



**REPUBLIC  
OF MALAWI**

*The Ministry of  
Natural Resources,  
Energy and Mining*

# TECHNICAL ORDER

## Forest Definition





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# FOREWORD

Malawi's forests provide a wide range of products and services including basic necessities such as food, water, and fuelwood; regulatory services such as river flow and flood protection; and supporting services such as nutrient cycling and carbon sequestration. Together, these products and services are central to Malawi's development and the well-being of our people.

Unfortunately deforestation and forest degradation are on the rise, undermining agricultural productivity and food security, water security, and hydroelectric generating capacity—leaving the country vulnerable to climate shocks.

The definition of forest, in this Technical Order, has been developed to provide the structure needed to effectively track the extent and quality of our forests over time. The definition is important for many reasons, among others it: i) distinguishes forests from other types of land cover and land use (i.e., crop land, wetlands, grasslands, settlement, and other land such as bare rock) and ii) it defines parameters and provides a basis for monitoring change over time, including deforestation, degradation and afforestation (including natural regeneration).

This definition must not be confused with the legal definition of a forest from the Government of Malawi Forestry Act, 1997, which states that “Forest’ means an area of land proclaimed to be forest under this Act or un-proclaimed land with trees on it”. Nor does it conflict with the definition of a forest reserve, which is “an area contained within a legal boundary where the Department of Forestry has jurisdiction”. This definition of a forest includes areas inside as well as outside of forest reserves, and forest reserves can contain Land Cover and Land Use that is not forest as defined in this Technical Order.

This Technical Order is issued at an important time when the Government has just made commitments to address

deforestation and degradation through the National Forest landscape Restoration Strategy, the National Charcoal Strategy and the National Resilience Strategy. The Technical Order, includes standards for forest cover mapping and provides the framework for monitoring our forests from present into the future.

The definition has been developed collaboratively by actors in the forestry sector, including staff of the Department of Forestry and colleagues from the academia. I would like to thank them for their commitment to this effort. I would also like to recognize the support provided by USAID/Malawi through the Protecting Ecosystems and Restoring Forests in Malawi (PERFORM) Project.

It is my hope that all sectors in Malawi will recognize and use this definition, and the guidelines outlined herein related to the National Land Use and Land Cover Classification System, to sustain and enhance the contribution of the Forestry Sector to the development of our country.



**Dr. C. Z. Chilima**

*Director of Forestry*

# ACRONYMS

FAO	Food and Agricultural Organization of the United Nations
GHG	Greenhouse Gas
GoM	Government of Malawi
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
MASDAP	Malawi Spatial Data Platform
MMU	Minimum Mapping Unit
MRV	Measurement, Reporting, and Verification
REDD+	Reducing Emissions from Deforestation and Forest Degradation
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change



# KEY TERMS

- **Crown closure** - An integrated measure of the canopy “over a segment of the sky hemisphere above one point on the ground”.
- **Dominant class** - The dominance of a life form is based on the “uppermost canopy” level, ranging from trees to shrubs to forbs/graminoids. This main condition for uppermost canopy has to be considered in conjunction with the sub-condition cover, ranging from closed or open to sparse. In other words, the uppermost canopy concept is only valid if the dominant life form has a cover either closed, open or closed to open. If the life form is sparse then the dominance goes to another life form that has a closed or open cover.
- **Height** - The height of a certain (vegetation) layer is measured from the ground to the average top of the life form being assessed.
- **Life form** - When related to a plant is defined by its physiognomic aspect.
- **Linear width** - For an elongated feature on a map this is the length on the smaller dimension; technically for all objects this is the length of the semi-major axis of an area.
- **Minimum mapping area or unit** - The minimum size or dimensions for features to be mapped as lines or areas for a given map scale. The recommendation for the MMU in the definition of forest is for maps of national coverage only, other MMU can be defined for local and regional studies.
- **Technical order** – A decree that standardizes use of a particular concept or practice among a community of professionals.
- **Trees** - A woody perennial plant having a single well-defined stem and a more or less defined crown and includes palms, shrubs, bamboos, saplings, and re-shoots of all ages and of all kinds and any part thereof.
- **Woody vegetation** - A woody perennial plant having a single well-defined stem and a more or less defined crown and includes palms, shrubs, bushes, climbers, seedlings, saplings, and re-shoots of all ages and of all kinds and any part thereof.

