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Acronyms and Abbreviations

ADC	Area Development Committee
AEC	Area Executive Committee
AfDB	African Development Bank
AHL	Agricultural and Hydrated Lime
ASWAP	Agriculture Sector Wide Approach
ASX	Australian Securities Exchange
ATI	Access to Information
BCI	Biodiversity Conservation Initiative
BVC	Beach Village Committee
CBNRMC	Community-based natural Resources management committees
CBO	Community Based Organisation
CDC	Community Development Committees
COPD	Chronic Obstructive Pulmonary Disease
CSI	Coal Supply Industry
CSO	Civil Society Organisation
DAT	District Advisory Team
DCAFS	Donor Coordination Committee on Agriculture and Food Security
DDPS	District Development Planning System
DEAP	District Environmental Action Plans
DEC	District Executive Committee
DEMG	Decentralised environmental management guidelines
DESC	District Environmental Sub Committee
DTT	District Training Team
EAD	Environmental Affairs Department
EAP	Environmental Action Plan
EDF	European Development Fund
EMA	Environmental Management Act
ENRM	Environment and Natural Resources Management
ENSO	El Niño Southern Oscillation
ESCOM	Electricity Supply Commission of Malawi
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCDO	Commonwealth and Development Office
FFS	Farmer Field School
FIDP	Farm Income Diversification Project
FLS	Frontline Staff
FOLU	Forest and Other Land Use
GCF	Green Climate Fund
GEF	Global Environment Facility
GDP	Gross Domestic Product
GEMMAP	Geological Mapping and Mineral Assessment Project
GHGs	Greenhouse Gases
GoM	Government of Malawi
GSD	Geological Survey Department
GWh	Gigawatt hour
HDI	Human Development Index
HFO	Heavy Fuel Oil
IAS	Invasive Alien Species
IGA	Income Generating Activity
IHS	Integrated Household Survey
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IRP	Integrated Resource Plan
ISEM	Improving Secondary Education in Malawi

ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KULIMA	Kutukula Ulimi m'Malawi (Agricultural Development in Malawi)
LEA	Local Education Authority
LEAP	Law Enforcement and Anti-Poaching
LPG	Liquefied Petroleum Gas
LWB	Lilongwe Water Board (LWB)
LWSP	Lilongwe Water and Sanitation Project
MEAP	Malawi Electricity Access Project
MEFE	Malawi Enterprise Productivity Enhancement
MEPA	Malawi Environment Protection Authority
MGDS	Malawi Growth and Development Strategy
MMCT	Mulanje Mountain Conservation Trust
MoAIWD	Ministry of Agriculture, Irrigation and Water Development
MoFNR	Ministry of Forestry and Natural Resources
MOM	Ministry of Mining
MoNREM	Ministry of Natural Resources, Energy and Mining
MW	Meggawatt
NAC	National AIDS Commission
NCS	National Charcoal Strategy
NEAPW	National Elephant Action Plan for Malawi
NEC	National Council for the Environment
NGO	Nongovernmental Organisation
NOCMA	National Oil Company of Malawi
OMC	Oil Marketing Company
PFM	Participatory Fisheries Management
PIL	Petroleum Importers Limited
PPP	Public Private Partnerships
PSP	Pico Solar Products
RIDP	Rural Infrastructure Development Programme
SADC	Southern African Development Community
SEOR	State of the Environment and Outlook Report
SVM	Sovereign Metals
TA	Traditional Authority
TFR	Total Fertility Rate
THA	Traditional Housing Areas
TTC	Teachers Training College
UNICEF	United Nations Children's Fund
VCPC	Village Civil Protection Committees
VDC	Village Development Committee
VHSC	Village Health and Sanitation Committees
VNRMC	Village Natural Resources Management Committee
WCIU	Wildlife Crime Investigation Units
WPC	Water Point Committees
WRA	Water Resources Areas
WRU	Water Resources Unit
WWF	World Wide Fund for Nature

1 Summary

1.1 State of the Environment

1.1.1 Physical and Biological Environment

Malawi's climate is becoming highly variable characterized by frequent episodes of floods and droughts that destroy crops and livestock, often killing hundreds of people and displacing thousands. Climate trend analysis shows that the temperature is rising with the potential of increasing by 1.3 °C to 2.6 °C by the end of this century. Minimum temperatures are exhibiting a faster rise than maximum temperatures (GoM, 2020).

Land pressure and land degradation (soil erosion and decreasing soil fertility) are the main environmental challenges affecting 40-60% of the land area with soil erosion averaging 29 metric tons per hectare. Malawi's water availability is rapidly decreasing due to erratic rainfall, invasive aquatic weeds, sedimentation, catchment degradation and climate change, which further pose threats on the country's food security and hydro power generation. In fact, water resources are mostly surface based (98%); estimated at 1.7 mega-litres per person, but with rapid population growth quantities per capita are rapidly declining. The pressures are majorly driven by rapid population growth; Malawi's population has grown from 13 million in 2008 to approximately 18 million in 2018 (National Statistical Office, 2018).

Malawi's land area is 94,080 km², of which approximately 24% was categorized as forest in 2006 (Halle & Burgess, 2006). This has reduced to 21% in 2020 (Forestry Department, 2021). All the protected areas, 88 in total (forest and wildlife resources), are threatened from invasion or destruction from humans. Rate of deforestation has declined from around 2.8% in the 1990's to less than 1% mainly because there are no more free-for-all trees to cut (as was previously the case in customary land forests) (Forestry Department, 2021). Logging is practiced in plantations, resulting in land degradation. Malawi's forests are rapidly diminishing due to illegal commercial charcoal and firewood production, insufficient management of planted trees; low adoption of natural regeneration for bare hill areas, riverine areas, and other areas with the opportunity for natural recovery; forest fires, increasing human population, expansion of agriculture into marginal lands and increased demand for fuel wood and charcoal by rural and urban populations resulting in the exploitation of the remaining forest resources.

Analysis of cause and effects shows that deforestation and forest degradation is resulting in loss of biological diversity and nature-based income, reduced household energy security, loss of soil fertility and land degradation, and watershed/catchment degradation. Watershed destruction is reducing the resilience of human systems (including the built environment) and other natural systems to floods and drought that in turn results in loss of life and property. Deforestation is also accelerating soil erosion and hence loss of soil fertility and land degradation.

Generally, the status of biodiversity in Malawi is declining due to terrestrial and aquatic ecosystems modification, unsustainable utilization and management of natural resources, destruction of habitat by forest clearing for wood, charcoal, timber and for subsistence agriculture in traditionally marginal production areas. Remnant riparian forest is restricted to protected areas (forests and wildlife reserves). According to Forestry Department (2021) forests outside the protected areas have been turned into agriculture fields or settlement areas. These protected areas are being threatened by population pressure that need a portion of the forest for cultivation, settlement and other economic uses. Habitat loss and fragmentation, overexploitation of biodiversity, invasive alien species, pollution and climate change are the main pressures for biodiversity in Malawi (GoM, 2015).

The number of threated fish species is not known but could be in hundreds. Malawi's fisheries resources are threatened by indiscriminate fishing tendencies such as use of banned fishing gear and fishing during the closed season. Existing management approaches including Participatory Fisheries Management (PFM) have proved futile (World Bank, 2019).

Dropping water levels associated with increasing frequency of drought episodes are exacerbating the challenge. Climate variation is adversely affecting the Lake Chilwa system that was once the most productive lake in Malawi (Government of Malawi, 2015). Lake Malawi, the largest and most significant aquatic system with hundreds of endemic fishes, is threatened by eutrophication resulting from nutrient loading from poorly managed agriculture systems.

Erosion of genetic diversity within domesticated, cultivated and wild and harvested species is widespread largely due to preference of improved varieties over indigenous breeds (Government of Malawi, 2015). Government has intensified the management of large mammals and other wildlife in protected areas and wildlife reserves through Public-Private Partnership (PPP) agreements with promising results (Kumchedwa, Director of National Parks & Wildlife, 2021).

At least 248 plant species are threatened by extinction (Government of Malawi, 2015). Invasive Alien Species (IAS) are on the increase and are fast displacing indigenous species and causing economic losses in agriculture, forestry, energy, tourism and many other development sectors. Efforts to manage IAS over the years has not been successful with water hyacinth still causing havoc in the Shire River (Government of Malawi, 2015).

Mineral reserves are available (Bauxite, Uranium, coal and precious stones) but their exploitation has been decimal with a contribution of around 1% to the national GDP. However, there has been an increase in the extraction of small-scale rock aggregate[1], sand and gravel in all parts of the country to support the construction industry, often with little consideration of environmental consequences left by open quarries which are rarely rehabilitated. Most impacts arise from energy consumption (including coal and petroleum) for processing and transporting raw materials, products and by-products.

1.1.2 Socio-economic environment

The main driver to environmental degradation in Malawi is rapid population growth, manifesting in increased demand for resources including food, natural resources and materials and services for sustaining lifestyles (housing, water and sanitation, energy and waste management) (GoM, 2016). Generally, agriculture (both crop and livestock production) has increased to cater for the growing population (GoM, 2016). Climate change manifesting as frequent episodes of extreme weather events (floods and drought) is exacerbating other impacts (GoM, 2016).

Malawi is among the countries with the highest exposure to household air pollution with a Household Solid Fuels Exposure Score of 9.3 and ranking 162 against 180 counties in the world (Yale University, 2020). This is attributed to high use of biomass for cooking. Overall, 99% of households in Malawi use solid fuels as the main fuel for cooking. Overreliance on biomass for cooking is the leading cause of deforestation and degradation in Malawi given that more than 97% of households rely on forests (biomass and charcoal) for energy (GoM, 2017).

Unsustainable extraction of natural resources is resulting in loss of biological diversity and reduced income from tourism, degradation of aquatic systems and ultimately loss of income for national development. High levels of exploitation of forests and forest products, wildlife, and fisheries are exceeding sustainability levels (GoM, 2015).

Land under agriculture has almost doubled from 34% in 1961 to 61% in 2020 (National Statistical Office, 2020). Livestock production has more than doubled, with livestock index of 244 over the period from 2006 – 2016 (World Bank, 2021). A cause and effect analysis show that agriculture expansion is causing soil erosion and land degradation resulting in degraded aquatic systems (lakes, rivers, wetlands and aquatic flora and

[1] Based on 2020 National Economic Report

fauna). This has knock-on effects on productive industries by reduced agriculture yields and incomes, reducing fish yields and incomes, and reducing hydropower generation.

Annual fish landings have increased by over 70% from an average of 90,000 tons in 2000 to around 155,000 tons in 2015. Aquaculture production has increased in terms of numbers of farmers engaged from 4,600 owning 9,500 small fishponds in 2006 to 15,465 owning 10,007 standard fishponds in 2020. However, these figures are decimated by population growth considering that the population has grown by over 4.5 million over the decadal inter-census period from 2008-2018 (NSO, 2018)[2]. Valuable fish species like the Chambo have been over-exploited to near extinction. Low value fishes such as Usipa have dominated fish catches.

Waste management is often a growing concern in the country. The industry sector is small, mostly characterised by agro-processing, but growing to satisfy the growing demand in processed goods, transportation and other services. This has culminated in increased generation of waste such as plastics and fuel-based emissions.

Malawi's urbanization rate of 5.2 % taking place in the absence of industrialization, job creating investments, or adequate service provision in terms of housing, infrastructure and services. Malawi's cities and towns are facing clear and growing challenges to provide local populations with better basic living conditions (electricity, transport infrastructure, water supply, sanitation, solid waste management, housing infrastructure, risk of hazards, unplanned settlements. In cities and towns, water resources are being increasingly polluted by waste generated and poorly managed.

The demand for water for human use is expected to triple from a cumulative total of 717 mega-litres per day (baseline in 2010) to 2,154 mega-litres per day in 2035, representing average annual growth of 8% – driven by population growth and increased access to potable water. Consumption and demand of electricity has increased from 230 MW in 2005 to 330 MW in 2018 whereas the supply side is overwhelmed not able to reach the increased demand (GoM, 2020). The proportion of population accessing electricity has increased from 3.2% in 1992 to 18.0% in 2018. The consumption of petroleum and other fuels, including coal and biomass, have also increased. More than 97% of the population rely on illegally acquired/produced firewood and charcoal (from forest reserves). The shift to renewable energy is slow despite the Government provision of incentives such as removal of import tax on all solar products.

1.1.3 Environmental and climate change policy/regulations

Environmental policies, legislation, strategies and plans have been developed, revised, and aligned with global and national development agenda. The Constitution of the Republic of Malawi, Malawi 2063, the Malawi Growth and Development Strategy (MGDS III) and all national framework policies recognize the importance and call for mainstreaming of sound environmental management considerations in development sectors.

Legislation has been developed for many sectors, but implementation is constrained by **limited funding, low capabilities** and in some cases, low willingness to execute. Legislation of environmental management was revised in 2017 and its critical element, the Malawi Environment Protection Authority (MEPA), has commenced operations following the appointment of a Board of Directors, and nomination of an Acting Director General and seconded personnel from Environmental Affairs Department (EAD). While the Disaster Risk Management Policy (2015) and the National Disaster Recovery Framework (2017) are relatively new, legislation on disaster management is archaic and not in sync with the growing appreciation and call for addressing the underlying risks or causes of vulnerability. Implementation of land legislation is undergoing review to rectify inconsistencies that would constrain operationalization as identified through a pilot project in selected parts of country.

[2] National Statistical Office (NSO), 2018 Population and Housing Census.

Section 30 of the Environment Management Act, 2017 requires that public institutions intending to develop policies, legislations, programs and plans that are likely to have adverse effect on the environment, conservation and enhancement of the environment or sustainable management of natural resources to conduct a strategic environmental assessment (SEA). However, so far, Malawi has not performed well with regard to adherence to this requirement. It is only the minerals sector that developed a strategic environmental and social assessment (SESA) in 2015. This is attributed to the fact that the previous act (1996 Environment Management Act did not explicitly provide for that requirement).

Environmental degradation is worsening in many fronts, despite the proliferation of environmental legislation in Malawi due to low enforcement of applicable law, and low penalties for offenders. Effective enforcement is hampered by a number of factors. These include, inadequate staffing in responsible institutions, inadequate political will, insufficient funding of environmental and natural resources management sectors, corruption and conflicting livelihood priorities.

Institutions for environmental management and coordination exist but the level of coordination is not desirable. Planning and implementation is often done in silos and conflicts exist, sometimes within the same ministry which have not been resolved. This results in neglected creeping environmental issues that are only appreciated and addressed when they reach disaster levels. With the new environmental law in force, the Environmental Affairs Department (EAD) is misplaced to handle other functions such as those on enforcement of environmental and social management in developments. Most environment sectors have decentralized their functions to Local Government Authorities except a few including Lands. In many cases, decentralization has been limited to functions but not resources as most decentralized sectors, including forestry, are under-resourced resulting in poor delivery of the decentralized functions.

1.2 EU and other donor co-operation with the Country from an environmental perspective

The European Union through the European Development Fund (EDF) and Thematic Budget has been a strategic development partner in environmental, natural resources and climate change management through provision of support in specific thematic areas of climate change, agriculture, nutrition and food security. Support has significantly increased from EDF 9 (300 million euros) to 607 million euros and 560 million euros in EDF 10 and EDF 11, respectively. The latest EDF 11 focused on thematic areas of governance, sustainable agriculture, secondary education and vocational training.

Key programs implemented under EDF and Thematic Budget, some of which had environmental and natural resources management elements, include: Kutukula Ulimi m'Malawi (KULIMA); Farm Income Diversification Project (FIDP); Skills and Technical Education Programme (STEP); Improving Secondary Education in Malawi (ISEM); Chilungamo (Justice and Accountability) Programme; Rural Infrastructure Development Programme (RIDP); Support to the Greenbelt Initiative; Agriculture Sector Wide Approach (ASWAP); AFIKEPO-Nutrition; and the Malawi Enterprise Productivity Enhancement (MEPE) project; Promoting Responsible Land Governance for Sustainable Agriculture , Improved Forest Management for Sustainable Livelihoods Programme and Global Climate Change Alliance Malawi.

Environmental management activities such as consideration of tree planting and soil and water conservation measures are included in the preparation phase of new projects, and regular monitoring is undertaken to check if project objectives are being achieved. However, systematic environmental and social assessments of the projects and implementation of safeguard measures have been generally inadequate or completely lacking within the programmes. Environmental impact monitoring ought to be done by the concerned officers in the beneficiary districts, but their capacities are in most cases weak. Budgetary provision is not adequate or lacking for such activities. Some of the programmes would have required strategic environmental and social assessment or environmental audits but these have never been done. This entails that it has not been possible to assess the environmental and social performance of these programs against existing local and international requirements and standards. In some cases, EU has supported interventions based on sector preferences that

ultimately, have not sustained on completion of project support. Most EU funded projects have weak or no safeguards components. There is need to include environmental and social safeguard sub components in programme/projects as these have an effect in long-term sustainability of the projects.

Several other development partners including the World Bank (WB), African Development Bank (AfDB), United States Agency for International Development (USAID), Japanese International Cooperation Agency (JICA), Millennium Challenge Corporation (MCC), Norway, United Nations Development Programme (UNDP), World Food Programme (WFP), Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), UNICEF, Foreign, Commonwealth and Development Office (FCDO)[3], Global Environment Facility (GEF) and Green Climate Fund (GCF) are providing development support on matters of environment to the Government of Malawi.

A Donor Coordination Committee is operational in the agriculture/food security sector (DCAFS) which focuses only on agriculture production. The Development Cooperation Group on Environment, Resilience and Climate Change (DCERCC) supports the National Steering Committee on Climate Change (NSCCC) with its coordination and oversight role and enhances donor coordination and networking among environment and climate change stakeholders. Troika is a platform where Development Partner representatives within Environment, Resilience and Climate Change engage on specific issues that require attention on either side. TROIKA is attended by Directors and Deputy Directors within Environment and Development partners who comprise the outgoing, current and incoming chairpersons of DCERCC[4]. The recently developed Nationally Determined Contributions (NDC) report assigns the DCERCC as a forum for reviewing success and challenges in implementation, and proposing actions to fast track implementation of the NDC in alignment with the MGDS III. Additionally, the DCERCC is required to facilitate alignment of programming and financing of NDC measures including tracking finance (Cook et al., 2021).

Despite availability of these institutions, Environmental Affairs and the National Planning Commission bemoan lack of coordination in the design and delivery of environment and natural resources interventions in the country resulting in fragmented environmental actions and lack of a holistic view and approach (Makonombera, 2021, NPC, 2020). The general impact of donor activities on environment is still limited by unsustainability of the outputs. The creation of parallel structures by donor funded projects concentrates the best human capacity into well-paid project jobs, resulting in the loss of capacity in the Government and local government administration. Donor interventions have contributed to better environment awareness, and a more or less complete legal framework and action plans, but the implementation of sustainable natural resources management is yet to be established.

In general, the direct support to combat environmental problems has decreased with the conversion of environment and natural resource management programs into a cross-cutting issue. Therefore, little effort has been made to address the country's environmental-poverty nexus through the realization of environmental management and planning.

Awareness levels have increased on the need to integrate environmental and social safeguard considerations in major development projects and programmes. This has mainly been due to donors' emphasis on environmental and social assessment of projects/programmes and implementation of various environmental and social safeguard instruments as an integral part of project implementation. The World Bank and IFAD have been instrumental in that regard.

[3] Formerly, DFID

[4] Environmental Affairs Department. (2020). About Us / Divisions. Retrieved from Environmental Affairs Department web site: http://www.ead.gov.mw/about-us/divisions

1.3 Conclusion and recommendations

Malawi's environment, natural resources and ecosystems are declining or degrading as a result of rapid population growth that has triggered a vicious cycle of unsustainable production, extraction and consumption often resulting in over-exploitation and further degradation of the environment. Climate change is exacerbating the impacts through cyclic episodes of drought and floods with devastating effects on the highly Agri-based economy. Key natural resources such as land, water, forests, fisheries and biodiversity show clear signs of a generally declining trend. A positive trend in wildlife is associated with strengthened legislation and management regime over the past five years.

The social environment is characterized by increasing levels of production, extraction, consumption and waste generation that have knock-on effects on the environment. Policies, legislation and plans on environmental and natural resources management have been developed but their implementation has been constrained by funding, limited technical capacities and inadequate decentralization. Environment issues have been mainstreamed in national policies and are being integrated in sector plans and programmes. Implementation of environmental management actions, however, remains disintegrated. Monitoring and evaluation of, and learning from, ongoing interventions is also very limited.

The EU and other development partners have supported the production and service sectors mainly agriculture and rural development. Other development partners have also rigorously supported the integration of environmental considerations through Environmental and Social Impact Assessment, but the level of coordination is still low to make meaningful impact.

The following recommendations have been prioritised for implementation based in an analysis of the key issues and their causes and considering previous efforts by the EU Delegation in Malawi and the efforts of other development partners.

RECOMMENDATION 1: ADDRESS LAND DEGRADATION

Reform incentives for farmer-level scale-up of sustainable land management (SLM) practices by strengthening land tenure security and reforming input subsidies.

RECOMMENDATION 2: OVERHAUL FISHERIES MANAGEMENT SYSTEMS

Strengthen fisheries co-management arrangements in tandem with stronger enforcement against illegal fishing technologies and overfishing***.***

RECOMMENDATION 3: SUPPORT IMPLEMENTATION OF THE ENVIRONMENTAL POLICIES, LEGISLATION AND PLANS

Provide sufficient public financing to support effective implementation of the new EMA (2017) and the creation of a semi-autonomous EPA.

The implementation of customary land laws will improve the governance of customary land and registration of customary estates that will incentivize management for productivity and sustainability.

Support the ambitious and progressive reform, National Charcoal Strategy, including its proposals to promote fuel switching to cleaner and alternative fuels (such as LPG) to develop legal and sustainable charcoal value chains.

Implementation of the National Forest Landscape Restoration Strategy.

RECOMMENDATION 4: ACCELERATE AND SUPPORT THE DECENTRALIZATION OF ENVIRONMENTAL MANAGEMENT FUNCTIONS AND RESOURCES

Support and promote GoM's renewed commitment toward decentralization

RECOMMENDATION 5. ESTABLISH A NATIONAL INFORMATION MANAGEMENT AND COMMUNICATION SYSTEM FOR ENVIRONMENT/CLIMATE CHANGE MANAGEMENT

Support GoM's environmental communication and education strategies.

RECOMMENDATION 6: ESTABLISH SUSTAINABLE FINANCING MECHANISMS FOR ENVIRONMENTAL, NATURAL RESOURCES AND CLIMATE CHANGE MANAGEMENT

In the wake of competing demands for financial resources and decreasing resource allocation to the environmental, natural resources and climate change management sector in Malawi, there is need for dedicated resources to be specifically available. This can be achieved through establishment and operationalization of sustainable financing mechanisms for environmental, natural resources and climate change management.

RECOMMENDATION 7: STRENGTHEN GOOD GOVERNANCE IN PUBLIC INSTITUTIONS

Instituting good governance will entail inspiring leadership for spearheading the integration of environmental considerations in institutions and executing strategies aimed at changing the mind-set of the general public through awareness programmes and incentivising good governance practices. One key strategy is to promote and award people and institutions that are performing well to act as ambassadors and role models on environmental management while scaling up measures to stamp out corruption.

2 State of the environment/climate change, trends and pressures

Malawi is about 900 km long and 80-161 km wide, with a total area of 118,484 km2 (11.8 million ha), of which 9.4 million ha is land. The remaining 2.4 million ha, about 20%, is covered by water, mainly Lake Malawi, which is 586 km long and 16-80 km wide. The rest of the water area is accounted for by the major lakes of Chilwa, Malombe and Chiuta and rivers.

In Malawi, natural resources and the environment play a very significant role in influencing social and economic development at both household and national levels. Approximately 80 % of Malawians depend on renewable natural resources for their livelihoods, and the foundation of the national economy is primarily rain-fed agriculture. The success of many important sectors of the economy such as agriculture, water supply and sanitation, transport, tourism, industry, health and education rely on environment and natural resources to enhance their productivity. However, environmental degradation and climate change have emerged as major development issues that have adversely impacted on food security, water quality and energy security, thereby frustrating government efforts to improve the general livelihoods of both urban and rural communities (GoM, 2016).

2.1 Land

Malawi is characterised by an extremely diverse physical environment. This wide range of relief is a major determinant of the climatic, hydrological and edaphic conditions of the country, and hence its agricultural potential.

2.1.1 Soil Erosion and degradation

Land pressure and land degradation (soil erosion and decreasing soil fertility) are the principal environmental problems facing Malawi that are reported to affect 40- 60% of the entire land area (Halle & Burgess, 2006; Vargus & Omuto, 2016; Kirui, 2015). The scale and intensity of land degradation from soil erosion varies by locality from 10t/ha/yr. to 43t/ha/yr. – with an average of 29 tons per hectare (Vargus & Omuto, 2016). According to Vargus & Omuto (2016), as of 2014, the topsoil loss rates were higher in the northern and southern regions than in the central region of Malawi with topsoil loss rate ranging between 0.4 ton/ha/yr to 39 ton/ha/yr. Nkhatabay had the most affected district while Mzimba was the least affected. Nkhatabay vulnerability to soil loss was attributed to high presence of steep slopes, fragile soil, and high rainfall as major underlying factors, exacerbated by significant decline of natural vegetation and expansion of croplands.

According to Kirui (2015), between 2001 and 2009, land degradation cost Malawi an estimated $244 million (6.8 % of GDP) whereas poor farming practices that degrade croplands for maize, rice, and wheat resulted in

a loss of $5.7 million per year. The worst degradation is in the densely populated southern region. The main causes are population pressure, inappropriate land management practices and deforestation. Erosion has major effects on services such as water, fisheries, lake and river transport, electricity generation, agriculture and irrigation. Based on the extend and causes of land degradation, key incentives to sustainable land management are secure land tenure, access to markets and extension services (Kirui, 2015).

2.1.2 Desertification

Desertification in Malawi is mostly seen from the perspective of loss/decline of productive land.

2.1.2.1 Land Productivity Dynamics

It is estimated that 182 km^2 of forest land was converted to cropland between 2000 and 2010 of which, only about 23% was showing increasing net land productivity whereas the remaining 77% was in the range of stable but distressed and declining productivity. The Declining land productivity has been mainly caused by over exploitation of vegetation for domestic use and unsustainable agricultural practices. This causes soil erosion which reduces land productivity. Indirect drivers include population pressure. Stable but stressed land productivity was mainly caused by improper management of annual, perennial and scrub and tree crops (GoM, 2017).

2.1.2.2 Soil Organic Carbon

There was a net Soil Organic Carbon (SOC) loss of 182,709 tons as a result of land cover transition from forest to crop land between 2000 and 2010 possibly due to improper crop soil management, where the SOC output (e.g., crop residue removal and yield harvest) exceeds the inputs. This emanates from ploughing for crop cultivation that turns over the soil, making it susceptible to high temperatures and accelerated erosion. Restoring SOC using Sustainable Land Management (SLM) practices is essential to enhancing soil quality, sustaining and improving food production, maintaining clean water, and reducing increases in atmospheric CO_2 (GoM, 2017).

2.1.3 Land use, arable land, losses due to urbanisation or infrastructure

Urbanization (the share of urban population in the total population) in Malawi has increased from 15.43% in 2009 to an estimated 17.7% in 2021 (O'Neill, 2021; CIA, 2021). Urbanisation induces land-use change and results in adverse effects on land because of the need for space for human settlement and associated amenities. Over the past five decades (from 1970's), most buildings in urban areas have been constructed with burnt bricks. The areas used for brick making, often river banks with fertile soils and high in biodiversity, have been heavily degraded, leaving burrow pits. When abandoned, these sites/pits become waste dumping sites that eventually become breeding sites for vermin (EAD, 2013). Additionally, brick burning contributes to deforestation leading to biodiversity loss, soil erosion and loss of soil fertility.

Urbanisation in Malawi is also associated with the proliferation of squatter and slum development where the construction of dwelling units is done without due consideration to solid and liquid waste and soil management, hence acting as sources of soil erosion and contamination. Human settlements and their associated structures such as road networks imply conversion of land use from pristine vegetation or farmland to built environment resulting in disturbance/fragmentation or destruction of natural habitat for wildlife, and loss of species and ecosystems diversity. The opening of new forest lands and use of heavy construction machinery accelerates soil erosion, siltation and sedimentation. For example, Lilongwe City is built on one of the most fertile plains in the country (the Lilongwe – Kasungu Plain) once described as ideal for the production of maize, groundnuts and tobacco (Walter, 1972). This plain also used to harbour a wide range of wildlife including elephant, buffalo, rhinoceros, lion, leopard, eland, kudu, sable, roan, hartebeest, zebra, warthog, bush pig, bush buck, baboon and hyenas – most of which have vanished with human settlement (Peters, 1969). With increasing population densities in both urban and rural areas, the conversion of land from forest to agriculture and other land uses is on the rise (Annex 7,4).

The highly centralized Ministry of Land is currently overstretched to resolve land related issues (including land ownership disputes, encroachment on public land, and squatting) across the country given the absence of

lands offices in the districts. Land laws advancing decentralization in land administration were developed in 2016 but their implementation has met resistance from Civil Society Organisations (CSOs) and traditional leaders in other parts of the country. A pilot project has tested the feasibility of customary land regularization from which operationalization issues were identified. The laws are being revised following a presidential directive for the review in 2020. Addressing the escalating land related issues in the country will require operation of the laws which entails (a) Customary land regularization, (b) devolution of land administration and management to the district, (c) improving land record management at council level, and (d) building the capacity at district level for execution of land related functions (Chilonga, 2021).

2.1.4 Land use planning including strategic environmental implications

Urban Land Use Planning exist in the major urban areas like Blantyre, Lilongwe, Zomba and Mzuzu, which have Urban Structure Plans and in smaller towns which have Outline Zoning Plans, but these plans are rarely respected and uncontrolled settlement takes place - often in environmentally sensitive, inappropriate areas like riversides and catchment areas. In the cities and most other parts of the country urban planning is following people's invasion of designated planning areas making it hard for councils and other utility operators (Electricity and water) to provide basic services. Urban planning often neglects environmental aspects (such as drainage and waste management structures) and pollution of surface water resources is common during the rainy season due to surface run off from polluted areas: markets near to rivers, Traditional Housing Areas (THAs) and squatters with poor sanitary facilities. Similarly, regulations on waste management and sanitation developed in 2008 are seldom enforced.

2.1.5 Land use change and related GHG emissions, large-scale land conversion

Land use total emissions excluding Forestry and Other Land Use (FOLU) are estimated at 9.33 million metric tons of carbon equivalent (tCO2e) for 2017. Agriculture accounted for by far the largest share of the total (5.07 million tCO2e, 54% of total) in 2017, which is double the emissions in 2010 and this has been driven, in particular, by increasing livestock numbers, resulting in growing rates of methane and Nitrous oxide (N_2O) emissions. Direct N_2O emissions from managed soils in crop production are estimated to have contributed 1.12 tCO2e towards the overall agriculture emissions (Cook, 2021).

2.2 Water

2.2.1 Water Regime

Malawi is endowed with a vast expanse of surface water systems, which include its network of rivers and four major lakes. The major rivers are the Shire, Ruo, Bua, South Rukuru, Linthipe, Songwe and Dwangwa. The country is divided into 17 Water Resources Areas (WRAs) corresponding each to one river basin and they are subdivided into 78 Water Resources Units (WRUs) (Annex 7.2). Malawi's water availability has reduced from an estimated 1.7 mega-litres per person, per year in 2012 to 0.9 mega-litres in 2017 mainly due to population increase. This decline has transitioned Malawi from a "water vulnerable" to a "water scarce" nation alongside Kenya and Zimbabwe according to international standards[5]. The neighbouring countries are better-off: Tanzania (1.5 mega litres), Mozambique (3.5 mega litres) and Zambia (4.8 mega litres) per person per year (World Bank, 2021). As of 2012, 2% of available water was classified as groundwater, and 98 % was surface water from Lake Malawi, which accounts for 95 % of all surface water resources in the country (MoAIWD, 2012). Lake Malawi flows out into the Shire River, the largest river in the country.

2.2.2 Groundwater

Groundwater resources are widespread throughout the country. Their occurrence is associated with two types of aquifers: (i) the extensive, but relatively low yielding weathered Precambrian basement gneiss complex formations, which accounts for about 85% of the country's geology, and (ii) the relatively high yielding

[5] The per capita water availability per year is equivalent to 1,712 cubic meters (m3). According to international standards, 0-1000 m3 per person per year = water scarce; 1000-1700 m3 per person per year = water stressed; 1,700-2,500 m3 per person per year = water vulnerable (MoAIWD, 2012).

quaternary alluvial deposits occurring in the Lakeshore Plains and the Shire Valley. The basement complex aquifers can yield up to 2 l/sec, while alluvial aquifers can yield up to 20 l/sec. Water in the basement complex aquifer has a relatively low concentration of salts, while in alluvial aquifers the water is highly mineralised (Halle & Burgess, 2006). Groundwater availability in the country is monitored through a network of 75 groundwater monitoring wells established across the country (GoM, 2020).

As previously described, Malawi's water availability is rapidly decreasing and has the lowest water availability per capita of its neighbouring countries namely Tanzania, Mozambique and Zambia. The availability and reliability of water resources is threatened by erratic rainfall, invasive aquatic weeds, sedimentation, catchment degradation and climate change, which further pose threats on the country's food security and hydro power generation. The rate of population growth, and thus water demand, far outpaces water availability. As a result, soon the country is likely to experience water stress (that is, when demand for water exceeds the available and accessible amounts of sufficient quality water). This situation could be made worse by climate change and insufficient water infrastructures and management systems such as dams, wells, and municipal extension services (World Bank, 2019).

Historically, from the early 1980's to the late 1990's, the level of Lake Malawi steadily dropped until the daily mean levels reached the lowest in more than sixty years in 1997. Consequently, the main flow in the Shire River dropped to close to 130m^3/s, which was much less than the required minimum flow for the hydro-electric power generation (Halle & Burgess, 2006) (hydropower plants of about 200 MW generation output installed on the Shire River and a barrage commissioned around 1965 were based on a volume flow rate of 170 m^3/s (Shela, 2000)). To increase water availability for various productive uses, the sector enhanced the efficient operation of the Kamuzu Barrage at Liwonde using the Kamuzu Barrage Operational Model (KABOM). This enables the regulation of flow in the Shire River to meet hydropower generation and other water demands downstream but also helped to regulate the water level in Lake Malawi. This, in principle, enabled the overall conservation of water in the Lake as evidenced by the significant improvement of the lake levels above those recorded for the past seven years. The improved operation of the barrage abated occurrence of extreme low flows in the Shire River thereby sustaining hydropower generation. Additionally, the new barrage also helped to improve management of weeds which usually affect hydropower generation downstream (Figure 2-2). A total of 136 hydrological stations have been established for monitoring the trends of the available surface water resources (GoM, 2020).

2.2.3 Water Quality

Malawi's rivers and lakes are experiencing rapidly deteriorating water quality. This is due to an increased load of chemicals and nutrients from agriculture, industries and mining, soil erosion, and sedimentation. Eutrophication in Southern and Central Lake Malawi, and the other larger lakes, is now evident with changes to the phytoplankton assemblages, riverine vegetation growth, and its impact on hypoxia (oxygen depletion) and fish stocks. Conditions are now more favorable for aquatic weeds, such as the water hyacinth (locally known as Namasupuni) and the Kariba Weed, allowing the creation of large mats of vegetation negatively affecting water flows, fisheries, navigation, and water quality (EAD, 2020).

Figure 2-1. Weed barricade at the Kamuzu Barrage, Liwonde

Deforestation and land degradation also put pressure on water resources. These are causing high rates of erosion and sedimentation, which, in turn, leads to high sediment loads and negative impacts on aquatic life. Biological and chemical pollution from urban areas and industrial waste are additional concerns. So is runoff from the overuse of fertilizers and pesticides (particularly during wet seasons) (World Bank, 2019). The compounded economic impact of degraded water resources in Malawi is hard to estimate, but poor sanitation alone is estimated to cost the country USD 57 million per year (or 1.1% of GDP). For example, a cost-benefit analysis of increased investments in water supply and sanitation infrastructures estimates 1.4 times return for water supply and 1.2 times return for sanitation (World Bank, 2019).

In cities and towns, water resources are being increasingly polluted by waste generated through increasing urbanization and the growth of informal settlements and industries. In Lilongwe, farming, housing, and informal markets (such as Tsoka and Lizulu) encroach on the buffer zones of the Lilongwe River. This results in direct and indirect transmission of pollutants into the water, including oils from workshops, effluent disposal, animal and solid waste, sulphates, nitrates, and lead from used batteries. Similar pollution patterns have emerged in the Mudi, Naperi, and Nasolo Rivers of Blantyre; the Lunyangwa River of Mzuzu and Likangala; and Domasi Rivers in Zomba.

Urban water pollution also has a knock-on effect on aquatic life, downstream users, and the river's ecosystem services. For example, large amounts of plastics are damaging to birds and wildlife. In addition, chemical and solid waste pollution affects people's health, spreads waterborne diseases, and increases treatment costs for municipal water utilities.

Flooding in recent years has cost the country the equivalent of 5% of GDP—a financial burden exacerbated by the absence of water regulating infrastructures and encroachment in high-risk flood zones (World Bank, 2019).

