

## DEFINITION OF FORESTS - A REVIEW

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### ABSTRACT:

The definition of word 'Forest' differs from region to region, and country to country based on the objectives of management, land use, vegetation type, composition, altitude, etc. and there are over 800 definitions world wide. India has no definition of the word 'forest' or 'forest land' in the two major central Acts i.e *Indian Forest Act 1927, and Forest Conservation Act 1980, but the Hon'ble Supreme Court of India in W.P No. 202/95 has defined the term "forest land", occurring in Section 2 of F.C Act, as it will not only include "forest" as understood in the dictionary sense, but also any area recorded as forest in the Government records irrespective of the ownership. Keeping in view the wide variety of definitions worldwide and the requirement of global efforts to mitigate adverse effects of deforestation and climate change, some common and workable definitions have been evolved by international organisations like FAO, UNFCCC, with certain parameters like crown cover, area and tree height in terms of threshold values, and they are being widely used for the purposes of assessment of forest area, growing stock, A&R projects under kyoto protocol, etc. The threshold values of the parameters chosen for definition and the wording of definition, play a crucial role in legal interpretation of land use, assessment of extent of forest area and its resources, development/ evolution of policy frame work and planning by a country, conservation and sustainable forest management.*

**KEYWORDS:** Definition; Forest; Policy; Conservation; Sustainable Forest Management.

### INTRODUCTION:

The word "Forest" is understood as '*A dense growth of trees and shrubs covering a large area*' from its dictionary meaning. However defining a forest is not easy.

The definition of Forest is as diverse as its diversity in terms of types, species composition, goods and services it provides, etc. Forest types differ widely, determined by factors including latitude, temperature, rainfall patterns, soil composition and human activity. How a forest is defined also depends on who is defining. People living in the British Isles or Scandinavia might identify forests differently from people in Africa or Asia. Similarly, a business person or economist might define and value a forest in a very different way from a forester, farmer or an ornithologist. A legal definition is different from an ecological definition. A recent study of the various definitions of forests (Lund 2012) found that more than 800 different definitions for forests and wooded areas were in use round the world – with some countries adopting several such definitions at the same time!

### **OBJECTIVE:**

The objective of this study is to know as to why a definition of forest is required and to understand the different perspectives underlying the various definitions, and their implications in the management of forests including development of policy framework.

### **Why to define a forest ?**

A definition of forest is important and necessary as it serves various purposes as outlined below.

- To interpret legally as to what constitutes a forest, and to differentiate it from other land uses.
- To assess the forest cover or growing stock of a particular ecosystem or a country
- To classify forests based on type, form, composition, latitude, altitude etc.,
- To understand and assess the goods and services that the forests provide
- To protect and conserve forests and its diversity of populations, species and ecosystems
- To prescribe sustainable forest management practices
- To assess the carbon sequestered or sequestration capacity of the forests
- To assess the CO<sub>2</sub> emissions on account of degradation or deforestation
- To encourage investments in the forestry sector
- To assist in policy and planning framework in management of country's forest resources, etc.

**MATERIALS AND METHODS:** Forests can be defined in several ways. The main differences in defining the 'Forest' concern:

i) The legal classification of land uses: Under this the definitions are generally based on a legally defined land area with or without vegetation.

ii) The kind of vegetation that constitutes a forest.

Available literature on the subject i.e., Books, Journals etc., has been referred, to compile some of the definitions of "Forest" and its processes, in the Indian as well as Global context and to discuss the perspectives underlying the definitions and their implications for the purpose of policy, planning, and implementation so as to enable the reader to better understand the subject, and the same are as below.

#### **Indian Context:**

There is no definition of the word "Forest" in two important national acts of forests i.e. Indian Forest Act 1927, and Forest Conservation Act 1980.

However a local Forest Act in Meghalaya namely "The United Khasi & Jaintia Hills Autonomous District (Management and Control of Forests) Act 1958" has a definition of forest, for the purpose of management of forests of that locality, the section 2 (f) of which says, "*Forest*" means and shall be deemed to be a forest, if in the area there are reasonable no. trees, say, not less than twenty five per acre reserved or any other forest produce growing on such area, which have been or are capable of being exploited for purposes of business or trade.

The Hon'ble Supreme Court of India in its order dated 12.12.1996 in WP No. 202/95, has defined the words "Forest", and "Forest land" occurring in section 2 of F.C Act as below.

*"The word 'forest' must be understood according to its dictionary meaning. This description covers all statutorily recognised forests, whether designated as reserved, protected or otherwise for the purpose of Section 2(i) of the Forest Conservation Act. The term "forest land", occurring in Section 2, will not only include "forest" as understood in the dictionary sense, but also any area recorded as forest in the Government record irrespective of the ownership."*

After the above definition/ interpretation of words 'Forest' and 'Forest Land' by the Hon'ble Apex Court, the Sec. 2 (d) of The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, defined the 'Forest Land' on similar lines and the same is as follows.