# 1.0 WHAT DOES THIS TECHNICAL ORDER COVER?

This Technical Order is issued to clarify the definition of a forest for reporting ecological and biomass extent, as well as other natural resource management purposes in Malawi. It provides guidance to be used in official Government of Malawi reports to submit to international bodies, inter alia the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention for Climate Change (UNFCCC), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Convention of Biological Diversity (CBD), and the Food and Agriculture Organization of the United Nations (FAO).

The information contained within this Technical Order is relevant to Department of Forestry personnel and Central Government regulators, the Department of Surveys, geographical information creators, custodians and distributors, forest owners, forest users, forest produce harvesters, processors and traders, holders of leasehold land, traditional leaders, civil society organizations, and international organizations related to climate change and natural resource management.

The intention is to provide a standard that is a clear definition of forest in Malawi, which not

only internally defines its parameters and extent, but also distinguishes it from other types of land cover and land use (i.e., crop land, wetlands, grasslands, settlement, and other land such as bare rock). This distinction clarifies what can be regarded as integral forest for purposes of monitoring change such as afforestation (including natural regeneration), reforestation, deforestation through logging or agricultural clearance, and degradation like that caused by removing source material for charcoal making.

The definition of forest here is intended for natural resource management and biodiversity-related applications, as well as a practical definition for all forest users and managers. It should not be confused with the legal definition of a forest from the Government of Malawi Forestry Act, 1997, which states that “Forest’ means an area of land proclaimed to be forest under this Act or un-proclaimed land with trees on it”. Nor should it conflict with the definition of a forest reserve, which is “an area contained within a legal boundary where the Department of Forestry has jurisdiction”. The definition of a forest will include areas both inside and outside a forest reserve, and a forest reserve can contain land cover and land use that is not forest as defined in this Technical Order.

# 2.0 WHAT IS THE BASIS FOR THIS DEFINITION?

This definition has been adapted from international guidelines, including the FAO (Global Land Cover Network land cover classification system), the IPCC (Good Practice

Guidelines, 2003), and the UNFCCC (Guidelines for reporting Greenhouse Gas Emissions). The definition also reflects the National Land Use and Land Cover Classification System.



# 3.0 WHAT IS THE DEFINITION OF A FOREST?

This Technical Order hereby defines forest as this:

Land with woody vegetation (i.e., trees defined as a woody perennial plant with a life form that is a single well defined stem and a more or less defined crown and includes palms, shrubs, bamboos, saplings and re-shoots of all ages and of all kinds and any part thereof (GoM, 1997)).

For national mapping, the woody vegetation should be the dominant class in a minimum mapping area of 0.5 hectare; for all mapping the woody vegetation should be a minimum 10% crown closure and a potential height of 5 meters at maturity

For multiple time series data, an area of land that has the potential for woody vegetation in situ to exceed the minimum height of 5m at maturity should be considered as forest.

# 4.0 WHAT DOES THE DEFINITION INCLUDE?

Included as a forest (determined first by the thresholds and parameters detailed above) would be the following:

- All natural forest land including open woodland down to 10% cover;
- All plantations of trees used for timber and non-timber purposes;
- All Conservation and Recreation Areas (including National Parks, Wildlife Reserves, Botanical Gardens, and other protected areas such as those of specific environmental, scientific, historical, cultural, or spiritual interest) where they meet the definition in Section 3;
- Agroforestry<sup>1</sup> where it meets the definition in Section 3;
- Firebreaks, forest roads, tracks/trails, footpaths, and other small open areas within or immediately adjacent to plantations or state forest reserves;
- Cleared tracts can be identified as non-forest cover for the purposes of a single classification, but in a time horizon of 10 years or more, if the cover has the potential to regenerate to meet the definition of forest *in situ*, then it can be regarded as forest.