The government has placed a high priority on irrigation and water resources management in order to ensure food and water security at household level through among other things enhancing water-harvesting technologies, promoting catchment protection and management including disaster risk reduction measures (JICA, 2020). Currently the Ministry is reviewing the National Water Policy and National Sanitation Policy with support from African Development Bank (AfDB). There are also plans to review Water Works Act (1995) through the Lilongwe Water Supply and Sanitation Project under Lilongwe Water Board, being supported by World Bank.

2.2.4 Water Resource Use and Management

Water resources are used for a number of purposes, including human use (potable water supply and sanitation), agriculture, mining, and electricity generation using hydropower schemes. In 2010, human use and irrigation together made up the majority of water demand for consumptive use, totalling 21% and 77%, respectively. Among other uses, the Shire River is used for hydroelectric generation, the source of 98% of Malawi's grid electricity (MoAIWD, 2012).

In 2010, demand for water for human use was 717 mega-litres per day. This amount is forecast to triple by 2035, to 2,154 mega-litres per day, representing average annual growth of eight percent. This is driven by population growth and expected increases in the percentage of the population with access to 'improved' rather than 'unimproved' sources of water. Even so, water consumed for human use will total only three percent of total available water resources in 2035 (MoAIWD, 2012). According to MoIWD (2012), demand for water for irrigation is expected to increase by an average of 19 % a year through 2035, from daily demand of 2,632 mega-litres in 2010 to 15,364 mega-litres per day in 2035.

This will total 23 % of the expected water resources available in 2035, on an annual average basis. Due to seasonal differences in the amount of surface water available, dry season water shortages are expected in 2035 if irrigation expansion plans of 485,000 hectares are carried out (MoAIWD, 2012). In 2020, the estimated water availability was 1,102.5m^3/capita/year (GoM, 2020).

It is estimated that 88.3% of Malawi's households have access to improved water sources with 64.5% of the households using boreholes as their main source of drinking water followed by 17.8% with stand pipes (GoM, 2020). Access to improved water sources is higher in urban areas (97.1%) than in rural areas at 86.5 %. On SDGs indicators, the trend shows a slight decline for safely managed sources from 20.3% in 2017-18 to 18.4% in 2018-19 which is attributed to damage caused by floods and drought (JICA, 2020). The Northern Region is better served with 16.8% of the population having piped water in dwelling or plot compared with 9.3% in Central Region and 9.4% in the Southern Region (NSO, 2018).

Provision of rural water supply services is the responsibility of the Department of Water Supply and Sanitation Services supported by various civil society organisations (CSOs) and non-government organisations (NGOs) while urban water supply is a responsibility of the five Water Boards[6].

To avoid inter-sectoral competition for water resources in times of scarcity, water use is prioritized in the following order: Water for human use, including public water supply and sanitation; Hydropower generation schemes; Irrigation schemes and Navigation.

2.3 Air quality

2.3.1 Urban Air Quality

Malawi has EPI score of 39.6 on air quality ranking 87 out of 180 countries globally. This is a composite score that includes three attributes namely, Mean urban air pollution of particulate matter (PM2.5) Exposure, Household Solid Fuels Exposure and Ozone exposure (Yale University, 2020).

Malawi is among the countries whose urban population is less exposed to particulate matter with a PM2.5 score of 61.2, ranking 33 in the world (Yale University, 2020). The trend of exposure has almost remained constant since 2010. PM2.5 is the concentration of particles with a diameter equal to or greater than 2.5 microns, usually produced from combustion. These small particles permeate and cause damage to the lungs[7].

Exposure to Ozone has increased slightly from an Ozone exposure of 50.5 in 2010 to 43.5 in 2020 ranking 84 among 180 countries, globally (the higher the score, the less the exposure and vice versa). The country has linked ozone occurrence with increased use of obsolete refrigeration equipment (Helema, 2015). Exposure to

[6] Lilongwe, Blantyre, Southern Region, Central Region and Northern Region Water Boards
[7] WHO has set guidelines for PM2.5 at 10 µg/m3 annual mean and 25 µg/m3 24-hour mean.

ozone may cause headaches, coughing, dry throat, shortness of breath, a heavy feeling in chest, and fluid in the lungs. Higher levels of exposure can lead to more severe symptoms (Centres for Disease Control, 2019).

2.3.2 Indoor Air Quality

Malawi is among the countries with the highest exposure to household air pollution with a Household Solid Fuels Exposure ranking of 162 against 180 counties in the world (with a Household Solid Fuels Exposure Score of 9.3). Exposure to household air pollution has improved slightly by a score from 6.5 in 2010. The Household Solid Fuels Exposure Score has a range of 0 to 100, where 0 denotes high exposure and 100 denotes low exposure to household air pollution from the use of household solid fuels (Yale University, 2020).

Household air pollution causes non communicable diseases including stroke, ischaemic heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer. Globally, close to half of deaths due to pneumonia among children under 5 years of age are caused by particulate matter (soot) inhaled from household air pollution (WHO, 2018). The high exposure to household air pollution in Malawi is attributed to high use of biomass (charcoal and firewood for cooking. Overall, 99 % of households in Malawi use solid fuels as the main fuel for cooking (79% of households use firewood whereas 19% % use charcoal, around 1 % use electricity and the remaining 1% use crop residue. By place of residence, a higher proportion (91% %) of households in rural areas use firewood as a fuel for cooking compared with 19% of the households in urban areas. About 75% of households in the urban areas use charcoal as their main fuel for cooking compared to 8% of the households in the rural areas (National Statistical Office, 2020).

2.4 Forest, vegetation, ecosystems

2.4.1 Forest cover and forest cover change

Natural forests represent the remainder of the Miombo forests that once covered almost the whole country. The Miombo woodland zones are the most dominant terrestrial eco-zones. Montane forests occur in high altitude and rainfall areas. Mopane woodlands frequently occur on fertile soils in the south around Shire River and the lakes. Malawi's land area is 94,080 km² of which, 21% (1,975,680 hectares) was categorized as forest in 2020, down from 24% in 2006 (Halle & Burgess, 2006). This is the area that is categorized under forest, wildlife reserves and national parks. Deforestation is estimated at a rate of 0.63% (+/- 0.10) down from ~2.8% per year in the 1990s (MoNREM, 2017). In 2020, Malawi lost 14.1kha[8] of natural forest, equivalent to 3.58Mt of CO_2 of emissions (Global Forest Watch, 2019). It further observes that between 2001 and 2020 most (51%) of the tree cover loss happened in the Northern and Southern Malawi and particularly in Nkhatabay (that lost 71.1kha of tree cover compared to a national average of 7.13kha).

2.4.2 Pastureland deterioration

Livestock production faces a number of challenges, including limited pasture due to population pressure, and inadequate production and storage technologies in feed and breeding programmes (GoM, 2016). The small size of farms constrains farmers from growing pasture crops when they have difficulty meeting household food needs. Forage cultivation has been promoted over the past three decades for smallholder fattening and dairy projects, with mixed success. Free access to harvested fields in the dry season limits the opportunity for under sowing or the use of palatable agroforestry species. Pasture/fodder crop seeds are difficult for smallholder farmers to obtain, even if they have the money to buy. Although extension staff receive training in both crop and livestock production, the emphasis in extension is placed on food crops. Staff have very limited knowledge of pasture/forage crops. Technical problems, such as lack of information and seed, are only part of the problem. Smallholder investment in livestock has been depressed by poverty, low demand for livestock products, and the possibility of animal theft (Reynolds, 2006).

[8] 1 kilo hectare (kha) is equivalent to 1000 hectares (ha)

2.4.3 Status of Unique forest/vegetative ecosystems

The country has a rich plant diversity including over 6,000 flowering plant species (Goma, 2010), of which 122 are endemic and 248 are threatened based on the IUCN Red Data List (2013). A great diversity of species is found in national parks, wildlife reserves, forest reserves and protected hill slopes. The unique forest/vegetative ecosystems include Mulanje Mountain and Nyika plateau, both of which are threatened by invasive alien species (GoM, 2015). Government is implementing a project with support from GEF to eradicate the invasive species (EAD, 2020).

2.5 Biodiversity and wildlife

2.5.1 Source of threats to biodiversity (synthetic agrochemicals, encroachment, poaching etc)

Malawi has a variety of unique ecosystems ranging from woodlands, swamps, seasonal wetlands, perennial wetlands, lakes and rivers. Some exist on customary land while others are found within areas designated as protected such as nature sanctuaries, national parks and wildlife reserves.

Malawi's eco-systems are greatly threatened by the human pressure, and ~60% of the country has been modified, leaving only 36% under natural vegetation (EAD, 2002).

Malawi has 88 forest reserves, five national parks, four wildlife reserves and three nature sanctuaries (MoNREM, 2017). Most of these protected areas are Important Bird Areas (IBAs).

Generally, the status of biodiversity in Malawi is declining. Terrestrial and aquatic ecosystems of the country are being modified and degraded and species composition is being altered due to unsustainable utilization and management of natural resources (GoM, 2015). The biggest pressure on wildlife biodiversity is through destruction of habitat by forest clearing for wood, charcoal, timber and for subsistence agriculture in traditionally marginal production areas.

2.5.2 Local status of globally threatened species/habitats (such as Malawi's Man and Biosphere and Ramsar Sites)

2.5.2.1 Malawi's Man and Biosphere

Lake Malawi's endemic fish species such as the Mbuna are increasingly important as a source of tourism attraction and forex. Cumulatively, from January to December 2019, a total of 66,461 live fish were exported to Hong Kong, Germany, Denmark and France generating MK302.93 million (around US$400,000) annually. Other export markets for Malawi's ornamental fish include China, Sweden, Thailand and United Kingdom (GoM, 2020). The aquarium trade needs regulation and coordination among the players. For instance, the Mbuna is regulated by: i) the Department of National Parks and Wildlife which restrict fishing within a 100m zone around islands on Lake Malawi where the rocky dwelling fish is located and ii) the Department of Fisheries which provides licenses to aquarium trade investors and inspects exported fish creating a regulation and coordination challenge due to conflicting roles. A strengthened collaboration between the Department of Fisheries and the Department of Parks and Wildlife is, therefore, necessary (GoM, 2016).

The level of biodiversity in the aquatic environment of Lake Malawi is very high with over 1,000 fish species belonging to 65 genera and 11 families. The fish in Lake Malawi are one of the most remarkably diverse and abundant faunal groups in the world. However, the lake ecosystem is under threat due to eutrophication from increasing multiple sources of nutrient loading from economic activities and development projects within the basin, climate change and limited implementation of appropriate management strategies that sustain productivity and fish biodiversity.

2.5.2.2 Ramsar Sites

Lake Chilwa wetland, which was designated a Ramsar site on 14 November 1996 (Ramsar Convention Secretariat, 2014)[9] and later as a Man and Biosphere Reserve (MAB) in 2006 (UNESCO, 2017), is one of the aquatic ecosystems that have been affected by human population and climate change. Lake Chilwa water levels fluctuate widely due to seasonal changes in precipitation and evaporation. These fluctuations result in several water recessions, including the complete drying out of the lake in 2010 (GoM, 2015). The Elephant Marsh was designated a Ramsar Site on 1 July 2017. Government is implementing biodiversity conservation activities as a component of the Shire Valley Transformation Project financed by World Bank.

2.5.3 Invasive alien species

Invasive Alien Species (IAS) are a growing threat to economic development, biodiversity and environmental sustainability in Malawi. The agriculture sector has been affected by several IAS, including cassava mealy bug, cassava green mite, larger grain borer and spotted stalk borer that have caused great losses in agricultural production (GoM, 2015). In 2018, FAO made a Save Our Souls (SOS) call for US$23 million to scale up its Fall Armyworm (FAW) campaign to reach more than 500 000 farmers through Farmer Field Schools (FFSs) in Malawi and other countries in sub-Saharan Africa (FAO, 2018).

Nearly a third of all freshwater fish species are threatened by extinction – and some 80 species have gone extinct due to introductions of invasive non-native species, among other causes (Hughes, 2021)[10].

Pinus patula was introduced on Mulanje Mountain Forest Reserve (MMFR) eventually became invasive hindering indigenous plant species growth (GoM, 2015). However, the pine is favoured by the majority (97%) of communities around the reserve for its timber and firewood provision capabilities (Makhambera, 2014). Bracken Fern on the other hand has been widely spread on Nyika National Park, the biggest National Park in Malawi, where it has invaded grasslands important for wildlife grazing and tourist attraction (GoM, 2015).

Hydropower interruptions on the Shire River, in the early part of 1990's were associated with proliferation of the invasive water hyacinth that caused impediment in water flow and sedimentation from which the power shutdowns cost $27,000 per day and led to industrial losses worth ten times this amount. In addition, damage to infrastructure in 2001 due to the water hyacinth and debris cost $12 million to repair.

2.5.4 Fish stocks (In Lake Malawi and other water bodies)

Endemism is highest in fisheries and relatively low in birds, amphibians and reptiles, whilst in mammals, insects and microorganisms it is not known. Malawi 's biological diversity is highly varied over its terrestrial and aquatic habitats. In 1997, there were 6,105 plant species listed, of which ~100 were characterized as endemic. The *National Biodiversity Strategy and Action Plan II* reports that the country has 192 mammals, 145 reptiles, 43 amphibians, >1,000 fish and 630 bird species. Several reptiles, amphibians and >950 fish species found in Lake Malawi are endemic. The country is also known to have several species of insects and microorganisms (Annex 7.7).

For example, reports indicate that the number of fishermen operating in Lake Malawi alone has risen by 124% in the past decade, bringing the total number of fishermen to over 50,000. The trend in fish stocks has been that of declining value species such as the Chambo (Oreochromis species) and increasing low value species such as Usipa. The *Oreochromis karongae* (Chambo), is listed as critically endangered on the IUCN Red List of Threatened Species (Kanyerere, Phiri, & Shechonge, 2018)[11].

Over-fishing and the use of inappropriate fishing methods cause a reduction in size and age of catch, altering the species composition and biodiversity of the stock, particularly with Chambo, Utaka and other small cichlid

[9] The Ramsar convention entered into force in Malawi on 14 March 1997.
[10] The other causes include damming rivers to draining wetlands, abstracting too much water for irrigation to releasing too much untreated waste, from unsustainable and damaging fishing practices to introductions of invasive non-native species – and, of course, the escalating impacts of climate change.
[11] Kanyerere, G., Phiri, T., & Shechonge, A. (2018). Oreochromis karongae (errata version published in 2019). Retrieved March 26, 2021, from The IUCN Red List of Threatened Species: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T61293A148647939.en.

species. The most dramatic case, demonstrating this trend, has been that of the Ntchila (*Labeo mesops*), which was the major commercial species in Malawi in the 1950s, but is now described by the IUCN as critically endangered (Tweddle & Gobo, 2019). Similarly, gravel and grass spawning species are suffering due to loss of habitat.

Non-sustainable fishing methods include use of nets with small mesh size and mosquito netting, fish traps at river outlets, fishing by blocking rivers and netting in breeding grounds, and during breeding seasons. Fish habitats are also negatively affected by environmental problems from other human activities: reduction in water flows and increased sedimentation from agricultural and deforestation activities, water pollution by human and agricultural waste, sand/sediment runoff and industrial waste, and the prevention of fish migration in rivers to breeding areas because of construction of weirs and other obstructions. In addition, aquatic invasive plants are increasing and reduce catches and reproduction. Water hyacinth (*Eichornia crassipes*) has been a problem in Malawi's rivers and lakes since the 1990's (GoM, 2015).

Existing fisheries regulations and management strategies such as licensing of fishing gear are rarely respected, and the destruction of breeding grounds has significantly reduced production capacity. The governance reforms that have been adopted since the 1990s with adoption of Participatory Fisheries Management (PFM) or co-management arrangements have not been successful (GoM, 2016). Fisheries management needs to include establishing community property regimes whereby empowered fishing communities and other stakeholders are responsible for formulation of fisheries by-laws and developing management plans in a decentralised framework. Without formulation of an appropriate strategy, fish supply in the country will continue to decline against the increasing human population (GoM, 2016).

2.5.5 Species with special value

There are 33 protected large mammal and 11 protected tree species in Malawi. Due to the pressures on all natural resources, biological diversity is seriously threatened. Outside the protected areas, the pressures from expansion of agriculture production and unsustainable harvesting have already resulted in the extinction of many species and loss of habitats (GoM, 2015).

In colonial times five National Parks and four game reserves were established to protect wildlife, and these still account for 11.6% of the country's land area. The rhino got extinct but has since been reintroduced. Many of the large mammal species including buffalo, lion, nyala and elephant were threatened towards extinction up to the first half of the last decade, but numbers have started increasing introduction of stringent laws governing the management of threatened wildlife species. The Department of National Parks and Wildlife now boasts of improved competence in the institution and the judiciary in handling wildlife crime. Additionally, a robust awareness programme, internal restructuring of operational system coupled with a system of benefits sharing with managing institutions and communities have led to improved management and the realization of benefits in the wildlife sector (Kumchedwa, Director of Parks and Wildlife, 2021).

2.6 Agriculture and livestock raising

Agriculture accounts for 30% of the country's Gross Domestic Product (GDP) and provides livelihood to over 80% of households (GoM, 2016). An estimated 43% of the country's workforce are employed in the agriculture sector. The country's vision is anchored on three pillars namely agriculture productivity and commercialization; industrialization; and urbanization.

2.6.1 Crop Production

2.6.1.1 Expansion of agricultural land

An estimated that 61% of the land area in Malawi is put to agriculture, up from 34% in 1961. Major cash crops are tobacco, sugar and tea and pulses. Tobacco alone accounts for around 60% of all agriculture-based export earnings (National Statistical Office, 2020).

2.6.1.2 Shifting cultivation

Shifting cultivation is less practiced, except in Nkhatabay and other parts of the Northern Region where large areas of pristine vegetation exist. However, there are practices in crop production that constitute maladaptation and these include: irrigated farming/winter cropping on the actual river bed or <10 metres from the river bank, contravening Malawi's agronomic guidelines - this instigates soil erosion and river bed siltation which eventually leads to flooding, and also contributes to water pollution from pesticide/chemical fertiliser use which may lead to fish kills; (2) deforestation resulting from clearing of forest for agriculture that accelerates surface runoff and hence soil erosion, and also reduces carbon sink; and continuous (maize) mono-cropping - which degrades soil structure and fertility thus undermining both crop production and the resilience of the farming system to climate change impacts (Thornton, et al., 2018).

Unsuitable cropping strategies have resulted in further land degradation, mainly due to changes in the hydrological regime on denuded water catchment areas, rainfall runoff increasing at the expense of rainfall infiltration into soils, with the result of flash floods in low-lying areas, with increasing soil temperatures and increasing aridity in upland soils. This creates a vicious cycle as native vegetation then struggles to re-establish. Furthermore, the increased rainfall runoff carries fertilisers and pesticides into the main rivers and water bodies including Lake Malawi, with associated impacts on pelagic fish stocks (GoM, 2016).

2.6.1.3 Intensification

Agricultural intensification in Malawi is mainly achieved by means of increased fertilizer application, use of improved/hybrid seed and pesticide use. To address the challenge of food and nutrition insecurity in the face of a growing population, increased land pressure, and climate change, the country is implementing an ambitious 15-yr Farm Input Subsidy Program (FISP) to support poor households with fertilisers and increase the adoption of improved technologies in maize and legume production. Diversification from maize and tobacco towards other commodities such as livestock and fisheries is also promoted (GoM, 2016).

2.6.1.4 Irrigation and water use

In Malawi, sustainable irrigation is perceived as construction of new irrigation infrastructure to put more land under irrigation. The irrigated area has been growing steadily since 2006 at the rate of around 5% per year mostly through smallholder irrigation schemes. In 2015, the country had an estimated 407,862 hectares of irrigation potential but only around 104,634 hectares had been developed (GoM, 2016). The 2020 National Economic Report shows a further increase of the developed area to 118 843 ha of which, 56,856 ha are under estates and 61,987 ha are under smallholder farming (benefiting about 370,618 smallholder households) – and an estimated total utilization rate of 84.8%. The annual increase in irrigation development is estimated at 2.23%, which is below the 6% targeted minimum annual growth rate stipulated in the Comprehensive African Agriculture Development Program (CAADP) for the agricultural sector (GoM, 2020). Evidently, the demand for water for irrigation has been increasing from a daily demand of 2,632 mega-litres in 2010 and is projected to increase by an average of 19 % a year to reach 15,364 mega-litres per day in 2035 (MoAIWD, 2012).

Application of environmental and social impact assessment (ESIA) in irrigation projects has increased over the past decade with World Bank and IFAD making ESIA mandatory for their financed projects to ensure integration of environmental and social safeguards consideration. Specific Environmental Impact Assessment Guidelines for Irrigation and Drainage Projects were developed in 2002. However, monitoring of implementation post ESIA assessment remains limited.

2.6.1.5 Pest control/Management

Most farmers in Malawi use pesticides to protect their crops from pests, otherwise, yield is significantly compromised. Farmers use insecticides, fungicides, herbicides, fumigants, nematicides, acaricide, and rodenticides especially in tobacco, tea, sugarcane, coffee, cotton, and maize production. However, control/management of pesticides is limited as farmers indiscriminately use pesticides from all sources including those sold be vendors on the market while other chemicals are illegally imported from neighbouring (Soko, 2018; Kosamu, Kaonga, & Utembe, 2020). The regulatory authority of pesticides, the Pesticides Control

Board (PCB) does not have the requisite facilities for analyzing pesticides, and adequate qualified personnel to conduct risk assessment of pesticides (Kosamu et al., 2020).

2.6.1.6 Agricultural practices

The Agriculture sector remains predominantly subsistence-oriented. With population growth the arable land per person has declined from 0.35 ha per person in 1961 at 0.2 ha per person in 2016 (World Bank, 2021). Therefore, people have resorted to farming in increasingly unsuitable areas and land systems, particularly on steep hillsides. Crop rotation through shifting agriculture is no longer possible and the result is declining soil fertility and crop yields. To survive people have adopted income generating strategies that include felling live trees to make charcoal for sale and encroachment onto riverbanks and even into seasonally dry stream beds to produce winter crops.

2.6.1.7 Soil management

The most soil management interventions propagated by institutions for minimizing soil tillage, maximizing soil cover and supplementing conservation agriculture are permanent planting basins, soil cover by maize stovers and agroforestry. However, research and extension messages on soil management approaches are not well coordinated, often producing and propagating inconsistent messages through different projects. Conservation agriculture is threatened by livestock feeding and fire damage resulting in scarcity of crop residues and delayed realisation of benefits. Still, conservation agriculture is seen to have the potential to rejuvenate soil health in Malawian crop fields the long run if customized to the needs of specific agro-ecological conditions with harmonized extension messages (Sosola, Sileshi, Akinnifesi, & Ajayi, 2011). Moreover, soil conservation measures – which include conservation agriculture or zero tillage and crop residue and rotation practices – account for almost half of the sector's feasible mitigation potential (Cook et al, 2021).

2.6.1.8 Agricultural waste and pollution management

Deforestation and land degradation also put pressure on water resources. These are causing high rates of erosion and sedimentation, which, in turn, leads to high sediment loads and negative impacts on aquatic life. Biological and chemical pollution from urban areas and industrial waste are additional concerns. So is runoff from the overuse of fertilizers and pesticides (particularly during wet seasons) (World Bank, 2019).

2.6.2 Livestock Production

Livestock production has more than doubled over the period from 2006 to 2016. Registering a livestock index of 244 in 2016 (considering baseline index of 100 over the period 2004-2006) (World Bank, 2021). In 2014 there were just over 1.3 million cattle in the country and slightly over 6.3 million goats (GoM, 2016). Both smallholders and estate farmers are involved in animal production, with more intensive production systems found on estate farms.

2.6.2.1 Overgrazing

Livestock production faces a number of **challenges**, including **limited pasture** due to population pressure, **inadequate production and storage technologies** in feed and breeding programmes, and **insufficient animal health support** infrastructure and services, such as dip tanks (GoM, 2016).

Cattle farmers are restricted to low lying wetland areas and/or marginal forest areas until field crops have been harvested. When cropland becomes seasonally available there is very little grass for cattle to eat. Meanwhile, wetlands and forested areas are not really suitable for grazing because hillslopes begin to erode along animal paths, creating severe gulley erosion, further impacting soil moisture regimes and accelerating land degradation.

2.6.2.2 Rangeland and watershed management

The rangelands of Malawi may be categorised into two: communal grazing areas (open access grasslands including forest reserves), and planted or private pastures. Access to communal grazing areas is not restricted. Farmers graze their animals in these areas provides they do practices has been quite challenging. Over the years, wetlands have turned into crop growing and settlement areas creating conflict with livestock production.

The Forestry Department allows grazing in forest reserves under a licence (forest use agreement) with an annual application fee of MWK2,000 and a nominal fee of MWK200 per animal per year. It is also common practice, especially in the northern region to let livestock graze on crop residue after harvest but this conflicts with conservation agriculture. Majorly, the traditional pastures are composed of natural vegetation, and are highly concentrated in energy sources with limited protein content. Seeding is not practised except in private pastures.

Fire is used in many grazing areas as a tradition to allow regrowth including in forest areas where such burning is controlled (controlled early burning).

Planted pastures are mostly associated with large scale livestock production institutions such as Mikolongwe and Katete livestock farms that grow elephant grass, other grasses and fodder crops and they institute standard management measures.

2.6.2.3 Livestock waste and pollution management

Livestock production is seen as the major source of non-carbon dioxide emissions of Greenhouse Gases (GHGs). For example, in 2001, CH4 emission from enteric fermentation was 33.4Gg while in 2017 it was 101.8 Gg, representing an increase of about 200%. The increase is due to the general increase in animal husbandry practices that the Government of Malawi is putting in, as well as the complementary efforts of the NGOs especially in goats and dairy. The CH4 from manure management was relatively on the lesser side: 1.4 Gg was emitted in 2001 while in 2017, it was 5.8Gg. Manure management and rice cultivation altogether were less compared to those from enteric fermentation, thus CH4 mitigation actions should focus on enteric fermentation (Ministry of Forestry and Natural Resources, 2020).

2.7 Mineral resources and geology

2.7.1 Mineral resources

Malawi is richly endowed with mineral resources that if sustainably developed, could significantly contribute towards economic growth and development. These resources include bauxite, heavy mineral sands, monazite, coal, vermiculite, uranium, gemstones, limestone, graphite, rare-earth-elements, iron ore, niobium tantalum, precious and semi-precious stones, dimension stones, gypsum and rock aggregates. Alluvial gold mineralization and kimberlitic anomalies in the country have also been reported in recent years by Geological Survey Department. The deposits for these minerals are spread across the country – from Southern, Central and Northern parts of Malawi. The collection of high-resolution geophysical data which indicated the availability of some magnetic and radiometric anomalies signal the possibility of further exploration for various mineral types including radioactive ore or ores associated with radioactive elements. It is expected that exploration activities together with an on-going French-funded Geological Mapping and Mineral Assessment Project (GEMMAP), with an allocation of 10.8 million Euros, will help collect data on the different types of minerals that exist in Malawi (GoM, 2020).

2.7.2 Geological risks (seismic, volcanic and related risks)

The seismic risk potential for Malawi is high because traditional adobe and earthen structures are seismically vulnerable, and large earthquakes of M_W7.0 or greater may occur in the Malawi Rift (Goda, et al., 2016). The December 2009 Karonga earthquake sequence, albeit moderate events with moment magnitudes M_W5.4 to M_W6.0 affected over 24,396 households mainly because of the low grade buildings (Goda, et al., 2016; Mwambira & Phalira, 2016). Improving housing conditions, mainly through resilient building techniques will significantly reduce the risk of loss and damages from seismic events.

2.7.3 Mining, extraction and hydrocarbons

The mining sector in Malawi is still small but slowly growing and characterized by little value addition(beneficiation) and illegal mining. Nevertheless, Malawi envisions mining as a key component of industrialization and seeks to enhance and support the local production and export of final products, thus moving away from exporting raw products. In 2019, the sector employed around 17,240 people (GoM, 2020).

Over the past 50 years, the exportation of ores and metals as a proportion of merchandise exports has dismally grown from 0.203 in 1966 to 0.34 in 2019 (World Bank, 2021). The sector's value contribution to the GDP is estimated at 0.8%, much of it coming from rock aggregate, Agricultural and Hydrated Lime (AHL), coal, gemstones and cement. Nevertheless, coal is seen as the major mineral product for Malawi. It is used for tobacco curing and as an energy source for production processes in the cement, textile, brewery, food processing and ethanol industries. Uranium, mined by Paladin Energy, used to be the top earning mineral until 2014 when the mine was placed on care and maintenance due to consistently low uranium spot prices. In 2020, Paladin Energy has sold the mine to Australian-based exploration company Lotus Resources Ltd (World Nuclear News, 2020).

Mining has severe negative environmental impacts affecting land systems and agricultural productivity, with riverbanks collapse affecting sedimentation/hydrology/ river function, and other knock-on impacts affecting energy, water and fisheries sectors. Sand and gravel extraction also leave large voids that provide an environment for disease vectors and waterborne pathogens and disrupt fish breeding grounds where sand is mined from rivers and beaches. Open quarries are also rarely rehabilitated and leave aesthetically unsightly scars on the landscape (Manda, 2013).

With respect to hydrocarbons, petroleum fuels distributed and consumed in the country are petrol (gasoline), diesel, paraffin (kerosene) and heavy fuel oil (HFO). The country is obliged to import refined petroleum fuels since it lacks domestic refining facilities. The importation and hence consumption of these petroleum products has increased by around 60% from a cumulative 318,029,360 litres in 2011 to 509,899,177 in 2019. Malawi's transport sector accounted for 11% of the total CO_2 emissions from Malawi in 2017 (Cook et al, 2021). This upward trend is projected to continue as the country has no readily available alternative transport sources (such as mass transit systems) to abate the impact.

2.8 Energy supply and use

2.8.1 Sources of Energy

The main source of household energy in Malawi is firewood (77.4 %) followed by charcoal (18.2 %) and electricity (2 %) (National Statistical Office, 2020). Overreliance on biomass (especially charcoal and firewood) for cooking is the leading cause of deforestation and degradation in Malawi but it also has knock-on effects on the health of those exposed to the fumes (carbon monoxide) (GoM, 2017).

For lighting battery is the main source of energy in most households in Malawi (52.9 %) followed by electricity (11. 4 %), solar (6.6 %), candles (6.2 %) and firewood (4.4 %) (National Statistical Office, 2020).

Access to electricity has improved from 12.7% of the total population in 2017 to 18.02% in 2018. The jump has been higher for the rural population (from 3.71% to 10.45%) whereas accessibility has declined slightly for urban population (from 57.5% to 55.16%) (World Bank, 2021). Currently, electricity supply is failing to meet demand and the country is looking for options to increase its power generation capacity (GoM, 2020).

2.8.2 Electricity Generation and Supply

Electricity is produced at various hydropower stations mostly on the Shire River. Major hydropower stations are Nkula (A&B), Tedzani (I, II & III), Kapichira (Phase I & II), Wovwe, Lilongwe B, Likoma, Chizumulu, Luwinga and Mapanga. Together, these stations generated 160,285,127 Kwh in 2019 but generation dropped to 139,337,495 kwh in 2020 mainly due to low water levels in Lake Malawi and reduced flow in the Shire River. The decline is taking place at the expense of high availability of generation plants, high maintenance costs and increased number of registered customers (GoM, 2020). According to GoM, electricity consumption has increased over the period from 2011 – 2019 whereas the supply side is overwhelmed (Table 2-1).

Table 2-1. Electricity Generation and Consumption in Malawi (2011 - 2019)

No.	Description	Unit	2011	2019	Variation (+/-)	% Change
1	Installed Hydro Capacity	MW	285.85	363.00	77.15	26.99

2	Maximum (Peak) Demand	MW	277.75	299.60	21.85	7.87
3	Energy Generation	GWh	1,887.00	1,871.88	- 15.12	- 0.80
4	Number of Consumers	No.	205,045.00	439,187.00	234,142.00	114.19
5	Consumption Domestic	GWh	593.85	568.20	- 25.65	- 4.32
6	General (GWh)	GWh	250.43	292.50	42.07	16.80
7	Power Demand	GWh	612.23	620.00	7.77	1.27
8	Export of (GWh)	GWh	19.08	19.90	0.82	4.30
9	**Total Consumption (GWh)**	**GWh**	**1,475.59**	**1,5760**	100.41	6.80

Generally, electricity demand has increased from 230MW in 2005 to 330MW by 2018, representing an average annual growth rate of 4% (GoM, 2020).

The proportion of the population accessing electricity has increased from 3.2% in 1992 to 18.02% in 2018 with more urban households accessing electricity (55.2%) than rural households (10.5%) (World Bank, 2021). The Government of Malawi targets to increase access to electricity to 30% of the population by 2030. To achieve these aspirations, the Government has developed an Integrated Resource Plan (IRP) for power development (generation and transmission facilities) as a blueprint for Malawi's electricity sector requirements up to 2037. The IRP essentially sets out a road map for optimal and least-cost expansion and development of the electricity sector in Malawi from 2017 to 2037 (GoM, 2020).

The IRP estimates that maximum demand will reach 1,158 MW by 2025 and 1,873 MW by 2030. Overreliance on the Shire River for almost all (98%) electricity generated renders the system vulnerable given the episodes of low precipitation and associated reduced levels in Lake Malawi and the Shire River.

To boost power generation during drought episodes when water levels diminish, the country uses diesel generators supplied by Independent Power Producers (IPP). ESCOM has signed Eleven (11) Power Purchase Agreements (PPAs) for various power supply options, totalling 328MW. On the transmission front, the IRP recommends constructing a (400kV) Malawi – Mozambique interconnector to enable both exports and imports of power, and a new double circuit 132kV overhead line from Nkhoma substation in Lilongwe and via a Nanjoka substation in Salima, to Chintheche in Nkhatabay. Other projects include, energy efficiency bulbs projects, which are initiatives aimed at managing demand and reducing losses on the system. These efforts are also planned to be undertaken during the IRP implementation period. It is envisaged that DSM and loss reduction initiatives will save about 40MW (GoM, 2020).

The Government has carried out three feasibility studies for hydropower development at Fufu, Mpatamanga and Kholombidzo that are promising but seek financing for execution.

2.8.3 Energy Balance

Malawi's energy balance is dominated by biomass (firewood, charcoal, agricultural and industrial wastes), which account for 80% of the total primary energy supply due to, among other reasons, lack of affordable and reliable alternatives. More than 97% of households in Malawi rely on illegally and unsustainably sourced biomass (charcoal and firewood) for domestic cooking and heating energy. This has resulted in high levels of deforestation and forest degradation throughout the country, with downstream negative impacts on water availability, hydropower-generating capacity, and more broadly, vulnerability of Malawians to climate change (GoM, 2017).

2.8.4 Strategies for Sustainable Energy

2.8.4.1 National Charcoal Strategy

Realising that biomass remains an important source of energy for the foreseeable future Government of Malawi has developed a National Charcoal Strategy (NCS) 2017 – 2027 that presents a multi-sectoral framework and approach, focused on pillars that define opportunities to incrementally address problems of charcoal production and demand in the near, medium and long term.

2.8.4.2 Promotion of Alternatives

The Ministry of Energy is promoting use of alternatives to charcoal and firewood which include use of Liquefied Petroleum Gas (LPG), biogas and biomass briquettes. However, there is a need for the Government to consider waiving some taxes and removing levies on LPG to make it affordable to the majority of Malawians. Clean and efficient cook-stoves are being promoted to reduce charcoal and firewood consumption. In this sense, the Ministry of Energy is spearheading the distribution of clean and efficient cook-stoves with the support of various NGO's and by 2020 more than 1.6 million cook stoves had been distributed (NPC, 2020).

The Government is also promoting off-grid solar products such as Pico Solar Products (PSP) or Solar Home Systems (SHS) that generally use a combination of solar panels linked to rechargeable batteries capable of producing safe, secure and effective energy to meet the needs of some of the most vulnerable members of Malawi's society. The target group for these technologies are rural vulnerable households that cannot afford connection to the national and mini-grid systems. The 2018 Malawi Population and Housing Census estimated that 6.6% of Malawi's households use these off-grid solar products for lighting. Government intends to address the regulatory and financing challenges facing the off-grid solar industry in Malawi.

Furthermore, the Government of Malawi is rolling out the Malawi Electricity Access Project (MEAP) with World Bank financing of USD 150 million. The Project has three components: (i) Grid electrification (USD 105 million) which seeks to extend the grid to urban centres and rural trading centres - implemented by Electricity Supply Commission of Malawi (ESCOM); (ii) Off-grid market development (USD 30 million) which seeks to address the challenges in scaling up the off-grid Market by providing a working capital for solar technologies and financing for mini-grids - implemented by the Ministry of Energy; and (iii) Technical Assistance to ESCOM and the Ministry of Energy for project implementation.

The Government removed import taxes on all solar products to make the technologies affordable thereby supporting the policy for Renewable Energy technologies.

2.8.4.3 Mini-grids

The Government of Malawi is implementing the "Increasing access to Clean and Affordable Decentralised Energy Services in vulnerable areas of Malawi" - a UNDP and GEF funded project that has upgraded a hydro Mini-grid operated by Mulanje Electricity Generation Agency (MEGA) in Mulanje by extra 120 kW, connecting over 850 households. The project has also successfully supported Community Energy Malawi to develop 80 kW Solar Mini-grid in Sitolo Village in Mchinji connecting the first 150 households. It is also supporting a few other mini-grid projects: upgrade of a 50 kW Chipopoma hydro Minigrid in Mantchewe, Rumphi, development of a 50-kW hydro Minigrid in Kavuzi and a 300 kW hydro mini-grid in Usingini Nkhatabay by Practical action. The Electricity Generation Company (EGENCO) is doing preliminary assessments of more than 3 sites for possible development of mini grids.

