce further. There has been extensive deforestation of Miombo woodlands outside protected areas for various reasons e.g. fuelwood for domestic purposes and curing of tobacco, charcoal production for supplying urban areas and clearing for gardens/shifting cultivation (e.g. Chitemene in Chitipa).</p> <p>Current Management</p> <p>The terrestrial ecosystems under the customary land tenure system, mostly under subsistence agriculture, are prone to extensive deforestation for various reasons, e.g. fuelwood for domestic purposes and curing of tobacco, charcoal production for supplying urban areas and clearing for gardens/shifting cultivation (e.g. Chitemene in Chitipa). These activities have resulted in fragmentation of forests and misrepresentation of species in protected areas.</p> <p>SUMMARY OF ISSUES</p> <p><u>Habitat fragmentation</u></p> <p>There has been extensive deforestation of the forests within and outside protected areas for various reasons e.g. fuelwood for domestic purposes and curing of tobacco, charcoal production for urban areas and shifting cultivation. This has produced many isolated remnants that are important for diversity but vulnerable to continuing degradation. Evergreen forests and montane grasslands, though fragmented are represented in protected areas. However, those close to the urban areas with valuable timber such as Mulanje cedar (<i>Widdringtonia whyte i</i>) are prone to extensive exploitation. In areas with high human population some evergreen forests (e.g. Thyolo Mountain) have been clearfelled because of encroachment for agricultural activities. In this regard there is need for greater recognition and action to restore fragmented and degraded habitats.</p> <p>Forest biologic al diversity:</p> <p>Utilisation of biological resources, especially in forests adjacent to villages, is extremely important to local communities since the forests are sources of livelihood. For example, grass and papyrus are used extensively for thatching, especially in rural areas. Wood fuel (firewood and charcoal) remains the dominant source of energy, accounting for approximately 90% of the household and industrial energy requirement. At the household level wood is also used for construction, timber, farm implements such as axe and hoe handles. Local communities also harvest different fruits,</p>
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		<p>Co-ordinated community action to conserve and sustainably use biodiversity.</p> <p>Objectives</p> <ul style="list-style-type: none"> ● To review documentation of the biological diversity of Malawi covering plants, animals, microorganisms, genetic material and ecosystems; ● To identify gaps in the knowledgebase and existing efforts to conserve and sustainably use biodiversity resources, and to ensure fair and equitable sharing of benefits arising from such use; ● To assess our knowledge of the various components of biological diversity; ● To assess and identify biological resources requiring immediate statutory protection; ● To assess and evaluate current indigenous knowledge systems pertaining to the conservation, sustainable use and the fair and equitable sharing of its benefits; ● To determine the socioeconomic value of biological diversity and the benefits arising from conservation and sustainable 	<p>mushrooms, roots and tubers for household consumption and for sale. Forest resources therefore contribute substantially to food security and poverty reduction.</p> <p>THEME FOUR : TRADITIONAL KNOWLEDGE, ACCESS AND BENEFIT SHARING</p> <p>(a) Access and Benefit Sharing</p> <p>Formal access and benefit sharing mechanisms are recent in Malawi and appear to be restricted to comanagement arrangements in forestry, fisheries and wildlife sectors. In the forestry resources, through comanagement arrangements communities are allowed some access to local forestry resources and are also entitled to 20% to 60% of forest revenues. For example through a World Bank Project communities around Chimaliro Forest Reserve in the Northern region were entitled to 40% of the revenue from exploitation of forest reserves and 60% revenue from exploitation of the surrounding customary land forests. In Mwanza, forest By Laws allow community groups in liaison with forest officials to confiscate charcoal. When the confiscated charcoal is sold, community groups are entitled to 25% of the sales.</p> <p>Poverty</p> <p>Malawi is one of the poorest countries in the world being listed 162 out of 175 in the United Nations Human Development Report for the year 2003. The poverty situation in Malawi is critical considering that 52.40% of the population live below the poverty line whilst 22.40% live in dire poverty. Poverty, therefore, forces people to depend on natural resources for energy (fuelwood), food, construction material, medicine, and fodder. Thus Malawians are forced by this low income base to trade off long term sustainable resources for short term consumption of stocks since they depend entirely on the existing natural resources.</p> <p>CHAPTER 4:</p> <p>Theme One: Terrestrial Biodiversity</p> <p>State of terrestrial biodiversity</p> <p>In 1975 about 47% of Malawi was classed as forest but this was reported to have reduced to 28% in 2000. With the ever increasing population and deforestation rate of 2.8% per annum, Malawi's forest cover is likely to reduce further. There has been extensive deforestation of Miombo woodlands outside protected areas for various reasons e.g. fuelwood for domestic purposes and curing of tobacco, charcoal production for supplying urban areas and clearing for gardens/shifting cultivation (e.g. Chitemene in Chitipa).</p>
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		<p>use thereof;</p> <ul style="list-style-type: none"> • To assess the capacity of institutions and personnel in meeting the demands imposed by the requirement to conserve, sustainably use, and fairly and equitably share the benefits arising from the use of genetic resources of the country's biological diversity; • To initiate creation of a database for use in raising public awareness for protection and sustainable use of biodiversity resources in Malawi; • To promote the integration of biological diversity conservation, sustainable use and the fair and equitable sharing of its benefits into sectoral and cross-sectoral policies, plans and programmes in the country; • To foster collaboration between neighbouring countries in the conservation and sustainable use of biological diversity, and the fair and equitable sharing of benefits arising from such use. 	<p>CHAPTER 4: Theme Ten: Incentive Measures <u>State of incentive measures</u> The private sector has been involved in provision of indirect incentive measures for biodiversity conservation to both rural and urban populations in Malawi. They have provided technologies that provide alternative sources of energy to both local communities and low-income urban residents. These include solar energy, biogas, gel fuel, solid fossil fuel (coal), ethanol and electricity. These energy sources provide alternative sources of energy to fuelwood and bio-waste from agricultural fields, thus conserving biodiversity. The provision of electricity in rural areas (rural electrification) may be considered an investment incentive measure for natural resources management.