*"Forest land" means land of any description falling within any area and includes unclassified forests, undemarcated forests, existing or deemed forests, protected forests, reserved forests, Sanctuaries and National parks.*

The above stated definitions are legal definitions of forest for the purposes of interpreting the term 'forest land' occurring in the concerned Acts. India is yet to evolve a comprehensive definition of the word "Forest".

However for the purpose of CDM Forest in pursuance of the 'Kyoto Protocol' India has come up with a definition as per the threshold limits fixed by UNFCCC for different parameters, according to which, "A forest is a land area of at least 0.05 ha, with a minimum tree crown cover of 15%, and tree height of at least 2 m"

As per the India State of Forest Report 2011, Forest Area means, the area recorded as 'Forest' in government records. The term "Forest Cover" includes "all lands with more than 1 Ha. area with tree canopy density of more than 10 % irrespective of ownership and legal status".

#### **Global Context:**

**Europe:** Each country in the European Union has its own definition of a forest and the European Commission has defined forestland as having at least 20% canopy closure (10% in the Mediterranean forests) and a minimum area of 0.5 ha. (1 ha. = 0.01Sq. KM)

**Russian Federation:** i). Forest includes lands covered by young stands of tree species with relative stocking 0.4 and more, and stands of other age groups with relative stocking 0.3 and more; harvested areas, burnt stands and other forest lands, which are in the process of natural regeneration, and on which amount and quality of young trees both naturally regenerated or conserved during harvest is not less than those required by manuals applying for transfer of such areas into forested area; covered by shrubbery in territories, on which high forests are not able to

grow due to natural climatic conditions (e.g., geographical or altitudinal tree lines). (Manual on Forest Inventory in Forest Fund of Russia, Part 1, Moscow, 1995)

ii) Forest is the aggregate of forest vegetation, land, fauna and other components of the natural environment that are of great ecological, economic and social importance. (Forest Code of the Russian Federation, Moscow, 1997)

**Brazil:** Forest is defined as an area of land greater than 1 hectare, with more than 30% canopy cover and a minimum tree height of 5 metres.

**USA:** Forest land, as defined by the U.S. Forest Service, includes land at least 10 percent of which is stocked by trees of any size, or land formerly having had such tree cover that will be naturally or artificially regenerated. Forest land includes transition zones such as areas between heavily forested and nonforested lands that are at least 10 percent stocked with forest trees and forest areas adjacent to urban and built-up lands. (USA-FED-DA-ERS 2003)

**Canada :** i) Forest land—Areas of land where tree canopies cover more than 10 percent of the total area and the trees, when mature, can grow to a height of more than 5 metres. Does not include land that is predominantly urban or used for agricultural purposes.

ii) Generally, an ecosystem characterized by a more or less dense and extensive tree cover. More particularly, a plant community predominantly of trees and other woody vegetation, growing more or less closely together.

**China:** Forest means a land having Minimum Area 0.67 ha., Min. Crown Cover of 20% and a Min. Tree Height 2m.

**South Africa:** “Forest land” means any land covered by trees or which is designated in any legislation, or national or sub-national forestry plan, or land-use plan as forest land or as land for afforestation or reforestation.

**Australia:** Forest is a land area, incorporating all living and non-living components, dominated by trees usually having a single stem and a mature or potentially mature stand height exceeding 2 metres, and with existing or potential crown cover of overstorey strata about equal to or greater than 20%. This definition includes native forests and plantations and areas of trees that are sometimes described as woodlands.

**FAO definitions:** (*Global forest resources assessment 2010*)

<b>Terms</b>	<b>Definitions</b>
Forest:	Land spanning more than 0.5 ha with trees higher than 5 metres and canopy cover of more than 10 percent, or trees able to reach these thresholds <i>in situ</i> . It does not include land that is predominantly under agricultural or urban land use.
Other wooded land:	Land not classified as <i>forest</i> , spanning more than 0.5 ha; with trees higher than 5 metres and canopy cover of 5–10 percent, or trees able to reach these thresholds <i>in situ</i> , or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Natural forest:	A forest composed of indigenous trees and not classified as forest plantation.
Forest plantation:	A forest established by planting or/and seeding in the process of afforestation or reforestation. It consists of introduced species or, in some cases, indigenous species.