2.9 Urbanisation, infrastructure and industries

2.9.1 State of Urbanisation

Malawi is urbanising at the rate of 5.2 %. At this rate, by 2030, one in every five Malawians (or around 20% of the population) will be a city or town dweller and by 2050, the share will reach 30 % of the population (The Situation of Urbanisation in Malawi Report (2013). This urbanisation is taking place in the absence of industrialization, job creating investments, or adequate service provision in terms of housing, infrastructure

and services. Malawi's cities and towns are facing clear and growing challenges to provide local populations with better basic living conditions.

In Malawi, Urban Areas refer to the four major cities of Blantyre, Lilongwe, Mzuzu and Zomba and other towns and Bomas (district centres), and gazetted town planning areas. It is estimated that 16% of the population resided in the urban areas of the country in 2018 of which, 12% resided in the four major cities and 4% resided in the other towns and Bomas. Urban population in Malawi has been on the increase from about 850,000 in 1987 to 1.4 million in 1998 to 2.0 million in 2008 to 2.8 million in 2018. However, the proportionate increase as a proportion of the national population has been marginal rising from 14.4 % in 1998 to 15.3 % in 2008 to 16 % in 2018 (National Statistical Office, 2018).

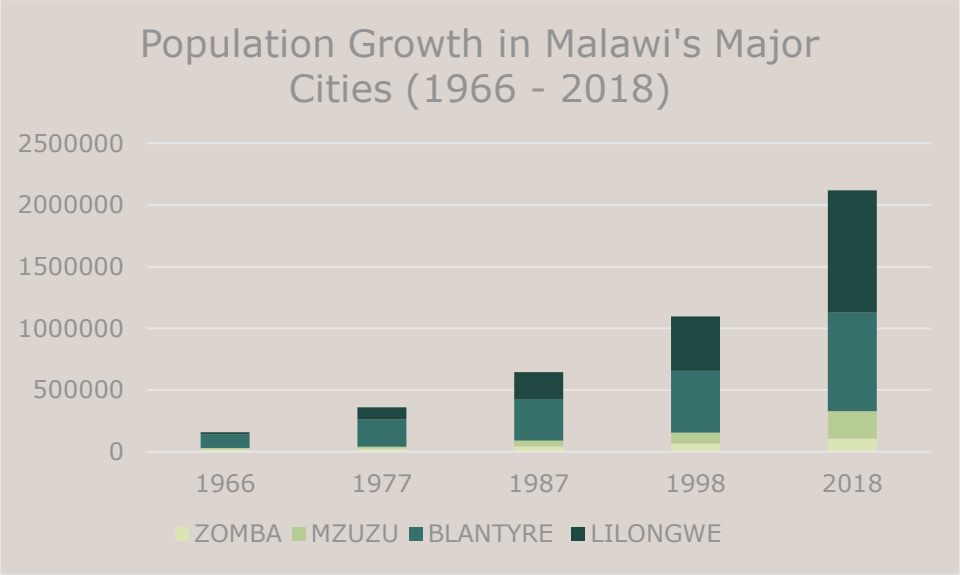


Figure 2-2. Malawi Urban Population Growth, 1966-2018 Source: NSO Housing and Population Census reports

2.9.2 Housing

Dwelling structures are classified into three major groups based on construction materials of the roof and walls: permanent, semi-permanent and traditional. A permanent structure is made of durable roofing materials such as iron sheets and strong walling materials such as burned bricks. A semi-permanent structure lacks one of the materials of the permanent structure such as having a roof made of iron sheets with the wall made up of unburned bricks. A traditional structure lacks both materials of the permanent structure. A survey conducted by NSO shows that 45.9% of the dwelling units in Malawi are permanent, 29.1% are traditional and 25% are semi-permanent structures (Table 2-53). While this situation is still deplorable, it indicates a marked improvement in the quality of housing structures compared to the situation in 2011 when the proportion of permanent households was 28.7%. The majority (67.3%) of permanent structures are in urban areas.

Table 2-2. Households by type of Construction materials

Construction Material	IHS3 (2011)	IHS4 (2017)	IHS5 (2020)
Permanent	28.7	26.7	45.9
Semi-Permanent	24.7	35.9	25.0
Traditional	46.6	37.5	29.1

Source: National Statistical Office, IHS5 2019-2020

The extremes of urban squalor and deprivation in the peri-urban and high-density slum areas, combined with massive population growth make it extremely important to address the urban sanitation problems for the

future prosperity of Malawi and its people. Poor sanitation conditions in urban areas encourage the rapid spread of communicable diseases such as tuberculosis and diarrhoea. Frequent outbreaks of cholera, especially in the country's main commercial Capital Blantyre emphasize this point[12].

2.9.3 Water Supply and Sanitation

A study of access to improved water sources over the period from 1990 – 2015 in fifteen countries across sub-Saharan Africa shows that Malawi had the highest (83%) access to improved water sources in 2010 – 2015 (Ato Armah, et al, 2018). The Fifth Integrated Household Survey conducted in 2019/20 shows that 88.3% of households have access to an improved water source, of which 64.5% are boreholes, followed by 17.8% piped into yard/plot/communal standpipe (NSO, 2020). According to NSO (2020), the proportion of households with access to improved water sources is higher (97.1%) in urban areas than in rural areas at 86.5%. Stand pipes are the main source of drinking water for the households in urban areas (64.9%) while boreholes are the main source of drinking water in rural areas (73.9%). However, only 3% of the urban population has access to water that is piped into their homes while the majority of those who have access to improved water supplies do so from either shared or multi-user sources. In 2012 it was estimated that to achieve universal access to improved water supplies and also secure urban water supplies until 2030 an investment of over US$ 1 billion is required (MoAIWD, 2012).

Sanitation in Malawi's cities and towns is also in need of improvement: although 47 % of the urban population has access to improved sanitation, the remaining 53 % either share improved sanitation facilities with others, use unimproved sanitation or defecate in the open. It is estimated that around US$ 200 million need to be invested to make a major improvement in urban sanitation in Malawi (MoAIWD, 2012).

A typical case is Lilongwe City which is facing major sanitation and hygiene challenges. A citywide survey conducted by the World Bank in 2017 showed that only 5% of the population is served by a sewer system, while the majority relies on onsite sanitation systems (70 % pit latrines and 25 % septic tanks).

Given the urgent need to improve current levels of sanitation services, the Government of Malawi (GoM) is implementing the Lilongwe Water and Sanitation Project (LWSP) with funding from the World Bank. The project development objective is to increase access to improved water services and safely manage sanitation in Lilongwe city. Under component 2, priority sanitation improvements, the LWSP intends to construct public toilets in 10 primary schools. These Primary Schools are Mbizi, Kafulu, Mwenyekondo, Nkomachi, Lilongwe LEA, Mvunguti, Lilongwe Demo (TTC), Chikanda, Magwero and Lumbazi. This initiative is expected to improve sanitation in primary schools in Lilongwe City and the project will be implemented by the Lilongwe City Council, as an implementing partner with the Lilongwe Water Board (LWB) (SWS; L. Gravam; Infracon, 2020).

Additionally, the Government is implementing the Malawi Education Sector Improvement Project (MESIP) that involves the construction of 500 classrooms, 300 latrine blocks focusing mainly on girls' sanitation needs and some 150 water points in the 8 most disadvantaged districts (GoM, 2020). MESIP is funded by the Global Partnership for Education (GPE) and the Royal Norwegian Embassy (RNE) and facilitated through the World Bank and the Ministry of Education.

At household level, the Fifth Integrated Household Survey shows that approximately 35.2% of households in Malawi had access to improved toilet facilities[13] in 2020. About 55% of the households were using pit latrine without slab, 31.7% were using latrine with a slab and 8.9% had no toilet facility (National Statistical Office, 2020). Approx. 65.5 % of the households in urban and 29.3% of the households in rural areas have access to improved toilet facility. About 12% of the households in urban areas were using flush toilets compared to 0.4% of the households in rural areas. The proportion of households which were using pit latrine with slab was 52.5% % in urban areas compared to 27.7% of the households in rural areas (National Statistical Office,

[12] Based on experiences of cholera prevalence in Blantyre in the past. In January 2021, Blantyre was hit by cholera amidst cholera ((Khamula, 2021)

[13] Improved sanitation (toilet) facility is defined as one that hygienically separates human excreta from human contact. They include flush or pour flush (to piped sewer system, septic tank, and pit latrine) ventilated improved pit (VIP) latrine, pit latrine with slab and compost toilet.

2018). An estimated 5.9 % of households use the bush/field for human waste disposal – a practice that is linked to proliferation of diarrhoea and other diseases transmitted through the faecal–oral route (Howard et al., 2020).

2.9.4 Solid Waste Management

Solid waste management is a growing challenge in all the 35 councils of the country especially at the burgeoning city and town councils. A survey on waste management in local government authorities has shown low levels of service provision in solid waste management (Table 2-3). In urban centres, including cities and towns, waste is disposed of indiscriminately along the streets, rivers, storm water drains and open spaces. Poor waste disposal is contributing to water pollution, air pollution, land contamination and spread of diseases through vectors. Rivers in most of the areas, especially the cities of Blantyre and Lilongwe, have been heavily affected through illegal dumping. Development of squatter settlements has also led to loss of aesthetic beauty of the areas as evidenced from indiscriminate waste disposal, and poor visual appearance of construction materials such as rubble (EAD, 2020).

Table 2-3. Service delivery in Waste Management in Malawi's councils

Type of Facility/Service	Number of Councils that have the facility/service	Percentage (%)
Solid waste dump sites	18	52.9
Appropriate landfill	0	0
Solid waste collection vehicles	14	41.2
Sewage treatment facilities	7	20.6
Sewage collection vehicles	8	23.5
Private sewage collection companies	5	14.7
Recycling companies/projects	5	14.7

Source: Waste Management Survey (GoM, 2019)

Waste materials including household rubbish, commercial refuse, construction and demolition debris, street and drainage cleaning refuse, abandoned vehicles and sanitation residues are discarded in urban areas for collection by the Local Government Authority. However, waste collection rates are generally low and most of the collected waste is disposed in sanitary landfills or open dumps without treatment or recycling.

2.9.5 Electricity

Electricity supply and distribution remains erratic and insufficient to meet growing industrial, commercial and residential demand in urban areas. In 2012, Malawi's urban population was estimated at 2.3 million (Population Reference Bureau, 2012)[14] of which, only 37 % had access to electricity (World Bank, 2021), which underlies deficiencies in the distribution network. Moreover, despite some improvements in recent years, electricity supply in Malawi (and its urban areas) is unreliable and insufficient to meet demand. In 2019, available generation capacity was estimated at 277 MW satisfying 62% of the estimated demand at that time (GoM, 2019). In 2020, there was still significant load shedding due to low rainfall and the system; while the maximum demand was severely constrained due to generation capacity challenges[15].

2.9.6 Transport Infrastructure

Malawi has a multi-modal transportation system consisting of road, rail, air and inland water transport – all of which transport goods and people in various proportions. Road transport is the major mode of transport in Malawi handling more than 70% of the internal freight traffic and 99% of passenger traffic (GoM, 2015). As of 2014, the total national classified road network was 15,451km, comprising Main (21.7%), Secondary (20.2%), Tertiary (26.7%), District (22.7%) and Urban (8.7%) roads. Only 26% of the national classified road network was paved (Roads Authority, 2014). Rural transport includes movement of agricultural products,

[14] Malawi Population Data Sheet 2012
[15] National Economic Report 2020.

water, firewood and food; and linkage to social services such as health care and education. Road condition surveys carried out in 2011, 2014 and 2017 show that the condition of the road has deteriorated over the years. In 2011, for example, 2,447 km of the national road network (representing 40% of the network) was classified as "in good condition" which reduced to 1,639 km (38%) in 2014 and 1,552 km (36%) in 2017. This is mostly attributed to inadequate funds being invested in road intervention works. While an expansion of the paved road network would significantly improve accessibility to most areas, the available resources are not adequate to sustainably preserve the existing network (GoM, 2020).

Partial road traffic accident statistics show that a total of 8,194 accidents occurred in 2015 involving 17,575 victims (GoM, 2017). According to GoM (2017), there has been a rapid increase of motorisation over the decade which has not been matched by corresponding improvements in regulations and standards of infrastructure. Lilongwe and Blantyre, in particular, are growing fast and this is already generating a range of challenges, such as traffic congestion, poor air quality, road accidents and constrained accessibility, the latter exacerbated by a fragmented, poorly co-ordinated and capacity constrained public transport system based on paratransit minibuses. In addition, there is slow provision, and maintenance of facilities for the high proportion of non-motorised transport using both urban and rural roads.

Environmental issues arising from the transport sector include land degradation from removal of vegetation, water and air pollution from construction related wastes (fumes, oils, chemicals), habitat destruction or fragmentation and GHG emissions contributing to climate change. It is estimated that the transport sector contributed 1.05 $MtCO_2e$ through fossil fuel combustion, to the overall 9.33 million tCO_2e total emissions excluding FOLU in 2017. If no significant measures are taken to address the challenge, GHG emissions from the transport sector are projected to increase more than three-fold by 2040 (Cook et al., 2021). According to Cook et al. (2020), emissions reductions arising from modal shift (promotion of mass public transport) and use of low carbon fuels such as biodiesel and ethanol are found to be potentially significant in reducing climate change related impacts from the transport sector.

The Government of Malawi, with support from the World Bank, has developed a National Transport Master Plan (NTMP), which provides a framework for delivering sustainable interventions to enhance the transport sector across Malawi for the period between 2017 and 2037.

2.9.7 Industries and Private Sector

Based on analysis of National Economic reports for 2018 and 2020, industry plays a minor role in the economy of Malawi's predominantly agrarian society. Small and medium-scale industries are concentrated in urban areas of Lilongwe, Blantyre and to a lesser extent in Mzuzu, with a few major agro-processing factories located on estates around the country (such as Illovo Sugar in Nchalo and Dwangwa and tea estates in southern and northern regions of Malawi). The other industrial sectors are wholesale and retail trade, manufacturing, real estate activities and the extractives.

Agro-processing industries contribute largely to the economy with abattoirs, tobacco, tea, sugar, cotton, soybean, sunflower, tomato and fruit processing. Effluents from the main abattoirs located in urban areas further impact on already overloaded City Sanitation Works (see sanitation). The availability of raw materials for agro-processing, however, is affected by climate (mainly drought and floods, which are indirect impacts from land degradation). Food fortification (supplements) processing (vegetable oils and proteins), is also carried out in the agro-processing sector where cases of spillages/effluents have been reported to be dumped in water bodies and settled environments (Mlaviwa, 2021).

Tourism industry is less developed and mostly nature-based, thus posing minimal threats to the environment except for unregulated developments, localised draw-down on natural resources and other impacts similar to those experienced under urban development relating to sanitation and waste management.

Industry has a significant draw-down on electricity and water, as well as the potential to pollute the ground and waterways with industrial effluent, and the atmosphere with smoke and heat. Bigger private sector companies such as Illovo have fully developed and adhere to industrial standards such as ISO14001, and applicable legislation regarding the use of fertilizer and pesticides/chemicals. However, the increasing small

and medium size companies tend to overlook environmental management and sustainability considerations and are difficult to control (Mlaviwa, 2021).

Over the past decade, EAD has fought legal battles with manufacturers of thin plastics over a ban on the manufacturing and/or of introduction of thin plastics in the country. In 2019 the Supreme Court of Appeal upheld Government's stance to implement the ban after an appeal by plastics' industry players to stop the ban was overruled. An estimated 75,000 tonnes of plastic is produced in Malawi each year, of which 80% is single-use plastic that cannot be recycled (Lilongwe Wildlife Trust, 2019). Plastic has detrimental environmental effects including fatality when ingested by (or when they trap) fish and other wildlife resulting in biodiversity loss and clogging of water channels culminating in flooding. The manufacture of plastics releases GHGs that contribute to climate change (UNFCCC, 2021).

Key problem areas related to the environmental impacts of industry are the lack of capacity, and of incentives for industries to develop appropriate waste disposal methodologies.

2.10 Climate

The climate of Malawi is tropical continental and largely influenced by the huge water mass of Lake Malawi. There are three main seasons: cool and dry, from May to August; warm and dry, from September to November; and warm and wet, from December to April (Halle & Burgess, 2006).

2.10.1 Temperature

Temperatures are greatly influenced by the topography and decrease with increasing altitude. The mean maximum and minimum temperatures are 28 °C and 10 °C respectively in the plateau areas, and 32 °C and 14 °C respectively in the rift valley plains. Climate trend analysis shows that the temperature is rising with the potential of increasing by 1.3 °C to 2.6 °C by the end of this century. Minimum temperatures are exhibiting a faster rise than maximum temperatures (GoM, 2020).

2.10.2 Precipitation

Annual rainfall ranges from 600mm in lower Shire Valley and Karonga lakeshore plains, to over 3,000 mm in high elevation areas with mean annual rainfall being 1,180 mm. The distribution of rainfall is strongly influenced by pressure and wind systems governed by movement of the Inter-Tropical Convergence Zone (ITCZ) and associated distribution belts. The five-month rainy season differs slightly in Southern and Central Regions (November to March). Distribution is further influenced by the topography and proximity of Lake Malawi. Climate trend analysis shows that generally, there is an insignificant decrease in rainfall during the October, November and December (OND) period, and an increase during (January, February and March (JFM) period (GoM, 2020)..

2.10.3 Frequency of extreme weather events, natural climate-related disasters

Scientific evidence in Malawi shows an increase in frequency, intensity and magnitude of extreme weather events over the last two decades (GoM, 2016). Malawi is particularly vulnerable to floods, droughts and strong winds associated with tropical cyclones. Most of the drought episodes that Malawi experiences are caused by the El Nino and the Southern Oscillation (ENSO) phenomena, with serious impacts on crop and livestock production. Additionally, the country experiences long dry spells that occasionally disrupt the rainfall season and cause crop failure. The pattern of rainfall results in the seasonality of crop production, and forces farmers to stay idle during the dry season. Livestock productivity is highly constrained by lack of adequate feed and drinking water in the dry season (GoM, 2020).

Over the past five decades, Malawi has experienced more than 19 major flooding events and seven droughts. In 2015, Malawi was affected by the worst floods in 50 years due to extreme rainfall that took place early that year. The floods affected over 1 million people, displaced 230,000 people and killed 106 people, with another 172 people reported missing (GoM, 2020).

Climate trend analyses show that over the period from 2020 to 2040, El Nino conditions will likely increase climate extremes, resulting in the increased severity, or magnitude/intensity, and frequency of floods,

droughts, and strong winds. This calls for urgent implementation of robust climate change adaptation strategies in order to avert impending disasters associated with these three hazards (GoM, 2020).

2.10.4 Natural Hazard Risk and Disaster Risk Management

Natural hazards are predominantly associated with natural processes and phenomena (UNDRR, 2020). Malawi has a relatively low hazard and exposure risk to natural disasters with a rating of 4.5 (out of 10) on the INFORM Risk – and has maintained this rating over the past three years. The key dimensions considered in this rating are:

i. Droughts probability and historical impact;
ii. Physical exposure to tropical cyclones;
iii. Physical exposure to earthquakes;
iv. Physical exposure to floods;
v. Physical exposure to Tsunami; and
vi. Epidemics

Except for Zambia, that has a lower risk rating of 3.5, the other neighbouring countries have higher hazard and exposure risk to natural disasters than Malawi (Table 2-2). As can be seen from this Table, Malawi's greatest risk dimensions are exposure to earthquakes followed by epidemics, droughts and floods.

Table 2-4. INFORM Risk Hazard and Exposure Risk to Natural Disasters for Malawi and Neighbouring countries

Country	Droughts	Cyclones	Earthquakes	Floods	Tsunamis	Epidemics	Overall
Malawi	5.8	0.7	6.5	5.3	0	6.1	4.5
Tanzania	5.3	0.8	4.8	5.8	5.9	6.6	5.1
Mozambique	6.4	5.2	3.8	6.3	6	6.6	5.8
Zambia	4.2	0	2.8	5.5	0	6.4	3.5

Compiled by the author using INFORM Risk data on Disaster Risk Management Knowledge Centre (DRMKC), European Commission (2021).

The most devastating hazard events in recent history were the flood of 2015 followed by the drought of 2016 that together contributed to the decline of over 5% in the annual GDP (World Bank, 2015). In particular, urban areas are highly vulnerable to earthquakes (UNU-EHS, 2014). For instance, the Global Urban Risk Index classifies Blantyre, Malawi's second most populated city, among the top five cities with the highest mortality risk and the risk of economic loss due to earthquakes (Brecht, Deichmann & Wang, 2013).

Malawi is also rated as "low risk" in terms of INFORM's three dimensions: Hazard & Exposure, Vulnerability and Lack of Coping Capacity. With these three dimensions combined, Malawi's risk rating is 4.8, which is lower than its sea-based neighbours namely, Mozambique (6.7) and Tanzania (5.1)[16]. The analysis shows that Malawi has low exposure to natural hazards but its poor socio-economic conditions (including overdependence on Official Development Assistance (ODA) and inadequate infrastructure) increase the country's vulnerability and reduces its coping capacity considerably (European Commission, 2021).

Most smallholder farmers in Malawi are resource poor, they have very limited capacity to contain shocks arising from climate change. Food security remains a concern in many of the affected districts and agriculture production of crops and livestock continues to see only a limited increase in productivity over years because of vulnerability to climate change (GoM, 2020). Food shortages cause domestic grain prices to rise, resulting in increased grain imports which erode the foreign exchange reserves with depreciating effects on the

[16] INFORM is a multi-stakeholder forum for developing shared, quantitative analysis relevant to humanitarian crises and disasters

exchange rate, and divert resource reallocation from other productive sectors. As a result, prices of other foodstuffs also increase, fuelling inflation with knock-on effects on interest rates and the macroeconomic outlook (GoM, 2016). Economic modelling has estimated the direct overall costs due to climate change impacts equivalent to losing at least 5% of the country's Gross Domestic Product (GDP) each year (GoM, 2016). Addressing these underlying factors through integrated climate change mitigation and adaptation strategies will considerably reduce the country's risk to natural disasters (European Commission, 2021).

2.10.5 Environmental and climate change indicators

Globally, Malawi is rated 112 against a total of 180 countries on a set of 46 indicators compiled by the Yale University. The ratings cover two broad thematic areas of health and ecosystem vitality. The analysis shows that Malawi has improved on most health indicators over the period 2010-2020 but has retrogressed on ecosystem vitality. The retrogression is seen in terms of increases in black carbon growth rate (-21.6)[17], CO_2 growth rate (-18.1), CH_4 growth rate (-8.2), GHG inventory trend (-10.5), tree cover loss (-8.4), ozone (-7.7), species habitat index (-4.4), and biodiversity habitat index (-0.3) (Yale University, 2020).

2.10.6 Trends in relation to the Sustainable Development Goals, Targets and indicators

At the higher level, the country has selected three broad environmental sustainability indicators and milestones that are reflected in the newly instituted Malawi 2063 (Table 2-5).

Table 2-4. Proposed environmental sustainability indicator for Malawi

Indicator	Possible Data Sources	Baseline year and value	Milestone 2030	Milestone 2040
Rate of deforestation	Department responsible for environmental affairs	1.6% (2018)	0.91%	0.62%
Environmental Sustainability Index	World Bank	4.22 (2017)	5.05	5.7
Carbon footprint (kt)	Department responsible for environmental affairs	1,298.12 (2016)	Below 10,000,000**	Below 25,000,000**

Source: Malawi 2063

***These milestones appear to be out of sync with the baseline and target*

Malawi has aligned its reporting with the SDGs and recently reported on progress (baseline 2016). Malawi is making significant progress on 29 of the 169 targets (achievement rate of 17 %). It is making moderate progress with performance gaps on 59 of the targets (35 %) and shows insufficient to no policy change or otherwise poor performance on 81 of the targets (48 %). The 29 targets on which Malawi is making significant progress include SDG 3 (Good Health and Well-Being), Target 3.2, under-five mortality rates are significantly declining and likely to be met; SDG 4 (Education for All), Target 4.5, gender parity in primary schools is already equal to parity, Net Enrolment in Primary Schools is close to target. Targets on which the country is making moderate progress include SDG 2 (Zero Hunger), despite significant progress through reduction and turning the curve on child malnutrition indicators (Stunting, Underweight, and Wasting) (GoM, 2020). Despite the progress, the country continues to suffer the challenges of poverty, unemployment, rapid population growth and environmental degradation, and vulnerability to external shocks, among others.

[17]Black carbon is formed through the incomplete combustion of fossil fuels, biofuel, and biomass, and is one of the main types of particle in both anthropogenic and naturally occurring soot.

2.10.7 Trends in additional indicators related to country-specific environmental issues

2.10.7.1 Nationally Determined Contributions Indicators

Malawi, through the coordination efforts of the Environmental Affairs Department updated its Nationally Determined Contributions (NDC) commitment in May 2021 when it submitted an NDC report and an associated NDC Implementation and Monitoring Plan to the United Nations Framework Convention for Climate Change (UNFCCC). The NDC Monitoring and Evaluation (M&E) Framework contains Malawi's institutional arrangements in relation to Monitoring, Reporting and Verification (MRV) of its GHG emissions within the NDC and the monitoring and evaluation of adaptation measures. The framework contains progress indicators for tracking the implementation of the NDC both at a sectoral and at a national economy-wide level over the period from 2021 to 2040, disaggregated by gender and vulnerable group where relevant (Cook G. , et al., 2021).

In terms of mitigation, indicators are provided for the main Intergovernmental Panel on Climate Change (IPCC) reporting categories including Energy, Industrial Processes and Product Use (IPPU), Waste and AFOLU (separated into Agriculture, and Forestry and Other Land Use). In addition, an aggregated economy-wide overall NDC progress monitoring template is presented. As for adaptation, indicators are provided for twelve thematic areas namely: agriculture, livestock, and fisheries; conservation of biodiversity; drought management; early warning systems and hazard monitoring; flood management; flood-proofing; heat and drought-proofing; integrated watershed management; health and nutrition; resilient ecotourism; social support; and governance (Cook G. , et al., 2021).

2.10.7.2 Sector-based Environment, Natural Resources and Climate Change Management Indicators

The Ministry of Forestry and Natural Resources, through the Environmental Affairs Department developed M&E Framework for Environment, Natural Resources and Climate Change Management (ENRCCM) Sector in 2010 to act as a planning tool for sustainable implementation of environment, natural resources and climate change management programmes in the country. The framework was updated in March 2020 to incorporate emerging issues highlighted in the Malawi Growth and Development Strategy III and the Sustainable Development Goals, and climate change. The output is a consolidation of core indicators with associated targets over a 5-year period from 2019 to 2024 (Annex 7.8). The indicators are drawn for 13 sectors: agriculture, biodiversity, climate change management, energy, fisheries, forestry, health, industry, land resources and resettlement, mining, parks and wildlife, sanitation and hygiene, and water resources development (Annex 7.8).

Based on this framework, Government sectoral agencies, NGOs and the private sector implementing climate change, environment and natural resources management programmes are responsible for data collection, analysis, storage and reporting to the Malawi Environment Protection Authority (MEPA). The organizations will develop necessary data collection tools, and collect the data as part of their routine implementation. At national level, the MEPA will be responsible for aggregating and storing data with individual organizations managing their own information systems. This is meant to facilitate flow of information to stakeholders at national, regional, and international level (Government of Malawi, 2020).

3 Environmental and climate change policy, regulatory and institutional framework

3.1 Policies

3.1.1 Existence of National Policies, Strategies and Action Plans for the Environment

In Malawi, management of the environment and natural resources is governed by a diverse set of sectoral policies and legal instruments. These include the Constitution of the Republic of Malawi, overarching policies, sectoral policies and sectoral acts. On the ground these are operationalised through various strategies, action plans, regulations, guidelines and standards. The mandate for managing specific elements of the environment and natural resources falls under many institutions in line with their respective sectoral mandates.

Malawi's overarching policy on matters of environmental and natural resources management is the National Environmental Policy (2004) that was based on the principles of the National Environmental Action Plan (NEAP) developed in 1994. The NEAP guided the formulation of the first National Environmental Policy (NEP) and the Environmental Management Act (EMA) in 1996, that set the tone for mainstreaming of environmental concerns and considerations in all other development policies. The EMA led to the development or revision of several policies in the environment and natural resources sector (Annex 7.6). The NEP was subsequently revised in 2004, and should be periodically revised according to general development policies and goals adopted by Malawi. A few policies have been developed or updated over the past decade to incorporate climate change and other emerging development issues. These include: The National Climate Change Management Policy (2016), National Forest Policy (2016), Fisheries and Aquaculture Policy (2016) and Gender Policy of 2015 (Annex 7.6).

3.1.2 Policy responses to global issues

The nine priority environmental issues identified by the NEAP in 1994 are still relevant namely: soil erosion, deforestation, water resources depletion and degradation, high population growth, depletion of fish stocks, threats to biodiversity, human habitat degradation, and climate change and air pollution.

3.1.3 Consistency between policies

This policy framework for environment and climate change management is very complex, however, and the documents rarely known about, except in the relevant departments and ministries. Coordination and coherence of policies is seen as one of the major challenges affecting the achievement of sustainable development goals in Malawi because political regimes tend to use party manifestos that are not aligned to the national and global development agenda (GoM, 2020).

At national level, information exchange and circulation are slow. Generation and dissemination of environmental data and information is uncoordinated. It is felt that EAD has not taken advantage of the education system to train teachers/educators to inculcate environmental information/knowledge values in learners. Additionally, investment in environmental information management, education and awareness is low to effectively advance knowledge, change mind-sets and advance practical action towards environmental sustainability in the country (Tikiwa, 2021).

3.1.4 Policies on gender and environment

The country has no specific policy on gender and environment but gender is integrated as a cross-cutting theme in all development policies and strategies including the MGDSIII and the National Environmental Policy (NEP) (2004) (GoM, 2004; GoM, 2017). The NEP acts as the guiding policy on environment and natural resources management in the country and it propagates integration of gender, youth and children concerns in environmental planning decisions at all levels to ensure sustainable social and economic development (GoM, 2004).

3.1.5 Important measures taken by the government to address environmental climate vulnerability concerns and types of policy instruments used for implementation

In 2016, Government of Malawi developed the National Climate Change Management policy with the goal to create an enabling policy and legal framework for a pragmatic, coordinated and harmonised approach to climate change management. The policy provides strategic direction for Malawi's priorities for climate change interventions and outlines an institutional framework for the application of adaptation, mitigation, technology transfer and capacity building measures. In 2017, Government developed the National Disaster Recovery Framework to coordinate the multi-stakeholder efforts and strengthen resilience of vulnerable population. In 2018, Government developed the National Resilience Strategy to guide the strategic decision-making at National and District level and coordinate and prioritise multi-stakeholder interventions for climate change, disaster risk management and resilience building over the period 2018 – 2030. These frameworks are aligned to the 17 Goals and were developed to making sure that Malawi remains on track to achieve the SDG (GoM, 2020).

The instruments used for implementation of environmental and climate vulnerability concerns include conduction of Environmental and Social Impact Assessments (ESIA) and implementation of Environment and Social Management Plans (ESMPs) (GoM, 2020). Additionally, Government in collaboration with NGOs/CSOs, development partners and the private sector engage in environmental education, awareness-raising and advocacy activities (Tikiwa, 2021).

3.1.6 Effectiveness in achieving targets, impact and outcome

According to an assessment by the National Planning Commission in 2020, Malawi has made commendable progress on 29 of the 169 targets and moderate progress on 59 of the targets. The country shows insufficient to no policy change or otherwise poor performance on 81 of the SDG targets. Positive strides have been made in achievement of health-related indicators. Environment and climate change are the areas where the country has stagnated or shown a declining trend in meeting the SDG (GoM, 2020). A review of implementation against meeting MGDSIII targets over the period 2017-2019 shows an overall 40% achievement on Health and Population and Agriculture, Water Development and Climate Change sectors (NPC, 2020).

3.1.7 Effectiveness of Implementation of ENR Policies and Legislations

Generally, environmental degradation is worsening in many fronts, despite the proliferation of environmental legislation in Malawi due to low enforcement of applicable law, and low penalties to offenders (Forestry Department, 2021; Mlaviwa, 2021). The failure to implement legislation is mostly observed in forestry with cases of illegal extraction reported on daily basis. Where offenders have been found guilty, the penalties have often been lenient to deter other would-be offenders.

Law enforcement is also hampered by inadequate staffing, low political will, insufficient funding, corruption and conflicting livelihood priorities (Forestry Department, 2021). Further, poor coordination among implementing sectors at district council level is listed as the major challenge to achieving SDG 13 on climate action (GoM, 2020). Furthermore, some strategies and action plans within different departments that address common resources (particularly water for irrigation), are not harmonised, creating confusion and conflicts of interest across departments responsible for implementation (Mlaviwa, 2021).

3.2 Regulatory Framework

Malawi has put in place (and updated) a series of legislative sectoral frameworks and strategies to integrate environment and climate change management in socio-economic development activities. These, among many, include: The Malawi Constitution, 1995; Malawi 2063; the Malawi Growth Development Strategy III; United Nations Development Assistance Framework for Malawi (UNDAF); National Strategy for Sustainable Development 2004; National Environmental Policy (NEP) 2004; National Disaster Risk Management Policy (2015) National Forestry Policy, 2016; National Land Resource Management Policy and Strategy (2000); Wildlife Policy (2000); National Agriculture Policy (2016), National Irrigation Policy (2016); National Fisheries and Aquaculture Policy (2016); National Land Policy (2002); National Environmental Action Plan 2002; National Climate Change Investment Plan (2013); National HIV and AIDS Policy, 2003; Malawi Energy Policy (2018); National Land Use Planning and Management Policy, 2005; Food Security Policy (2006); National Water Policy (2005); Mines and Minerals Policy (2013); National Transport Policy (2015); National Construction Industry Policy (2015); Water Resources Act (2013); Mines and Minerals Act (1981); Disaster Preparedness and Relief Act (1991); Waterworks Act (1995); Environment Management Act (2017); Forestry Act (1997); Fisheries Conservation and Management Act (1997); Road Traffic Act (1997); Local Government Act (1998); Energy Regulation Act (2004); and National Parks and Wildlife Act (2004).

3.2.1 Ratification status and implementation of Multilateral Environmental Agreements

Malawi is a signatory to many international and regional treaties and conventions concerning environment and natural resources including biodiversity, climate change, desertification, migratory birds, plant protection, CITES and wetlands conservation. Annex 7.5 provides details regarding the status of ratification and implementation of these multilateral environmental agreements. These also include regional agreements with neighbouring countries (Tanzania, Zambia and Mozambique, SADC) on shared watercourses, wildlife management and law enforcement, energy, mining, and forestry and fisheries.

These agreements have been mainstreamed in national strategic frameworks such as Malawi 2063, MGDSIII, and sector policies, legislation and plans. There are currently few follow-ups and/or concrete actions aside from policy development, mainly due to lack of resources in the technical departments concerned. Thus, action on international treaties has mostly concentrated in areas for which funding is provided from development partners (Mlaviwa, 2021).

3.2.2 Adequacy of environmental legislation

3.2.2.1 National customary land laws aimed at enhancing land tenure/security

Land laws advancing land reform including decentralization in land administration and land tenure were developed in 2016 but their implementation has met resistance from some traditional leaders in the country. A pilot project entitled "Strengthening Land Governance Systems for Smallholder Farmers in Malawi" has piloted the titling and registration of customary estates provided for under the Customary Land Act 2016 (CLA) and the Customary Land Regulation 2018 (CLR) and lessons have been drawn for upscaling the exercise (CEPA & Oxfam, 2020). The laws are being revised following a presidential directive for the review in 2020 (Chilonga, 2021). According to Chilonga (2021) addressing the escalating land related issues in the country will require operationalization of the laws which entails (a) Customary land regularization, (b) Devolution of land administration and management to the district, (c) Improving land record management at council level and (d) Building the capacity at district level for execution of land related functions (Chilonga, 2021).

3.2.2.2 Access to rights to natural resources

Natural resources regulations (for example in forestry and fisheries) confer rights to access of natural resources to persons or groups of persons that are protecting a resource. For example, section 34 of the Forest Act states, "Any person who or community which protects a tree or forest, whether planted or naturally growing in any land which that person or community is entitled to use, shall acquire and retain the ownership of the tree and forest with the right to sustainable harvest and disposal of the produce" (GoM, 1997). Similar provisions are made by the Fisheries Management Act (GoM, 1997).

3.2.2.3 Management of natural resources

Sets of legislation are available that provide for the management of natural resources such as water, forest and fisheries. The legislations provide for community engagement in the management of these resources but where this has been tried, the results have been a mixed. Other experts feel that the challenge so far is not necessarily in the laws, but rather in the implementation arrangements especially regarding clarification on and management of stakeholder expectations. Where the expectations have been clarified, guidelines developed for the sharing of benefits with strong traditional leadership, the results have been positive. Where any of these attributes is lacking, collaborative management arrangements between the Government and the community have often failed (Kamoto, 2021).