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<sup>1</sup> The inclusion of Agroforestry (when it conforms with the general parameters that define a forest) in the overall definition of a forest is for calculations of overall forest/non-forest cover in Malawi. It is accepted that these same areas can also be calculated within

agricultural land for other purposes. Agroforestry transitioning between forestry and agriculture is acceptable, as long as in any particular schema and documentation, it is made clear how agroforestry is being classified.

# 5.0 WHAT DOES THE DEFINITION NOT INCLUDE?

What is excluded from this definition of forest are the following:

- All trees, timber and non-timber, grown on Cropland , where the tree cover does not meet the definition of forest in Section 3;
- Windbreaks, shelter belts and roadside plantings less than 30m in width.

# 6.0 WHAT IMPLICATIONS DOES THE DEFINITION HAVE?

The “Forest” definition gives clarity to Malawi's intentions for international reporting requirements agreed on and practiced by all agencies involved with land issues. As a consequence, the definition will provide the following:

- A standard to allow discrimination between forest and non-forested areas;
- A standard to allow discrimination between forest and non-forested areas;
- Temporal comparability for forest cover and change estimates;
- A reporting standard for national land use/land cover mapping across Malawi that can avoid duplication and waste of resources;
- Consistency in reporting on both extent and amount of resources;
- Transboundary consistency since the definition is consistent with definitions in countries adjoining Malawi;
- Consistency and comparability at a range of scales (geographical and classification),
  - Coherence with international standards (e.g., IPCC, FAO):
    - For internal departmental use;
    - For national data sharing, strategic and routine inventory, reporting, monitoring and evaluation, planning and awareness raising; and
    - For international reporting (IPCC/REDD+, UNCCD, FAO, GHG, Biodiversity);
- Along with the Malawi Land Use/Land Cover Classification System, a standard for land use/land cover mapping and reporting.

# 7.0 HOW IS THIS DEFINITION TO BE USED?

This definition of forest, the guidelines on inclusion and exclusion, and the specific classes detailed in this technical order provide a framework within which determination of extent and quantitative areal estimates of forest and non-forest cover can be estimated/calculated. The estimation/calculation can be used to determine the amount of woody biomass in Malawi.

This formalization of the definition of forest, and resulting standardization of forest cover and other land use and land cover classifications, contributes to a multitude of national priorities including land and resource planning, management and monitoring; infrastructure planning and development; and, community resilience and disaster management.

# 8.0 WHAT IS THE RELATIONSHIP OF THE DEFINITION TO THE NATIONAL LAND USE AND LAND COVER CLASSIFICATION SYSTEM?

This definition of forest, and the guidelines outlined above relate to the National Land Use and Land Cover Classification System. Under this system, all forest land as defined above, is classified as one of the six major land use and land cover classifications in the IPCC guidelines (the others being cropland, wetland, grassland,

settlement, and other land). In Table 1 below, the subdivisions of the forest class cover are organized whether or not they are managed (e.g., plantations) or unmanaged (e.g., natural forests), by density in the case of unmanaged, and then by vegetation complex or specific commodity.



Table 1 | National Land Use and Land Cover Classification System

Code	Level 1	Level 2	Level 3	Level 4
1	Forest Land			
1M		Managed Forest		
1Mp			Tree Plantation	
1Mpe				<i>Eucalyptus</i> spp.
1Mpp				Pine ( <i>Pinus</i> spp.)
1Mpr				Rubber ( <i>Hevea</i> spp.)
1Mpo				Other plantation spp.
1U		Unmanaged Forest		
1Ud			Dense Forest	
1Ude				Montane Evergreen
1Udm				Miombo
1Uda				Acacia
1Udc				Mopane
1Udl				Lowland Evergreen
1Udo				Other Woodland Complex
1Um			Moderate Forest	
1Ume				Montane Evergreen
1Umm				Miombo
1Uma				Acacia
1Umc				Mopane
1Uml				Lowland Evergreen