</p> <p>CHAPTER 4 THEME TEN: INCENTIVE MEASURES SUMMARY OF ISSUES Weak Institutional framework The concept of incentive measures has not been integrated into the existing institutions and as such human capacity to implement programmes is inadequate resulting in ineffective implementation of programmes that have elements of incentives. A good example of institutional failure in the implementation of incentives is the Blantyre City Fuelwood Project (BCFP), which established forest plantation by transfer of land usufruct rights from local communities to the project through compensation. When the plantations were later given back to local communities, the question of who should get back the forest plantations had to be addressed especially in cases where communities adjacent to the plantations were without traditional rights to forest land. In order to ensure sustainable use of the resources, plots were allocated to all villages living along the plantation without taking into consideration the original boundaries. This has caused a number of conflicts, which have resulted in unsustainable harvesting by communities that feel unfairly treated.</p> <p>CHAPTER TWO Importance of biodiversity : Value of biodiversity to Malawi In the forestry sector use of biodiversity, especially in forests adjacent to villages, is extremely important as source of fuelwood, food (vegetable, tubers, fruits, insects, mushrooms), construction material, medicines, etc. Commercial</p>
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			<p>uses of the forest plantations are mainly in form of timber and firewood. Although a few indigenous tree species yield good timber most are poor in commercial timber. Species such as <i>Widdringtonia cupressoides</i> (Mulanje cedar), <i>Pterocarpus angolensis</i> (mlombwa), <i>Khaya anthotheca</i> (mbawa) produce quality and durable hard wood and as a result their populations are threatened due to unsustainable harvesting.</p> <p>THREATS TO BIODIVERSITY <u>Habitat loss and fragmentation:</u> <i>Population pressure</i> The high population and density has also resulted in increased demand for indigenous plant resources for food, medicine, fodder, fuelwood and construction material and has led to these becoming locally rare. This coupled with unsustainable harvesting methods of plant resources, such as uprooting, tree felling and debarking have reduced their populations to unsustainable levels. <u>Summary of issues</u> <i>Integrated watershed management</i> In order to achieve sustainable integrated management of the aquatic biodiversity the following issues need to be considered:</p> <ul style="list-style-type: none"> • Encourage integrated watershed management and minimize the current deforestation, biomass burning and winter cultivation that is wide spread in wetlands and riverbanks; these activities are a source of excessive nutrient enrichment, sedimentation deposits and contaminants which affect ecological health of aquatic habitats.
10	<p>THE AGRICULTURE SECTOR WIDE APPROACH (ASWAp) MALAWI'S PRIORITISED AND HARMONISED AGRICULTURAL DEVELOPMENT AGENDA, 2010</p>	<p>Objective To achieve the agricultural growth and poverty reduction goals of the Malawi Growth and Development Strategy (MGDS). The ASWAp, therefore, offers a strategy for supporting priority activities in the</p>	<p><i>The Malawi Growth and Development Strategy (MGDS)</i> The MGDS represents a policy shift from social consumption to sustainable economic growth and infrastructure development and places emphasis on six key priority areas of a) agriculture and food security; b) irrigation and water development; c) transport infrastructure development; d) energy generation and supply; e) integrated rural development; and f) prevention and management of nutrition disorders, and HIV/AIDS. These six key priority areas are expected to accelerate the attainment of the Millennium Development Goals (MDGs) in the areas of health, education, gender, environment, and governance.</p>



		<p>agricultural sector in order to increase agricultural productivity to make Malawi a hunger free nation, enable people access nutritious foods and increase the contribution of agro-processing to economic growth.</p>	<p>2.5.1 Institutional Arrangements, Roles and Responsibilities</p> <p>At national level, key institutions in the agricultural sector comprise the Ministries of Agriculture and Food Security, Irrigation and Water Development, Trade and Industry, Local Government and Rural Development, Natural Resources, Energy, and Environment; Development Planning and Cooperation, the Office of the President and Cabinet, Department of Nutrition, HIV and AIDS, and Department of Public Procurement. There are however unclear roles and responsibilities, weak implementation arrangements, and other rigidities amongst these stakeholders hence the need to enhance coordination mechanisms so as to maximise synergies and complementarities. The MoAFS therefore plans institutional reform across the sector in response to the results of the core function analysis to ensure improved service delivery mechanism.</p> <p>Link between ASWAp and on-going programmes</p> <p>The Greenbelt Initiative (GBI) - The Greenbelt Initiative (GBI) implements Focus Area 3 (Sustainable Agricultural Land and Water management) of the ASWAp. The overall objective for Greenbelt Initiative is to contribute towards the attainment of sustainable economic growth and development in line with the Malawi Growth and Development Strategy (MGDS). The Initiative aims at reducing poverty, improving livelihood and sustainable food security at both household and national level through increased production and productivity of agricultural crops, livestock and fisheries. Specifically the Initiative aims at increasing production and productivity of crops, livestock and fisheries; increasing household incomes; agricultural exports and foreign exchange earnings; promoting diversification of crop and livestock enterprises; reducing rural-urban migration; and improving availability of quality water for both domestic and industrial use.</p> <p>The GBI Secretariat will periodically report progress to the ASWAp secretariat. The ASWAp secretariat will report to the Principal Secretary and the Executive Management Committee for final decisions. In addition, a multi-sectoral GBI Management Body chaired by the Office of the President and Cabinet will give oversight to the implementation process and manage inter-sectoral and inter-institutional issues.</p> <p>5.1.4 ASWAp Organizational arrangements</p> <p>Ministry of Natural Resources, Energy, and Environment The Ministry will</p>
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			principally be responsible for ensuring that resources are used in a sustainable manner.