3.2.2.4 Requirements for environmental assessment, pollution control and development control

Environmental Assessment is used in Malawi as a tool for ensuring that environmental concerns associated with development interventions are integrated in the project implementation cycle. Section 30 of the Environment Management Act, 2017 requires that public institutions intending to develop policies, legislations, programs and plans that are likely to have adverse effect on the environment should conduct a strategic environmental assessment (SEA). Practically, this has not been the case as only the mines and minerals sector had developed a strategic environmental and social assessment (SESA) in 2015 (Mlaviwa, 2021). This has been the case because the previous Act (Environment Management Act, 1996) did not explicitly provide for that requirement. The SESA for the minerals sector made key recommendations which included: the need to protect the environment during mining operations need for community involvement, need to address social impacts of mining projects, establishment of national consensus on mining matters, encouraging investment in the mining sector, increasing economic opportunities, and the need to build capacity in government and non-governmental organisations (Mlaviwa, 2021).

3.2.2.5 Environmental and Social Impact Assessment (ESIA)

The National Climate Change Management Policy provides a framework for implementation and adaptation programs to enhance the resilience of communities to the impacts of climate. The National Environmental Policy calls for integration of environmental considerations in development projects through Environmental and Social Impact Assessments (ESIA) and implementation of Environment and Social Management Plans (ESMPs) (GoM, 2020).

Section 31 of the Environment Management Act requires that environmental and social impact assessments (ESIAs) be undertaken before implementation of developments that are likely to have significant effects on the environment. The Malawi Environment Protection Authority (MEPA) has been mandated to administer the environmental and social impact assessment process in Malawi. The MEPA has powers to undertake environmental monitoring and sanction environmental audits of projects in order to enforce environmental compliance (GoM, 2017). In line with this requirement, all major public and private sector projects are subjected to ESIA, the reports from which are submitted to the MEPA (formerly, this function was performed by Environmental Affairs Department-under the provisions of the Environment Management Act of 1996)[18]. Implementation of projects only commences after environmental approval is granted.

Major development partners such as the World Bank and African Development also require application of environmental and social safeguards instruments to guide the mainstreaming of environmental and social concerns within program and project implementation. Dedicated environmental and social experts are also employed to support project implementation. Similarly, private sector projects and contractors also designate environmental and social safeguards officers to ensure implementation of environmental management, health and safety issues during project implementation.

3.2.3 Provision and procedures for public participation in environmental decision-making

The Environment Management Act, 2017 provides for procedures for public participation in environmental decision-making. Section 5 (b) of the Act states, "For purposes of ensuring effective public participation, enforcement of rights and duties created under this Act, the Authority shall promote the right of every person to participate in environmental decision-making processes directly or through representative bodies and mechanisms for effective, direct and indirect public participation shall be created by lead agencies".

Despite the provision, participation in environmental decision-making is considered limited to those that understand English and have technical understanding of the subject matter given that most conversation is conducted in English and using jargon. In a few instances, effort is taken to conduct outreach sessions or to reach out to the public through mass media. For example, as part of disclosure, ESIA reports are sometimes placed at the District Commissioner's office for public scrutiny where only can comfortably access such documents (Mlaviwa, 2021).

3.2.4 Effectiveness of legislation policing and enforcement, and the importance of self-policing buy-in from the affected communities

Legislation policing and enforcement are the most challenging processes to operationalisation of climate change, environment and natural resources laws in Malawi. Where successfully applied, the courts have often mete out lenient judgements. Community members have been engaged in co-management schemes but even here, success has not been as expected. Social fencing has worked in the management of graveyards but rarely has it worked beyond this. It is generally felt that community-based is still the way to go in management of natural resources but that each intervention should be customised to the needs of the community. Otherwise, a one-size-fits-all approach has proved futile (Kamoto, 2021).

3.2.5 Use of other (non-legislative) instruments

Malawi has not actively pursued the use of non-legislative instruments such as 'green budgeting', environmental fiscal reform and market-based mechanisms, voluntary schemes (e.g. environmental

[18] Environmental Affairs Department (EAD) provides general supervision and coordination over all matters relating to the management of the environment and natural resources in the country.

management systems, environmental labelling, and voluntary industry–government agreements) mainly because of limited knowledge and capacity on implementation of such measures (Mlaviwa, 2021).

Otherwise, some interventions are already available on the market and would require increased effort and stronger collaboration with stakeholders (especially private organizations) in order to be escalated. These include: deposit refund on glass, carbonated beverage containers; actively engaging the public and professionals through information and education; implementing incentive economic instruments such as resource user rights (e.g. water user rights that are currently applied in the water sector, and mining rights/licences in the mining sector); and developing the knowledge base, and promoting adoption of environmentally-friendly practices and technology through fostering of research activities. However, resources for environmental research are generally very limited.

The application of non-legislative instruments will require capacity building on the application of specific schemes such as payment for ecosystem services, green budgeting, and other environmental fiscal reform and market-based mechanisms as well as voluntary schemes (e.g. environmental management systems, environmental labelling, and voluntary industry–government agreements), and customisation of these to the national situation.

3.3 Institutions with environmental and climate change responsibilities

3.3.1 Identity and quality of institutions involved in policymaking, legislation, planning, environmental protection, monitoring and enforcement

3.3.1.1 Malawi Environment Protection Authority (MEPA)

The Malawi Environment Protection Authority (MEPA), established under the Environment Management Act (EMA) of 2017, is the principal agency for the protection and management of the environment and sustainable utilization of natural resources. It is mandated to coordinate, monitor, supervise, and consult all relevant stakeholders on matters relating to environment, natural resources and climate change management in Malawi. For purposes of management of the environment under the EMA 2017, the MEPA has been given powers to oversee all relevant institutions and authorities such as, lead agencies; advisory committees; District Environment Sub-Committees; and Local Environment and Natural Resources Committees. In the performance of its functions the MEPA can also delegate any of those functions to a lead agency, relevant advisory committee or any other public officer.

3.3.1.2 Cabinet Committee on Natural Resources and Environment

At cabinet level, Malawi has a Cabinet Committee on Natural Resources and Environment (CCNRE). The CCNRE is the highest environmental policy and decision-making body. Its objective is to advise the Cabinet on the protection, conservation and sustainable utilization of renewable and non-renewable natural resources and the environment to ensure equitable and enhanced socio-economic development of the people of Malawi.

3.3.1.3 Parliamentary Committee on Natural Resources and Climate Change

Malawi parliament has a Parliamentary Committee on Natural Resources and Climate Change (PCNRCC) as a forum for discussing environment, natural resources and climate change issues at the legislator level (Figure 3-1). It is also responsible for overseeing and promoting the participation of local communities in the management and conservation of natural resources and the environment, based on principles of democracy and good governance.

3.3.1.4 Climate Change, Environment & Natural Resource Management Steering Committee

The Climate Change, Environment & Natural Resource Management Steering Committee (CC-ENRM SC) is a forum for effective policy dialogue on frameworks, priority setting, and ways and means of facilitating investment, capacity building and transfer of technology related to climate change, environment and natural resource management mainstreaming initiatives in the Malawi. It also enhances collaborative project development and implementation, with a view to optimizing the contribution of climate change adaptation and

mitigation programmes. The committee is also responsible for mainstreaming poverty reduction, environmental programmes and sustainable development into implementation of the Malawi Growth and Development Strategy III, Sustainable Development Goals (SDGs) and the National Vision (Malawi 2063).

3.3.1.5 Ministry of Forestry and Natural Resources

The Ministry of Forestry and Natural Resources (MOFNR) is mandated to protect and foster management, development and sustainable utilization of natural resources and environment in Malawi. This mandate is implemented through its specialized departments of Environmental Affairs, Climate Change and Meteorological Services, Forestry, Water Resources and Fisheries.

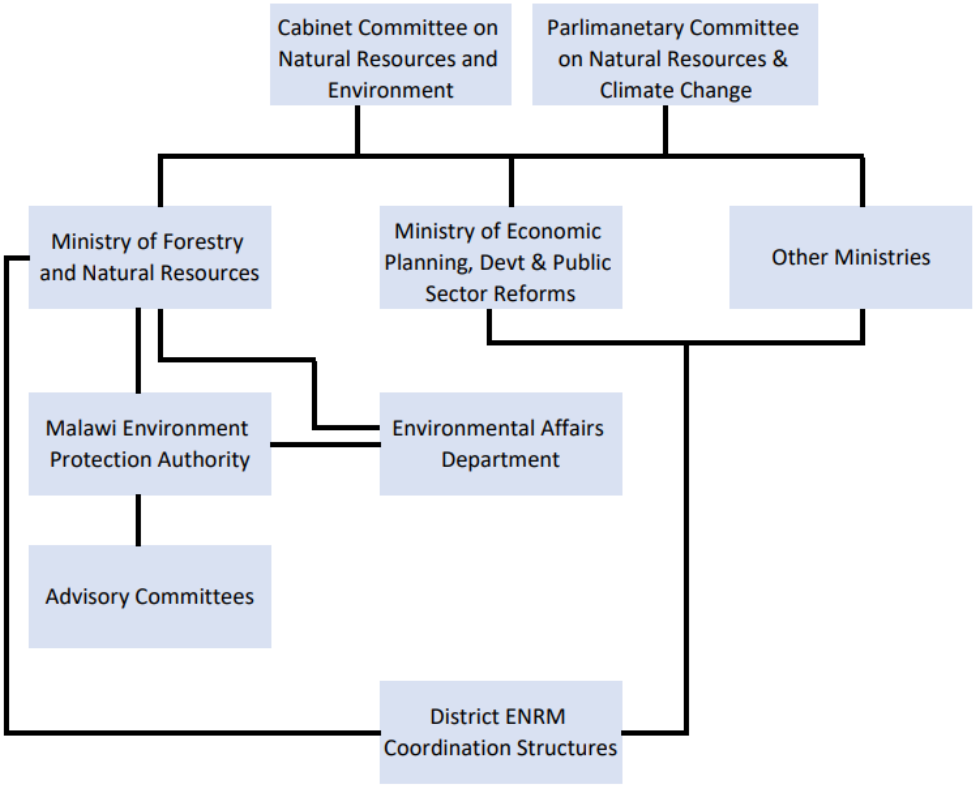


Figure 3-1. Institutional Framework for Environment, Natural Resources and Climate Change Management in Malawi

3.3.1.6 Environmental Affairs Department

The Environmental Affairs Department (EAD) is charged with co-ordination of environmental activities in order to promote the sustainable utilization of the environment and natural resources. The EAD's long-term vision is to provide excellent services in cross-sectoral coordination, monitoring, overseeing compliance, and facilitating the integration of environmental concerns into sectoral policies, plans and programs to ensure sustainable development. With the institution of the MEPA, EAD maintains overall responsibility for policy development and execution on environment and natural resources management whereas environmental protection including enforcement are the responsibility of the MEPA. The Department has district offices that oversee implementation of environment and natural resources programmes at district and sub-district levels. These offices are manned by Environmental District Officers who are supported by the District Environmental Sub-committee (DESC), a sub-committee of the District Executive Committee (DEC). The DESC integrates government and nongovernmental organisations/civil society engaged in environment and natural resources management.

Further down are sub district local government authority structures: Area Development Committee (ADC) established at the Traditional Authority level, and the Village Development Committee (VDC) established at

the Group Village Head level in accordance with the District Development Planning System (DDPS). Within these structures may be formed Community Based Natural Resources Management Committees to manage specific resources as available within the locality. Village Natural Resources Management Committees (VNRMCs) are established by Forestry Department, Beach Village Committees (VBCs) by Fisheries Department, Catchment Management Committees by Water Resources and Civil Protection Committees (CPCs) are established for disaster response.

3.3.2 Level of coordination and decentralisation

The 2019 SDGs Index and Dashboard, which ranks Malawi 25 out of 52 countries on the continent, singles out a lack of policy coherence and coordination across levels of government, lack of effective linkages between policy planning and budgeting at the central level of government and lack of political will as the main challenges affecting the SDGs implementation. This calls for increased coordination to address Malawi's development challenges (GoM, 2020).

The Decentralisation Act has provided for the establishment of committees and sub-committees that have the mandate to coordinate implementation of environment and natural resources management interventions in line with the decentralised environmental management guidelines. Figure 3-2 illustrates the operational relationships between those committees.

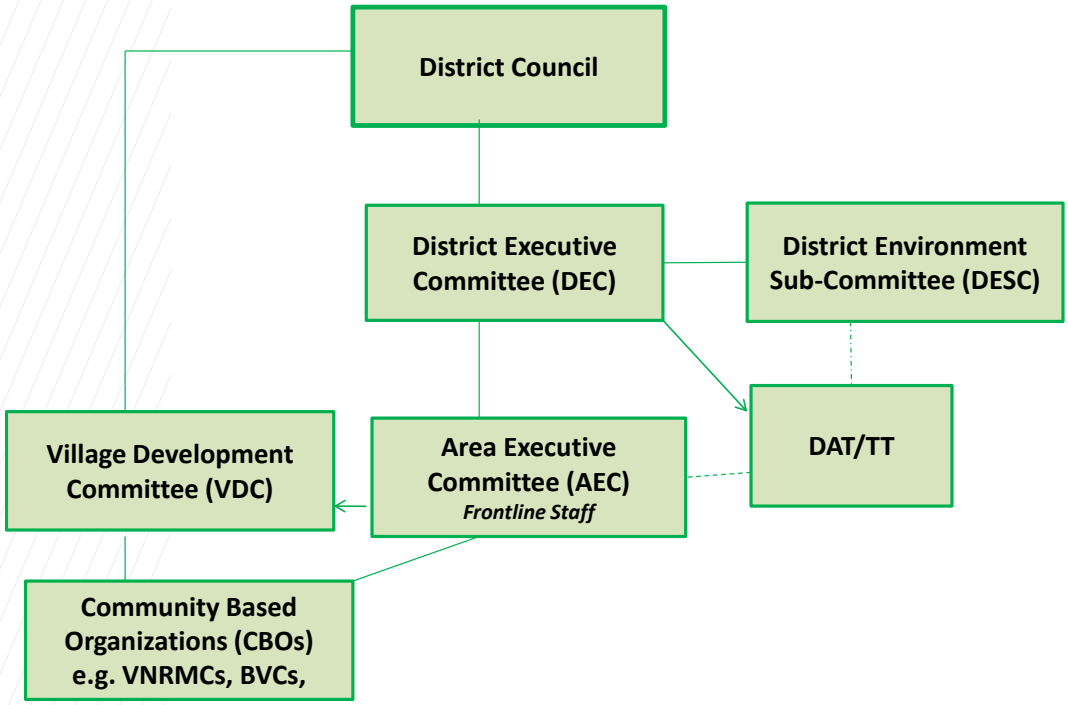


Figure 3-2. District Level Structures for ENRM Source: EAD

3.3.3 Strength and capacities of individual institutions, Influence on other institutions

The MEPA is a new institution that has taken over environmental protection functions previously held by Environmental Affairs Department (EAD). Previously analysis of the institutional framework for environmental management in the country alluded to the weaknesses of EAD to influence other departments including those with conflicting mandates within the same ministry (Halle & Burgess, 2006). The establishment of the MEPA is Government of Malawi's response to have an institution that would exert power over all other public and private agencies on matters of environmental management (Makonombera, 2021).

3.3.4 Good governance practices

Government of Malawi has set up environmental governance institutions at the Parliament, Cabinet, sector, ministry, technical (national), district and sub district levels to spearhead and coordinate environmental management interventions across the country. Each of these institutions is oriented to its functions but experience has shown that some of these institutions (e.g. the sector working group on environment and natural resources) have not been active in discharging their functions. Some village level governance institutions are functional while others died a natural death as functionality has been influenced by strength of traditional leadership and Government's meeting of people's expectation (Kamoto, 2021).

Observations show that in some cases, institutions lack the passion and urgency to instituting measures to prevent or stop environmental degradation e.g. through accelerated enactment of legislation, institution of non-legal instruments or enhancement of cross-sector coordination and coherence in policy and delivery approaches. For example, preparation of the National Urban Development Policy has dragged for close to a decade (GoM, 2020).

3.3.5 Capabilities, means, functioning of environmental services

Service delivery of environmental management institutions can generally be rated as below 30% (Makonombera, 2021). Analysis shows that almost all the core components of the environment: land, forests, water, air, ecosystems are experiencing deteriorating trends. Population growth is seen have exerted pressure on the environment, but other experts feel that the political and technical machinery has not taken a bold stance to address critical issues such as corruption in a systematic manner (GoM, 2020).

Another key challenge that affects service delivery and accountability is the lack of adequate technical capacity because of high staff turnover in district councils. Additionally, Government departments, development partners and NGOs have not provided adequate safe spaces for their staff to critique dysfunctional approaches to service delivery (GoM, 2020).

3.3.6 Major NGOs, institutes or other organisations involved in environmental/climate change management or policy

Major non-governmental organisations involved environmental management policy include Centre for Environmental Policy and Advocacy (CEPA), Civil Society Network on Climate Change (CISONECC), Leadership for Environment and Development (LEAD), Malawi Environment Endowment Trust (MEET), Mulanje Mountain Conservation Trust (MMCT), Lilongwe Wildlife Trust (LWT) and Association of Environmental Journalists in Malawi (AEJM).

3.4 Public Participation

3.4.1 Transparency and access to environmental information

Malawi developed the Access to Information (ATI) law in 2017 that came into force on 30 September 2020 through Gazette Notice Number 70 dated 11th September 2020 upon inauguration into office of the Tonse Alliance Administration as way of promoting transparency and accountability. The ATI law accords citizens the right to access information held by public and relevant private bodies (GoM, 2017). Accordingly, the Environment Management Act, 2017, instructs the MEPA to promote the right of every person to (a) access environmental information from lead agencies, private sector and non-governmental organizations; and (b) accords all people the right to participate in environmental decision-making processes directly or through representative bodies and mechanisms for effective, direct and indirect public participation (GoM, 2017).

Dr. Lazarus Chakwera had pledged to operationalise the Access to Information Act to end the era of government secrecy and usher in the dawn of government accountability (The Media Institute of Southern Africa, 2020). According to Media Institute of Southern Africa (2021), the enacting of Access to Information laws in various countries in Southern Africa will accord citizens the freedom to know how their governments are conducting their affairs noting that the present democratic dispensation makes it imperative for the public

to always be kept informed about how leaders, who are given the mandate to run national affairs are operating for and on behalf of those who put them in public office (The Media Institute of Southern Africa, 2020).

3.4.2 Role of NGOs and Civil Society in Environmental Decision-making

Nongovernmental Organisations (NGOs) or Civil Society Organisations (CSOs) have been engaged in identifying links between the economic, social and environmental dimensions of sustainable development so that all players can act in a coordinated manner. CSOs have been creating awareness about the SDGs, environment and natural resources management and climate change. CSO representatives have also actively participated in the preparation of policies and legislation and advocating policy changes. In addition, they have been organizing the youth, women and men into structures that would enable them to speak and act with one voice regarding the SDGs and environmental issues (GoM, 2020).

3.4.3 Effectiveness of participation

3.4.4 Participation of women in traditionally less represented groups

Malawi scored 0.614 on the Gender Inequality Index (Human Development Report, 2016) globally. The low score is mainly attributed to negative social norms and discriminatory practices, resulting in low levels of representation in politics and the economy with 93 % of women in unpaid labour compared to 79 % of men. Currently, Malawi's parliament only has 19 % of women holding the parliamentary seat and 30 % included in the cabinet (GoM, 2020). According to a survey on Malawi's progress towards achieving the SDGs conducted by the National Planning Commission, the youth that were engaged reported that the major challenge to women empowerment is the lack of opportunity or power for decision making due to cultural and traditional reasons. From a legal perspective, Malawi has made substantial progress in enhancing gender equality. Malawi's Constitution states that women enjoy the same rights as men, and Malawi is a signatory to regional and international protocols encouraging gender equality, such as the 2008 25 Southern African Development Community (SADC) Protocol on Gender and Development; and o Women and girls are still treated unequally in most cases and most initiatives support the girl child leaving boys behind hence they have no idea on how to support women empowerment (GoM, 2020).

3.4.5 Access to justice in environmental matters

The Environment Management Act, 2017 accords all persons the right to "an adequate and effective administrative or judicial remedy for any harmful or adverse effects resulting from acts or omissions affecting the environment"[19]. Part XVI of the Environment Management Act, 2017 provides for an Environmental Tribunal as a tool for dispute settlement on environmental matters. Additionally, aggrieved persons are accorded the right to appeal against any orders or acts by the authority, its associated agencies or any other person. The core functions of the Environmental Tribunal are to: (a) consider appeals against any decision or action of the Authority, lead agency, Director General or inspector under this Act; (b) hear and determine petitions on violation of the right to a clean and healthy environment or any other provision of this Act and any written law relating to environment and natural resources management; (c) receive complaints from any person, lead agencies, private sector or non-governmental organizations relating to implementation and enforcement of environment and natural resources management policies and legislation; and (d) consider other issues and makes declaratory orders for reference by MEPA, agencies or persons.

3.5 Environmental services and infrastructure

3.5.1 Protected areas

Malawi's 88 protected areas (forest and wildlife reserves) experience deforestation and forest degradation, largely resulting from agricultural expansion, and illegal extraction of fuel wood and charcoal for energy. More

[19] Environment Management Act, 2017, section 5(c).

than 97% of households in Malawi rely on illegally and unsustainably sourced biomass (charcoal and firewood) for domestic cooking and heating energy (GoM, 2017). Also, forest fires have destroyed young stands of forests in the country and to some extent, the major cause of forest fires has been hunting.

Illegal logging mostly occurs in forest reserves and plantations which are managed by Government or Private concessionaires. Theft of wood occurs in the form of logs, sawn wood, firewood and charcoal. Pressure comes from excessive demand for construction timber and poles and unavailability of affordable and alternatives for charcoal (Forestry Department, 2021).

Management efforts to restore degraded forest have been insufficient with survival rates estimated at 60% and 80% on customary estate and in Government plantations respectively. Adoption of natural regeneration for bare hill areas, riverine areas, and other areas with the opportunity for natural recovery has been low. The forest sector has further challenged by inadequate financial, physical and human resources to deliver extension messages; weak law enforcement, forest fires, and poor coordination among stakeholders (Forestry Department, 2021).

3.5.2 Sanitation and waste treatment infrastructure

Poor waste management has remained a big challenge for most of the urban centres in the country for decades. The proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated by cities was 30% in 2017. The participation of private players in waste and sanitation marketing, collection and recycling are generally low (GoM, 2020).

3.5.3 Disaster risk reduction systems

Malawi is committed to implement the Sendai Framework for Disaster Risk Reduction 2015- 2030 as it strives to achieve various SDGs. In this regard, the country developed the National Disaster Risk Management Policy in 2015 whose operation is hampered by lack of a corresponding legislation since the Disaster Preparedness and Relief Act, 1991 is response-focussed. However, given Malawi's vulnerability to disasters and in alignment with the Sendai Framework for Disaster Risk Reduction, the country's Disaster Risk Management (DRM) System ought to effectively address risks in all stages of the DRM cycle with an emphasis on risk reduction.

3.5.4 Emergency response mechanisms

Emergency response is coordinated by the Department of Disaster Management Affairs (DoDMA). Within its DRM coordination structure, DoDMA works with specialised groups of institutions called clusters, supported by the Humanitarian Country Team (HCT) to develop a response management strategy. The HCT is a strategic and operational decision-making and oversight forum co-chaired by the Commissioner of the Department of Disaster Management Affairs (DoDMA) and the Resident Coordinator of the United Nations in Malawi (OCHA, 2021). It seeks to foster effective and efficient humanitarian assistance that contributes to longer-term recovery from shocks. Its vision includes alleviation of human suffering and protecting the lives, livelihoods and dignity of populations in need (OCHA, 2021). Humanitarian assistance is majorly provided by development partners as the country has no special fund for disaster/emergency response.

3.5.5 Emergency prediction and early warning systems

Existing early warning systems and sources of climate information in Malawi are under-resourced and under-utilized. EWS and climate information to help communities learn of pending weather events, plan harvests, and respond to the threat of flash floods are not widely available or accessible to communities. Malawi's weather/climate and hydrological observation infrastructure, whilst declining over recent years, is in the process of being improved and rebuilt but is still in a state which limits the ability to accurately monitor current conditions and produce tailored information and forecasts. While data are transmitted daily from staffed stations, these data are only incorporated into the central database once per month, limiting their real-time utility. Seasonal forecasts, which help farmers plan their crops, are available but only used to a limited degree, partly due to understanding and confusion regarding the application of probabilistic information for assessing risks. Hydrological monitoring and forecasts have recently been improved for the Shire river basin but remain unavailable for much of the country (GoM, 2015).

3.6 Environmental and climate resilience monitoring system

The country has no system for monitoring environmental resilience but is in the process of establishing one through the Nationally Determined Contributions (NDC) Project implemented by EAD. The system being developed will support tracking and reporting of GHG emissions and efforts taken to reduce emissions and extent of implementation of adaptation activities. To ensure consistency and alignment with the SDGs, Malawi 2063, MGDS III and national policies, the indictors will be formulated around the SDG indicators (Cook et al, 2021).

4 Integration of environmental concerns into key policies and sectors

4.1 Malawi's Commitment

Malawi's Vision (Malawi 2063) has emphasized environmental sustainability as one of the pillars for this vision. This demonstrates the country's recognition of the wise use of environmental wealth in building resilient economies that deliver high and sustained values from Malawi's rich soils, biodiversity and water bodies – as well as of the cause-effect relationship of environmental degradation with poverty. Clearly there is an imperative to act rapidly: environmental degradation is exacerbating poverty through reduced soil fertility, increased disease and parasite incidences and water scarcity; as well as reducing the quality of goods and services, which reduces people's health and livelihood status. In turn, poverty leads to the increased exploitation of natural resources, decreasing the community's will and power to manage natural resources, leading into environmental degradation.

The Malawi Growth and Development Strategy (MGDS), the country's medium-term national development strategy, places climate change, environment and natural resources as one of its key priority areas. This represents a commitment to good environmental and natural resource management (ENRM) as a platform for sustainable development and poverty reduction. It aims to improve the regulatory framework for harmonized environmental and natural resource management, and to reduce environmental pollution, including greenhouse gas emissions and ozone depleting substances.

4.2 Instruments for Integrating Environmental Concerns

In a bid to fulfil the commitment towards mainstreaming environmental concerns in the country's development policies, programs and projects across all sectors, Malawi has come up with a number of instruments and approaches to facilitate the integration of environment, natural resources and climate change in decision making and development planning and implementation processes.

4.2.1 Cabinet Manual for Policy Coherence

The government of Malawi developed a Cabinet Manual for Policy Coherence in 2004 and a policy guide to facilitate central agency coordination in policy development. Using the manual, the cabinet office is now able to perform due diligence on public policy proposals before the cabinet finally considers and approves them. Environment or natural resource management has not so far been a key area of consideration in the due diligence menu.

4.2.2 Environmental Assessment

Environmental Assessment is used in Malawi as a tool for ensuring that environmental concerns associated with development interventions are integrated in the project implementation cycles. Sections 30 to 32 of the Environment Management Act (2017) have made appropriate legal provisions for that.

4.2.2.1 Strategic Environmental Assessment (SEA)

Section 30 of the act requires that public institutions intending to develop policies, legislations, programs and plans that are likely to have adverse effect on the environment, conservation and enhancement of the environment or sustainable management of natural resources to conduct a strategic environmental

assessment (SEA). However, so far, Malawi has not performed well with regard to adherence to this requirement. It is only the minerals sector that developed a strategic environmental and social assessment (SESA) in 2015. This is attributed to the fact that the previous act (1996 Environment Management Act did not explicitly provide for that requirement). The SESA for the minerals sector made key recommendations which included: the need to protect the environment during mining operations, need for community involvement, need to address social impacts of mining projects, establishment of national consensus on mining matters, encouraging investment in the mining sector, increasing economic opportunities, and the need to build capacity in government and non-governmental organisations.

4.2.2.2 Environmental and Social Impact Assessment (ESIA)

The National Climate Change Management Policy provides a framework for implementation and adaptation programs to enhance the resilience of communities to the impacts of climate. The National Environmental Policy calls for integration of environmental considerations in development projects through Environmental and Social Impact Assessments (ESIA) and implementation of Environment and Social Management Plans (ESMPs) (GoM, 2020).

Section 31 of the Environment Management Act requires that environmental and social impact assessments (ESIAs) be undertaken before implementation. The Malawi Environment Protection Authority (MEPA) has been mandated to administer the environmental and social impact assessment process in Malawi. Furthermore, the MEPA has powers to undertake environmental monitoring and sanction environmental audits of projects in order to enforce environmental compliance.

In line with this requirement, all major public and private sector projects are subjected to ESIA and submit ESIA reports to the MEPA (formerly to Environmental Affairs Department-under the EMA 1996). Implementation of projects only commences after environmental approval is granted.

Major development partners such as the World Bank and African Development also require development of a number of environmental and social safeguards instruments to guide the mainstreaming of environmental and social concerns within program and project implementation. Dedicated experts are also employed as part of the project implementation units to be responsible for implementation of environmental safeguards within the projects. Similarly, a growing number of private sector projects and contractors also designate officers to ensure implementation of environmental management, health and safety issues during project implementation.

4.2.3 Promotion of Conservation Agriculture

The primary sector of agriculture is both the biggest contributor to and most affected by environmental degradation. In view of this, the Ministry of Agriculture is promoting conservation agriculture (CA) as a tool for integrating environmental and climate change concerns within the sector.

The conservation agriculture movement in Malawi is driven by the realisation that excessive cultivation is destroying one of the country's most significant assets: the soil on which all farming depends; and in the process is also contaminating water resources. CA is spearheaded by the Land Resources Conservation Department (LRCD) of the Ministry of Agriculture. The LRCD realises that deteriorating soil structure, reduced moisture retention capacity, depletion of nutrients and organic matter, and decreased micro-fauna and flora are threats to soil fertility, crop productivity, general agricultural production and available surface water resources.

Conservation agriculture technologies aim at managing crop residues and integrating them into the soil, minimising soil disturbance by reducing tillage, maintaining permanent soil cover, using herbicides for weed management, maximising moisture retention in the soil and practicing crop rotation.

5 EU and other donor co-operation with the country from an environmental, climate change and green economy perspective

Malawi continues to receive financial and technical support for environmental, natural resource management and climate change activities through various sectoral projects and programmes. Some of the projects and programmes cover the whole country and cut across a number of sectors, while others are localized and sector specific, aimed at addressing specific identified environmental issues and natural resources management issues in particular hotspots. Generally, the interventions are aligned to the Government of Malawi's priorities as reflected in various national plans and strategies as well as local authority development plans.

Recently, there has been a paradigm shift in the mode of programming for environmental, natural resource management and climate change related interventions. In the 1990s the country used to develop and implement environment and natural resources-specific projects and programmes. Currently, environmental and natural resources management (ENRM) issues are generally integrated into sector programs and infrastructure development projects as an enabler of sustainable socioeconomic development. In view of this, ENRM programs take various forms such as natural resources based livelihood activities; environmental and social safeguard measures; climate change response (adaptation and mitigation) interventions; biodiversity conservation activities; climate smart agricultural practices; waste and pollution management activities; environmental awareness activities, clean energy promotion activities; and catchment or watershed management projects.

The European Union through the European Development Fund (EDF) and Thematic Budget has continued to be a strategic development partner in a number of these environmental, natural resources and climate change related activities through provision of support in specific thematic areas of climate change, agriculture, nutrition and food security. Support has significantly increased from EDF 9 (300 million euros) to 607 million euros and 560 million euros in EDF 10 and EDF 11, respectively. The latest EDF 11 focused on thematic areas of governance; sustainable agriculture; secondary education and vocational training.

Key programs implemented under EDF, some of which had environmental and natural resources management elements, include: Kutukula Ulimi m'Malawi (KULIMA); Farm Income Diversification Project (FIDP); Skills and Technical Education Programme (STEP); Improving Secondary Education in Malawi (ISEM); Chilungamo (Justice and Accountability) Programme; Rural Infrastructure Development Programme (RIDP); Support to the Greenbelt Initiative; Agriculture Sector Wide Approach (ASWAP); AFIKEPO-Nutrition and the Malawi Enterprise Productivity Enhancement (MEPE) project; Promoting Responsible Land Governance for Sustainable Agriculture , Improved Forest Management for Sustainable Livelihoods Programme and Global Climate Change Alliance Malawi.

Environmental considerations such as tree planting and soil and water conservation measures are included in the preparation phase of new projects, and regular monitoring is undertaken to check if project objectives are being achieved. However, systematic environmental and social assessment of the projects and implementation of safeguard measures has been generally inadequate or completely lacking within the programmes due to either poor programming of these issues during the design phase and/or poor implementation during implementation phase. Environmental impact monitoring ought to be done by the concerned officers in the beneficiary districts, but their capacities are in most cases weak. Furthermore, budgetary provision is not adequate or lacking for such activities. Some of the programmes would have required strategic environmental and social assessment or environmental audits but these have never been done. This entails that it has not been possible to assess the environmental and social performance of these programmes against existing local and international requirements and standards. Transformation and impact should be the focus of forthcoming development initiatives funded by the EU.

There are also other large programmes and projects with an environmental focus and/or anticipated impacts which are getting financial support from various donors, development partners and funding organizations. Notable ones include; World Bank, African Development Bank, United States Agency for International Development, Japanese International Cooperation Agency, Millennium Challenge Corporation, Norway, United

Nations Development Programme, World Food Programme, Food and Agriculture Organization, International Fund for Agricultural Development, UNICEF, DFID, Global Environmental Facility (GEF) and Green Climate Fund (GCF). A list of recent and planned projects/programmes from other donors with an environmental, climate change and/or green economy focus is presented as Annex 7.10.

A Donor Coordination Committee is operational in the agriculture/food security sector (DCAFS) focusing on agriculture production. In the environment sector, the Development Cooperation Group on Environment, Resilience and Climate Change (DCERCC) supports the National Steering Committee on Climate Change (NSCCC) with the coordination and oversight role and enhances donor coordination and networking among environment and climate change stakeholders. Coordination has improved, but fragmented and/or non-harmonized actions and approaches still limit the benefits. The general impact of donor activities on environment is still limited, with the main problem being non-sustainability of the outputs. The creation of parallel structures by donor funded projects concentrates the best human capacity into well-paid project jobs, resulting in the loss of capacity in the Government and local administration. Donor interventions have contributed to better environment awareness, and a more or less complete legal framework and action plans, but the implementation of sustainable natural resources management is yet to be established.

In general, the direct support to combat environmental problems has decreased with the conversion of environment and natural resource management programmes into a cross-cutting issue. This is because little effort has been made to address the country's environmental-poverty nexus through the realization of environmental management and planning.

Nevertheless, increased awareness has been achieved regarding integration of environmental and social safeguard considerations in major development projects and programmes. This has mainly been due to donors' emphasis on environmental and social assessment of projects/programmes and implementation of various environmental and social safeguard instruments as an integral part of project implementation. The World Bank and IFAD have been instrumental in that regard. It has become a requirement in all World Bank supported projects/programmes that environmental and social safeguard experts are hired as key staff within programme implementation units. If all donors would adopt a similar approach, environmental and social sustainability of development programmes would be enhanced in the long term.

6 Conclusions and Recommendations

This analysis has shown that Malawi has a myriad of environmental issues but key amongst these are land scarcity, declining land productivity, depletion and degradation of water resources, Household Air Pollution (HAP), deforestation /reduced forest cover, fisheries resources depletion, threat to biodiversity/loss of biodiversity, poor solid and liquid waste management and low environmental governance. The main pressures for environmental change are population growth and climate change (Table 6.1).

6.1 Recommendations/Priority actions for addressing key environmental and climate issues

This section identifies priority actions to address the environmental and climate change challenges identified. These include policy and institutional reform measures as well as specific actions at sector level. The strategic recommendations presented below are based on the key issues identified in the report.

RECOMMENDATION 1: ADDRESS LAND DEGRADATION

Reform incentives for farmer-level scale-up of sustainable land management (SLM) practices by strengthening land tenure security and reforming input subsidies.

The priorities are to reform incentives for farmer-level scale-up of SLM practices by **implementing land tenure reforms at scale in tandem with reforms to subsidy regimes**. If land tenure reforms are

implemented effectively, and at scale, this will increase tenure security and incentives for landholders to invest in SLM measures. Improved land tenure security will reduce land degradation and increase productivity. Unfortunately, poorly targeted input subsidies currently work in the opposite direction and contribute to land degradation, directly (for example, by constraining crop diversification) and indirectly (for example, by crowding out fiscal space for investments in extension services). Therefore, reforms to subsidy regimes are also needed that better target limited public resources and create incentives for better land stewardship.

RECOMMENDATION 2: OVERHAUL FISHERIES MANAGEMENT SYSTEMS

Strengthen fisheries co-management arrangements in tandem with stronger enforcement against illegal fishing technologies and overfishing.

Effective fisheries governance is prioritized in the revised fisheries policy, along with the recognition that **improved institutional arrangements** must be based on co-management with fishing communities. Successfully implemented, co-management interventions will empower primary stakeholders (mostly local fisherfolk) to manage the fishery on which their livelihood depends. However, this will need to be complemented by much more **effective enforcement of fisheries management regulations and bylaws**.

RECOMMENDATION 3: SUPPORT IMPLEMENTATION OF THE ENVIRONMENTAL POLICIES, LEGISLATION AND PLANS

Environmental Management Act, 2017

Provide sufficient public financing to support effective implementation of the new EMA (2017) and the creation of a semi-autonomous EPA.

These linked reforms provide an important window of opportunity for strengthening environmental management in Malawi. The aim of the new EMA is to align Malawi's management of ENR with modern global standards. It also allows for the creation of a semiautonomous EPA with broad and substantial powers. Successful implementation of the new legal framework will depend in large part on whether the new agency is provided with sufficient resources to operate efficiently.