1Umo

Other Woodland  
Complex

1Us

Sparse Forest

1Use

Montane  
Evergreen

1Usm

Miombo

1Usa

Acacia

1Usc

Mopane

1Usl

Lowland  
Evergreen

1Uso

Other Woodland  
Complex

Definitions of these classes can be obtained with the full National Land Use Land Cover Classification System. Note that this classification is hierarchical and aims to ensure that all maps classify every piece of forest land into a single category; i.e., the dominant land cover in a specific area (i.e., MMU). Additional subdivisions of existing classes can be acceptably created for specific mapping

purposes as long as they have mutually exclusive definitions, but merging of the classes defined above is not permitted unless through the established hierarchy. Mosaic classes, where more than one of the above classifications of forest is located, are not permitted; the dominant cover type for the MMU should be determined in all cases.

# 9.0 HOW SHOULD THIS DEFINITION BE MAINTAINED?

The definition of forest and its subclasses within the National Land Use Land Cover Classification System hierarchy should be strictly maintained by all stakeholders involved with land issues. While it is not envisaged that the overall definition of forest should change, and that the subdivisions detailed in this technical order are nationally agreed and established, there is some flexibility in detailing additional classifications and technical advice from relevant agencies; negotiation with other sectors will be essential. Additionally, it is critical that agencies actively publicize both the definition and National Land Use Land Cover Classification System and quality control outputs from any related mapping. To ensure these standards are met, it is imperative that the following instruments are operational:

- The Department of Surveys establishes the mapping standards and quality control for any use of the forest definition in land use and land cover mapping. This includes the establishment of map projection, datums and coordinate systems, metadata standards, and distribution rights.
- The Land Resources Conservation Department coordinates the maintenance of the National Land Use Land Cover Classification System, any revisions therein, as well as advocate for its usage by government and non-government agencies including international donors and organizations, academics, researchers, and technical consultancies, and maintain quality assurance and control of any resulting mapping. They should actively seek advice from the Department of Forestry in any matters related to the definition and standard classification system for forest.
- The Department of Forestry advises the Land Resources Conservation Department on any (exceptional) revisions or addenda to the land use/land cover standard schema for forests as defined by this technical order. The Department of Forestry should also advise on any technical matters pertaining to the adherence to the definition of forest. They should oversee quality assurance and control of any mapping products created for forest or general land issue purposes (if forest is a class within that product). Lastly, the Department of Forestry should actively publicize and educate other stakeholders in these instruments and directives.

# 10.0 DIRECTIVES ON METHODS

This forest definition shall be used in forest cover, and land use and land cover mapping and analysis, in adherence to the following:

1. All mapping shall conform to the National Spatial Data Standards for geographical information as laid out by the Department of Surveys/Malawi Spatial Data Platform (MASDAP).
2. All mapping shall conform to the classification hierarchy as detailed in the National Land use Land Cover Classification System.
3. All thresholds and parameters defined in any classification methodology should encapsulate the definition of forest to maintain a strict delineation of forest and non-forest land.
4. Methods used to create mapping, definitions of any classification or terminology used, metadata according to ISO 19115 standards, field data collection techniques, and clarity on how accuracy assessments are conducted (including use of overall accuracy percentages, confusion matrices and calculation of chance coefficients such as Kappa) should be extensively documented.



the 1990s, the number of people in the UK who are employed in the public sector has increased from 10.5 million to 12.5 million, and the number of people in the public sector who are employed in health care has increased from 1.5 million to 2.5 million (Department of Health 2000).

There are a number of reasons for this increase. One of the main reasons is the increasing demand for health care services. The population of the UK is ageing, and there is a growing number of people with chronic conditions such as heart disease, diabetes, and cancer. This has led to an increase in the number of people who need to be treated in hospitals and other health care settings.

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