11	FOOD SECURITY POLICY, 2006	<p>Goal: The long-term goal of this policy is to significantly improve food security of the population. The goal implies increasing agricultural productivity as well as diversity and sustainable agricultural growth and development.</p> <p>Specific Objectives; The specific objective of Food Security, is to guarantee that all men, women, boys and girls, especially under-fives in Malawi have, at all times, physical and economic access to sufficient nutritious food required to lead a healthy and active life.</p>	Null
12	MALAWI NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT (Environmental	<p>Goal: Provide information that will enable coordinated planning, tracking of progress to enhance informed decision-making at all</p>	<p>3.5 Energy According to the Global Energy Charter for Sustainable Development the following principles are intended to achieve sustainable energy production and use: Reduce energy-related atmospheric emissions, and enact strict legislation for</p>



	Sustainability Criteria Framework (ESCF)	levels in effective implementation of interventions by multi-sectoral stakeholders in the ENRM sector.	ecological performance standards and labelling for energy services and systems; Establish clear guidelines and internationally standardised evaluation methods for determining the external effects and risks of all energy systems; Create international, regional, national and local programs for energy efficiency improvements, safety controls, waste management and emissions reductions; Create programs for the substitution of non-renewable energy resources by environmentally benign sustainable energy technologies; Introduce full-cost pricing to reflect accurately the total life-cycle social and environmental costs of energy production and consumption; Establish sustainable energy funds to finance energy efficiency improvements and the best available environmentally sound energy technologies; Promote and monitor the Global Energy Charter for Sustainable Development and develop new financial mechanisms involving the private and public sectors; and Promote world-wide cooperation and exchange of technologies, expertise, education, training programs and statistics for environmentally sound energy technologies, energy efficiency, performance standards, safety codes, methods of energy costing and means of internalising external costs.
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13	FUTURE PLANS AND PROGRAMMES FOR THE MINISTRY OF NATURAL RESOURCES, ENERGY AND ENVIRONMENT: 2009 – 2014	-	Facilitate and strengthen participatory development, implementation and monitoring of natural resources, energy and environmental management activities. Promote research and studies on natural resources, energy and environmental issues. Capacity building in natural resources, energy and environmental policies, legislation and other issues. To increase security and reliability of energy supply systems. To increase access to affordable and modern energy services.
14	SUMMARY - MALAWI GROWTH AND DEVELOPMENT STRATEGY (FROM POVERTY TO PROSPERITY) 2006-2011	Goal: -To create a conducive environment for private sector investment to stimulate economic growth. -Government is, therefore, committed to pursue sound economic policies geared at increasing and sustaining economic growth, reducing inflation rate, maintaining a flexible exchange rate and improving foreign reserve position II. GOVERNMENT PRIORITIES WITHIN PRIORITIES <u>Goal:</u> 1. <i>Agriculture and Food Security</i> To increase agricultural productivity and ensure food security	5. Climate Change, Natural Resources and Environmental Management Promoting production and marketing of alternative energy technologies; Integrated Rural Development Government is committed to promoting the development of rural growth centres and emphasis is being placed on infrastructure development such as roads and communications, energy supply, agro-processing and manufacturing. This is envisaged to promote private sector investment that will create employment and improve incomes of the rural people. 9. Energy, Mining and Industrial Development Energy development, exploitation of mineral resources and industrial development are crucial for economic growth and development. Although Malawi is relatively well endowed with a wide variety of energy and mineral resources, the full potential of the sectors remain far from being realized due to a number of structural, operational and institutional challenges that have resulted in stagnation of industrial development. Energy Development: The expected outcome is an accessible, reliable and sustainable electricity, liquid fuel and gas supply. To achieve this, the key strategies include the following: Improving efficiency in generation, transmission and distribution; Promoting alternative energy sources including renewable energy; and Encouraging private sector investment in the sector.



	<p><i>Green-Belt Irrigation and Water Development</i></p> <p>Goal: To improve the utilization and management of water resources for agricultural use through irrigation farming in designated areas, as well as domestic and industrial demands</p> <p><i>Transport Infrastructure and Nsanje World Inland Port</i></p> <p>Goal: To reduce the cost of transportation and lead times by opening up the country to the Indian Ocean, and improving the road and the railway network.</p> <p><i>Climate Change, Natural Resources and Environmental Management</i></p> <p>Goal: To conserve, manage and utilize natural resources and the environment in a sustainable manner so as to reduce degradation and adverse socio-economic impacts.</p> <p><i>Integrated Rural Development</i></p> <p>Goal: To develop rural growth centers that will</p>	
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		<p>contribute effectively to economic growth through the creation of employment opportunities thereby enhance redistribution of wealth to all citizens.</p> <p><i>Public Health, Sanitation and HIV and AIDS Management.</i></p> <p>Goal: To improve the health status of Malawians to effectively contribute to socio-economic development</p>	
15	MALAWI ECONOMIC GROWTH STRATEGY DOCUMENT II (2004)	<p>Objective; To reduce poverty through sustained economic growth and infrastructure development.</p>	<p>8.2 FUTURE PROSPECTS One of the by-products of sugar processing is molasses, which is being utilised to produce ethanol. This in turn is used in various applications including an additive for petrol and now ethanol gel stoves (as a replacement for charcoal burning).</p> <p>14.4 STRATEGIES; Strategy 14: Improve domestic infrastructure by: Providing investment incentives for local water treatment and for power Supplies such as solar energy.</p>
16	MALAWI ECONOMIC RECOVERY PLAN (Revised 1)	<p>Goal Outlines the way forward for the country to achieve quick development results in the short and medium term.</p> <p>Vision To eradicate poverty through economic growth and wealth creation.</p>	<p>2.0 THE RECOVERY PLAN Given the economic challenges outlined earlier, implementation of the Economic Recovery Plan was urgent. Thus the recovery plan embraced a set of immediate (within 3 months), short (1 year), and medium term (2-5 years) policy reforms aimed at restoring external and internal economic stability. It further proposed measures to cushion the vulnerable from the impact of any reforms particularly the exchange rate policy. In addition the plan proposed increasing resource allocation to areas that would address constraints to economic growth such as energy and to those aimed at boosting production for the export market.</p>



		<p>Recovery Plan Policies (on Energy) To generate and distribute sufficient amount of energy to meet national demand</p>	<p>2.2 Short Term (1 year); B. Budget Framework: To this end, efficient and reliable energy will be required to promote value addition, export diversification, and boost growth in these sectors and other potential sectors such as mining.</p> <p>2.3.1 Medium Term Focus Areas Economic growth in Malawi is constrained by a number of factors including energy, transport and limited exports. To contain the situation the country will ensure that energy generation and supply, transport infrastructure and exports diversification are addressed quickly. Tourism, mining, manufacturing, commercial farming and agro-processing will be key in generating the desired foreign exchange earnings. Going forward, focus will therefore be placed on the following sectors:</p> <p>Medium Term Focus Areas The country continues to face a number of challenges in the energy sector. These include inadequate capacity to generate electricity and intermittent supply. Consequently, economic activity in areas such as mining and manufacturing are affected.</p> <p>Government will therefore support investments in energy generation and supply in order to generate and distribute sufficient amount of energy to meet national socio-economic demands. It will endeavour to, among other activities do the following:</p> <ul style="list-style-type: none"> Continue financing works at Kapichira II rehabilitation project; Establish new hydro stations; Continue pursuing the Millennium Challenge Compact with a view to widen its scope; Manage the demand in the industry by encouraging economic usage of electricity, including usage of energy saver bulbs; Encourage regional interconnectivity; Explore establishment of coal generated electricity; Enhance research in other sources of energy including wind and solar; and
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			Promote Public Private Partnerships (PPP) in energy generation and distribution.						