To enable effective implementation of the EMA, the **EPA will need a robust program of capacity building and operational support**. This support should come from both the government and development partners. This will need to include support for the **development of internal institutional structures, appropriate staffing and capacity building, preparation of regulations for the SEA and EIA**, and the certification of EIA practitioners, as well as the **development of operational procedures**, for example, to guide and define relationships with other government agencies, to establish registries of EIAs, and so on.

Customary land laws

Malawi developed/revised customary land laws in 2016 that are aimed at regularizing land tenure hence **security over land through titling and registration**. The "Strengthening Land Governance Systems for Smallholder Farmers in Malawi Project" has piloted implementation of these laws that will provide useful lessons for scaling up the titling and registration of customary estates provided for in these laws. The implementation of these laws will improve the governance of customary land and registration of customary estates that will incentivize management for productivity and sustainability.

National Charcoal Strategy

Support this ambitious and progressive reform, including its proposals **to promote fuel switching to cleaner and alternative fuels** (such as LPG) to develop legal and sustainable charcoal value chains. There are opportunities, which align with the government's recently launched Renewable Energy Strategy, to promote

greater efficiency in consumption and encourage a switch to alternative clean fuels where affordable and appropriate.

A number of commercial players and social enterprises in East and Southern Africa offer high-quality, modern cooking appliances for both firewood and charcoal. There is potential for them to be encouraged to **invest in Malawi's clean cooking sector**, for example, by using tax breaks.

Simplify or remove regulations to allow the wood fuel industry to transform from the informal to the formal economy. A functioning and legal charcoal industry could deliver significant fiscal returns to the state through the formal taxation system, which are not currently being captured, and encourage investment in modernization and efficiency improvement. Initial steps for transforming wood fuels from the informal to the formal economy would involve simplifying or removing regulations and reducing barriers to securing licenses for charcoal production and trade. This could include promoting sustainable practices through incentives, for example, by **providing planting and tree stewardship grants and supporting co-management efforts**.

National Forest Landscape Restoration Strategy

Implementation of the National Forest Landscape Restoration Strategy. Malawi has a target of 4.5 million hectares for restoration by 2030. It is crucial that the priority degraded areas, identified during the national restoration opportunities assessment, are prioritised for the new interventions.

RECOMMENDATION 4: ACCELERATE AND SUPPORT THE DECENTRALIZATION OF ENVIRONMENTAL MANAGEMENT FUNCTIONS AND RESOURCES

Support and promote GoM's renewed commitment toward decentralization

The new EMA and the forthcoming establishment of the EPA provide an opportunity to accelerate the decentralization of environmental management functions, as does the integration of the LDF and National Local Governance Finance Committee. These developments could also provide an opportunity to **strengthen compliance monitoring of EIAs and improve coordination** with other officers and bodies at the district level and below. The LDF also offers the possibility of increasing investments in interventions that tackle environmental degradation, for example, for SLM and forest regeneration.

Despite these developments, some sectors, such as the Land, has not decentralized and this presents operational challenges. The **Ministry of Lands needs support to decentralize its operations** to the district while policy matters shall be centrally addressed. This is envisioned to reduce transactional costs, reduce corruption and optimize public spending.

RECOMMENDATION 5. ESTABLISH A NATIONAL INFORMATION MANAGEMENT AND COMMUNICATION SYSTEM FOR ENVIRONEMNT/CLIMATE CHANGE MANAGEMENT

Support GoM's environmental communication and education strategies.

A focused environmental communications strategy with consolidated and proactive messaging is needed. Policies and institutional changes will not, on their own, bring about the major changes required to address key challenges. **Quality information sharing and the encouragement of behaviour change** are needed to help citizens understand the environmental challenges they and their country face and be aware of the positive and negative roles they can play.

Incorporate the Internet and social media into traditional communication channels to accommodate their ever-increasing global communication role when designing environmental interventions.

RECOMMENDATION 6: ESTABLISH SUSTAINABLE FINANCING MECHANISMS FOR ENVIRONMENTAL, NATURAL RESOURCES AND CLIMATE CHANGE MANAGEMENT

In the wake of competing demands for financial resources and decreasing resource allocation to the environmental, natural resources and climate change sector in Malawi, there is need for dedicated resources to be specifically available. This can be achieved through **establishment and operationalization of sustainable financing mechanisms for environmental, natural resources and climate change**.

Government needs to consider expediting the establishment and operationalization of the Environment Fund, as provided for under Section 91 of the Environment Management Act of 2017, and the National Climate Change Fund in line with the aspirations of the National Climate Change Management Policy. These funds, if mobilized and effectively utilized, will provide reliable and predictable financing for implementation of ENRM and climate change management policies, plans/projects, strategies and enhance the country's resilience to climate change. The Environment Fund and the National Climate Change Fund should act as well-defined and established channels for leveraging resources from international development partners and climate change funding agencies (e.g. the Green Climate Change Fund) and appropriate domestic sources of funding, such as the carbon levy.

RECOMMENDATION 7: STRENGTHEN GOOD GOVERNANCE IN PUBLIC INSTITUTIONS

Instituting good governance will entail inspiring leadership for and the general public for mind-set change through **awareness programmes and incentivising good governance practices** through recognition and promotion and scaling up measures to stamp out corruption, among other strategies.

Table 6-1 below summarises the environmental and climate change concerns in Malawi, the main sectors and policies related to them together with the related priority actions recommended in this country environmental profile.

Key environmental and climate change aspects in the country	State, trends and pressures	Policy, regulatory and institutional opportunities and challenges	Implications on national and sectoral development and vulnerability.	Comparison of environmental/climate change concerns and the main sectors or policies.	Priority action	Main sectors/policies
Land scarcity	Land under agriculture has almost doubled from 34% in 1961 to 61% in 2020. Livestock production has more than doubled, with livestock index of 244 over the period from 2006 – 2016. However, arable land per person has declined from 0.35 ha per person in 1961 to 0.2 ha per person in 2016 (World Bank, 2021) due to population increase. Resultantly, people have resorted to farming in increasingly unsuitable areas and land systems, particularly on steep hillsides. Crop rotation through shifting agriculture is no longer possible and the result is declining soil fertility and crop yields. To survive people have adopted income generating strategies that include felling live trees to	The country has several policies aimed at enhancing productive land including the Land Resources Management Policy and Strategy (2000), National Agriculture Policy (2016), National Fisheries and Aquaculture Policy. and National Forest Landscape Restoration Strategy. Additionally, Government and several NGOs operating in the country are supporting climate smart agriculture interventions. Agriculture extension personnel are available in all districts across the country that can spearhead sustainable soil management approaches although the numbers are limited with other sections under-served. However, there are policy and institutional conflicts on the management of riverbanks where the agriculture sector is promoting the use of riverbanks for agriculture production and this is leading to further	Small land holding means low food production and hence food insecurity for the country, and reduced income since almost all smallholder farmers rely on agriculture for food and income.	Highly significant	Enhance sustainable land management practices for productivity. This would include a mix of options including climate smart agriculture, climate smart aquaculture and coherent legislation/ guidelines and messages on riverbank cultivation.	Agriculture; Forestry/National Agriculture Policy (2016); Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000)

	make charcoal for sale and encroachment onto riverbanks and even into seasonally dry stream beds to produce winter crops.	soil erosion and degradation of riverbanks.				
	Urban population in Malawi has been on the increase from about 850,000 in 1987 to around 2.8 million in 2018 leading to land scarcity for settlement in both urban and rural areas. As result, there is increased settlement in fragile areas, encroachment on public and private land and squatting resulting in conflicts/disputes over land.	Land Policy and legislation (Community land laws enacted but not enforced due to resistance by some groups (traditional leaders and Civil Society Organisations). Pilot of the regularisation process done and successful, needs upscaling. Upscaling of land legislation will be constrained by absence of Land Planning/Administration personnel in districts	Poor settlement pattern especially in urban centres; rising conflicts over land (land disputes). This further complicates delivery of basic services/utilities such water and waste management	Highly significant	Operationalize (upscale implementation of customary land laws. Operationalize district land offices.	Lands/ Land Policy, Physical Planning Act, 2016, Land Act, 2016, Customary Land Act, 2016, and Registered Land (Amendment Act), 2017
Declining land productivity	Soil erosion is in the range of 10mt - 43mt /ha /yr with an average of 29 mt /ha per yr. Worst degradation in the southern region of the country. Main pressure is population growth.	Agriculture Policy (2016), Land Resources Conservation Policy and Strategy (2000) provides framework for conservation and effective of land resources; including matters related to soil fertility enhancement. Additional strategies are available, e.g. for climate smart agriculture and conservation agriculture. The sector has a wide coverage of extension personnel across the country although personnel gaps still exist especially at the lower levels (Extension Planning	Intensification of inputs (mostly synthetic fertilisers to improve productivity). This is costly but also adds to soil and water pollution as a result of increased soil acidification and eutrophication of water bodies (e.g. in Lake Chilwa).	Highly significant	Intensify implementation of agroforestry, Soil and Water Conservation measures, and Climate smart agriculture practices.	National Agriculture Policy (2016); Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000)

		Area and section level). Technology is available for addressing the challenge, but adoption rates are often low.				
Depletion and degradation of water resources	Water resources are mostly surface based (98%); estimated at 1.7 mega-litres per person but with rapid population growth, quantities per capita are rapidly declining. Water shortage is exacerbated by climate variability in form of erratic rainfall (frequent episodes of drought); Malawi's population has grown from 13 million in 2008 to approximately 18 million in 2018. The demand for water for human use is expected to triple from a cumulative total of 717 mega-litres per day (baseline in 2010) to 2,154 mega-litres per day in 2035, representing average annual growth of 8% – driven by population growth. Malawi's rivers and lakes are experiencing rapidly deteriorating water quality due increased load of chemicals and nutrients from agriculture, industries and mining, soil erosion, and sedimentation.	The National Water Policy (2007) addresses all aspects of water including resource management, development and service delivery. The Policy comprehensively covers areas of water resource management and development, water quality and pollution control, water utilization, disaster management and institutional roles and linkages. The National Water Resources Act (2013) established a National Water Resources Authority as a regulatory agency on all matters relating to water resources management and development. However, the National Water Resources Authority is not fully operational leading to ineffective enforcement of water resources management and development issues in the country.	Declining water availability or water scarcity is a threat to the country's agriculture productivity (food security and income generation) considering that agriculture contributes around 30% to the national GDP. Declining water quality may result in loss of biological diversity and reduced ecosystems services. Purification processes of water for human consumption and industrial use would also be costly (high operational costs).	Highly significant	Implement the Water Resources Act, 2013 by operationalising the National Water Resources Authority and supporting catchment protection measures, especially main river sources such as the Shire River.	Water; Forestry; Land. Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000), National Water Policy (2007), National Land Policy (2002)

	Eutrophication in Southern and Central Lake Malawi, and the other larger lakes, is now evident with changes to the phytoplankton assemblages, riverine vegetation growth, and its impact on hypoxia (oxygen depletion) and fish stocks. Conditions are now more favourable for aquatic weeds, such as the water hyacinth (locally known as Namasupuni) and the Kariba Weed, allowing the creation of large mats of vegetation negatively affecting water flows, fisheries, navigation, and water quality (EAD, 2020).					

Household Air Pollution (HAP)	Malawi is among the countries with the highest exposure to household air pollution with a Household Solid Fuels Exposure Score of 9.3 and ranking 162 against 180 counties in the world. This is attributed to high use of biomass (charcoal and firewood for cooking. Overall, 99 % of households in Malawi use solid fuels as the main fuel for cooking.	A general policy on environment management exists but is never applied to regulate household level consumption of biomass, the major source of HAP.A policy on waste management also exists but again, not applicable. Knowledge of HAP in the country is limited as the issue has not received policy and media prominence.	Very little is known on the development effects of HAP in the country. What is known however, if that the effects of HAP will continue to affect rural and urban populations in the country, given the level of biomass use for household level cooking. Women and children are generally most exposed to HAP than males because in Malawi, working in the home is often seen as a task for females.	Significant	Conduct dust monitoring in line with air quality and dust standards for Malawi. Raise awareness on Household Air Pollution (HAP) and upscale cleaner energy technologies.	Environment; Environmental Health. National Environmental Policy (2004), Environmental Health Policy, Occupational Safety, Health and Welfare Act (1997)
Deforestation /reduced forest cover	Forest cover is decreasing. Out of Malawi's land area of 94,080 km², approx. 24% was categorized as forest in 2006. This has reduced to 21% in 2020. Remnant riparian forest is restricted to protected areas (forests and wildlife reserves). Forests outside the protected areas have been turned into agriculture fields or settlement areas. These protected areas are being threatened by population pressure that need a	Implementation/enforcement of forest policy and regulations has been a huge challenge in the country. Forest crimes have not been given prominence in the judiciary system with very lenient sentences, if ever taken for trial. People of influence have often gone scot free when apprehended, and personnel that show eagerness to enforce the law have often been punished or frustrated (e.g. through transfers to remote areas). However, the law has been enhanced to allow for legalisation of	Deforestation is escalating soil erosion resulting in reduced agricultural productivity. This implies increased food insecurity and negative/constrained economic returns from agricultural production.	Highly significant	Restore degraded lands (propagate landscape restoration) using integrated catchment management approaches.	Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000); Water Resources Policy (2012), Forest Act, Water Resources Act (2013).

	portion of the forest for cultivation, settlement and other economic uses. However, deforestation rate has declined from 2.8% in the 1990s to less than 1% in the past decade mainly because there most of the forest in communal lands has been depleted.	charcoal production and stiffer penalties for illegal forest practices including unlicensed charcoal production.				
Deforestation /declining forest cover	Malawi's forests are rapidly diminishing due to illegal commercial charcoal and firewood production, insufficient management of planted trees, low adoption of natural regeneration for bare hill areas, riverine areas, and other areas with the opportunity for natural recovery, forest fires, increasing human population, expansion of agriculture into marginal lands and increased demand for fuel wood and charcoal by rural and urban populations resulting in the exploitation of the remaining forest resources.	Government of Malawi has developed the National Charcoal Strategy (2017-2027) which provides a framework to address the linked problems of increased deforestation and increased demand for household cooking fuel, with defined and prioritized short-term, medium-term and long-term actions and aligned with the Forestry Policy (2016), Forestry Act (1997), Energy Policy (2003), National Energy Policy (2016), Energy Act (2004), and the Climate Change Policy (2016). The strategy supports Government's objectives to arrest and reverse deforestation and forest degradation and to reduce energy overdependence on solid biomass fuels. Nevertheless, the implementation of the strategy is still at infancy stage.	Illegal charcoal production continues to take place both on customary land and in protected areas (forest reserves) leading to high rates of deforestation and associated land degradation. Soil erosion is increasing thereby adversely impacting on siltation of water bodies and reduced land productivity.	Highly significant	Support the full implementation of the National Charcoal Strategy and massive afforestation program	Forestry Policy (2016), National Energy Policy (2016), Climate Change Policy (2016), Land Resources Conservation Policy and Strategy (2000), Water Resources Policy (2005), Water Resources Act (2013).

Fisheries resources depletion	Malawi's fisheries resources are threatened by indiscriminate fishing tendencies such as use of banned fishing gear and fishing during the closed season. Dropping water levels associated with increasing frequency of drought episodes are exacerbating the challenge. .	The fisheries sectoral policy, aims at maximizing the sustainable yield from the national waters of Malawi and man-made water bodies. Secondary objectives are to improve the efficiency of exploitation, processing and marketing of quality fish products, promote investment in the fishing industry, rural fish farming units and exploit all opportunities to expand existing and develop new aquatic resources. The policy also provides for Participatory Fisheries Management (PFM) arrangements between government and fishing communities.	The overall contribution of the fisheries sector to the national economy and national security is decreasing.	Significant	Explore mechanisms for improving effectiveness of participatory fisheries management arrangements and enforcement of fisheries management regulations and by-laws	National Fisheries and Aquaculture Policy (2016), National Water Policy (2005), Decentralisation Policy (1998)
Declining fish production	In 2019 there was a 3 % decrease from 63,023 in the number of fishers employed in 2018 to 60,636 in 2019. There has been a decrease in total fish landing by 30 % when compared with 2018 fish landing of 221,849 metric tonnes. Foreign exchange earnings from ornamental fish are increasing.	National Fisheries and Aquaculture Policy, 2016 focuses on adoption of strategies aimed at enhancing fish production, fish quality and value addition and promoting aquaculture in Malawi. However, there is inadequate support of infrastructure for fish landing, processing and marketing along the fish value chain, and insufficient number of technical and support staff to implement the planned programs in the fisheries sector. Participation of private sector investment in aquaculture is limited.	Reduced employment opportunities and revenues from the fisheries sector and declining contribution of the sector to the national gross domestic product (GDP)	Highly significant	Promote and support pond and cage fish farming by the private sector. Promote ornamental fish farning	National Fisheries and Aquaculture Policy (2016), National Water Policy (2005)

Threat to biodiversity	Generally, the status of biodiversity in Malawi is declining due to terrestrial and aquatic ecosystems modification, unsustainable utilization and management of natural resources, destruction of habitat by forest clearing for wood, charcoal, timber and for subsistence agriculture in traditionally marginal production areas. Habitat loss and fragmentation, overexploitation of biodiversity, invasive alien species, pollution and climate change are the main pressures for biodiversity in Malawi.	Management of biodiversity in Malawi is not a responsibility of a single government department but is a responsibility of all departments with mandate for the management of various components of biodiversity. The Forestry Department (FD), Department of Fisheries (DoF), Department of National Parks and Wildlife (DNPW), National Herbarium and Botanic Gardens (NHBG) and Environmental Affairs Department (EAD) are the major government agencies whose core mandates include biodiversity conservation and sustainable use. The National Biodiversity Steering Committee, which is multisectoral follows up and monitors implementation of biodiversity management issues.	The contribution of biological diversity to various sectors of the economy, such as wildlife, tourism, agriculture, fisheries, energy, culture and medicine is threatened.	Highly significant	Strengthen coordination, research and monitoring of biological diversity in the country	National Agriculture Policy (2016); Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000), Wildlife Policy (2000)
Loss of biodiversity	At least 248 plant species are threatened by extinction. The number of threated fish species is not known but could be in hundreds. Lake Malawi is the largest and most significant aquatic system with hundreds of endemic fishes, but it is threatened by eutrophication resulting from nutrient	Government has intensified the management of large mammals and other wildlife in protected areas, wildlife reserves through Public-Private Partnership (PPP) agreements with promising results. Information on genetic diversity is limited, except for crops where studies have shown a declining trend. As indigenous livestock breeds are	The contribution of biological diversity to various sectors of the economy, such as wildlife, tourism, agriculture, fisheries, energy, culture and medicine is threatened.	Highly significant	Increase public-private management agreements for protected areas and ecosystems of biodiversity significance	National Agriculture Policy (2016); Forest Policy (2016), Land Resources Conservation Policy and Strategy (2000), Wildlife Policy (2000)

	loading from poorly managed agriculture systems. Climate variation is adversely affecting this and the Lake Chilwa system that was once the most productive lake in Malawi.	constantly being cross bred with exotics, the local genes are at risk of eroding. Invasive Alien Species (IAS) are on the increase and are fast displacing indigenous species and causing economic losses in agriculture, forestry, energy, tourism and many other development sectors. Efforts to manage IAS over the years has not been successful with water hyacinth still causing havoc in the Shire River.				
Mineral resources	Mineral reserves are available (Bauxite, Uranium, coal and precious stones) but their exploitation has been decimal with a contribution of 1% to the national GDP. Low consideration of environmental consideration in mineral exploration/exploitation. Extraction of mineral resources is minimal, and most impacts arise from energy consumption (including coal and petroleum) for processing and transporting raw materials, products and by-products. Small-scale mining of rock-aggregate, sand and gravel has increased in all parts of the country to	The National Artisanal and Small-scale Mining (ASM) Policy (2017) provides direction on appropriate frameworks for investment in the subsector, particularly the nature of investments in mining, the enhancement of institutional, administrative and operational capacity and governance issues in this field. Both the ASM Policy and the Mines and Minerals Policy (2013) promote environmentally sustainable mining practices. ESIAs are done for mining projects but monitoring is minimal. No ESIAS for small scale exploratory activities but their cumulative impact could be colossal. However, reports and complaints are occasionally received from communities in close	Some of the environmental impacts that have been attributed to mining in Malawi include erosion and sedimentation, chemical spillages into soils, ecosystem and habitat disturbances, noise and dust pollution and visual disturbances. Noise and dust pollution could seriously affect public health and wellbeing. Silica dust has been associated with occupational lung disease incidences among miners and mining communities (World Bank, 2015)	Highly significant	Establish Mining Regulatory Authority, Review the Mines and Minerals Policy, Review the Artisanal and Small-Scale Mining Policy, Conduct detailed studies on the impacts of current mining operation on the atmosphere, water resources, ecology and biodiversity, and on human livelihood. Make ESIAs mandatory for all mining projects in Malawi in line with SESA for the mineral sector	National Artisanal and Smallscale Mining Policy 2017, Mines and Minerals Policy (2013), National Environmental Policy (2004), National Land Resources Management Policy of 2000, Gender Policy (2000), National Land Policy (2002), National Energy Policy (2003), National Cooperative Development Policy (1997)

	support the construction industry, often with little consideration of environmental consequences.	proximity to such operations. Most of the complaints have been of noise and vibrations from blasting operations and dust from drilling, blasting, haulage, and stone crushing operations. In addition, there have been some reports of siltation of agricultural fields in close proximity to quarries as a result wash away of quarry dust by rainwater. Malawi undertook a strategic environmental and social assessment (SESA) for the mineral sector in 2015				
High indoor air pollution	Indoor air pollution mainly resulting from use of biomass for energy since at least 97% of all Malawians use biomass in form of charcoal and firewood for cooking. Electricity is accessed by less than 2% of the population. Those with electricity installed in homes also use biomass either as main source of energy due to high cost of electricity or as alternative source because electricity in not reliable (intermittent supply).					
Poor solid and liquid waste management	Waste management is often a growing concern in the country. The industry sector is small, mostly characterised by agro-	The National Sanitation Policy 2008 aims at achieving universal access to improved sanitation, improved health and hygiene behaviour, the	Poor waste disposal is contributing to water pollution, air pollution, land contamination and	Highly significant	Support institutional capacity development and coordination for the waste	National Environmental Policy (2004), National Sanitation Policy (2008),

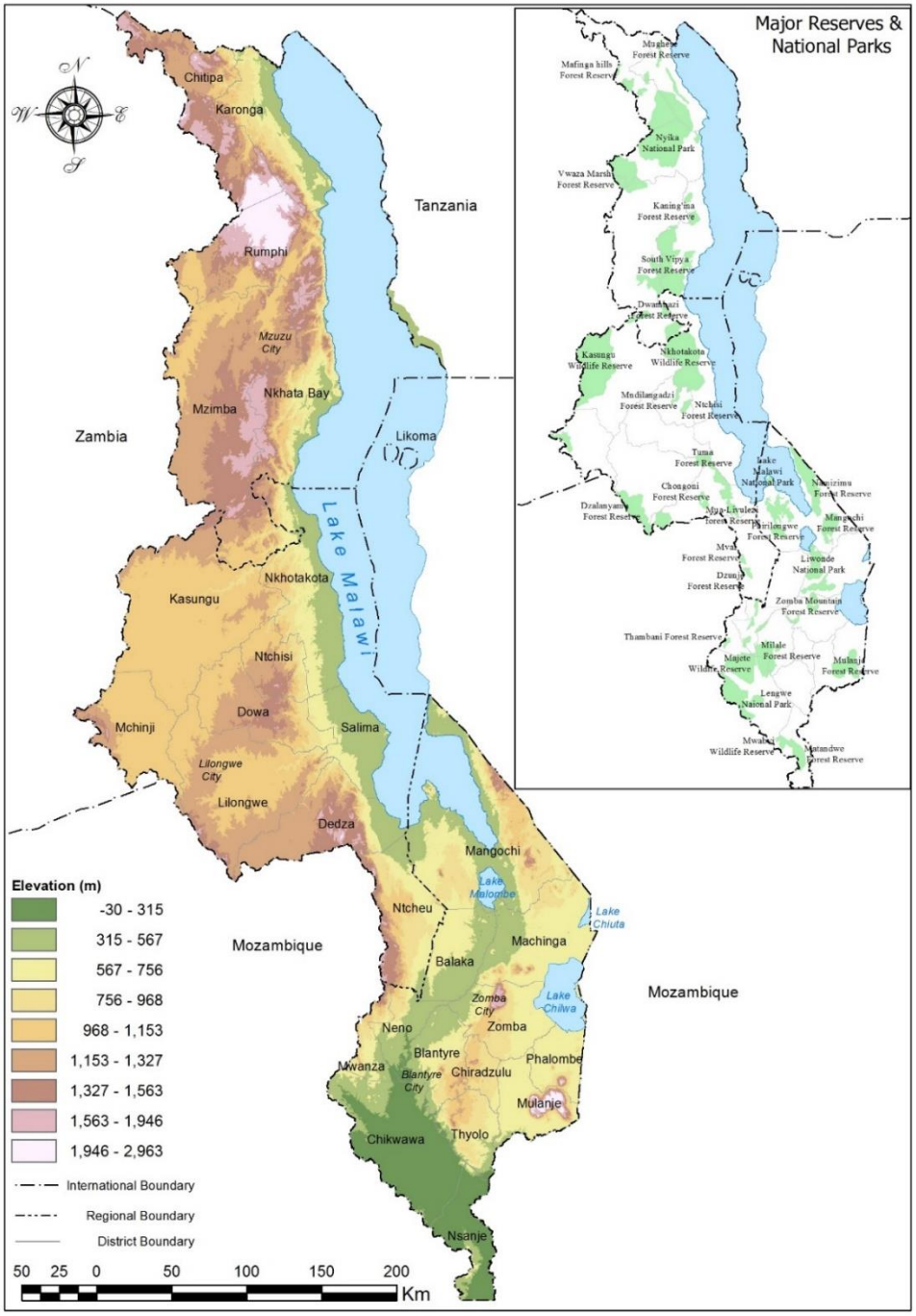
	processing, but growing to satisfy the growing demand in processed goods, transportation and other services. This has culminated in increased generation of waste such as plastics and fuel-based emissions.	common acceptance and use of recycling of human waste to protect the environment and create wealth. Environment Management (Waste Management and Sanitation) Regulations, 2008 provide a regulatory framework regarding waste management and sanitation matters in Malawi. The National Waste Management Strategy (2017-2022) sets out the priorities to be pursued to minimize the detrimental impact on human health and the environment associated with waste and to improve the management of waste in the country taking into consideration the the 2030 Agenda for Sustainable Development. However, coordination and institutional capacity for waste management is generally low	spread of diseases through vectors. Rivers in most of the areas especially cities of Blantyre and Lilongwe have been heavily affected through illegal dumping.		management sector in Malawi. Invest in waste management infrastructure in cities and urban centres	National Water Policy 2005, Decentralisation Policy (1998), Public Health Policy (2006)
High urbanisation rate	Malawi is urbanising at the rate of 5.2 %. At this rate, by 2030, one in every five Malawians (or around 20% of the population) will be a city or town dweller and by 2050, the share will reach 30 % of the population. The number of people dwelling in urban areas has almost doubled from 1.4 million in 1998 to 2	The Decentralisation Policy (1998) gives mandates to councils to properly plan socioeconomic development and provide services and infrastructure in areas under their jurisdiction. However, councils have low fiscal capacity to perform effectively in line with this mandate.	This urbanisation is taking place in the absence of industrialization, job creating investments, or adequate service provision in terms of housing, infrastructure and services. Malawi's cities and towns are facing clear and growing challenges to provide local	Highly significant	Increase investment for social services in urban centres. Improve land use planning for urban centres	National Environmental Policy (2004), National Sanitation Policy (2008), National Water Policy 2005, Decentralisation Policy (1998)

	million in 2018 creating pressure on land, water and other life supporting systems in these areas. The city administrators are failing to cope with the amount and size of the demands from city residents.		populations with better basic living conditions.			
Climate variability	The Country is experiencing frequent episodes of extreme weather events (floods and droughts). Over the past five decades, Malawi has experienced more than 19 major flooding events and seven droughts with the worst flood experienced in 2015. The 2015 flood affected over 1 million people, displaced 230,000 people and killed 106 people with a further 172 people reported missing. Climate trend analysis shows that the temperature is rising with the potential of increasing by 1.3 oC to 2.6 oC by the end of this century. Minimum temperatures are exhibiting a faster rise than maximum temperatures (GoM, 2020). Additionally, there is slight	Climate change is recognised as a threat to national development through the Malawi 2063, MGDSIII and several other national policies and strategies. Malawi developed a Climate Change Management Policy (2016) and an associated Implementation Plan. Among the key elements of the policy and the implementation plan is a call to establish a climate change fund for implementation of the proposed climate change mitigation and adaption measures in the the implementation, which has not materialised, Nevertheless, various streams of resources for climate change management are available through Government, development partner and private sector financing that could be mobilised, coordinated and streamlined towards addressing priority/innovative climate	Climate variability (Extreme weather events) are costing Malawi huge losses and damages (to both social and natural systems). Recovery, rehabilitation and reconstruction is costly, and often diverts resources away from growth sectors (such as agriculture). This sustains the cycle of poverty for the country.	Highly significant	Implement the National Climate Change Management Policy in line with the Implementation, Monitoring and Evaluation Strategy (IMES). Other climate management implementation tools available include Nationally determined contributions (NDCs), and National Adaptation Plans. All these tools aspire to mainstream climate change in sector plans, policies and programs and advocate domestic resource mobilisation through carbon fees and polluter pay principle to support ENRM	Climate Change; Disaster Risk Management; Environment; Cross-cutting/ Climate Change Management Policy (2016); Disaster Risk Management Policy (2015), Environment Management Act, 2017;

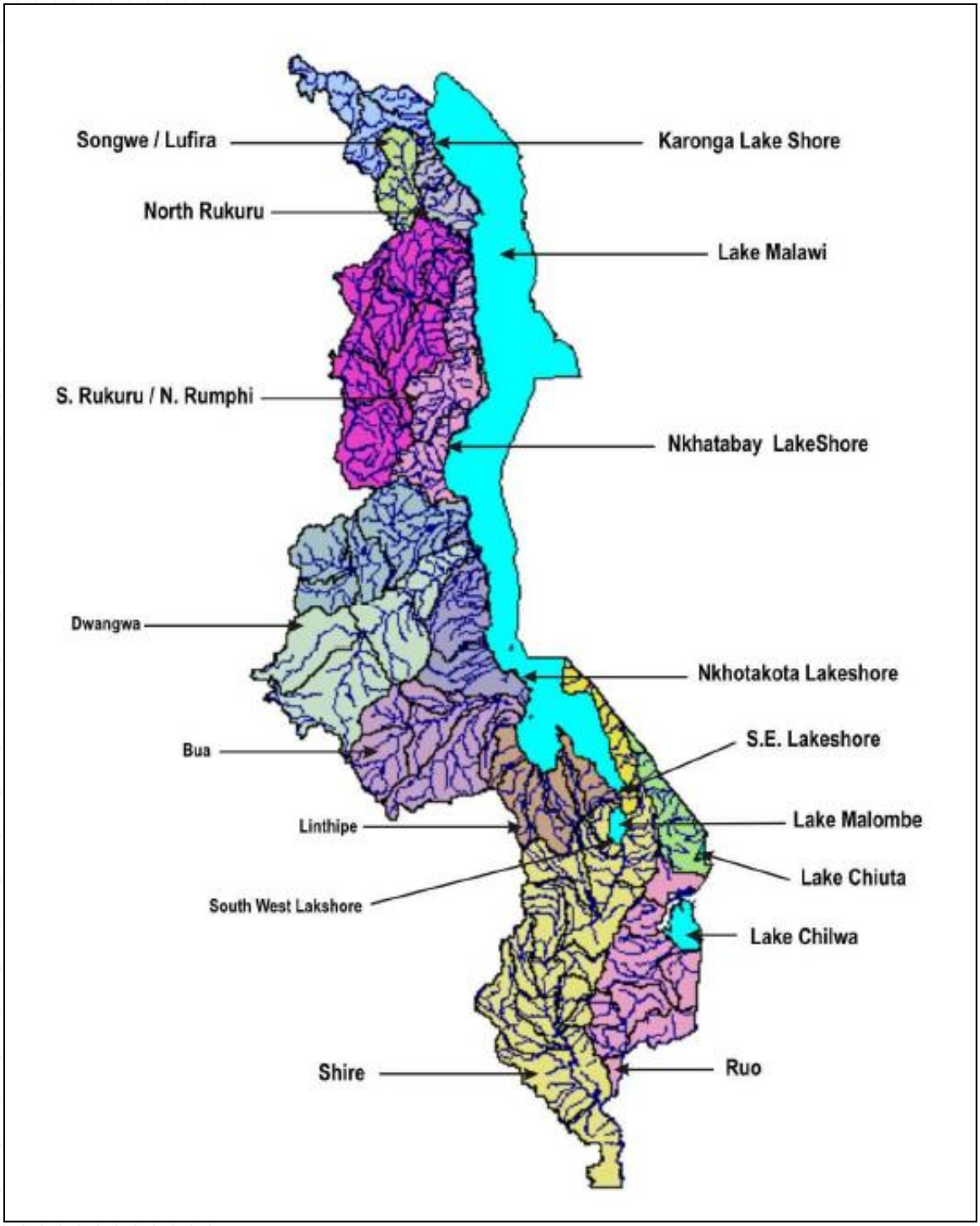
	decrease in rainfall during first half of the rainy season. Malawi's increased vulnerability to extreme weather events arises from poor socio-economic and infrastructure conditions.	change management interventions.			investments. Therefore, operationalise the Climate Fund as a tool for domestic and international mobilisation of mitigation and adaptation resources.	
Ineffective (weak) implementation of environment and natural resources management policies and legislations	There is general lack of passion and urgency to institute measures to prevent, or reverse environmental degradation e.g. through accelerated enactment of legislation, institution of non-legal instruments or enhancement of cross-sector coordination, promoting coherence in policy and delivery approaches and stamping out corruption.	Environmental policies, legislation, strategies and plans have been developed, revised, and aligned with global and national development agenda. The Constitution of the Republic of Malawi, Malawi's 2063, the Malawi Growth and Development Strategy (MGDSIII) and all national framework policies recognize the importance and call for mainstreaming of sound environmental management considerations in development sectors. MEPA has been instituted through the EMA 2017, but resources are limited to operationalize it.	Environmental degradation is worsening in many fronts, despite the proliferation of environmental legislation in Malawi due to low enforcement of applicable law, and low penalties for offenders. Effective enforcement is hampered by a number of factors.	Highly significant	Operationalise the Malawi Environment Protection Authority (MEPA). Institute performance evaluation in institutions and provide administrative incentives (e.g. acknowledgements) to performing institutions and individuals in leadership positions (Good governance award).	MEPA; EAD; MEPD&PSR /National Environmental Policy (2004), Environment Management Act (2017)

7 Technical Appendices

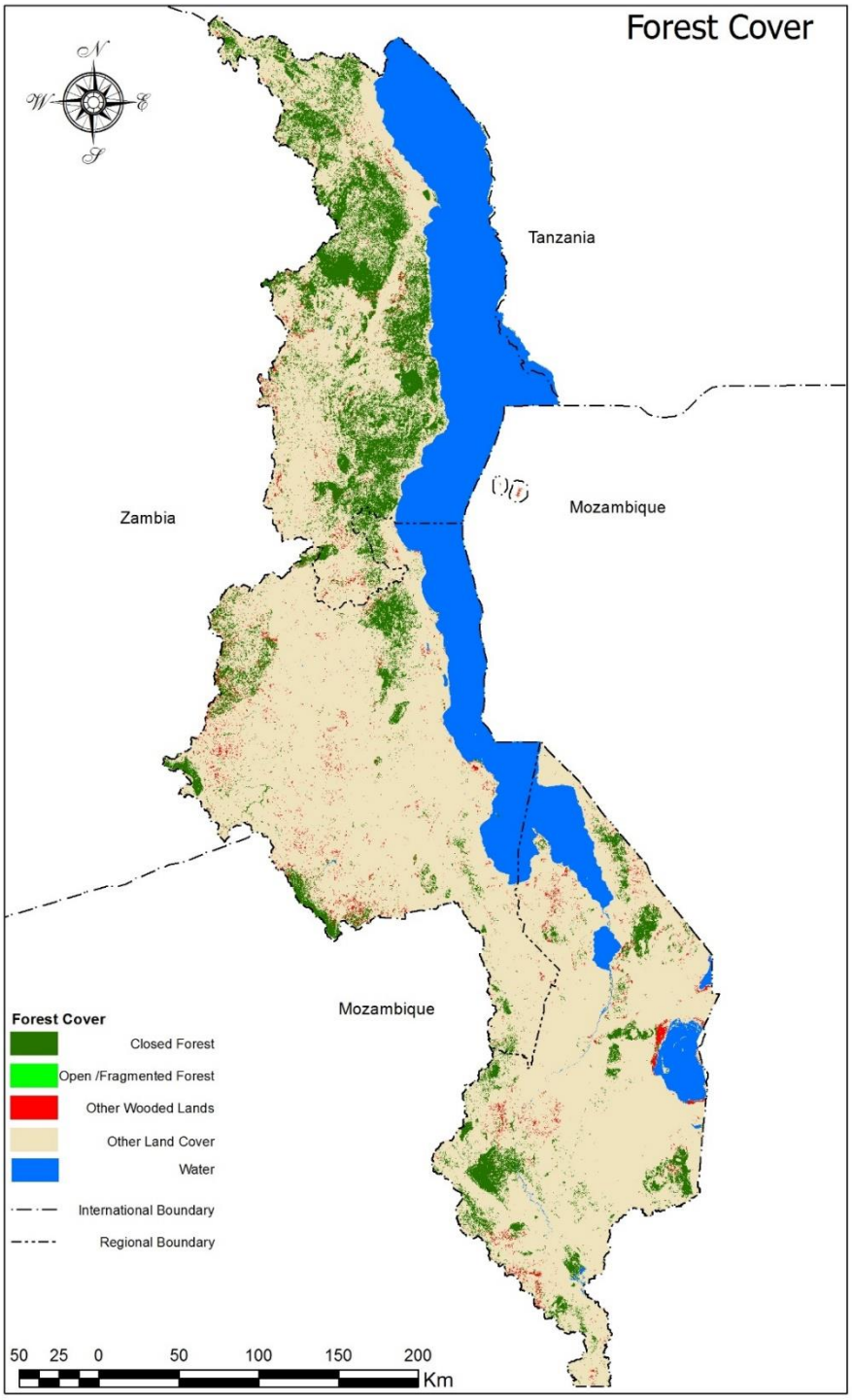
Annex 7.1. Map of Malawi showing elevation and protected area (national parks, wildlife and forest reserves)