**Definitions of Forest and its different types as per Report of the adhoc technical expert group on forest biological diversity.**

<b>Terms</b>	<b>Definitions</b>
Forest	A forest is a land area of more than 0.5 ha, with a tree canopy cover of more than 10%, which is not primarily under agricultural or other specific non-forest land use. In the case of young forests or regions where tree growth is climatically suppressed, the trees should be capable of reaching a height of 5 m <i>in situ</i> , and of meeting the canopy cover requirement.
Forest biome	This reflects the ecological and physiognomic characteristics of the vegetation and broadly corresponds to climatic regions of the Earth. In this document, it is used in reference to boreal, temperate and tropical forest biomes.
Forest type	Within biomes, a forest type is a group of forest ecosystems of generally similar composition that can be readily differentiated from other such groups by their tree and undercanopy species composition, productivity and/or crown closure.

Forest ecosystem: A forest ecosystem can be defined at a range of scales. It is a dynamic complex of plant, animal and micro-organism communities and their abiotic environment interacting as a functional unit, where trees are a key component of the system. Humans, with their cultural, economic and environmental needs are an integral part of many forest ecosystems.

Primary forest: A primary forest is a forest that has never been logged and has developed following natural disturbances and under natural processes, regardless of its age. It is referred to "direct human disturbance" as the intentional clearing of forest by any means (including fire) to manage or alter them for human use. Also included as primary, are forests that are used inconsequentially by indigenous and local communities living traditional lifestyles relevant for the conservation and sustainable use of biological diversity. In much of Europe, primary forest has a different connotation and refers to an area of forest land which has probably been continuously wooded at least throughout historical times (e.g., the last thousand years). It has not been completely cleared or converted to another land use for any period of time.

Secondary forest: A secondary forest is a forest that has been logged and has recovered naturally or artificially. Not all secondary forests provide the same value to sustaining biological diversity, or goods and services, as did primary forest in the same location. In Europe, secondary forest is forest land where there has been a period of complete clearance by humans with or without a period of conversion to another land use. Forest cover has regenerated naturally or artificially through planting.

Old growth forest: Old growth forest stands are stands in primary or secondary forests that have developed the structures and species normally associated with old primary forest of that type have sufficiently accumulated to act as a forest ecosystem distinct from any younger age class.

Plantation forest: A plantation forest may be afforested land or a secondary forest established by planting or direct seeding. A gradient exists among plantation forests from even-aged, single species monocultures of exotic species with a fibre production objective to mixed species, native to the site with both fibre and biodiversity objectives. This gradient will probably also reflect the capability of the plantation forest to maintain "normal" local biological diversity.

Degraded forest: A degraded forest is a secondary forest that has lost, through human activities, the structure, function, species composition or productivity normally associated with a natural forest type expected on that site. Hence, a degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. Biological diversity of degraded forests includes many non-tree components, which may dominate in the undercanopy vegetation.

Agro-forest: An agro-forest is a complex of treed areas within an area that is broadly characterised as agricultural or as an agro-ecosystem.

### **WCMC / CIFOR Definitions** (*A Global Overview of Forest Conservation*)

#### **Terms**

#### **Definitions**

Mangroves:

Natural forests with > 30% canopy cover, composed of species of mangrove tree, generally along coasts in or near brackish or salt water.

Freshwater swamp forest:

Natural forests with > 30% canopy cover, below 1200m altitude, composed of trees with any mixture of leaf type and seasonality, but in which the predominant environmental characteristic is a waterlogged soil.



- Lowland evergreen broadleaf rain forest: Natural forests with > 30% canopy cover, below 1200m altitude that display little or no seasonality, the canopy being > 75% evergreen broadleaf.
- Semi-evergreen moist broadleaf forest: Natural forests with > 30% canopy cover, below 1200m altitude in which between 50-75% of the canopy is evergreen, > 75% are broadleaves, and the trees display seasonality of flowering and fruiting.
- Deciduous/semi-deciduous broadleaf forest: Natural forests with > 30% canopy cover, below 1200m altitude in which between 50-100% of the canopy is deciduous and broadleaves predominate (> 75% of canopy cover).
- Sclerophyllous dry forest: Natural forests with > 30% canopy cover, below 1200m altitude, in which the canopy is mainly composed of sclerophyllous broadleaves and is > 75% evergreen.
- Thorn forest: Natural forests with > 30% canopy cover, below 1200m altitude, in which the canopy is mainly composed of deciduous trees with thorns and succulent phanerophytes with thorns may be frequent.
- Needle leaf forest: Natural forest with > 30% canopy cover, below 1200m altitude, in which the canopy is predominantly (> 75%) needleleaf.
- Mixed broadleaf/needleleaf forest: Natural forests with >30% canopy cover, below 1200m altitude, in which the canopy is composed of a more or less even mixture of needleleaf and broadleaf crowns (between 50:50% and 25:75%).
- Lower montane forest: Natural forests with > 30% canopy cover, between 1200-1800m altitude, with any seasonality regime and leaf type mixture.