17	MALAWI GROWTH AND DEVELOPMENT STRATEGY REVISED VOLUME II (2006)	<p>Overall objective To reduce poverty through sustained economic growth and infrastructure development.</p> <p>Forestry ; Goal To reduce environmental degradation with the medium term expected outcome of ensuring sustainable use and management of forestry resources in Malawi.</p> <p>Strategies</p> <ul style="list-style-type: none"> • Improving productivity and value added by the industrial forestry sector, while balancing it with sustainable practices • Increasing forestation efforts for key are; <p>Improving enforcement of regulations for forestry management</p> <p>Initiating afforestation and environmental rehabilitation programmes in priority areas; and</p> <p>Introducing incentives for private sector participation in forestry.</p>	<p>Summary of Theme 5; Infrastructure Development</p> <table border="1"> <thead> <tr> <th>Sub theme</th> <th>Long and medium term goals</th> <th>Expected outcome</th> </tr> </thead> <tbody> <tr> <td>Energy</td> <td>The goal in the sub-sector is to reduce the number and duration of blackouts, increase access to reliable, affordable electricity in rural areas and other targeted areas (such as social Facilitates) and improve coordination and a balance between the needs for energy and the needs of other high growth sectors (such as Tourism). In the medium term, it is expected that the country will have reliable and sustainable energy supply and increased Access.</td> <td>Reliable and sustainable energy supply and access. Increased access current 6% to 10% and 30% by 2020 Biomass-commission mix target of 75% set for 2010. Power supply is SAPP.</td> </tr> </tbody> </table> <p>5.5.2 Sub-Theme Two: Energy Energy is a crucial input into any industrial processing and serves as the life-blood for any economy. Malawi is relatively well endowed with a wide variety of energy resources such as biomass (firewood, charcoal, crop residues), coal, and perennial rivers for power generation and adequate sunshine for photovoltaic and photo-thermal applications. The full potential of the energy sub-sector remains far from being realized owing to a number of structural, operational and institutional challenges The provision of energy in Malawi is inadequate, unreliable and inaccessible to all who need it. This is mainly due to lack of competition in the sector; siltation resulting from deforestation; poor farming practices and management; weeds and water hyacinth on the Shire River which affects hydro-generation; expensive spare parts which inhibit maintenance of equipment leading to frequent breakdowns; and lack of progress on</p>	Sub theme	Long and medium term goals	Expected outcome	Energy	The goal in the sub-sector is to reduce the number and duration of blackouts, increase access to reliable, affordable electricity in rural areas and other targeted areas (such as social Facilitates) and improve coordination and a balance between the needs for energy and the needs of other high growth sectors (such as Tourism). In the medium term, it is expected that the country will have reliable and sustainable energy supply and increased Access.	Reliable and sustainable energy supply and access. Increased access current 6% to 10% and 30% by 2020 Biomass-commission mix target of 75% set for 2010. Power supply is SAPP.
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			<p>regional interconnection and commitment to tap into other energy sources. In addition to these challenges is the limitation of public investment in power generation and widespread vandalism of equipment</p> <p>Goals The long-term goal is to generate sufficient amount of energy to meet the economic and social demands.</p> <p>Medium Term Expected Outcome In the medium term, it is expected that the country will have accessible, reliable and sustainable energy supply. At the same time, rural communities will begin to use alternative energy supplies in underserved areas while managing energy related environmental impacts. To achieve an efficient energy supply, strong inter-sectoral linkages especially with the water, natural resources and agriculture sectors will have to be established. An efficient supply of hydropower requires a constant supply of water through proper conservation of catchment areas, connections to neighbouring countries and exploring into other sources of energy. The sub-sector will also require strong public-private partnerships especially in generation, distribution and transmission. Main strategies include: Expanding the Rural Electrification Programme (increase resources, promote development of micro hydropower stations and use of solar energy for off grid power supply) and use of both grid and off-grid options; Ensuring that energy provision takes into account and puts in place measures to deal with negative environmental impacts that may set in</p>
18	<p>MALAWI NATIONAL LAND POLICY,2002</p>	<p>Goal: To ensure tenure security and equitable access to land, to facilitate the attainment of social harmony and broad based social and economic development through optimum and ecologically balanced use of land and land based resources.</p>	<p>9.5 Community Forests And Woodlands Management 9.5.1 The level of environmental damage done through bush fires, poor farming practices, overgrazing, over harvesting of trees and others calls for better management of forests and woodlands. More than 90% of Malawians use fuel wood (firewood) for cooking. The current annual rate of consumption is estimated to exceed the rate at which natural regeneration is able to replenish the stock. Forest clearing for agriculture, fuel wood and for tobacco curing is therefore a major problem and a leading cause of degradation. The need for more land for cultivation, as cultivable land becomes scarce pushes farmers into marginal areas. In most cases the loss of forest products - fruit trees, nuts and dyes, herbal</p>

		<p>Objectives: To promote tenure reforms that guarantee security and instill confidence and fairness in all land transactions To promote decentralized and transparent land administration To extend land use planning strategies to all urban and rural areas To establish a modern land registration system for delivering land services to all To enhance conservation and community management of local Resources To promote research and capacity building in land surveying and land Management</p>	<p>medicine, flora and fauna - essential for human survival affects the communities that most depend on them for income and subsistence. In some rural areas, collecting, processing and selling forest products are the only way by which rural households obtain income.</p> <p>9.6 Over-dependence on Fuel Wood 9.6.1 There is over-dependence on fuel wood for rural and urban energy consumption despite the abundance of other potential energy sources like wind, coal and solar. Steps will be taken to exploit alternative sources of energy to provide and diversify energy sources and minimize the depletion of forests and woodlands for urban and commercial use. Programs to involve Communities in safeguarding forest reserves, conservation areas and national parks and to share the revenue derived from them, will be encouraged and supported.