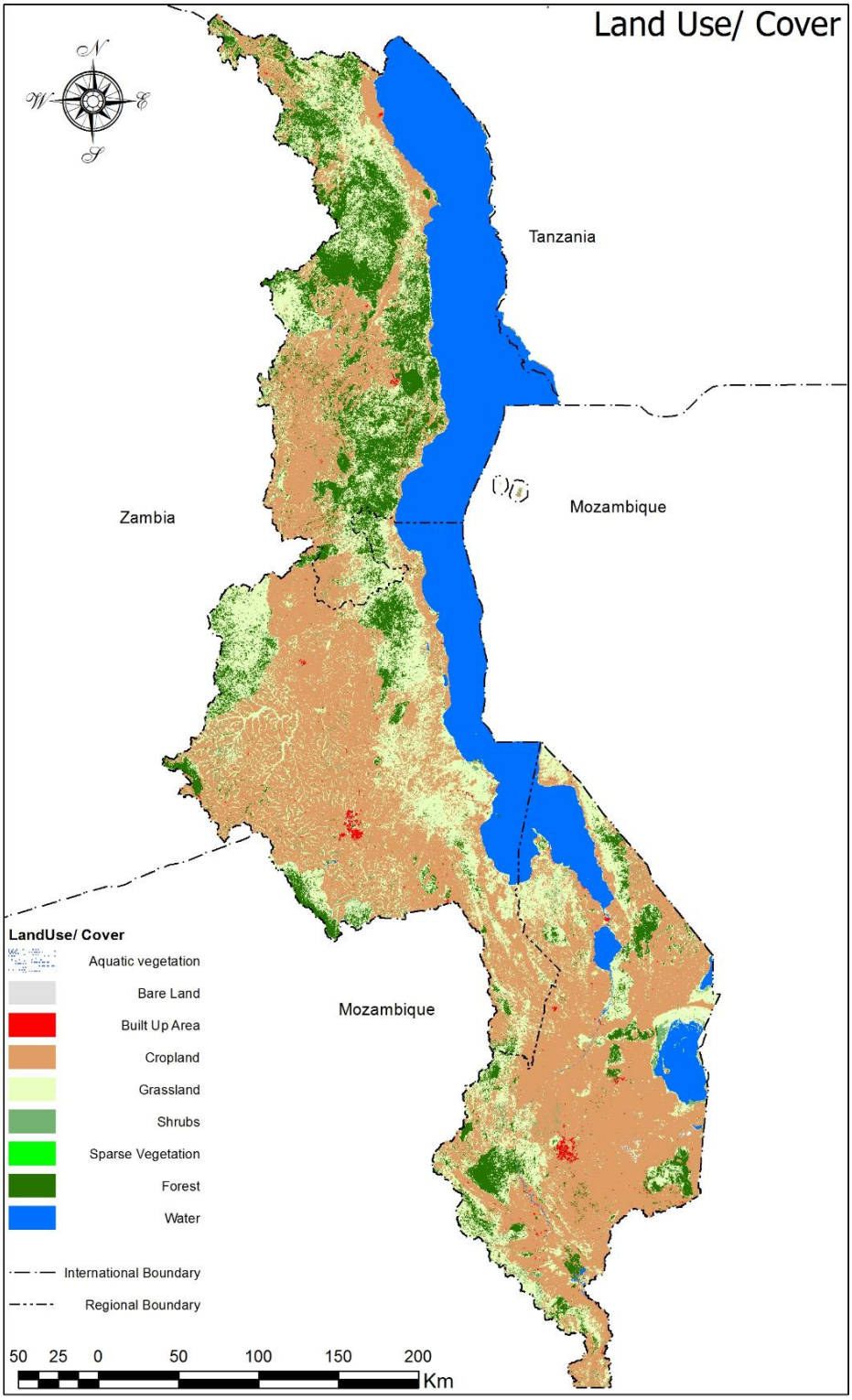
Annex 7.2. Water Resource Units



Annex 7.3. Forest Cover for Malawi



Annex 7.4. Land use cover



Annex 7.5. Status of International Conventions

Convention/Protocol/Treaty	Signed	Ratified	Current Status
Ramsar Convention (1971) Wetlands of International Importance	1996	1996	Ratification. Lake Chilwa designated as a Ramsar Site on 14 November 1996; Elephant Marsh designated a Ramsar Site on 1 July 2017
Protection of World Cultural and National Heritage Sites (1972)	1975	1982	Ratification. Lake Malawi National Park and Mulanje Mountain designated as heritage sites
Action Plan for Zambezi River (1987)	1996	-	SADC Shared watercourses treaty
Montreal Protocol on Ozone Layer (Ozone depleting substances, 1987)	1987	1991	Accession. Methyl Bromide strategy to phase out by 2017
Convention to Combat Desertification (1994) 1994 1996	1994	1996	National strategy and action plan prepared supported by UNSO.
UN Framework Convention on Climate Change (1992)	1992	1994	Ratification. Inventory of greenhouse gases in place.
Basel Convention (Transboundary movement of hazardous wastes)	1994	1994	Accession
Stockholm Convention on Persistent Organic Pesticides (POPs)	2002	2009	Ratification
Rotterdam Convention		2009	Accession
Kyoto Protocol	1992	2001	Accession
Johannesburg, UNC-WEHAB 2002	2002	-	Water, Energy, Health, Agriculture & Biodiversity - for sustainable natural resources for improved livelihoods and poverty eradication
Cartagena Protocol on Biosafety	2000	2009	Ratification
Convention on Biological Diversity	1992	1994	Ratification

Convention/Protocol/Treaty	Signed	Ratified	Current Status
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1982	1982	Accession
Minamata Convention on Mercury	2013		Signatory
Nagoya Protocol	-	2014	Accession
Paris Agreement	2016	2017	Ratification
United Nations Convention to Combat Desertification	1995	1996	Ratification
United Nations Convention on the Law of the Sea	1984	2010	Ratification
Vienna Convention	-	1991	Accession
Agreement on the Conservation of African-Eurasian Migratory Water Birds	-	2019	Ratification

Annex 7.6. Institutions with responsibilities for environmental management and a brief summary of their legal mandates

Environmental Component	Responsible Agency	Main Legislation	Brief Summary of Key Purpose
Environment	Ministry of Forestry and Natural Resources (MoFNR)	National Environmental Policy (NEP) (2004)	Integration of planning and management
		The EMA (No. 23 of 1996)	Makes Environmental Impact Assessments (EIAs) a statutory requirement and outlines the EIA process
		The EMA (No. 19 of 2017)	Replaces the 1996 EMA, establishes the Malawi Environment Protection Authority (EPA)
Water resources	MoFNR	National Water Policy (2007) Water Works Act (1995) Water Resources Act, 2013	Water rights, abstraction, pollution control, water resource planning and development
Effluent (disposal)	MoFNR	Water Resources (water pollution control) Regulations, 1978	Controls water pollution
Waste	MoFNR Local Government Authorities	Various Acts, regulations, and local bylaws control waste management Various local authority bylaws	Waste control, management, transport, treatment, recycling, disposal Towns manage municipal waste
Planning and zoning	Ministry of Lands	Physical Planning Act (2016) Part IV of EMA, sections 19 and 23	District Environmental Action Plans to be drawn up in conformance with the National Environmental Action Plan
Forestry	MoFNR	National Forest Policy (2016) Forestry Act (1997) Forest Rules	Forest products, forest reserves, tree planting and other enterprises

Environmental Component	Responsible Agency	Main Legislation	Brief Summary of Key Purpose
		Forestry (Amendment) Act, 2017	
Energy	Ministry of Energy	National Energy Policy (2003) Energy Regulation Act (2004) Rural Electrification Act (2004) Electricity Act (2004) Atomic Energy Act, 2011	Energy development, supply, use, distribution, pricing and governance
Mining and mineral resources	Ministry of Mining	Mines and Minerals Act (2019) and Regulations Explosives Act (1966) and Regulations Petroleum Regulations (1984)	Mining and quarrying, exploration and production of petroleum, and provides for the protection of the environment
Wildlife	Ministry of Tourism, Culture & Wildlife	Wildlife Policy of 2000 Nation Parks and Wildlife Act (1992), National Parks and Wildlife (Amendment) Act, 2017 (No. 11 of 2017). as amended, and Regulations	Wildlife conservation and management, benefit sharing, national parks, and hunting
Plants	Ministry of Agriculture	Plant Protection Act (1969) Noxious Weeds Act (1936)	Controls the export and import of plants, eradication of noxious weeds
Agriculture	Ministry of Agriculture	Special Crops Act (1972) Tobacco Act (1970) Cotton Act (1951)	Development and marketing of crops

Environmental Component	Responsible Agency	Main Legislation	Brief Summary of Key Purpose
Land	Ministry of Lands	Registered Land Act (1967) National Lands Policy (2002) Physical Planning Act, 2016 Land Act, 2016 Customary Land Act, 2016 Registered Land (Amendment Act), 2017	Customary, public and private land, and the sustainable use of such land
Fisheries	Ministry of Forestry and Natural Resources (MoFNR)	Fisheries Conservation and Management Act (1997) Conservation and Management Regulations (2002) Fisheries and Aquaculture Policy (2016)	Regulation and control of fishing, aquaculture, conservation, and management
Industrial development	Various including Ministry of Industry	Industrial Development Act (1966) Electricity Act (2004) and (2016) Public Roads Act (1966)	Development of industry, clearing of land and for transmission lines, public roads, and compensation
Health (including HIV/AIDS)	Ministry of Health (MoH)	Public Health Act (1948) National HIV/AIDS Policy of 2013	Prevention of infectious diseases; sanitation and housing, sewerage, and drainage
Historic monuments	Ministry of Tourism, Culture & Wildlife	Monuments Act (1991)	Protecting places of distinctive natural beauty, historic sites, and buildings

Environmental Component	Responsible Agency	Main Legislation	Brief Summary of Key Purpose
Decentralization	Ministry of Local Government and Rural Development (MoLGRD)	Malawi Decentralization Policy of 1998	Decentralization, accountability, and good governance
Gender	Ministry of Gender, Children, Disability, and Social Welfare	Gender Policy of 2015	Mainstream gender and enhance participation of women and men, girls, and boys
Climate change	MoFNR	EMA (No. 23 of 1996 and No. 19 of 2017) National Climate Change Management Policy (2016)	EAD coordinates but various ministries and departments including the Department of Climate Change and Meteorological Services (DCCMS) implements the activities.

Annex 7.7. Species diversity in Malawi

Species	Total Species	Endemic	Threatened
Mammals	192	Not Known	8
Birds	630	1	16
Amphibians	43	6	12
Reptiles	145	8	8
Fish	>1,000	950	Not known
Insects	8,770	Not Known	8
Microorganisms	700	Not Known	Not known

Source: GoM (2015)

Annex 7.8. Environment and Natural Resources and Climate Change Indicators for Malawi

This section presents a set of selected indicators for monitoring progress of implementation of environment, natural resources and climate change management interventions in Malawi over the period from 2019 – 2024 as consolidated by the lead institutions. The framework (including strategies, indicators, targets) is reproduced in its entirety (except for editorials and updating of institutional names) for ease of reference.

Annex 7.8.1 Forestry

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1. Increase forest cover through promotion of tree planting and management										
1.1 Produce/raise tree seedlings	1.1.1 No. of seedlings raised by category	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	Annual Report	Annually	DoF, Council NGOs
1.2 Intensify tree planting	1.2.1 Area under forest plantations replanted	1,514.90	2,514.90	3,523.90	4,514,	4,550	4,560	Annual Report	Annually	DoF, Council NGOs
	1.2.3 No. of trees planted on customary land	47,760,524	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	Annual Report	Annually	DoF, Council NGOs
1.3 Intensify awareness campaigns on reforestation and afforestation programs.	1.3.1 No. of awareness campaigns conducted	5	20	20	20	20	20	Annual Report	Quarterly	DoF, Council NGOs
1.4 Promote the creation of Village Forest Areas (VFAs) and woodlots	1.4.1. No. of VFAs created.	5	10	15	20	25	30	Annual Report	Annually	DoF, Council NGOs
	4.2 No. of VNRMCs established/ formed	5	10	15	20	25	30	Annual Report	Quarterly	DoF, Council NGOs
	1.4.3 No. of woodlots established	10	20	20	20	25	30	Annual Report	Annually	DoF, Council NGOs

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
1.5 Assess survival rate of trees planted	1.5.1 Survival rate of tree seedlings planted (%)			80	80	80	80	Annual Report	Annually	DoF, Council NGOs
1.6 Conduct tree survival rate awareness campaigns	1.6.1 No. of tree survival rate awareness campaigns	5	10	15	20	25	30	Annual Report	Annually	DoF, Council NGOs
1.7 Conduct silvicultural operations in forestry plantations and reserves	1.7.1 Area weeded	4,249.55	6,249.55	7,249.55	8,249.55	8,300	8,400	Annual Report	Annually	DoF, Council NGOs
	1.7.2 Area thinned	60.6	329	451	490	500	500	Annual Report	Annually	DoF, Council NGOs
	1.7.3 Area pruned	387.1	389	350	480	500	500	Annual Report	Annually	DoF, Council NGOs
Strategy 2. Conserve existing forest reserves and sustain forestry resources.										
2.1 Facilitate co-management in forest reserves	2.1.1 No. of Forest reserves under co-management arrangement	1	1	1	1	1	1	Annual Report	Annually	DoF, Council NGOs
2.2 Promote natural regeneration	2.2.1 Area of natural woodland regenerated	704	736	749	750	760	780	Annual Report	Annually	DoF, Council NGOs
2.3 Undertake fire management activities in forest reserves and plantation	2.3.1 % reduction in hectares destroyed by fires.				10	15	20	Annual Report	Annually	DoF, Council NGOs
	2.3.2 Distance of fire breaks maintained	1,113.12	1,257.10	1,500	1,500	1550	1,650	Annual Report	Annually	DoF, Council NGOs
	2.3.3 No. of reported cases under fire management	30	35	40	30	25	20	Annual Report	Annually	DoF, Council NGOs

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
	2.3.4 Distance of retraced forest reserve boundaries	225	352	455	551	560	565	Annual Report	Annually	DoF, Council NGOs
	2.3.5 No. of fire campaigns conducted	5	10	10	10	15	20	Annual Report	Annually	DoF, Council NGOs
2.4 Establish miombo recovery rate following disturbance	2.4.1 No. of plots established and assessed				1	1	1	Annual Report	Annually	DoF, Council NGOs
Strategy 3. Ensuring sustainable fuel wood management./ Energy consumption for cooking by source										
3.1 Encouraging the use of alternative energy sources to biomass	3.1.1 No of households utilizing alternative energy sources to biomass				200,000	200,000	200,000	Annual Report	Quarterly	DoF, Council NGOs
3.2 Create awareness of sustainable management of fuel wood	3.2.1 No of awareness campaigns conducted on sustainable management of fuel wood				10	15	20	Annual Report	Quarterly	DoF, Council NGOs
Strategy 4. Protect endangered tree species. /Conservation of genetic resources										
4.1 Intensify planting and conservation of endangered tree species.	4.1.1 No. of endangered tree species planted							Annual Report	Annually	DoF, Council NGOs
	4.1.2 Survival rate of endangered tree species planted							Annual Report	Annually	DoF, Council NGOs
	4.1.3 Area (Ha) under endangered tree species conserved							Annual Report	Annually	DoF, Council NGOs

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
4.2 Conduct awareness campaigns on conservation of endangered tree species	4.2.1 No. of awareness campaigns on conservation of endangered tree species							Annual Report	Quarterly	DoF, Council NGOs
4.3 Prevent introduction and establishment of invasive alien species	4.3.1.Area under invasion of alien species							Annual Report	Annually	DoF, Council NGOs
Strategy 5. Carbon sequestration										
5.1 Promote carbon trading	5.1.1 Quantity of carbon stocks traded to address climate change.							Annual Report	Annually	DoF, Council NGOs
Strategy 6. Monitor productivity of forests										
6.1 Assess revenue from timber and non-timber products	6.1.1 Aggregate revenue by type of timber and non-timber products.	805,392,550	900,000,000	900,000,000	900,000,000	1,000,000,000	1,000,000,000	Annual Report	Annually	DoF, Council NGOs
Strategy 7. Monitor and enforce forestry laws and regulations										
7.1 Issuance of forest licences, transfer certificates and permits.	7.1.1 No. of permits issued	1123	2235	3240	4555	4560	4565	Annual Report	Quarterly	DoF, Council NGOs
	7.1.2 No. of Transfer certificates issued	1123	2345	3540	4635	4650	4	Annual Report	Quarterly	DoF, Council NGOs
	7.1.3 No. of phytosanitary certificates issued;	900	900	900	900	1000	1000	Annual Report	Quarterly	DoF, Council NGOs
	7.1.4 No. of CD1 forms inspected and verified	578	578	578	578	590	600	Annual Report	Quarterly	DoF, Council NGOs

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
	7.1.5 No. of Export and Import licences issued/renewed	64	300	374	403	410	420	Annual Report	Quarterly	DoF, Council NGOs
7.2. Conduct forest patrols to ensure compliance with laws and regulations	7.2.1 No. of patrols	466	480	510	680	700	700	Annual Report	Quarterly	DoF, Council NGOs
	7.2.2 No. of cases reported	10	15	20	25	30	35	Annual Report	Quarterly	
	7.2.3 No. of cases concluded	5	10	15	20	25	30	Annual Report	Quarterly	
	7.2.4 No. of arrests	60	70	70	70	70	70	Annual Report	Quarterly	
7.3 Regulate movement of forest produce and products	7.3.1 No. of roadblocks manned	22	22	22	22	22	22	Annual Report	Quarterly	DoF, Council NGOs
	7.3.2 No. of border posts managed	6	6	6	6	6	6	Annual Report	Quarterly	
7.4 Empower Village Natural Resources Management Committees (VNRMCs) to enforce bye-laws.	7.4.1 No. of VNRMCs functioning	200	200	200	200	220	250	Annual Report	Quarterly	DoF, Council NGOs
7.5 Monitor implementation of concession and forest management agreements	7.5.1 No. of concessionaires and institutions adhering to forest management agreements	10	10	10	10	12	15	Annual Report	Quarterly	DoF, Council NGOs
Strategy 8. Monitor implementation of concession and forest management agreements										

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
8.1 Improve quality and quantity of tree seeds supplied	8.1.1 Germination rate by species of improved seeds							Annual Report	Annually	DoF, Council NGOs
	8.1.2 Quantity of tree seeds collected and supplied	152.5	165	175	185	200	220	Annual Report	Annually	DoF, Council NGOs
8.2 Identify and evaluate tree species for rehabilitation of water catchments and degraded natural forests	8.2.1 No. of tree species identified and evaluated	3	6	8	10	12	12	Annual Report	Annually	DoF, Council NGOs
	8.2.2 No. of compendiums for tree species for rehabilitation of water catchment areas and natural forests	4	4	4	4	4	4	Annual Report	Annually	DoF, Council NGOs
8.3 Establish and protection of high-quality tree sources	8.3.1 No. of tree seed sources/orchards established and protected	3	3	3	3	3	3	Annual Report	Annually	DoF, Council NGOs
	8.3.2 Optimal storage periods for germination of economic tree seed species							Annual Report	Annually	DoF, Council NGOs
8.4 Identify and evaluate suitable woody species for incorporation into farming systems	8.4.1 No. of woody species for incorporation into farming systems identified	5	5	5	5	5	5	Annual Report	Annually	DoF, Council NGOs
8.5 Monitor and evaluate existing and new tree pests	8.5.1 No. of surveillance conducted in plantations and natural forests	2	2	2	2	2	2	Annual Report	Quarterly	DoF, Council NGOs

Activities	Indicators	Baseline 2018/2019	Target (FORESTY)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
and diseases in plantations										
8.6 Develop growth and yield prediction models for plantations	8.6.1 No. of growth and yield plots established	3	3	3	3	3	3	Annual Report	Annually	DoF, Council NGOs
8.7 Evaluate existing silvicultural systems on productivity and ecology of miombo woodland trees	8.7.1 No. of existing silvicultural systems evaluated	3	3	3	3	3	3	Evaluation report	Annually	DoF, Council NGOs
8.8 Publish research findings	8.8.1 No of publications	2	2	2	2	2	2	Annual Report	Annually	DoF, Council NGOs
	8.8.2 No. of policy briefs produced	2	2	2	2	2	2	Annual Report	Annually	

Annex 7.8.2 Fisheries

Activities	Indicators	Baseline 2018/19	Target (FISHERIES)					Means of verification	Frequency of reporting	Responsible institution (s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1. Promote establishment and conservation of fish sanctuaries /Conservation of genetic resources										
1.1 Identify and conserve fish breeding habitats e.g. rivers and lagoons.	1.1.2 No of fish sanctuaries conserved	2	4	6	8	10	10	Annual Report	Annually	Fisheries Dept, Councils & NGOs
	1.1.1 No of fish sanctuaries identified	2	4	6	8	10	10	Annual Report	Annually	
	1.1.2 No of threatened fish species restored	6	6	6	6	6	6	Annual Report	Annually	
Strategy 2. Promote aquaculture										
2.1Promote commercial aquaculture	2.1.1 No. of commercial aquaculture entities established and certified	2	3	3	4	4	5	Annual Report	Quarterly	Fisheries Dept, Councils, NGOs
2.2 Develop integrated fish farming schemes	2.1.2 No. and size of fish ponds constructed and stocked.	75	87	100	110	120	130	Annual Report	Annually	
	2.1.3 Quantity (Tons) and Value (MK) of fish harvested from fish ponds by species.	4	4.5	5	5.5	6	6.5	Annual Report	Annually	
2.3 Invest in fish genetic improvement programs	2.2.1 No. of fish farming schemes developed	2	4	5	6	8	10	Annual Report	Annually	
	2.3.1 No. of genetically improved fish species used in aquaculture	1	2	2	3	4	4	Annual Report	Annually	Fisheries Dept, Councils & NGOs

2.4 Strengthen fisheries extension services	2.4.1 No. of farmers adopting aquaculture technology.	1725	2940	3810	4500	5215	6100	Annual Report	Annually	
2.5 Enhance production of fingerlings	2.4.2 No. of farmers utilizing best fish management practices	3570	5019	6310	7221	8001	8993	Annual Report	Annually	
2.6 Facilitate formation of fish farming clubs.	2.4.3 No. of farmers accessing fisheries extension services	4770	5859	6750	7534	8423	9265	Annual Report	Annually	
	2.4.4 No. of students undergoing preservice training at Malawi College of Fisheries	30	50	50	50	50	50[20]	Annual Report	Annually	
	2.4.5 No. of farmers trained in modern fish farming technologies	1725	2940	3810	4500	5215	6100	Annual Report	Annually	
	2.6.1 No. of fingerlings produced	12,765,050	14,630,670	15,750,000	16,750,000	17,750,000	18,750,000	Annual Report	Annually	
	2.1.10 No. of fish farming clubs.	100	120	140	160	180	200	Annual Report	Annually	
Strategy 3. Promote deep water fishing - /value in fish sales from non-traditional fish production techniques										
3.1 Improve fishermen's access to modern deep-water fishing technologies.	3.1.1 No. of fishermen using modern deep-water fishing by type of technology.	4	6	8	8	10	12[21]	Annual Report	Annually	Fisheries Dept, Councils & NGOs
	3.1.2 Catch (Tons) of fish harvested through deep water fishing by species.	3.45	3.51	3.62	3.70	3.81	3.92	Annual Report	Annually	

[20] The number for students undergoing pre-service training will remain constant in the following years due to the limitation on the number of student Malawi College of Fisheries can accommodate

[21] For fishers to use deep water fishing, they are required to apply for a licence from the Department of fisheries and the approval depends on availability of fish stocks in the lake (determined through stock assessment)

	Value (MK) of fish harvested through deep water fishing by species	3,204,912	3,891,642	4,344,000	4,810,000	5,334,000	5,880,000	Annual Report	Annually	
Strategy 4. Monitor and enforce fisheries regulations /enforcement…										
4.1 Issuance of licences and register fish gears.	4.1.1 No. of licences issued by type of fishing gear.	602	602	602	602	602	602	Annual Report	Annually	Fisheries Dept, Councils & NGOs
4.2. Conduct patrols to ensure fishers comply with laws and regulations	4.1.2 No. of fishermen complying with licensing regulations.	15,000	17,000	19,000	21,000	23,000	25,000	Annual Report	Annually	Fisheries Dept, Councils & NGOs
4.3 Ensure Vessel Monitoring System (VMS) used by commercial fishermen is functional and operational	4.2.1 No. of patrols conducted	86	28[22]	70	90	110	130	Annual Report	Annually	Fisheries Dept, Councils & NGOs
4.4 Empower beach village committees (BVCs) to enforce bye-laws.	4.2.2 % reduction in the number of fishermen using inappropriate fishing gear.	50	45	40	35	30	25	Annual Report	Annually	Fisheries Dept, Councils & NGOs
	4.3.1No. of commercial fishermen complying with the use of VMS	34	54	60	66	72	78	Annual Report	Annually	
	4.4.1 No. beach village committees functioning.	115	134	142	158	164	176	Annual Report	Quarterly	
4.5 Regulate exploitation of ornamental fish species	4.5.1 Number of pieces Value (MK) of ornamental fish caught.	1,686	2,280	2,280	2,500	3,000	3,500	Annual Report	Annually	
	Value (MK) of ornamental fish caught.	226,058,228.69	302,930,869.64	302,930,869.64	332,161,041.27	398,593,249.53	465,025,457.78	Annual Report	Annually	

[22] Patrols were affected by the national-wide demonstrations

	4.5.2 No. of export destinations.	7	7	7	7	7	7	Annual Report	Annually	
Strategy 5. Monitor productivity of fisheries resources										
5.1 Assess income generated from fishing activities	5.1.1 Income generated from capture fisheries by fish species	201,250,276,973.41	169,408,653,702.16	191,102,950,237.5	201,728,640,288.0	208,860,400,194.0	216,109,600,196.0	Annual Report	Annually	Fisheries Dept, Councils & NGOs
	5.1.2 Qty of fish catches per unit effort	219,031.23	152,813.51[23]	201,161.25	210,134.30	215,320.2	220,520.2	Annual Report	Annually	Fisheries Dept, Councils & NGOs

[23] Catch decline is attributed to the increase in catches in low value species such as Usipa, unlike in the previous years when high value species such as Chambo, Kampango and Mcheni were in abundance

Annex 7.8.3 Parks and Wildlife

Activities	Indicators	Baseline 2018/19	Targets (NATIONAL PARKS AND WILDLIFE)					Means of verification	Frequency of reporting	Responsible institution(s)
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1. Enhance sound conservation practices of wildlife resources.										
1.1 Promote co-management of wildlife resources and eco-tourism	1.1.1 No. of functional co-management arrangements with communities.	6	2	1	1	1	1	Annual Report	Annually	DNPW, Councils,NGOs
1.2 Intensify conservation awareness campaigns	1.2.1 % in wild animals killed through poaching.	65	60	55	50	45	40	Annual Report	Annually	DNPW, NGOs
	1.2.2 No of wild animals by species elephants)	2000	2120	2247	2340	2500	2700	Animal Census Report	Annually	DNPW, NGOs
1.3 Construct and rehabilitate perimeter electric fences.	1.3.1 Km of perimeter fence constructed and maintained	300	300	310	320	350	400	Annual Report	Annually	DNPW, Councils, NGOs
Strategy 2. Protect endangered animal species. /Endangered species under improved management system										
2.1 Identify and protect endangered animal species, provide sanctuaries.	2.1.1 No. of anti-poaching operations conducted	1500	1800	18500	18500	18500	18500	Annual Report	Annually	DNPW, Councils, NGOs
	2.1.2 No. of sanctuaries established by type of animals protected.	2	2	2	2	2	2	Annual Report	Annually	DNPW, Councils, NGOs
Strategy 3. Monitor Parks and Wildlife contribution to economic performance										
3.1 Assess income from National Parks and Wildlife	3.1.1 Aggregate income from National Parks and Wildlife.	K100m	K115m	K120m	K130m	K140m	K150m	Financial Income Report	Annually	DNPW, Councils, NGOs

Annex 7.8. 4 Mining

Action	Monitoring Indicators	Base Year (2018/19)	TARGETS (MINING)					MOVs (Means of verification)	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
1. Strengthen legal and institutional framework to improve competitiveness and create sustainable mining practices										
1.1. Revision Mines and Minerals Act and subsidiary regulations	1.1.1. Enacted revised Act	0	1	-	1	1	1	Gazetted Act	1 Year	MOFNR, MOM
	1.1.2. Enacted revised Mines and Minerals Regulations	0	1	1	1	1	1	Gazetted Regulations	1 Year	
	1.1.3. Enacted revised mining safety regulation	0	1	1	1	1	1	Gazetted Regulations	1 Year	MOFNR, MOM
2. Improve participation of artisanal and small scale miners.										
2.1. Formulation of Artisanal and Small Scale Mining Policy	2.1.1. Formulated Artisanal and Small Scale Mining Policy	0	1	1	1	1	1	Policy launch	5 Years	MOFNR
2.2. Establish coordination mechanism among stakeholders	2.2.1. Number of forums for inter-sectoral coordination	4	6	6	6	6	6	MRCM, SWGs, MSGs	1Year	
2.3. Conduct sensitization campaigns on legal provisions for ASM and opportunities available	2.3.1. Number of sensitization campaigns conducted (through cooperatives training)	13	1	1	1	1	1	DOMAR	1 Year	MOFNR, MOM

Action	Monitoring Indicators	Base Year (2018/19)	TARGETS (MINING)					MOVs (Means of verification)	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
2.4. Facilitate formation of mining cooperatives and associations	2.4.1. Number of registered and active cooperatives and associations	9	25	25	25	25	25	DOMAR	1 Year	MOFNR, MOM
3. Increase exploration and mining of mineral resources										
3.1. Conduct geological, geochemical and geophysical mapping	3.1.1. Mineral resources and occurrence maps produced							Map copies	5 Years	GSD, MOM
3.2. Intensify drilling and sample analysis for mineral identification	3.2.1. Number of exploration licenses granted	48	5	5	5	5	5	DOMAR	1 Year	MOM
3.3. Create an integrated data management systems	3.3.1. Availability of integrated data management system	0	1	1	1	1	1	GIDMIS	5 Years	GSD
4. Improve transparency in the management of the sector										
4.1. Conduct awareness campaigns on the availability of the mining cadastre portal	4.1.1. Number of awareness campaigns on accessibility of mineral rights information to the public through the	0	1	1	1	1	1	Activity reports	1 Year	MOM, MOFNR

Action	Monitoring Indicators	Base Year (2018/19)	TARGETS (MINING)					MOVs (Means of verification)	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
	cadastre portal									
	4.1.2. Number of hits registered on the mining cadastre public portal	N/A	1000	5000	5000	5000	5000	Website log copy		
4.2. Reporting on production and trade of minerals	**4.2.1.** Production figures of minerals	3,015,035.69 tons (all minerals)	3,086,268.8	3,086,268.8	3,086,268.8	3,086,268.8	3,086,268.8	DOMAR	1 Year	MOFNR, MOM
	4.2.2. Amount of Government revenue generated from mining	K11,597,000,000	K600,000,000	K600,000,000	K600,000,000	K600,000,000	K600,000,000	K600,000,000	1 Year	MOF, MOM, MRA
5. Enforce legislation on safe and sustainable use and management of mineral resources.										
5.1. Monitor the practice of safe and environmentally sustainable mining	5.1.1. Fines imposed on the mismanagement of the environment and mineral resources							GRs??	1 Year	MOM, EAD
	5.1.2. Number of mining projects referred to	6	6	6	6	6	6	ESIA & Audit Reports	1 Year	MOM, EAD

Action	Monitoring Indicators	Base Year (2018/19)	TARGETS (MINING)					MOVs (Means of verification)	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
	EAD for environmental certification									
	5.1.3. Trainings for ASMs on sustainable use and management of mineral resources	0	1	1	1	1	1	Training Reports	5 Years	MOM, MOFNR
	5.1.4. Number illegal operations shut down,	3						Reports	1 Year	MOM
	5.1.5. Number of field inspection reports on compliance with environmental and mining safety legislation	42	42	42	42	42	42	Inspection reports	1 Year	MOM, EAD
5.2. Monitor mine decommissioning and closure provisions according to the MMA of 2019	5.2.1. Number of annual rehabilitaion and mine closure plan reports submitted to MOM	32	32	32	32	32	32	RMCPs	5 Years	MOFNR, MOM, EAD

Action	Monitoring Indicators	Base Year (2018/19)	TARGETS (MINING)					MOVs (Means of verification)	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
5.3. Operationalise environmental bond	5.3.1. Indication of environmental performance bond issued by EAD.	1	2	3	3	3	3	Copies of letters from EAD	5 Years	MOFNR, MOM, EAD

Annex 7.8.5. Sanitation and Hygiene

Action	Monitoring Indicators	Base Year (2018/19)	Targets (SANITATION AND HYGIENE)					Means of Verification	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
1.Promote use of improved and accessible sanitation facilities in all public places (SUN Framework)										
1.1. Conduct awareness campaigns on the importance of constructing and using sanitation facilities	1.1.1. Number of awareness campaigns conducted on the need for sanitation facilities per district.	40	55	60	50	45	35	Meeting reports	Annually	EAD, Councils, NGOs
1.2. Provide sanitation facilities that are user friendly to all	1.2.1. Number of user-friendly sanitation facilities per district.	15	25	40	50	60	80	Reports	Annually	EAD, Councils, NGOs
1.3. Facilitate and enforce construction of sanitation facilities such as washrooms in all public places	1.3.1. Number of sanitary facilities constructed in public places per district.	20	30	50	80	80	80	Reports	Annually	EAD, Councils, NGOs
1.4. Introduce ventilated improved pit latrines	1.4.1. Number of VIP latrines constructed per district.	40	50	100	120	150	200	Reports	Annually	EAD, Councils, NGOs
1.5. Enter into PPP arrangements to provide sanitation facilities in public	1.5.1. Number of MOUs signed between Council and partners/private sector	5	10	20	30	50	60	Reports	Annually	EAD, Councils, NGOs
2.Promote adoption of safe water and sanitation practices at individual and household level										
2.1. Conduct awareness campaigns on sanitation and general hygiene.	2.1.1. No. of awareness campaigns on sanitation and hygiene	8	15	25	30	40	50	Meeting reports	Annually	Councils, NGOs, PWOs

Action	Monitoring Indicators	Base Year (2018/19)	Targets (SANITATION AND HYGIENE)					Means of Verification	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
2.2. Increase collaboration between various stakeholders at all levels to advocate for, as well as address issues related to sanitation and hygiene.	2.2.1. No of Stakeholder Coordination Team (SCT) meetings convened at all levels (both district and national levels)	5	8	10	15	20	20	Meeting Reports	Annually	Councils & Members Of Sct.
2.3. Adopt appropriate rural water sanitation technologies (at TA or Area level)	2.3.1. Number of appropriate Sanitation technologies adopted	3	8	10	15	20	30	Reports	Annually	Councils, NGOs, Academia
3. Improve management and disposal of both liquid and solid waste.										
3.1. Review and implement guidelines for disposal and management of household and industrial waste.	3.1.1. Number of appropriate Sanitation guidelines reviewed.				1			Reports	Annually	Councils, NGOs, EAD.
	3.1.2. Number of disposal and management guidelines of Household waste implemented both at district and national level;		2	2	2	2	2	Reports	Annually	Councils, NGOs, EAD.
	3. 1.3. Number of disposal and management guidelines of Industrial waste implemented.		2	2	2	2	2	Reports	Annually	Councils, NGOs, EAD
3.2. Register Private Waste Operators and regulate	3.2.1. Number of PWOs registered	5	10	15	20	30	40	Reports	Annually	Councils