</p> <p>9.10 Mining And Minerals Quarrying and mining operations in many instances result into Environmental pollution or land degradation. For example, sand quarries Increase soil erosion in riverbanks and valleys. Stone quarries lead to noise and dust pollution from stone and may result in earth movements. Small-scale brick making operations create open pits and breeding grounds for Mosquitoes and relies on fuel wood for curing.</p> <p>6.4 Rural Physical Development Policy 6.4.1 The National Physical Development Plan was prepared to guide the Preservation of the nation’s agricultural land potential, particularly the best arable lands. The Plan also formulates land use measures to facilitate agricultural and other sectoral developments. It provides a spatial framework for the co-ordination of sectoral development projects and balances space requirements for all competing uses of land</p> <p>Villagers will be sensitized during the land use planning process to provide and establish fuel-wood plantations to meet the demands for wood energy. Fragile areas such as steep slopes, wetlands and areas susceptible to flooding will be zoned to prevent or minimize the adverse environmental impact of cultivation and other developments.</p>
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			<p>10.3 Poor Agricultural Technology and Land Utilization</p> <p>10.3.1 The damaging effect of poor agricultural methods and land use practices on the nation's land resources is a matter of grave concern. Agriculture exerts various forms of land degradation; chief among these is high smallholder population concentrations, primitive agricultural technology, soil erosion, and the effects of land clearing and deforestation on the environment. The loss of biomass due to wood harvesting for fuel and tobacco curing alone is estimated at 84,826 cubic meters per annum. The combination of poor agricultural practices, soil and biomass losses, unimproved traditional methods using no, or minimum improved inputs, and no conservation practices, have all contributed to declining productivity in agriculture</p> <p>4.22 Advantages for Enabling Efficient Land Transactions</p> <p>4.22.1 A priority issue for this land policy is the comprehensive registration and titling of customary land interests in Malawi. From the experience of titling programs elsewhere, the design and initial investment in a Customary Land Titling and Registration exercise will consume a lot of energy and resources.</p> <p>10.1 Sectoral Land Use Policies</p> <p>10.1.2 Development aims to improve the living standards of all people. Considering development is based on land and the utilization of land-based resources, such as water, minerals and energy, and the supply of clean and healthy living space, the condition of the land has repercussions on the welfare of the society. However, compliance monitoring is normally not found in land legislation and because those mechanisms which do exist are usually weak in any event, the subject of monitoring land policy requirements presents other land sector agencies with an opportunity to assist the Ministry achieve its land policy objectives.</p>
19	<p>NATIONAL GENDER POLICY, 2008</p>	<p>Goal: To mainstream gender in the national development process to enhance participation of men, and women, boys and girls for sustainable and equitable development for poverty eradication.</p>	<p>3.3.3.1 (Strategies) Promote energy saving technologies to reduce women's time and energy on the multiple roles;</p> <p>3.3.3.6 (strategies) Create awareness on alternative and clean sources of energy;</p>

		<p>Overall objective;</p> <p>To increase access, retention and completion to quality education for girls and boys;</p> <p>To ensure gender issues and concerns are addressed throughout the health sector;</p> <p>To ensure gender concerns and issues are mainstreamed throughout all activities relating to HIV and AIDS;</p> <p>To strengthen gender mainstreaming in the agriculture, food and nutrition security sector;</p> <p>To strengthen gender mainstreaming in the natural resources and environmental sector in order to achieve equality and sustainable environmental development;</p> <p>To reduce poverty among women and other vulnerable groups through economic empowerment;</p> <p>To promote women's</p>	<table border="1"> <thead> <tr> <th data-bbox="801 300 1039 411">OTHER SPECIFIC GOAL</th> <th data-bbox="1039 300 1272 411">SPECIFIC OBJECTIVE</th> <th data-bbox="1272 300 1554 411">STRATEGY</th> <th data-bbox="1554 300 1655 411">RESPONSIBILITY FOR IMPLEMENTATION</th> </tr> </thead> <tbody> <tr> <td data-bbox="801 411 1039 970">other vulnerable groups in the sound management, conservation and utilization of natural resources and the environment for sustainable development</td> <td data-bbox="1039 411 1272 970">To minimize negative natural resource and environmental impacts thereby enhancing environmental benefits of projects to the majority of the vulnerable groups.</td> <td data-bbox="1272 411 1554 970"> Promote energy saving technologies to reduce women's time and energy on reproductive activities; Promote more involvement of women, men and vulnerable groups in issues of waste management and pollution; Create awareness among women, men, girls and boys on global warming and climate change; Promote organic farming for women and men; </td> <td data-bbox="1554 411 1655 970"> MoWCD UNIMA, NGOs, P MoWCD Media, M Dept of E FBOs, M Town, Ci Municipa Dept of E MoICE, I MoWCD NGOs, F </td> </tr> </tbody> </table>				OTHER SPECIFIC GOAL	SPECIFIC OBJECTIVE	STRATEGY	RESPONSIBILITY FOR IMPLEMENTATION	other vulnerable groups in the sound management, conservation and utilization of natural resources and the environment for sustainable development	To minimize negative natural resource and environmental impacts thereby enhancing environmental benefits of projects to the majority of the vulnerable groups.	Promote energy saving technologies to reduce women's time and energy on reproductive activities; Promote more involvement of women, men and vulnerable groups in issues of waste management and pollution; Create awareness among women, men, girls and boys on global warming and climate change; Promote organic farming for women and men;	MoWCD UNIMA, NGOs, P MoWCD Media, M Dept of E FBOs, M Town, Ci Municipa Dept of E MoICE, I MoWCD NGOs, F
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		<p>participation in politics and decision making; and</p> <p>To eliminate gender based violence from the Malawian society.</p> <p>To strengthen the capacity of the National Gender Machinery.</p> <p>To reduce child abuse and trafficking</p>	