Action	Monitoring Indicators	Base Year (2018/19)	Targets (SANITATION AND HYGIENE)					Means of Verification	Reporting frequency to EAD	Responsible Organization
			2020	2021	2022	2023	2024			
3.3. Improve refuse collection.	3.3.1. Increased tonnage of waste being collected and transferred to waste transfer stations per month,	5200 tons	6000 tons	8000 tons	10000 tons	15000 tons	20000 tons	Reports	Annually	Councils
	3.3.2. Increased volume of liquid waste channeled to the waste treatment plant if any per month.								Annually	District/City/Town Councils
3.4. Provide support infrastructure such as refuse bins and dumping sites.	3.4.1. Number of Strategically Positioned Waste treatment/dumping sites established per district.		1	1	1	1	1	Reports	Annually	Councils
	3.4.2. Number of dust bins and skips procured per district.		10	15	17	20	23	Reports	Annually	Councils
3.5. Improve community health surveillance systems	3.5.1. Number of qualified HSAs working per district.	36	50	60	80	100		Reports	Annually	Councils, DHO
3.6. Develop and harmonize policies related to Sanitation and Hygiene.	3.6.1. Relevant Sanitation and hygiene related policies harmonized.	2	2					Policy Documents	Annually	Councils, EAD
3.7. Enforcing compliance of waste management standards and legislation at district level.	3.7.1. Level of compliance and enforcement checked (number of fines).	20	30	50	30	20	5	Inspection reports	Annually	Councils

Action	**Monitoring Indicators**	**Base Year (2018/19)**	**Targets (SANITATION AND HYGIENE)**					**Means of Verification**	**Reporting frequency to EAD**	Responsible Organization
			2020	**2021**	**2022**	**2023**	**2024**			
3.8. Construct Waste transfer stations in all Councils.	3.8.1. Number of waste transfer station constructed per district	4	5	6	6			Reports	Annually	Councils
3.9. Train Waste Transfer Operators on issues of compost making and recycling	3.9.1. Number of Waster Transfer Operators(groups) trained per district	1	2	2	4			Reports	Annually	Councils
3.10. Link Waste Transfer operators to potential buyers in and outside the districts.	3.10.1. Number of waste transfer operators linked to potential buyers.	2	4	6	8	10		Reports	Annually	Councils
4.0. Enhance regulatory frame work related to waste management										
4.1. Develop and enforce Waste Management bylaws in all councils.	4.1.1. Waste Management bylaws developed and enforced	4	6	6				Reports	Annually	District/City/Town Councils

Annex 7.8.6 Land Resources and Settlement

Action	Monitoring Indicator	Baseline Year	Targets (Land Resources and Settlement					Means of Verification	Reporting Frequency	Responsible Organization
		2018/19	2020	2021	2022	2023	2024			
Strategy 1: Improve accessibility to land for settlement										
1.1. Allocate serviced plots in urban areas;	1.1 No. of hectares of land acquired		12500	12500	12500	12500	12500	Hectares of land acquired	Annually	MoLHUD / Councils
1.2. Enhance security of land tenure;	1.2 No. of leases registered		600	700	750	850	1000	Leases documents issued	Annually	MoLHUD / Councils
1.3. Conduct public awareness of land related laws, policies and procedures.	1.4 Number of communities sensitized on land rights		3	12	20	25	30	Report on communities sensitized in land rights	Annually	MoLHUD / Councils
Strategy 2: Develop and enforce land use plans										
2.1. Conduct planning standards enforcement exercise to enhance compliance with provisions of physical development plans;	2.1.Number of planning standards enforcement exercise conducted							Enforcement exercise reports	Annually	MoLHUD / Councils
2.2. Conduct public awareness of physical planning services and sustainable land use management;	2.2.Number of sensitization meetings on Physical Planning conducted		5	5	5	5	5	Sensitization meetings reports	Annually	MoLHUD / Councils
2.3.Reduce informal settlements;	2.3.Number of Development Applications scrutinized		Demand driven	Demand driven	Demand driven	Demand driven	Demand driven	Development applications	Annually	MoLHUD / Councils
2.4.Ensure proper planning of urban and rural centres;	2.4.1Number of urban structure plans prepared		4	4	4	4	4	Urban structure plans	Annually	MoLHUD / Councils

	2.4.2Number of detailed layout plans prepared		18	18	18	18	18	Detailed layout plans	Annually	MoLHUD / Councils
	2.4.3Number of special physical development plans prepared		2	2	2	2	2	Special physical development plans	Annually	MoLHUD / Councils
2.5.Implement National Land Use Planning and Management Policy;	2.5.Number of Land Use Planning and Management Policy implementation initiatives							Implementation report	Annually	MoLHUD / Councils
2.6.Enforce planning standards and guidelines;	2.6.Physical Planning Guidelines and Standards reviewed and enforced		1					Reviewed Physical Planning Guidelines and Standards	Annually	MoLHUD / Councils
2.7.Provide policy guidance on land use planning and management;	2.7.Land Use Planning and Management Policy finalized		1					Land Use Planning and Management Policy	Annually	MoLHUD / Councils
2.8. Develop Land Information Management System (LIMS);	2.8.Land Information Management System developed		1					Land Information Management System	Annually	MoLHUD / Councils
Strategy 3: Improve accessibility to low cost housing										
3.1. Ensure availability of adequate and affordable housing for all income groups;	3.1.1Number of government institutions in rented offices		20	20	20	20	20		Annually	MoLHUD / Councils
	3.1.2Number of residential properties rented		400	400	400	400	400		Annually	
3.2. Sensitize the rural masses on the orderly development of the rural housing and settlements;	3.2.1Number of village communities sensitized		5	5	5	5	5	Reports	Annually	MoLHUD / Councils

	3.2.2Number of houses constructed		15	15	15	15	15	Houses	Annually	MoLHUD / Councils
3.3. Sensitize people on the use of cost effective but environmentally friendly building materials.	3.3. Number of sensitization campaigns		20	20	20	20	20	Reports	Annually	MoLHUD / Councils
Strategy 4: Promote Urban and Rural Housing planning services that provide sustainable human settlements										
4.1. Conduct regular meetings with rural and urban population to strengthen positive linkages between rural and urban areas;	4.1. Number of meetings conducted		10	10	10	10	10	Minutes/ Reports	Annually	MoLHUD / Councils
4.2. Conduct regular meetings with stakeholder to improve on coordination mechanisms;	4.2. Number of meetings conducted		10	10	10	10	10	Minutes/ Reports	Annually	MoLHUD / Councils
4.3. Train the population in inclusive, participatory and integrated land use and sustainable human settlements planning and development;	4.3. Number of trainings conducted							Reports	Annually	MoLHUD / Councils
4.4. Conduct awareness campaigns to increase resilience to natural and man-made disaster;	4.4. Number of awareness campaigns conducted		20	20	20	20	20	Reports	Annually	MoLHUD / Councils
4.5. Undertake participatory, community-led upgrading of informal settlements to enhance safety, service provision and compliance with environmental guidelines;	4.5. Number of upgraded informal settlements							Formal settlements		MoLHUD / Councils
4.6. Sensitize stakeholders to promote socially inclusive urban development;	4.6. Number of sensitization meetings		6	6	6	6	6	Reports		MoLHUD / Councils

Annex 7.8.7 Health

Action	Indicators	Base line Year (2018/19)	Targets (HEALTH)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
Strategy 1: Provide and promote use of improved and accessible sanitation facilities in all public places.										
1.1 Conduct awareness campaigns on the importance of constructing and using sanitation facilities.	1.1.1 %age of people having and using sanitation facilities	83%	90%	95%	100	100	100	Awareness campaigns reports	Annually	MOHP
1.2 Facilitate and enforce construction of sanitation facilities such as wash rooms in all public places including banks.	1.1.2 Number of sanitation facilities constructed							Inspection Reports	Annually	MOHP
1.4 Introduce ventilated improved pit latrines.	1.1.3 Number of ventilated improved pit latrines constructed	40.6 %	57%	65%	70%	75%	80%	Inspection Reports	Annually	MOHP
1.5 Enter into PPP arrangements to provide sanitation facilities in public places.	1.1.4 Number of stakeholders providing sanitation facilities in public places							MOUs	Bi-annually	MOHP
Strategy 2: Promote adoption of safe water and sanitation practices at individual and household level										
2.1 Conduct awareness campaigns on sanitation and general hygiene.	2.1.3 %age of population practicing personal hygiene	36%	49%	55%	65%	75%	85%	Awareness campaigns reports	Annually	MOHP

Action	Indicators	Baseline Year (2018/19)	Targets (HEALTH)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
2.2 Increase collaboration between various stakeholders at all levels to advocate for, as well as address issues related to sanitation and hygiene.	2.1.2 Number of stakeholders addressing issues related to sanitation and hygiene	117	117	117	117	117	117	Reports	Bi-annually	MOHP
2.3 Promote appropriate rural water sanitation technologies.	2.1.1 %age of population using appropriate rural water sanitation technologies	83%	90%	95%	100	100	100	Reports	Bi-annually	MOHP
Strategy 3: Improve management and disposal of both liquid and solid waste.										
3.1 Review and implement guidelines for disposal and management of household and industrial waste.	3.1.1 Number of guidelines for waste management developed and distributed	2	1	1	0	0	0	Guidelines distributed	Annually	MOHP
3.2 Provide incentives for private sector participation.	3.1.2 Number of private sectors participating	TBC	TBC	TBC	TBC	TBC	TBC	Reports	Bi-annually	MOHP
3.3 Improve refuse collection.	3.1.3 %age of population using refuse collection facilities	35%	45%	55%	65%	75%	85%	Reports	Bi-annually	MOHP
3.4 Provide support infrastructure such as refuse bins and dumping sites.	3.1.4 %age of population safely disposing of solid and liquid wastes							Reports	Bi-annually	MOHP
3.5 Improve community health surveillance systems.	3.1.4 Number of surveillance reports produced							Reports produced	Annually	MOHP
Strategy 4: Improve access, delivery and utilization of selected basic services to all										
4.1 Encourage people to use improved drinking water sources	4.1.1 %age of Households accessing improved drinking water sources	83%	85%	90%	95%	100 %	100 %	Survey Reports	Bi-annually	MOHP

Action	Indicators	Base line Year (2018/19)	Targets (HEALTH)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
4.2 Increase people using improved sanitation facilities	4.2.1 %age of Households using improved sanitation facilities	40.6 %	57%	65%	70%	75%	80%	Survey Reports	Annually	MOHP
Strategy 5: Improve housing living conditions of populations										
5.1 Protect population living in hazard-prone areas	5.1.1 Number of people exposed to hazards							Reports	Annually	MOHP
5.2 Provide support to homeless population	5.2.1 Basic services available							Reports	Bi-annually	MOHP
Strategy 6: Increase management and prevention measures of exposure to ambient pollution										
6.1 Improve management and prevention of population exposed to air pollution in main cities	6.1.1 Disease incidence and prevalence rate							Reports	Bi-annually	MOHP
6.2 Improve management and prevention of population exposed to noise population in main cities	6.2.1 Disease incidence and prevalence rate							Reports	Bi-annually	MOHP
Strategy 7: Strengthen management and prevention of Health problems associated with excessive UV radiation exposure, Toxic substances and nuclear radiation										
7.1 Procure PPEs	7.1.1 Disease incidence and prevalence rate							Reports	Annually	MOHP
7.2 Construct Cancer Centre	7.2.1 No. of cancer Centre constructed	0	1		1		1	Cancer centres constructed	Annually	MOHP

Annex 7.8.8 Energy

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
1.Ensure reliable supply of electricity to key social and economic development areas and increase electricity access rate										
1.1. Expand electricity grid network to rural growth centers	1.1.1 Number of trading centres with access to electricity on MAREP	514	486	536	586	636		MAREP Reports	Annually	DoEA
	1.1.2 %age of population in rural areas with access to electricity	4 %						Global Tracking Framework	Annually	DoEA
	1.1.3 No of rural households and enterprises connected to the grid	68,000						ESCOM Reports	Annually	DoEA
1.2 Enhance private sector investment in energy generation and distribution through PPPs and Independent Power Producers (IPPs) for renewable and clean energy	1.2.1 No. of awareness campaigns conducted on standards of construction of power substations and transmission lines	0						DoEA Reports	Annually	DoEA
	1.2.2 No. of IPPs engaged in power generation and distribution	9	3	3	4			DoEA Reports	Annually	DoEA

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
	1.2.3 No. of power stations constructed by IPPs	0	1	4	3	1		Project construction Reports	Annually	DoEA
	1.2.4 Power (MW) generated by IPPs	0	60	100	120	70		Project Commissioning Reports	Annually	DoEA
	1.2.5 No. of lines connected from all IPP-developed power stations	0						Project Commissioning Reports	Annually	DoEA
	1.2.6 Tax regime for PPP arrangement Reviewed	0	0	1	0	0	0	Approved Tax regime	Annually	DoEA, MRA, MOF
	1.2.7 No. of cost-reflective pricing regimes established for all types of consumers	0						MERA Reports	Annually	DoEA, MERA
	1.2.8 No. of PPPs in renewable and clean energy	0	1	1	0	0	3	DoEA and PPPC Reports	Annually	DoEA, PPPC
1.3 Construct mini-grids	1.3.1 No of feasibility studies conducted on mini-grids	4	1	10	5	2	2	Feasibility study reports	Annually	DoEA

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
	1.3.2 No. of mini-grids constructed	2	4	10	5	2	2	Project progress reports	Annually	DoEA
	1.3.3 Power Generated from mini-grids (kW)	300	1200	3000	1500	600	600	Project Commissioning reports	Annually	DoEA/ ESCOM
1.4 Rehabilitate and expand the transmission and distribution system.	1.4.1. No. of transmission sub-stations rehabilitated	3						Project Progress Reports	Annually	DoEA/ ESCOM
	1.4.1. No. of distribution sub-stations rehabilitated	5						Project Progress Reports	Annually	DoEA/ ESCOM
	1.4.2. No. of new distribution sub-stations constructed	12						Project Progress Reports	Annually	DoEA/ ESCOM
	1.4.3. No. of new transmission sub-stations constructed	10	2	1	1	5	-	Project Progress Reports	Annually	DoEA/ ESCOM
	1.4.4. Circuit length (KM) of new line and cables commissioned at 33kV and 11kV	12260						Project Commissioning Reports	Annually	DoEA/ ESCOM
	1.4.5. Circuit length (KM) of new transmission lines added	2395	471		280	260		Project commissioning reports	Annually	DoEA/ ESCOM

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
	and commissioned at 66kV, 132 kV and 400kV									
	1.4.6. No. of new connections to the grid.	409,425	450,370	504,411	580,073	696,088	870,110	ESCOM Reports	Annually	DoEA/ ESCOM
1.5. Adopt utilisation of the Global Tracking Framework (GTF) for measurement of electricity access rate	1.5.1 %age of electricity access rate	11 %						Annual NSO Reports	Annually	DoEA
2. Diversify the use of clean and renewable energy sources /Proportion of households using renewable sources /climate smart technologies										
2.1 Develop additional power stations from clean and energy sources (solar, wind, hydro, geothermal) .	2.1.1No. of power stations developed from clean and energy sources (solar, wind, hydro, geothermal) .	10	4	2	2	4	3	Project progress reports	Annually	DoEA/ EGENCO
	2.1.2 No. of Power Purchase Agreements executed by each type of clean and renewable energy source	10	4	2	2	4	3	Executed PPAs	Annually	DoEA/ ESCOM

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
	2.1.3 No. of Implementation Agreements executed by each type of clean and renewable energy source	10	4	2	2	4	3	Executed IAs	Annually	DoEA/ EGENCO
	2.1.4 Power (MW) generated by each type of clean and renewable energy source	361	131	78	120	100		Project progress reports	Annually	DoEA/ EGENCO
2.2. Interconnect with regional power pools	2.2.1 Power (MW)imported from regional power pools	0	0	50	0	80	230	Project progress reports	Annually	DoEA/ ESCOM
	2.2.2. Circuit length of transmission lines constructed	0						Project progress reports	Annually	DoEA/ ESCOM
3. Promote the use of energy efficient technologies and designs /proportion of households using										
3.1 Undertake market research to identify affordable technologies and designs	3.1.1 population %age use of energy efficient technologies							M&E Reports	Annually	DoEA/ NCSC
	3.1.2 No. of affordable technologies and designs identified	12						DoEA, NCSC reports	Annually	DoEA/ NCSC
3.2 Develop Minimum Energy	3.2.1 No. of MEPS	1						Executed MEPS	Annually	DoEA/ MBS/ MERA

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Performance Standards (MEPS)	developed and gazetted									
3.3Introduce new technologies to reduce the cost of connection and billing errors.	3.3.1 No. of new technologies to reduce the cost of connection and billing errors introduced	0		3				Executed technologies	Annually	DoEA/ ESCOM
3.4 Conduct awareness campaigns on energy efficient technologies among the public	3.4.1 No. of awareness campaigns conducted on non-renewable resources	2				4		Progress Reports	Annually	DoEA
3.5. Distribute energy efficient cook stoves	3.5.1 No of energy efficient cook stoves distributed	1 700 000	2,000,000					ESCOM reports	Annually	DoEA/ NCSC
3.6. Distribute LED bulbs	3.6.1 No. of LED bulbs distributed	500 000					950,000	ESCOM reports	Annually	ESCOM
3.7 Develop and enforce standards on cook stoves sold as commercial products.	3.7.1 No. of standards developed	1						Gazette	Annually	DoEA
4. Promote the production and use of alternative sources of energy										
4.1. Engage in extensive exploration and drilling to determine coal reserves	4.1.1 No. of coal reserves identified	3	2					Project progress reports	Annually	DoEA/ EGENCO
	4.1.2 Qty (tonnes) of coal explored and drilled	70552.07	-	-	-	120,000		Project progress reports	Annually	DoEA/ EGENCO

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
4.2. Construct the Kammwamba coal plant.	4.2.1 Kammwamba coal plant constructed	0	0	0	1			Project reports	Annually	DoEA/ EGENCO
4.3. Conduct awareness campaigns for non-renewable resources such as gases	4.3.1 No. of awareness campaigns implemented on non-renewable resources	0		3				Project progress reports	Annually	DoEA
4.4 Subsidize other sources of energy such as Liquid Petroleum Gas (LPG) and solar energy equipment	4.4.1 No. of other sources of energy subsidized	0	2					Executed subsidies	Annually	DoEA
5. Promote sustainable environmental and social management principles in energy development programs.										
5.1. Conduct Environmental and Social Impact Assessment (ESIA)	5.1.1 No. of ESIA reports approved	3	2	4	8	12		Approved ESIA reports	Annually	DoEA/EAD
5.2. Enforce the use of environmental protection and management Practices.	5.2.1 No of Environmental and Social Impact Management Plans (ESIMPs) approved for each project.	1	2	4	8	12		Approved ESIMPs	Annually	DoEA/EAD
5.3 Strengthen coordination and enforcement of compliance to	5.3.1. No of IPPs adhering to	9	3	3	4	9		Project environmental reports	Annually	DoEA/EAD

Action	Indicators	Base Year (2018/19)	Targets (ENERGY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
environmental laws and regulations	environmental laws									

Annex 7.8.9 Agriculture

Strategy / Action	Indicators	Baseline Year (2018/19)	Targets (AGRICULTURE)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
Strategy 1. Improve crop and livestock production /climate smart agriculture										
1.1. Produce improved, high yielding crop varieties and improved animal breeds	1.1.1 Average Crop yield								Annually	MOA
	a) Maize (Mt/ha).	2.199				4	4	APES Reports		
	b) Rice Production (Mt/year)	110,000				220,000	220,000	APES Reports		
	c)Groundnuts Production (Mt/year)	350,000				700,000	700,000	APES Reports		
	c) Pulses (Mt/ha).	0.925				1.5	1.5	APES Reports		
	d) Tobacco	1.2				2.0	2.0	APES Reports		
	1.1.2 Number of Farmers using improved seeds.	1.5 million				3.2 million	3.2 million	APES Reports	Annually	MOA
	1.1.3 National Livestock Population(Millions)									
	a) Chicken Stock	97				110	110	APES Reports		
	b) Cattle	1.5				2.0	2.0	APES Reports		
	c) Goats Stock	7				10	10	APES Reports		
	d) Pigs	4				5.5	5.5	APES Reports		
	1.1.4 Livestock units owned per household (Average)	1.35				1.8	1.8			
Strategy 2. Enhance sustainable irrigation farming /climate smart irrigation										
2.1 Promote environmentally sound	2.1.1 No. of farmers engaged in irrigated agriculture.	370,538						Department of Irrigation Reports	Annually	MOA

Strategy / Action	Indicators	Baseline Year (2018/19)	Targets (AGRICULTURE)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
irrigated agriculture.	2.1.2 Hectarage with irrigation potential	407,862	407,862	407,862	407,862	407,862	407,862	Department of Irrigation Reports	Annually	MOA
	2.1.3 Hectarage of Sustainably developed for irrigation	118,844	124,000				152,000	Department of Irrigation Reports	Annually	MOA
Strategy 3. Support inclusive agricultural innovation systems for research, technology generation, and dissemination										
3.1 Conduct soil nutrient analysis for efficient fertilizer application and utilization	3.1.1. Number of soil nutrients maps	0	1 National Map and 28 District Maps					Department of Land Resources Reports	Annually	MoAIWD
3.2 Develop programs aimed at arresting agro-biodiversity deterioration and integrating diverse species in agricultural production	3.1.2. Number of Programs developed							Department of Land Resources Reports	Annually	MoAIWD
Strategy 4. Promote reforms of Agricultural institutions and programmes to make them more sustainable and cost effective										

Strategy / Action	Indicators	Baseline Year (2018/19)	Targets (AGRICULTURE)					Means of Verification	Reporting frequency	Responsible Organization
			2020	2021	2022	2023	2024			
4.1 Incorporate complimentary integrated soil fertility management practices in the FISP package.	4.1.1. Number of practices integrated	2							Annually	MoAIWD
Strategy 5. Promote integrated pest and diseases management										
5.1 Test and explore bio-technology options for disease and pest control.	5.1.1. Number of bio-technology options tested	2	3	3	3	3	3		Annually	MoAIWD

Annex 7.8.10 Water Resources Management

Action	Indicators	Baseline Year (2018/2019)	Targets (WATER SECTOR)					Means of verification	Reporting frequency	Responsible Organization
		Source	2019	2021	2022	2023	2024			
1.0 Improve accessibility to water /Exposure Drought management interventions										
1.1 Provide portable water	1.1.1 %age of people accessing improved source of water.	Urban -87	Urban-95	Urban-100				Annual Reports	Annually	MOA NGOs
		Rural- 63	Rural-75	Rural-80						Private sector
		National-67	National-80	National-90						
	1.1.2 No. and type of systems constructed and rehabilitated.	GFS -12	GFS -31	GFS -15				Annual Reports	Annually	MOA, Councils ,NGOs, Private
		BH- 1042	BH- 1500	BH- 1500						sector
2.0 Improve management of water resources /Area (Ha) under integrated watershed /catchment management										
2.1. Intensify environmental awareness education	2.1.1 No. of committees reached out on environmental education by location.	900	1000	1000				Quarter Reports	Quarterly	MOA NGOs
										Private sector
2.2 Rehabilitate degraded catchment areas	2.2.1 No. and Ha of catchment areas rehabilitated	180,000	200,000	200,000				Quarter Reports	Annually	Water Boards
2.3 Conduct regular checks on water quality	3.1 No. of water quality checks conducted	4	4	4				Quarter Reports	Quarterly	

Action	Indicators	Baseline Year (2018/2019)	Targets (WATER SECTOR)					Means of verification	Reporting frequency	Responsible Organization
		Source	2019	2021	2022	2023	2024			
against set standards	2.3.2 No. of water quality monitoring reports	4	4	4				Quarterly Reports	Quarterly	
2.4 Conduct regular monitoring of surface and groundwater	2.4.1 No. of surface water(SW) and groundwater (GW) monitoring stations established	144 SW, 75GW	15 SW	10 SW				Annual Reports	Annually	MOA NGOs
			10 GW	5 GW						Private sector
2.5. Conduct mapping of water points, dams and monitoring stations across the country	2.5.1 No. of water infrastructure mapped	BH-11805	BH-8000	BH-8000				Annual Reports	Annually	Water Boards
		GFS- 75	GFS- 10	GFS- 10						
		Protected Wells- 5000								
2.6 Construction of water harvesting and conservation structures	2.6.1 No. of water harvesting structures constructed	28	48	12				Annual Reports	Annually	
3. Improve management of water infrastructure /water use efficiency										
3.1 conduct formation of Water Users Associations (WUA)	3.1.1 No of WUAs formed	54	70	85				Annual Reports	Annually	MOA NGOs,
										Councils
3.2 Conduct community awareness on water infrastructures	3.2.1 No of communities trained on water infrastructure awareness by location	28	200	300				Training Reports	Annually	MOA NGOs
										Pvt sector
										Councils

Action	Indicators	Baseline Year (2018/2019)	Targets (WATER SECTOR)					Means of verification	Reporting frequency	Responsible Organization
		Source	2019	2021	2022	2023	2024			
4. Control infestation of water weeds/alien species /Number of surface water bodies with declining water quality										
4.1 Adopt integration of water weeds management technologies	4.1.1 Improvement in Megawatts of ESCOM generated power.							Annual Reports	Annually	
5. Enhance adaptation to the effects of climate change										
5.1 Monitor floods and droughts	5.1.1 Frequency of drought s and floods.							Annual Reports	5-7 Years	MOA NGOs Pvt sector
5.2 Mitigate flood impacts (construction of flood protection structures)	5.2.1.No of flood protection structure constructed	12	8	10				Annual Reports	Annually	Councils
	5.2.2. % reduction flood impacts (No of households, & land (hec))	10	20	50				Annual Reports	Annually	

Annex 7.8.11 Industry

Action	Indicators	Baseline Year 2018/19	Targets (INDUSTRY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1. Improve safe disposal of Industrial waste-gas, solids and liquids										
1.1 Monitor compliance with existing standards for solid and liquid disposal	1.1.1 %age of industries complying with set standards		100	100	100	100	100	Inspection reports	Annually	Ministry of Industry, MBS, EAD, City and Councils
1.2 Conduct Environmental and Social Impact Assessments (ESIA) prior to licensing	1.2.1 No. of ESIAs conducted by type of industry.	15	30	40	53	60	65	ESIA Records	Annually	Ministry of industry and councils, EAD
	1.2.2 No. of industries granted EIA Certificates	12	20	35	40	57	62	Copies of Certificate	Annually	Ministry of Industry, Councils, MBS, Water Dept, EAD.
1.3 Develop waste management policies	1.3.1waste management policy in place			1				Policy document in place	Once off	City and district councils, EAD
Strategy 2: Improve Industrial Safety										
2.1 Monitor compliance with set standards.	2.1.1 %age of industries complying with industrial safety guidelines		100	100	100	100	100	Inspection reports	Annually	Ministry of industry, EAD, MBS, Ministry of Labour
2.2 Conduct regular inspections of work places.	2.2.1 No. of inspections conducted.	64	87	91	102	120	135	Inspection reports	Annually	Ministry of industry,EAD, MBS, Ministry of Labour
2.3 Ensure all workers have adequate Personal Protective equipment	2.2.1 No. of workers with Personal Protective Equipment		100	100	100	100	100	Inspection reports	Daily	Ministry of Labour, EAD, AERA

Annex 7.8.12 Climate Change Management

Action	Indicators	Base Year (2018/ 2019)	Targets					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1: promoting effective and efficient generation, analysis and utilization of high quality sector specific services										
1.1. Modernize weather and climate monitoring and prediction	1.1.1. Number of automated monitoring systems operational	81	109	115	115	120	120	Inventory of Stations	Annually	MOFNR
1.2. Undertake climatic data management for access and utilization by national and international stakeholders	1.2.1. Number of climatic tables (summaries) developed	33	33	40	45	55	60	Tables	Annually	DCCMS
1.3. Produce and disseminate of weather/climate information and advisories for an effective early warning	1.3.1. Number of developed weather and climate products for information and advisories	8	8	12	14	16	18	Inventory of Products	Annually	EAD
1.4. Review agro-climatologically requirements, develop and disseminate crop weather calendar	1.4.1. Number of districts with crop weather calendars for at least one crop	9	21	28	28	28	28	Crop Weather Calendars	Annually	
Strategy 2. Harmonizing climate change related strategies and policies										
2.1. Review and harmonize strategies and policies related to climate change	2.1.1. Number of policies and strategies reviewed	3	3	3	4	4	4	Revision Reports	Biennially	MOFNR EAD, MoJCA
Strategy 3. Developing and enforcing legal and regulatory framework in climate change management										
3.1. Review the National Climate Change Policy and develop a Climate change Act	3.1.1. Climate change Act in place						1	Climate Change Act	Annually	MOFNR EAD, DCCMS, MoJCA
3.2. Develop a Meteorological Act	3.2.1. Meteorological Act in place						1	Meteorological Act	Annually	
3.3. Develop the national framework for climate services (NFCS)	3.3.1. NFCS in place		1					NFCS document and implementation plan	Annually	

Action	Indicators	Base Year (2018/ 2019)	Targets					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 4. Mainstreaming Climate Change issues in sectoral policies, plans and programmes										
4.1. Incorporate climate change issues into national and sectoral development plans and policies	4.1.1. Number of plans integrating climate change	5	2	2	2	2	2	District development plans	Annually	MOFNR, EAD, DCCMS, MoJCA, MLGR&UD
4.2. Conduct advocacy and awareness campaigns	4.2.1. Number of stakeholder awareness raising campaign sessions	?	3	3	3	3	3	Annual reports	Annually	
4.3. Review the National Climate Change Training Manual	4.3.1. Reviewed Training Manual	1	0	0	0	o	1	Revised manual	Annually	
4.4. Undertake capacity development in climate change management for sectors	4.4.1. Number of sectors engaged		9	9	9	9	NA PA	Annual reports	Annually	
Strategy 5. Reduced Greenhouse Gas Emission										
5.1. Adopt Clean Development Mechanism technologies	5.1.1. Number of registered projects under CDM	8	1	1	1	1	5	CDM brochure	Biennially	MoFNR, MoAIWD, Energy, DCCMS, EAD, DPs, Research Institutions, Financial Institutions
5.3. Develop projects on climate change mitigation	5.3.1. Number of projects developed		2	2	2	2	2	Malawi Project fiche		
5.4. Resource mobilization on climate change mitigation interventions	5.4.1. Amount mobilized on CC mitigation								Biennially	
5.5. Develop inventories on greenhouse gases	5.5.1. Number of inventories produced	2	1	1	1	1	1	National Communications, GHG IS	annually	
5.6. Produce national communications on GHG emissions	5.6.1. Number of reports submitted to UNFCCC	2	1	0	1	0	2	UNFCCC website, EAD website	Biennially	
Strategy 6. Improving adoption of climate change adaptation measures										

Action	Indicators	Base Year (2018/ 2019)	Targets					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
6.2. Undertake sensitization on adaptation and mitigation measures through extension services	6.2.1. Climate Sensitization campaigns manuals produced		3	3	3	3	3			
6.3. Promote climate proofing of infrastructure	6.3.1. Number of projects incorporating climate proofing		2	2	2	2	2	Annual reports		
Strategy 7. Enhancing cross sectoral coordination on climate change programmes										
7.1. Revamp, formulate and strengthen expert working groups, technical and steering committees	7.1.1. Number of coordination structures revamped/formulated	6	1	1	1	1	1			MOFNR MoAIWD DCCMS EAD, DPs, CISSONECC
7.3. Undertake stakeholder sensitization	7.3.1. Number of sensitization meetings		3	3	3	3	3	Annual reports		
7.4. Update climate change websites for information sharing	7.4.1. Number of updating sessions	1	3	3	3	3	3	Updated website		
Strategy 8. Improving access to domestic, bilateral and multilateral climate financing and private sector investments										
8.1. Lobby for resources from bilateral and multilateral institutions to implement specific adaptation and mitigation programs	8.1.1. Amount of resources accessed from bilateral and multilateral institutions	?						Annual Reports	Annually	MOFNR MoAIWD EAD, DoF, DCCMS, DPs, CISSONECC
8.2. Establish a National Climate Change Management Fund	8.2.1. Fund established	0					1	Annual Reports	Annually	
8.3. Introduce incentives for adopting clean technologies	8.3.1. Number of incentives introduced	0						Annual Reports	Annually	
8.4. Integrate climate change issues in national budgeting	8.4.1. %age of budget allocation disbursed	?	5%	10%			20 %	Annual Reports	Annually	
Strategy 9. Enhancing capacity building on climate change management										
9.1. Conduct national training on climate change management for key staff and stakeholders	9.1.1. Number of national stakeholders personnel trained		50	50	50	50	50	Training reports	Annually	EAD, DCCMS, DPs
9.2. Conduct regional trainings on climate change management	9.2.1. Number of regional stakeholders trained	0	3	3	3	3	3	Training Reports	Annually	
Strategy 10. Promoting research, technology development and transfer in climate change and meteorology										

Action	Indicators	Base Year (2018/ 2019)	Targets					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
10.1. Conduct Technology Needs Assessment for Climate Change	10.1.1. Number of Technology Needs Assessment Reports	1		3				Annual Reports	Annually	MoFNR, MoAIWD, DCCMS, EAD, DPs, Research Institutions
10.2. Conduct Climate Change Technologies Barrier Analysis and Enabling Framework	10.2.1. Number of Climate Change Technology Barrier Analysis and Enabling Framework Reports developed	0	0	2	0	0	0	Annual Reports	Annually	
10.3. Develop Technology Action Plans	10.3.1. Number of Technology Action Plans developed	0	0	2	0	0	0	Annual Reports	Annualy	
10.4. Operationalization of guidelines for research grants on climate change	10.4.1. Number of research grants	0	5	5	5	5	5	Annual Reports	Annually	
10.5. Collaborate with other research institutions.	10.5.1. Number of innovations developed from research output	0	2	2	2	2	2	Annual Reports	Annually	
10.3. Mobilize resources for climate change research and technology	10.3.1. Amount of resources mobilized							Annual Reports	Annually	

Annex 7.8.13 Biodiversity

Action	Indicators	Baseline Year 2018/19	Targets (BIODIVERSITY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 1. Enhance conservation and sustainable utilization of biological diversity;										
1.1. Implement National Biodiversity Strategy and Action Plan (NBSAP).	1.1.1. Number of programs implemented emanating from NBSAP.	3	4	4	4	4	4	Project Documents and Inception Reports	Annually	EAD
	1.1.2. Trends in the number of organisations taking one or more of measures identified in the NBSAP	2	3	4	5	6	7	Reports	Annually	EAD
	1.1.3. %age of Annual Government budget allocation dedicated to implementing measures in the NBSAP	1	1.5	2	2.5	3	3.5	Annual Public funding reports	Annually	Ministry of Finance, EAD.
1.2. Facilitate the development and implementation of Memorandum of Understanding (MoU) for Clearing House Mechanism of biodiversity	1.2.1. number of MoU's signed & under implementation	0	-	1	-	-	-	Signed MoU	Once	EAD, MoLGRD, MoFEPD, CSOs, DPs, & Pvt Sector
	1.2.2. Number of publications on the clearing house portal	0	5	5	5	5	5	Publications online	Annually	EAD

Action	Indicators	Baseline Year 2018/19	Targets (BIODIVERSITY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
1.3. Develop and implement Regulations for access and benefit sharing of biological resources.	1.3.1. Number of regulations developed	0	-	1	-	-	-	ABS regulations	Once	EAD
	1.3.2. Number of ABS contracts developed	1	1	1	1	1	1	Contracts	Annually	EAD
	1.3.3. Annual monetary benefits from ABS	1,312,000.00	1,443,200	1,587,120	1,601,952	1,762,147.2	1,938,361.92	Finance reports from providers	Annually	EAD
	1.3.4. Number of Scholarship as benefits from ABS	0	1	1	1	1	1	Scholarship grants	Annually	EAD
	1.3.5. number of infrastructures by type developed as benefits from ABS	5	6	7	8	9	10	Certificates of contract completion	Annually	EAD
Strategy 2: Enhance community based natural resource management										
2.1. Facilitate development of Local Biodiversity Action Plans.	2.1.1. Number of Local Biodiversity Action Plans formulated	0	10	15	20	25	30	Approved Action plans (LBSAP)	Annually	EAD, Local Councils.
	2.1.2. Number of Habitats with high species diversity identified	5	1	1	1	1	1	Survey reports	Annually	EAD, Local Councils

Action	Indicators	Baseline Year 2018/19	Targets (BIODIVERSITY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
Strategy 3. Integrate biodiversity values in planning and decision making										
3.1. Valuation and Accounting for Biodiversity	3.1.1. Number of eco-systems economically valued	0	-	1	1	1	-	Economic Valuation Reports	Annually	EAD,MoF,NSO
	3.1.2. number of natural accounts incorporated into systems of national account.	0	-	-	-	-	3	Revised National Accounting framework	Once	NSO,MoF,EAD
3.2. Develop innovate financing solutions for biodiversity	3.2.1. number of viable financing solution developed	0	-	10	-	-	-	Biodiversity Financing plan	Once	EAD,EAD, MoLGRD, MoFEPD, CSOs, DPs, & Pvt sector
	3.2.2. Number of biodiversity financing solution implemented	0	-	-	3	7	10	Organisations Financial reports	Annually	EAD &
Strategy 4. Conserve genetic diversity										
4.1. Manage and Prevent Introduction Invasive Alien Species	4.1.1. Number of invasive alien species identified	31	-	4	10	10	5	National IAS Inventory	Annually	EAD
	4.1.2. Number of strategies developed to management invasive species	0	-	1	-	-	-	National IAS Strategy Plan	Once	EAD