20	<p>MALAWI NATIONAL FORESTRY PROGRAMME, 2001</p>	<p>Goal Sustainable management of forest goods and services for improved and equitable livelihoods</p> <p>Aim To link policy and on-the-ground practice so that both are continuously improved in favour of good forest and tree management for alleviating poverty and improving livelihoods in Malawi.</p>	<p>FOREWORD</p> <p>My Government recognizes the role that the natural resources sector in general, and the forest sector in particular, can play in poverty alleviation and the consolidation of Malawi's democracy. For example, forests supply almost 95% of our household energy requirements; in addition, they are particularly important in sustaining our growing economy by supporting development and employment in agriculture tourism, and the expanding construction industry. Forests and trees also play an important role in conserving the environment and biodiversity – key elements in ensuring that development is sustainable. Malawi, being a predominantly agriculture-based economy, cannot underestimate the role natural resources play in the economic and social development of its People</p> <p><i>The NFP has developed twelve strategies , each with a set of prioritised actions. In summary these strategies and actions aim to ensure that the role-players are able to:</i></p> <p>8. Influence wood energy supply and demand. Focus wood energy policies, and phase out government subsidies for timber, to encourage private production of wood fuel and timber.</p> <p>4.5 Improve Individual Smallholder Livelihoods</p> <p><u>Issues</u></p> <ul style="list-style-type: none"> • The partially enforced policy which bans unlicensed indigenous fuelwood and charcoal selling may reduce the incentives to manage woodlands and indigenous trees

			<p>38. MALAWI'S NATIONAL FORESTRY PROGRAMME A key strategy for the NFP is to stimulate private investment in fuelwood/charcoal production while at the same time keeping fuelwood prices affordable for customers</p> <p>4.11 INCREASE WOOD PRODUCTION IN THE ESTATE SECTOR The majority of estates obtain their fuelwood from outside sources, particularly from customary land and government plantations. According to the Agricultural Research and Extension Trust, 60% of wood for tobacco estates comes from natural woodlands while 40% comes from plantations. Among the large tobacco estates the Kasungu Flue Cured Tobacco Authority (KFTCA) appears to be self sufficient in supplying wood to its growers but is still over-harvesting natural woodlands, while the largest producer, Press Agriculture, meets about half of its wood needs from own resources. The other half is obtained from charcoal from Viphya (25% of its requirement) and indigenous wood from customary land (25% of its requirement). In general, it has been noted that only 15% of tobacco estates are self sufficient in wood while over 50% of estates cannot supply even half of their own requirements. Although all estates are legally required to maintain 10% of their land area under tree cover (natural or planted), in many cases this requirement has not been met and neither has it been enforced.</p> <p>Issues</p> <ul style="list-style-type: none"> • Poor relationships between estate managers and communities living in adjacent customary land, characterised by conflict over access to resources (particularly land, fuelwood and timber). <p>EXECUTIVE SUMMARY</p> <ul style="list-style-type: none"> • Fuelwood problems are rising, and affect women and children most. For the foreseeable future fuelwood will remain vital for most Malawians. But much of the wood is being chopped from woodlands much faster than it can grow back. Women have to spend more time finding wood, whilst children suffer from less frequent cooking. <p>1.2 WHY MALAWI NEEDS A NATIONAL FORESTRY PROGRAMME</p> <ul style="list-style-type: none"> • Fuelwood problems hit women and children the hardest. Apart from demand for land, the greatest demand on forests and trees is for energy – an estimated 93% of all
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			<p>energy used is derived from biomass. Inadequate fuelwood is a chronic problem, which, given the inability of poor households to buy substitutes, has resulted in the: diversion of household time (particularly female labour) away from productive activities to the search for fuel; the burning of crop residues and available biomass to the detriment of soil fertility; and reduced consumption of energy through less frequent cooking – with attendant adverse nutrition consequences, particularly for children. Women comprise more than 70% of the farming population, as men often migrate to cities to find wage labour, yet much of their work is invisible in the national accounts that register only formal employment.</p> <p>4.2. OPTIMISE POLICY INFLUENCES ON FORESTS AND LIVELIHOODS Policies influencing demand for forest goods and services:</p> <p>Energy pricing and fuelwood alternatives – the price and availability of e.g., paraffin and electricity is directly linked to demand for fuelwood</p> <p>4.4 SUPPORT COMMUNITY-BASED FOREST MANAGEMENT Indigenous forests, originally widespread, have been the major source of additional agricultural land. In addition to providing much of the country’s fuel for domestic and industrial uses, they are the main source of many essential products for the rural poor: fuelwood, pole and timber for construction and hand tools; and important non-timber forest products such as thatch, mushrooms, caterpillars, bushmeat, medicinal plants and materials for handicrafts. These forests also help to ensure supplies of fresh water, prevent flooding, protect crops from wind damage, stabilise soil and avoid excessive siltation of riverbeds downstream.</p> <p>Issues</p> <ul style="list-style-type: none">• Miombo woodlands on customary land are host to most of the forest clearance and unsustainable harvesting of forests and trees occurring in Malawi. The highest pressure is in Central region (39% of population), whilst the lowest is in Southern region (50% of population) where there is little forest cover left. Pressure in the Northern region (11% of population) is increasing• High demand for forest products, notably fuelwood, is liquidating forest assets and growing stock. Driving forces for these effects are to be found in deficiencies of policy,
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			<p>markets, information and education</p> <p>4.5 IMPROVE INDIVIDUAL SMALLHOLDER LIVELIHOODS Farmers in Malawi have a long tradition of planting and managing trees within crop lands, field boundaries and around their homes. Surveys have recorded up to seventy species of trees that are deliberately retained or planted by farmers in crop lands. Smallholder households typically secure fuelwood from land clearing, lopping and pollarding of on-farm trees, and gathering dead wood from bush fallows (complemented by use of agricultural residues such as maize, millet, tobacco, cotton and pigeon pea stalks).</p> <p>Past forestry initiatives in support of smallholders have tended to abstract trees out of their livelihood strategies context – and have concentrated on improving technical efficiency and user education to increase adoption of extension packages. Insufficient attention has been paid to the complex mix of activities often involved in farmer livelihoods, and the balance of risks and willingness to pay. Technologies such as planting trees for fuelwood, or utilising fuel-efficient stoves in the rural context are generally time (rather than money) saving technologies, since the majority of households collect their fuelwood for nothing. Willingness to pay for them is low – because there is little logic to investing precious financial resources in saving time, even if shortages require people to work longer or walk further for fuelwood. However, in some areas the critical turning point has been reached – and rural households are buying fuelwood.</p> <p>4.6 STRENGTHEN FOREST EXTENSION In the past, extension efforts concentrated on providing subsidies for planting of fuelwood trees with the aim of reducing pressure on existing woodlands. This strategy failed to recognise the real cause of woodland clearance, and did not provide direct support for local management of woodlands. Furthermore, extension staff were involved in enforcing the unpopular system of royalties and controls on sale of woodland products, which have served to undermine local management efforts, and caused considerable suffering through the loss of sources of essential income.</p> <p>4.8. INFLUENCE WOOD ENERGY SUPPLY AND DEMAND After forest clearance for agriculture, off-take of fuelwood is the major use of much of Malawi’s forest resources. It is estimated that about 70% of demand for wood originates from urban and rural households (10% and 60%, respectively), whilst about</p>
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			<p>30% of demand stems from tobacco and tea estates (see section 4.11). It is further estimated (based on mean annual increments) that forest resources on customary land make up about 4.5 million cubic metres of Malawi’s potentially sustainable supply from existing forest resources of 7-8 million cubic metres (see section 1.2). However, demand from rural households alone is perhaps double this amount.</p> <p>Past donor-supported forest programmes in Malawi were heavily influenced by “fuelwood crisis” thinking, which underpinned international approaches to support for forestry in developing countries throughout the 1970s and into the 1980s. Large investments were made in rural fuelwood programmes, which largely failed to meet expectations since they were based on inadequate understanding of household incentives, coping strategies, and shifts to other fuel sources.</p> <p>Issues</p> <ul style="list-style-type: none"> • Wood energy policies and programmes have over-emphasised planting trees for fuelwood and fuel-saving technologies in rural areas – which overestimate people’s willingness to pay for these approaches • Customised instruments and approaches need to be geared to the specific characteristics of genuine markets for fuelwood <p>4.10 FOSTER IMPROVED INDUSTRIAL FORESTRY</p> <p>Pole and fuelwood plantations on public land. About 22,940 hectares of pole and fuelwood plantations have been established. The major species are Eucalyptus grandis/saligna, E. camaldulensis and E. tereticornis. Mean annual increments vary widely from 10 to 40 cubic metres per hectare per year depending on altitude and precipitation. Whilst these pole and fuelwood plantations are now mature, long distances to major market centres and increasing transport costs have to date made these resources relatively unattractive to wood merchants.</p>
21	<p>STANDARDS & GUIDELINES FOR PARTICIPATORY FORESTRY IN MALAWI</p>	<p>This document sets standards and guidelines for improving forest governance and rural livelihoods.</p> <p>Goal To empower rural communities to conserve and develop Malawi’s forest resources for the economic and</p>	<p>Community involvement in the management of state plantations: The minimum requirement is that social issues including community access rights are addressed within State plantation management plans, concession agreements with private operators and other licenses issued. Reference should be made to lessons from the Blantyre City Fuelwood Project (BCFP) and documentation from the Forest Plantation Initiative Malawi (FPIM)</p> <p>HIV/AIDS-AFFECTED HOUSEHOLDS COPING STRATEGIES Increase in forest product collection: Subsistence – increase dependence on near</p>

		<p>environmental benefit of the present and future generations.</p> <p>Objective It aims firstly to stem the prevailing widespread destruction of forest resources on customary land and the material products and essential environmental services they provide.</p> <p>The second and equally important objective is to encourage the development of customary forests and woodlands as important economic assets to the communities on whose land they occur.</p>	<p>resources – collection of fuelwood around the homestead; and</p> <p>Commercial – increase in collection and sale of wood and non-wood forest products.</p> <p>What are customary law and local resource use rules? Investigate and stimulate discussion over rules covering the following:</p> <ul style="list-style-type: none"> • Rules to regulate harvesting of fuelwood and timber products; <p>Processing and marketing forest produce Under a Forest Management Agreement (FMA), a VNRMC (or recognised management authority) may be established as the licensing authority for commercial forest resource production within its Village Forest Area. The VNRMC may generate income from forest production in two ways. Firstly, it may engage in direct sales of forest products (planks, poles, grass, firewood, etc.) outside the community. Alternatively, it may license community members or even outsiders to harvest such products for their own private business purposes. Production (harvesting) must in every case be recorded, and must not be permitted to exceed the limits set in the forest management plan which form part of the legal agreement (FMA).</p> <p>What are customary law and local resource use rules? Note: Changing a rule alone will not lead to actual change unless practices are changed, therefore practices need to be understood. For example, who collects firewood from where, when and by what means. Banning firewood collection will not solve the problem, without the agreement of those who currently collect firewood or use the particular area.</p> <p>Who issues licences? The licensing of wood processing, the trade in forest products and the harvesting of forest products from customary land that is not a Village Forest Area managed under a Forest Management Agreement will be decentralised to the District Assemblies in accordance with the Ministry of Mines, Natural Resources & Environment devolution plan.</p>
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22	<p>STATUS OF FORESTS AND TREE MANAGEMENT IN MALAWI, 2010 <i>{A Position Paper Prepared for the Coordination Union for Rehabilitation of the Environment (CURE)}</i></p>	<p>1.41995-2010: Multi-party democrac</p> <ul style="list-style-type: none"> The first five years were characterized by multiparty democracy euphoria, resulting in destruction of timber plantations and escalation of deforestation through charcoal production on both private and customary land, e.g., Ndirande Timber Plantation in Blantyre disappeared within two years after attaining the multiparty system of government (in 1994). <p>2.3 Public Forests in Malawi</p> <p>Ndirande Forest Reserve was encroached for settlements and cultivation. Government has since reclaimed 300ha and the encroachers have been compensated approximately MK16 million. The remaining encroached 400 ha will cost government MK36 million for houses and gardens the encroachers had established. The integrity of these protected areas is also under threat from illegal production of charcoal to supply urban centres with low cost fuel. Most of the charcoal is produced from forest reserves with 15,000 ha cleared for an estimated volume of 6.08 million standard bags per year consumed in the Malawi's four cities (Kambewa et al 2007, Charcoal the Reality).