Action	Indicators	Baseline Year 2018/19	Targets (BIODIVERSITY)					Means of Verification	Reporting frequency	Responsible Organization
			2019/20	2020/21	2021/22	2022/23	2023/24			
	4.1.3. Hectare under invasion reduced	0	-	60	80	80	30	Field Reports	Annually	EAD
4.2. Manage Living Modified Organism (LMO)	4.2.1. Revise Biosafety Act	0	-	-	1	-	-	Revised Biosafety Act	Once	EAD
	4.2.2. Biosafety clearing house developed	0	-	1	-	-	-	Functional Clearing house web	Once	EAD
	4.2.3. Number of trainings on LMO and Biosafety legislation conducted	3	2	5	5	4	2	Training Reports	Annually	EAD
	4.2.4. Number of permits on Living Modified organism issued.	3	3	4	4	4	4		Annually	EAD

Annex 7.9 Donor funded environment or environment related projects in Malawi

Project Abbreviation	Project	Partners	Duration	Cost ($/€)
SFADWM	Sustainable Fisheries, Aquaculture Development and Watershed Management Project	Fisheries Department	2019-2025	$13.2 million
SVTP	Shire Valley Transformation Project (SVTP)	MoA	2017-2023	$160 million
AGCOM	Agriculture Commercialization Project	MOA, MoITT	2018-2023	$95 million
ANSAP - Nutrition	Adolescent Nutrition Sensitive Agriculture Project	Farmers Union of Malawi (FUM)	2018-2021	$2.73 million
MWASIP	Malawi Watershed Services Improvement Project	DLRC, DoF, DAES, DNPW, Survey Dept,	2020 - 2026	$157 million
MRDRMP	Malawi Resilience and Disaster Risk Management Project	MoFEPD	2020-2024	$80 million
PRIDE	Programme for Rural Irrigation Development	MOA	2016-2022	$84 million
ERASP	Enhancing the Resilience of Agro-Ecological Systems	MOA, EAD	2016-2022	$10 million
AFIKEPO	AFIKEPO	Government, FAO, GiZ, NGOs, WFP	2016-2026	$74.2 million EUR 99,550,602
KULIMA	Promoting farming in Malawi	Government, FAO, GiZ, Gorta/Self-help Africa, private sector	2016-2022	$106 million
Ag Diversification	Agricultural Diversification	Palladium International	2016-2021	$37.99 million
ESPRCSA	Enhancing Smallholder Productivity and Returns through Climate Smart Agriculture (CSA)	NASFAM	2016-2021	$1.71 million
TRANSFORM	Sustainable Food systems for Rural Resilience and Transformatiom	Norwegian Church Aid + 2 Norwegian and 12 Malawian partners	2020-2021	$7.774 million
PCIERP	Multinational Post Cyclone Idai Emergency Recovery and Resilience Project	DODMA	2019-2023	$22.55 million
AIYAP	Agricultural Infrastructure and Youth in Agribusiness Project	Ministry of Agriculture	2016-2022	$22.4 million
STCINRM-SRB	Strengthening Transboundary Cooperation and Integrated Natural Resources Management Project in the Songwe River Basin	Water Resources Department	2019-2023	$6.39 million
LUPSLWMIAP	Land Use Planning and Sustainable Land and Water Management for Improved Agriculture Productivity in Kasungu and Mzimba Districts	MoAIWD and MoLHUD	2019 - 2023	$5.017 million

MA-SHEP	Market Oriented Smallholder Horticulture Empowerment and Promotion	Department of Extension Services	2017-2022	$3. 362 million
COSMA-DFR	The Project for Conservation and Sustainable Management of Dzalanyama Forest Reserve	Department of Forestry	2016-2022	$753,500
MCHF	Modern Cooking for Healthy Forest	DOF, DOEA	2018-2023	$17 million
FLR	Large Scale Forest landscape Restoration (FLR) in Africa	Department of Forestry	2021-2025	€5 million
BCCRF	Building climate change resilience in the fisheries sector in Malawi	Department of Fisheries	2017-2021	$5.46 million
FSP	Pesticide Risk Reduction in Malawi	MoAIWD, Pesticides Control Board (PCB), Crop Life	2015-2021	$2.55 million
FIRST	Food and Nutrition Security Impact, Resilience, Sustainability and Transformation	MoAIWD, NGO Partners	2015-2022	$160,000
BSACC	Building resilience and adapting to climate change in Malawi	MoAIWD, NGO Partners	2018-2023	$9.10 million
GCF	Green Climate Fund	EAD	2018-2023	$20.3 million
R4	Rural Resilience Initiative	District Councils	2017-2021	$3.5 million
FAACPSRB	Food Assistance for Asset Creation Programme to support resilience building	Councils, NGOs	2014-2021	$75 million
ISP-Ozone	Institutional Strengthening Project (Phase-out of Ozone Depleting Substances)	EAD	2017-2021	$150,000 million
`IASMP	Invasive Alien Species Management Project (UNEP/GEF)	EAD	2018-2023	$1.5 million
SIC-LMO	Multi-Country Project on Strengthening Institutional Capacity for Living Modified Organisms (LMOs) Testing in Support of Biosafety Decision Making	EAD	2017-2021	$400,000million
BIOFIN	Biodiversity Finance Initiative	EAD	2018-2022	$300,000 million
NCRP	Climate Change Resilience Programme	EAD	2019-2023	$2.5 million
M-CLIMES	Saving Lives and Protecting Agriculture-based Livelihoods in Malawi: Scaling-Up the Use of Modernized Climate Information and Early Warning systems (M-CLIMES)	Department of Climate Change and Meteorological Services, Department of Water Resources	2017-2022	$250,000 million
GFCS	Global Framework for Climate Services Adaptation Programme for Africa – Malawi	Department of Climate Change and Meteorological Services	2019-2021	$0.341 million

Source: DCAFS Programmes/Projects Database, March, 2021

8 Administrative/Other Appendices

Annex 8.1. Study Methodology

Data collection/Evidence Gathering

The data for this study was mostly collected through systematic review and consultations. Literature on global, regional and national policies, strategies legislation, plans, technical reports and academic journals were sourced from the Internet, responsible institutions and personal libraries guided by CEP themes (Land, Water, Air quality, Forest, vegetation, ecosystems, Biodiversity, wildlife, Mineral resources and geology, Landscape, living conditions in human settlements and Climate trends) as determined by the ToRs (Annex 9.5).

One-to-one consultations were held with key informants such heads of public institutions to gain insights on current/updated information or data on key thematic areas and indicators relevant to the study. Key informant interviews were held with technical personnel from the National Authorization Office, EAD, Forestry Department, Department of Land Resources Conservation, Ministry of Lands, Water Resources Department, National Herbarium and Botanical Gardens, Department of Energy, and Department of Parks and Wildlife. Additionally, an online meeting (Focus Group Discussion) was held with the Department of Land Resources Conservation. Forestry Department also shared a sector specific CEP based on a customized guide shared with them by the Consultant.

As the study was conducted amidst COVID-19, data was mostly collected online or shared electronically via email/WhatsApp. Consultations were held via the phone or online platforms such as Teams or Zoom. Where it became necessary to hold physical consultation, preventive measures such as social distancing, wearing of masks and sanitizing were applied.

Data Analysis

The data was analyzed thematically. Trends were generated by comparing present and past records of environmental and social indicators.

Report compilation, review and finalisation

A draft report was compiled and peer-reviewed by the NIRAS Team of experts before submission for further review and adoption by the Client. Client and stakeholders' comments were incorporated and a final report produced.

Study Limitations

The study coincided with Government's long (combined) Christmas and New Year's holiday. This was followed by the peak of the second wave of COVID-19 in the country, that prompted Government and Development partners to scale down operations in January and February, making it difficult to communicate and collaborate with Government from whom most data and information was relied upon. The major effect of this has been delayed finalization of the report.

Government and other stakeholders have provided valuable input through sharing of reports, and providing insights on matters relevant to their sectors. This has helped to maintain quality of the report.

Annex 8.2 List of persons/organisations consulted

Name	Designation	Institution	Contact email/phone
Biswick Mlaviwa	Principal Environmental Officer	EAD	bismlaviwa@gmail.com
Brighton Kumchedwa	Director	Department of National Parks and Wildlife	bright.kumchedwa@gmail.com
Charles Lumanga	Head of Operations	National Authorising Office (NAO)	clumanga@naosupportmw.org
Chiukepo Luhanga	Assistant Programme Manager – Sustainable Agriculture	National Authorising Office (NAO)	cluhanga@naosupportmw.org
Clement Chilima	Director of Forestry	Forestry Department	cchilima@gmail.com
Clement Tikiwa	Chief Environmental Officer	EAD	clement.tikiwa@gmail.com
Davie Chilonga	Deputy Commissioner for Lands	Ministry of Lands	daviechilonga@gmail.com
Enock Whayo	Principal Land Resources Conservation Officer	Department of Land Resources Conservation	ewhayo@yahoo.co.uk
Euphemia Bota	Commissioner for Lands	Ministry of Lands	euphybota@gmail.com
Francis Chilimampunga	Deputy Director	Forestry Department	Fchilima@gmail.com
Gertrude Kambauwa	Director	Department of Land Resources Conservation	gkambauwa@gmail.com
Henry Utila	Chief Forestry Officer	Forestry Department	hutila@gmail.com
Jane Swira	Project Manager	UNDP/EAD	jane.swira@undp.org
Joseph Kanyangalazi	Chief Land Resources Conservation Officer	Department of Land Resources Conservation	jokanyangalazi@gmail.com
Michael Makonombera	Deputy Director	EAD	makonommbera@yahoo.com
Mutemwe Kavalo	Programme Manager - Sustainable Agriculture	EU Delegation	mutemwe.kavalo@eeas.europa.eu
Patricia Masupayi	Chief Forestry Officer	Forestry Department	pmasupayi@yahoo.co.uk
Rex Kanjedza	Chief Water Resources Officer	Water Resources Department	rexkanjedza@gmail.com
Roman Malumero	Coordinator	DCAFS	dcafsmalawi@gmail.com
Tangu Tumeo	Programme Officer	IUCN	tumeo.tangu@gmail.com
Teddie Kamoto	Deputy Director	Forestry Department	teddiekamoto@yahoo.co.uk
Titus Zulu	Chief Forestry Officer	Forestry Department	tituszulu2@gmail.com
Zacharia Magombo	Director General (Ag)	National Herbarium and Botanical Gardens of Malawi	zachmagombo@gmail.com

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Annex 8.4. Terms of Reference for the Country Environmental Profile

ToR for the preparation of the Country environmental profile of Malawi

1. BACKGROUND

Malawi is a land-locked country in central/southern Africa. The UNDP Human Development Index (HDI) for 2017 ranks Malawi at 171 out of 189 countries, the third lowest in the Southern Africa Development Community (SADC). Humanitarian crises are happening regularly due to a combination of unfavourable policies, climate change and rapid population growth. Fertility rates are among the highest in the world with about 4.5 children per women and a population growth of 2.9% with a significant footprint on the environment, an overstrained education and health system, high levels of unemployment and a high HIV and AIDS prevalence. Poverty remains widespread with 50% of the population living below the poverty line and 25 % in extreme poverty.

Agriculture is the backbone of Malawi's economy and one of the main employers. This is likely to remain so for the foreseeable future. The sector contributes only 30% to GDP but it impacts growth in the other sectors (e.g. manufacturing), it determines most households' income levels and has also significant implication for Malawi's food and nutrition security. Malawi's heavy reliance on the agriculture sector translates into high exposure to weather-related shocks, whose frequency and intensity has increased in the last years. The country exports predominantly raw agriculture products (60% of it being unprocessed tobacco), but some of its produce could potentially be competitive on foreign markets if transformed into high value goods. The private sector can be an engine of inclusive agricultural growth by generating decent and green jobs, but agriculture is still considered a very risky business in Malawi. World Bank Doing Business in Agriculture index (2017) ranked Malawi at the bottom globally mainly due to the high cost and time to introduce new seeds and fertilizers.

Malawi has been characterized by high levels of undernutrition of the under-5 children for decades, resulting from micronutrient deficiencies and inadequate food energy and protein leading to: stunting (height for age) 37%: wasting (weight for height) 2.7%: underweight (weight for age) 11.7% and 12.9% children born at a low birth weight (less than 2500g). Micronutrient disorders, especially Vitamin A and Iron deficiency, are of public health concern. Stunting was associated with up to 23% of all deaths of under-5 and 10.3% annual loss in GDP between 2008 and 2012 and also high school dropouts and class repetition in Malawi. Although the prevalence of stunting among children under the age of 5 decreased from 47.1% in 2010 to 37% in 2015/16, in absolute terms, the numbers are still increasing.

The European Union has been a strong and reliable partner to the Government of Malawi in past 40 years, supporting the country in its attempts to develop its agricultural sector, while managing wisely its natural resource base. Recently, the EU has deepened its relations with Malawi in the field of nutrition, to support the growth of healthy and productive future generations. Adaptation and mitigation of climate change effects in Malawi have also progressively been introduced in the design of EU funded interventions.

The two flagship programmes in the field of sustainable agriculture under the 11 European Development Fund are Kulima and Afikepo. With a total grant contribution of EUR 170 million, these two interlinked programmes respond to the agriculture and food and nutrition security constraints that Malawi is facing, such as low agricultural productivity and worrisome levels of stunting.

Kulima aims at promoting farming in Malawi. It focuses on: i) increase agricultural productivity and diversification in Malawi, through climate-smart agricultural technologies; ii) develop agriculture value chain and rural income opportunities; iii) strengthen governance of agriculture sector. Afikepo addresses Malawi's problem of malnutrition, particularly in under 5 children, and it focuses on: i) increase and diversify dietary intake of safe and nutritious food; ii) increase enhanced nutrition knowledge and awareness and hygiene practices in targeted communities and schools and training institutions; iii) strengthening multi sectoral governance of nutrition.

Despite long term support from a wide variety of development partners, the agricultural sector of Malawi, and its economy at large, has failed to achieve a steady growth (Malawi is far from reaching the Malabo target of 6% annual growth in agriculture). The food and nutrition security remains vulnerable to weather-related shocks, whose frequency and intensity is increasing due to the effects of climate change and the progressive environmental degradation. Even in years of good harvest, such as the past two agricultural seasons (2018/19 and 2019/20), the caseload of food insecure people remains well above one million.

Agricultural ecosystems provide humans with food, forage, bioenergy and pharmaceuticals and are essential to human wellbeing. These systems rely on ecosystem services provided by natural ecosystems, including pollination, biological pest control, maintenance of soil structure and fertility, nutrient cycling and hydrological services. Research has shown that the value of these ecosystem services to agriculture is enormous and often underappreciated. Agroecosystems also produce a variety of ecosystem services, such as regulation of soil and water quality, carbon sequestration, support for biodiversity and cultural services. Depending on management practices, agriculture can also be the source of numerous disservices, including loss of wildlife habitat, nutrient runoff, sedimentation of waterways, greenhouse gas emissions, and pesticide poisoning of humans and non-target species. The trade-offs that may occur between provisioning services and other ecosystem services and disservices should be evaluated in terms of spatial scale, temporal scale and reversibility. As more effective methods for valuing ecosystem services become available, the potential for 'win–win' scenarios increases. Under all scenarios, appropriate agricultural management practices are critical to realizing the benefits of ecosystem services and reducing disservices from agricultural activities[24]. Therefore, Malawi needs to increase agriculture productivity and diversification, maintain ecosystems, and make its agriculture more resilient to climate change.

With the new programming cycle of the European Union in Malawi due to start in the coming months, it is therefore important to gather as much evidence and information as possible on environmental challenges, success, bottlenecks, and their impact on markets behaviours relating to the field of sustainable agriculture. This will contribute to set up a renewed partnership with Malawi and to increase the impact of the EU investments in the country' agriculture & agri-business development, food & nutrition security, climate change and natural resources management.

2. OBJECTIVE

The main objective of the Country Environmental Profile is to identify and assess environmental and climate change issues to be considered during the preparation of the next EU Development Framework, which will directly or indirectly influence EU cooperation with Malawi. The Country Environmental Profile will provide decision makers in Malawi and the EU with clear information on the key environmental and climate change challenges and opportunities, including the implementation of the new Sustainable Development Agenda 2030 and the transition to a green economy. It will cover the current policy, regulatory and institutional framework and the strategies and programmes (including those of the EU and other donors) to address them. The analysis aims to inform the preparation of the EU cooperation programme, to guide the integration of environmental and climate change concerns and objectives in the policies and programmes supported by the EU and to establish the necessary environment and climate change safeguards for all cooperation activities undertaken in the country. The Profile will describe the key linkages between the environment, including climate change, and poverty reduction. It will constitute an important source of baseline information and contribute to focusing political dialogue and cooperation with the country on key areas of concern including sustainable development as well as raising awareness among policy makers.

3. RESULTS

The profile will deliver the following results:

- an assessment of the state of the environment and key environmental factors and trends, including those related to climate change, influencing the country's sustainable development and stability;
- an assessment of the main links between the state of the environment, climate change and human development in its multiple dimensions (income, consumption, health, security, and vulnerability);
- an assessment of national environmental and climate change policy and legislation/regulations, institutions and capacities, and the involvement of civil society in environmental and climate change matters (including areas relevant for the transition to a green economy);
- an assessment of available analyses on the potential impacts of increasing climate variability and climate change on different key sectors and the strategies and processes in place or under development to respond to them;
- an assessment of the integration of environmental and climate change concerns in development policy and sectors (including an overview of existing institutional arrangements for mainstreaming

[24] Power, A. G. (2010). Ecosystem services and agriculture: trade-offs and synergies. Philos Trans R Soc Lond B Biol Sci., 2959–2971

at sector level);
- an overview of past and ongoing international (including EU) cooperation in environment and climate change as an area for cooperation and environmental and climate change integration;
- recommendations and, as far as possible, guidelines or criteria for mainstreaming environmental and climate change (adaptation and mitigation) concerns in cooperation areas. These recommendations should support the preparation of the country programming and include guidance or criteria to be used for environmental and climate change integration in subsequent phases of the cycle of operations.

4. ISSUES TO BE ASSESSED (SCOPE OF THE ANALYSIS)

The following issues should be analysed using existing sources of information and key stakeholders' perspectives. It is not expected that the preparation of the Profile will involve the collection of original data.

The sub-headings below are the same as the recommended profile format.

4.1 STATE OF THE ENVIRONMENT/CLIMATE CHANGE, TRENDS AND PRESSURES

This chapter should identify the **state** and **trends** of key environmental resources or components in the country, including (as relevant), but not necessarily limited to:

THEMES	ASPECTS
1. Land	• Soil erosion and degradation (causes and effects, for example loss of Soil Organic Carbon, and sheet erosion by wind & water, due to poor farming practices, correlated with resulting lower yield) • Desertification (due to climate change, poor farming practices • Land use, arable land, losses due to urbanisation or infrastructure building
2. Water	• Water regime • Groundwater • Water quality (reasons for decline, for example ineffective hygiene and sanitation and use of inorganic fertilisers & synthetic agrochemicals)
3. Air quality	• Urban air quality • Indoor air quality
4. Forest, vegetation, ecosystems	• Forest cover, and forest cover change (reasons for decease include cut & burn agriculture, charcoal making as an off-farm income earner, timber extraction, insufficient reforestation etc) • Pastureland deterioration, due to over-stocking/ over-grazing • State of particular ecosystems (e.g. savannahs, rainforest)
5. Biodiversity, wildlife	• Source of threats to biodiversity (synthetic agrochemicals, encroachment, poaching etc) • Local status of globally threatened species/habitats (such as Malawi's Man and Biosphere and Ramsar Sites) • Alien invasive species • Fish stocks (In Lake Malawi and other water bodies) • Species with special value (Africa's Big five and others species)
6. Mineral resources and geology	• Mineral resources • Geological risks (seismic, volcanic and related risks)
7. Landscape	• Aesthetic and cultural value of landscape • Need to terrace sloping arable land
8. Living conditions in human settlements	• Air and water quality • Sanitation • Slums • Environmental health • Vulnerability/ resilience to disasters

9. Climate trends	• Temperature (global warming) • Precipitation (amount and distribution) • Frequency of extreme weather events, natural climate-related disasters • Disaster risk assessment, plans to mitigate and build resilience, need to coordinate actions to address causes rather than effects (through bunding, climate-smart conservation agriculture practices, through awareness campaigns, training, demonstrations, social mobilisation, upscaling rollout etc.)

Expected impacts of climate change should be described, focusing on key impacts affecting national and sectoral development, taking into account direct and indirect impacts. An overview should be provided of climate vulnerability for key development sectors, including an indication of the social groups that are particularly vulnerable to climate change due to their particular exposure, sensitivity or adaptive capacities.

This section will also highlight the effects of climate change in exacerbating existing environmental pressures and the linkages between environmental degradation (ecosystem services) and vulnerability, with a focus on the poorest and most exposed social groups.

Existing national or sub-regional studies on the expected effects of climate change should be considered, including proposed responses, which may include technical, policy and institutional components.

The overall implications of climate change for focal areas of cooperation should be assessed, including any safeguards or need for additional analyses to ensure that investments are adapted to increasing climate variability and predicted climate change effects.

Pressures on the environment and on climate vulnerability explaining the main negative trends should be identified, as well as pressures contributing to global environmental problems and to the atmospheric concentration of greenhouse gases (GHG), using the following table as a guiding checklist.

PRESSURE ON ENVIRONMENT AND/OR CLIMATE VULNERABILITY	POSSIBLE ASPECTS TO CONSIDER
1. Mining, extraction of hydrocarbons	• Extraction, processing and transport of minerals and hydrocarbons, and the resulting pollution and waste
2. Water use and management	• Water extraction (surface and groundwater) • Wastewater discharges, water treatment • Water use
3. Land use and management	• Land use planning including strategic environmental implications; land use change and related GHG emissions, large-scale land conversion.
4. Forest exploitation, hunting, fisheries, biodiversity	• Deforestation and forest degradation and related GHG emissions • Forest product extraction; illegal logging • Forest and fisheries management practices • Hunting and fishing activities, poaching • Wildlife trafficking • Use of non-timber forest products • Fires • Introduction of alien species
5. Livestock	• Overgrazing • Rangeland and watershed management, use of fire, water management, re-seeding • Livestock waste and pollution management

PRESSURE ON ENVIRONMENT AND/OR CLIMATE VULNERABILITY	POSSIBLE ASPECTS TO CONSIDER
6. Agriculture	• Expansion of agricultural land • Shifting cultivation • Intensification • Irrigation and water use • Pest control/Management • Agricultural practices, soil management, need for permanent ground cover (the key defining feature of Conservation Agriculture) • Agricultural waste and pollution management
7. Energy supply and use	• Sources of energy • Supply- and generation-related waste and emissions • Energy consumption and associated emissions • Energy efficiency
8. GHG emissions	• Emissions of main GHG and sources
9. Urbanisation, infrastructure and industry	• Urban growth and sprawl, urban planning • Dams, roads, ports, other major infrastructure • Polluting industries, tourism
10. Transport	• Transport of goods • Transport of people
11. Waste disposal and management	• Waste production • Waste management • Public behaviour and practices • Hazardous waste management

As far as possible, the driving forces influencing these pressures should be identified, such as Government of Malawi (GoM) policies and strategies, economic and fiscal incentives (including those affecting the transition to a green economy), multinational versus green lobby groups, demographic pressure, growing demand for commodities, unsustainable production systems, governance of natural resources, access rights to natural resources and land tenure systems.

Trends in the state of the environment and climate should be analysed with regard to their social and economic impact, including:

- impact on the economy;
- decline in production and/or productivity (e.g. agriculture, forestry, fisheries);
- threats to human health;
- human exposure to environmental disasters (e.g. floods, drought, landslides, pollution);
- conflicts and security issues;
- impact on poverty, differentiated impact on women and men, impact on vulnerable groups (including children and people with disabilities);
- sustainability of resource use;
- cultural values.

The concluding paragraphs of this section should summarise the main problems identified, described in terms of situations or trends that are undesirable due to their current socio-economic consequences (e.g. falling productivity, health problems, natural risks, social crises, conflicts), their future consequences (e.g. decline in natural resources, cumulative pollution) and/or their contribution to global environmental problems. The main links between the environment, climate change and human development (in its multiple dimensions: income, consumption, health, security, vulnerability) should be highlighted, possibly in the form of a matrix or 'problem tree'.

As appropriate, the consultant should refer to environmental and climate change indicators that could be used for monitoring changes in key parameters in the country. To the extent that data are available, trends in relation to the Sustainable Development Goals, targets and indicators should be provided; trends in additional indicators related to country-specific environmental issues can also be provided, as available, to highlight those that are significant.

Where appropriate, the information should be organised according to agro ecological zones and/or administrative scales (national, district) of the issues indicated.

4.2 ENVIRONMENTAL AND CLIMATE CHANGE POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK

A brief description and review should be provided of the main government responses to deal with key environmental and climate change issues and promote sustainable development. This section should analyse strengths and weaknesses, threats and opportunities, and cover the following aspects.

ASPECTS	EXAMPLES OF ISSUES TO CONSIDER
1. Policies[25]	• Existence of national policies, strategies and action plans for the environment, including possible national strategy for sustainable development, national climate change strategy, national environmental action plan, National Adaptation Plan (NAP), low carbon-, green economy- or green growth strategies • Policy responses to global issues, sustainability issues (depletion of natural resources), and specific environmental and climate change issues identified above • Consistency between policies • Policies on gender and environment • Important measures taken by the government to address environmental climate vulnerability concerns and types of policy instruments used for implementation • Effectiveness in achieving targets, impact and outcome
2. Regulatory framework, including Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) legislation	• Ratification status and implementation of Multilateral Environmental Agreements such as those concerning climate change, biodiversity and desertification (with reference to any official plans, programmes, communications or reports issued in the context of these conventions) • Adequacy of environmental legislation, including on land tenure and land reform, access rights to natural resources, management of natural resources, requirements for environmental assessment such as for EIA and SEA, pollution control, development control • Provision and procedures for public participation in environmental decision-making • Effectiveness of legislation policing and enforcement, and the importance of self-policing buy-in from the affected communities, through strategies such as community forestry and social fencing • Use of other (non-legislative) instruments, e.g. 'green budgeting', environmental fiscal reform and market-based mechanisms, voluntary schemes (e.g. environmental management systems, environmental labelling, voluntary industry–government agreements) • Potential impact of non-environmental legislation

[25] Note that climate-related policies and strategies may be briefly described here but are also covered in more detail in section 4.3.

ASPECTS	EXAMPLES OF ISSUES TO CONSIDER
3. Institutions with environmental and climate change responsibilities	• Identity and quality of institutions involved in policy-making, legislation, planning, environmental protection, monitoring and enforcement • Level of coordination and decentralisation • Strength and capacities of individual institutions • Influence on other institutions • Good governance practices • Capabilities, means, functioning of environmental services • Major NGOs, institutes or other organisations involved in environmental/climate change management or policy
4.Public participation	• Transparency and access to environmental information • Role of NGOs and civil society in environmental decision-making • Effectiveness of participation • Participation by women and traditionally less represented groups • Access to justice in environmental matters
5. Environmental services and infrastructure	• Protected areas: number, areas, relevance, effectiveness of protection • Sanitation and waste treatment infrastructure • Disaster risk reduction systems • Emergency response mechanisms • Emergency prediction/ early warning systems
6. Environmental and climate resilience monitoring system	• Relevance of selected indicators, particularly those linked to the SDG targets • Measurement of the indicators: periodicity, reliability • Integration in the general development indicators

4.3 INTEGRATION OF ENVIRONMENTAL AND CLIMATE CHANGE CONCERNS INTO KEY POLICIES AND SECTORS

The analysis should examine the integration of environment and climate change in the national development policy and in sector policies, **particularly those that might be identified for EU support**, taking into account the focal areas in the current programming document as well as any pre-identified option for future cooperation.

This section should examine whether Strategic Environmental Assessments (or similar assessments) are available for the national development strategy such as the Malawi Growth and Development Strategy (MGDS III), the National Resilience Strategy, the National Agriculture Investment Plan (NAIP), Malawi Water Sector Investment Plan and other sectors of interest. If such SEAs exist, they should be briefly described including the main recommendations. The main legislation, institutional arrangements and measures that address environmental issues in the sector, especially those identified in section 4.1 above, should be examined.

4.4 EU COOPERATION WITH THE COUNTRY FROM AN ENVIRONMENTAL AND CLIMATE CHANGE PERSPECTIVE

This section should briefly review the past and current experience with development cooperation interventions related to environment, natural resource management, more sustainable climate-smart agriculture and food systems, climate change and the green economy, as well as the steps taken to integrate the environment into other cooperation areas (e.g. SEA or EIA studies conducted in the context of EU-funded programmes/projects). Where information is available, the environmental impacts or potential risks of past or ongoing cooperation should be identified for the benefit of future programmes. The relevant findings and conclusions of existing evaluations/reviews should be summarised

4.5 COOPERATION FUNDED BY OTHER DONORS FROM AN ENVIRONMENTAL AND CLIMATE CHANGE PERSPECTIVE

This section should review the past and current involvement of other donors (in particular EU Member States, but other significant donors such as The World Bank, the Millennium Challenge Cooperation, African Development Bank should also be included) and their experience in the country, and include a list of recent and planned projects/programmes with an environmental, climate change and/or green economy focus or anticipated impact. Coordination mechanisms between donors and the EU with respect to the environment, climate change and green economy should be assessed.

5. CONCLUSIONS AND RECOMMENDATIONS

The key environmental and climate change aspects in the country (state, trends and pressures, needful actions), and the policy, regulatory and institutional opportunities and challenges should be identified as clearly as possible, indicating how these affect national and sectoral development, including vulnerability. These key aspects may be presented in a matrix, comparing environmental/climate change concerns and the main sectors or policies.

Based on a comprehensive assessment of available information and on consultations with stakeholders, conclusions and recommendations should be formulated on how Malawi and the EU can best address identified environmental/climate change challenges, enhance natural capital and promote the green economy in the programming and implementation of EU cooperation, taking into account current programmes and any pre-identified option for future cooperation. Conclusions and recommendations should feed into the country analysis, response strategy and possibly the identification of focal cooperation sectors[26]. They should address (but not necessarily be limited to) the following aspects:

- Environmental issues should inform and guide all development interventions jointly devised by the EU and GoM. Actions undertaken need to be of a coordinated, coherent and complementary inter-sectoral nature. The views of the end beneficiaries are paramount. If the latter do not endorse and take ownership of the actions proposed, they will not and cannot be, sustainable in perpetuity. Indeed, those end beneficiaries must participate in formulating the actions proposed, through workshops and the media, rather than being passively 'participated' at the implementation stage.
- Rationale and possibilities for considering the environment or climate change as an area for cooperation, and/or (more frequently) the need to integrate environmental objectives, safeguards and complementary actions in other areas of cooperation, in order to address environmental and climate change constraints and opportunities as appropriate, including opportunities to contribute to the transition towards a green economy. Measures may include, for example, proposals for institutional strengthening and capacity building (including the enhancement of the regulatory framework and enforcement capacities) particularly in relation to environmentally- and climatically-sensitive sector programmes and budget support programmes. Opportunities may include supporting sustainable and resource efficient production systems or low-carbon development plans and programmes;
- Recommendations to ensure that projects and programmes are adapted to increasing climate variability and the anticipated effects of climate change, and can thus deliver sustained developmental benefits. Information gaps preventing this work from being accomplished should be identified;
- Opportunities for coordination on environmental/climate change issues with other donors, seeking to achieve complementarities and synergies in order to more effectively deliver development objectives;
- Proposals for environment- and climate change-related indicators to be used in the Multiannual Indicative Programme or to be considered during the formulation of cooperation actions. Wherever possible, indicators from the country results frameworks and indicators related to the Sustainable Development Goals should be used, taking account of the availability of data and actual capacity to monitor their evolution. The report should mention whether the proposed indicators are included in the performance assessment framework of national (e.g. national development plan or poverty reduction strategy) or sectoral strategies/programmes[27].

[26] Taking into account that other factors intervene in the choice of cooperation sectors, including past cooperation areas and the 'division of labour' between development partners in the context of the Paris Declaration.
[27] For example, the National Resilience Strategy 2018 – 20130 contains such indicators that could be adopted.

Individual recommendations should be clearly articulated and linked to the issues to be addressed and grouped according to the sector or institutional stakeholder concerned. The relative priority of the recommendations and an indication of the challenges to their implementation should be given.

Any constraints to preparing the profile resulting from limited information should be described.

6. WORK PLAN

The work plan should include but not necessarily be limited to the following activities:

- Consultations with EC country desk officers and other relevant officials, EU Delegation, the national competent environmental and climate change authorities and a selection of national and local authorities, key international donors, plus key national and international civil society actors operating in the environmental, climate change and green economy areas;
- Review of key documents and reports, including (include here a list of key documents already identified by the EU Delegation) EU programming document for the country; evaluation reports; existing environmental assessments of EU-funded projects and/or sector programmes relevant national documents (e.g. state of the environment reports); previous Country Environmental Profiles and/or Country Environmental Analysis or similar analytical reports; the current (particularly those related to potential future focal sectors); environmental and climate change literature; environmental and climate change policies, legislation and regulations; environmental and climate change monitoring data; and environmental/ climate change performance indicators; SADC and African Union environmental and climate change literature so Malawi learns from and contributes to a consistent regional and continental perspective.
- Field visits to sites of key environmental/climate change concern and (if possible[28]) the organisation of a national workshop attended by national authorities, development partners, experts and representatives of civil society with the aim of clarifying and validating key environmental, climate change and green economy concerns;
- On the basis of the outline and time schedule given in these Terms of Reference, a detailed work plan should be proposed.

7. EXPERTISE REQUIRED

The proposed mission shall be conducted by a team of experts; the Leader shall have the following profile:

- Expert level II with at least 10 years' experience in environmental and food & nutrition security issues, including institutional aspects, international environmental policies and management, environmental assessment techniques, climate change and experience in rapidly assessing information and developing recommendations. He/ she would be the team leader;
- Previous working experience in Malawi for at least one team member;
- Excellent analytical and synthesis skills;
- Experience in undertaking environmental and climate change analyses and preparation of development programmes would be an asset;
- Familiarity with Commission guidance on programming, country strategies, project cycle management, policy mix and integration of environmental and climate change issues into other policy areas is desirable;
- Experience on green economy policy would be an asset;
- Experience of participatory planning processes and gender issues would be an advantage.

The experts should have excellent communication skills in *English* and Knowledge of *Chichewa* among the Team members would be an asset. *English* will be the working language; the final report must be presented in English.

[28] Considering the travel restrictions associated with COVID-19 pandemic

8. REPORTING

The results of the study should be presented based on the outline presented in Section 10 of these ToR. The draft profile, in 10 hard copies (double-sided printing on certified or recycled paper) and electronic version (Microsoft Word), should be presented to the EU Delegation in Malawi by 27th November 2020 at the latest. Within two weeks, comments on the draft report will be received from the relevant authorities and the EU. The consultants will take account of these comments in preparing the final report (maximum 45 pages excluding appendices). The final report in English and 10 copies (double-sided printing on certified or recycled paper) is to be submitted by 15 January 2021.

9. INDICATIVE PLAN OF ACTIVITIES AND MAN-DAYS REQUIREMENTS

#	TASK	Responsible	Task Rate (Forestry Expert)[29]	wk1	wk2	wk3	wk4	wk5	wk6	wk7	wk8	wk9	wk10	wk11	wk12
1	Prepare Draft Inception Report (IR) incl. ToRs and Approach	FE	4	*											
2	Submit Draft IR	TL		*											
3	Review draft Inception Report	EUD			*										
4	Present Draft Inception Report to Client (online)	FE	0.5		*	*									
5	Revise, produce final Inception Report	FE	1			*									
6	Submit Revised IR	TL				*									
7	Further Systematic Review, consultations, data analysis and draft CEA report compilation	FE	20				*	*	*	*	*				
8	Submit draft CEA report	TL									*				
9	Review draft report	EUD										*	*	*	
10	Validation workshop with EUD & Stakeholders[30]	All	0.5											*	
11	Revise, produce final CEA Report	FE	4											*	*
12	Submit final CEA Report	TL													*
	Total		30												

[29] Indicative Task Rate for Leading Expert only. Food and Nutrition Expert and other experts will also provide input as required.
[30] Validation workshop to be organised in collaboration with EUD

10. REPORT FORMAT FOR A COUNTRY ENVIRONMENTAL PROFILE

Maximum length (excluding appendices): 45 pages.
The following text appears on the inside front cover of the report:

This report is financed by the European Union and is presented by (*name of consultant*) for (*national institution*) and the European Commission. It does not necessarily reflect the opinion of (*national institution*) or the European Commission.

Structure of the report:

1. Summary

   (The summary should succinctly and clearly present the key issues described in the profile following the order of headings 2 to 6 given below. The summary should not exceed 6 pages).

2. State of the environment/climate change, trends and pressures
3. Environmental and climate change policy, regulatory and institutional framework
4. Integration of environmental and climate change concerns into key policies and sectors
5. EU and other donor cooperation with the country from an environmental, climate change and green economy perspective
6. Conclusions and recommendations

   (Comprising the main issues presented in sections 2 to 6 above (excluding section 7) in no more than 4 pages).

7. Technical appendices

   a. Relevant maps (e.g. Environmental variables, climate projections)
   b. Reference list of environmental and climate change policy documents, statements and action plans
   c. Reference list of environmental and climate change legislation and regulations
   d. Other relevant technical information

8. Other appendices

   a. Study methodology/work plan (1–2 pages)
   b. Consultants' itinerary (1–2 pages)
   c. List of persons/organisations consulted with their affiliation and contact details
   d. List of workshop participants (if organised)
   e. List of documentation consulted
   f. Curriculum vitae of the consultants (1 page per person)
   g. Terms of Reference