</p> <p>2.4.4 Biomass Energy and Non-Energy Demands</p> <p>Biomass is Malawi's main source of energy, mainly in the form of wood. It accounts for an estimated 88.5% of total demand, ranging from 98% in the household sector through 54% in the industrial sector and 27% in the service sector to 5% in the transport sector (Government of Malawi- BEST 2009)</p> <p>In terms of wood equivalent (w.e.), the total demand for biomass energy in 2008 is estimated at 8.92 million t. w.e. (air dry) or about 13.5 million m³ solid¹⁵. Wood and other forms of biomass are used for additional (non-energy) purposes such as construction, joinery and furniture. The additional demand for these applications is about 1.5 million m³ for wood products alone (Government of Malawi- BEST 2009)</p> <p>While much of the demand for household energy in rural areas is met by self-collection, most urban biomass is purchased and practically all biomass for non-household uses is purchased or plantation-grown for own use. This makes biomass the most important commercial fuel in the country, in terms of economic value, employment and energy security (Government of Malawi- BEST 2009).</p> <p>3.1.4 The National Forestry Programme (NFP)</p> <p>Using the NFP as a guide, a number of forestry projects and programmes were</p>
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			<p>supposed to be implemented in Malawi. A decade later, Malawi still continues to face critical challenges in the implementation of the NFP, evidenced by illegal tree cutting in all forest reserves and plantations; illegal charcoal production and trading across Malawi; and many others. The forestry resources have become a tragedy of the commons- free for all. A case in point is the Chongoni Pine Plantation in Dedza which is being cut illegally with grossly low enforcement by authorities. Again, charcoal production and trade in Malawi has reached critical proportions, to such an extent that charcoal is being produced along roadsides and transported in day broad light without any actions from responsible authorities. In general, the NFP has just become a reference document for preparing other documents rather than acting as a reference for implementing programmes. For example, an assessment by June 2010 training workshop on NFP held in Salima vividly indicated that the NFP process was not proactive.</p> <p>3.1.5 Standards and Guidelines for Participatory Forestry Following many guidelines, field manuals and extension kits prepared in the past, in 2005 the Government of Malawi developed Standards and Guidelines for Participatory Forestry in Malawi. This document sets standards and guidelines for improving forest governance and rural livelihoods.</p> <p>3.2 Forest and Tree Management in Malawi The Government of Malawi, through the Department of Forestry, has implemented a number of large-scale projects to create sustainable supplies of timber and fuel wood. Examples of such programmes and projects are presented below. According to Kafumba (1984), the government started creating additional supplies of wood in the 1966/67. Some of these actions are captured under this section.</p> <p>3.2.1 Wood Energy Plantations The global energy crisis that occurred in 1970's prompted governments, including Malawi to create wood energy sources. This prompted the Malawi government to launch the Wood Energy Project in 1980, financed by the World Bank. The objective of the project was to improve fuel wood and pole supplies to both rural and urban population for domestic and commercial purposes (Wood Energy Appraisal Report, 1979). The project established 12, 000 ha of fuelwood plantations and 88 tree nurseries throughout the country. The project had an extension to the second phase, which established 2,800 ha of fuel wood plantation at Mulanje.</p>
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			<p>3.2.2 Blantyre City Fuel wood Plantations</p> <p>Realizing the dwindling forest resources on customary land, the Malawi government, with funding from the Norwegian Agency for Development Cooperation (NORAD) implemented the Blantyre City Fuelwood Project from 1987 to 2001. The objective was to contribute to fuel requirements of low-income groups living in Blantyre and Zomba. A total of 4,700 ha were established on customary land in Blantyre, Chikwawa and Zomba Districts. However, all the plantations were later handed over to 98 village local communities in 2001, as part of decentralization process and poverty reduction strategy.</p> <p>Tree planting programmes undertaken by the general public, initiated during the projects, together with the fuel wood plantations have contributed significantly to alleviating fuel wood problems for both domestic and commercial uses. Observations indicate that most of the wood currently being sold in urban areas of Blantyre and Zomba come from these fuel wood plantations and woodlots established by the general public.</p> <p>Although the government created large forest plantation resource, most of it has been degraded due to theft, overexploitation and uncontrolled bush fires. For example, significant large proportions of BCFP plantations have been destroyed (Figure 1). Limited funding by the government to manage the fuelwood plantations and sustain extension services for the BCFP plantations has been the major challenge.</p> <p>Mpemba Hill in TA Somba, Blantyre and Namisu Hill in TA Kumnthembwe, Blantyre. All these hills were afforested under the Blantyre City Fuelwood Project (1987-2001), but later the plantations were handed over to the local communities. The plantations have been degraded.</p> <p>3.2.3 Improved Forest Management for Sustainable Livelihoods Programme (IFMSLP)</p> <p>However, despite these agreements, encroachment and charcoal production continued uncontrolled in other forest reserves. Since the project was implemented in selected areas, people from the non project areas interpreted the co-management agreements to mean that government had approved cutting down of trees in forest reserves. Though the blocks under co-management agreement were not seriously affected by encroachment and charcoal burning, the surrounding and nearby areas were affected by heavy deforestation and encroachment for farming like in the case of Malosa and Zomba Forestry Reserve.</p>
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			<p>politics and economics around this business. Above all, many people in Malawi will not be connected to the electricity grid due to in competencies and inefficiencies in the way ESCOM is working, and also due to high prices of electrical appliances.</p> <p>5.4.1 Therefore, there is need for Government to encourage tree planting on commercial basis to supply firewood to those that will still continue to depend on firewood.</p> <p>5.4.2 There is also a need for Government to start implementing its policy and legislation on charcoal production to ensure that only those that qualify can produce and trade in charcoal business (i.e. those that have a sustainable forest with a management plan and a license from the Department of Forestry);</p> <p>5.4.3 Having put a mechanism on charcoal production and trade, the Department of Forestry and its partners will have to train charcoal makers to produce charcoal more efficiently. Current methods of making charcoal are rudiment and waste a lot of trees.</p>
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