Upper montane forest:	Natural forests with > 30% canopy cover, above 1800m altitude, with any seasonality regime and leaf type mixture.
Sparse trees and parkland:	Natural forests in which the tree canopy cover is between 10-30%, such as in the savannah regions of the world. Trees of any type (e.g., needleleaf, broadleaf, palms).
Disturbed natural forest:	Any forest type above that has in its interior significant areas of disturbance by people, including clearing, felling for wood extraction, anthropogenic fires, road construction, etc.
Exotic species plantation:	Intensively managed forests with > 30% canopy cover, which have been planted by people with species not naturally occurring in that country.
Native species plantation:	Intensively managed forests with > 30% canopy cover, which have been planted by people with species that occur naturally in that country.

## **WRI Definition**

<b>Terms</b>	<b>Definitions</b>
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Frontier forests:	Frontier forests are large, relatively intact forest ecosystems. A frontier forest must meet the following criteria:
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- It is primarily forested.
- It is large enough to support viable populations of all species associated with that forest type even in the face of natural disasters of a magnitude to occur once in a century.
- Its structure and composition are determined mainly by natural events, and it remains relatively unmanaged by humans, although limited human disturbance by traditional activities is acceptable.
- In forests where patches of trees of different ages occur naturally, the landscape shows this type of heterogeneity.
- It is dominated by indigenous tree species.
- It is home to most, if not all, other plants and animals that typically live in this forest.

## **UNFCCC definition of ‘Forest’ and its processes:**

**Forest :** It is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 meters at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 meters are included under forest, as are areas normally forming part of the forest area which are temporarily un-stocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.

**Afforestation:** It is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.

**Reforestation:** It is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest as on 31 December 1989.

## **RESULTS AND DISCUSSIONS:**

Forests have been defined differently by different countries keeping in view the objectives and the purposes for which they are managed or put to use. An assessment focusing on the availability of timber for commercial or industrial purposes may exclude small wooded areas and types of forest not considered to be of commercial value. A definition based on physical characteristics, such as the canopy cover, will most likely be used for an assessment of the forest extent, whilst a definition based on botanical characteristics, i.e. variety of tree species, will be used for assessing various classes or types of forest. An overall assessment carried out on a regional or global level is unlikely to satisfy more detailed national level requirements. Conversely, a definition developed to suit the needs of any given country is unlikely to be applicable at a global level. In an attempt to calculate how much forest there is, both at regional and global levels, some common definitions have been developed. These definitions are

generally very broad, in order to encompass all types of forests – from dense, tall forests found in the humid tropics, to temperate and boreal forests and forests in semi-arid and arid regions. For eg. the “Forest” definitions of FAO, Adhoc Technical Expert Group on Forest Biological Diversity, UNFCCC etc take in to account parameters such as crown cover, area of forest and tree height and cover all kinds of forests. Any change in values of the parameters will have an impact in assessment of its resources in terms of area, growing stock, carbon sequestration capacities, etc.

The Decision 19/CP.9 of the Conference of Parties held at Milan requires that for hosting Afforestation/ Reforestation activity under CDM, Non-Annex-1 countries have to apply a forest definition with certain parameters within threshold values; 0.05 -1.0 hectares for minimum area, 2-5 meters for minimum tree height and 10-30 per cent for minimum crown cover, in pursuance of Kyoto Protocol.

The selected values shall be fixed for all CDM afforestation and reforestation (A&R) project activities registered prior to the end of the first commitment period (2008-12). In the case of India, being a non-Annex 1 country, only A&R are eligible activities under CDM that can earn carbon credits for meeting Kyoto targets. “Afforestation” is conversion of land, which has not been a “forest” for at least 50 years, to a “forest” as defined above. And “reforestation” is raising “forest” on lands not being a “forest” as on 31.12.1989. Thus, this definition of forest is crucial both in selection of sites for CDM (the land chosen should not have been a “forest” for the requisite length of time) as well as in creating the end product (which should be a “forest” as defined above) for the carbon sequestered in the process to qualify as carbon credits. (Kant 2005)

As required by UNFCCC in defining the forest, if we adopt the lower value of 10% crown cover, then no open forests as on 31.12.89 in the country, with their crown densities ranging from 10% to 40%, could be taken up for reforestation because all these lands would be seen as forest as on 31.12.89 and thus ineligible. This would cut off all Joint Forest Management (JFM) areas, raised in degraded forests with existing densities of 10% and above, from inflow of funds from CDM. But, at the same time, this value would enable agro-forests raised with a mere 10% tree density to be also considered as creation of forest through afforestation and thus earn carbon credits for the farmers who want to earn extra income from growing a few trees with the agriculture crops as their main stay. This would enhance the attractiveness of agro forestry for the CDM investors.

On the other hand if we take the higher range of 30% cover as the defining value than all open forests in the country that had less than 30% cover on 31.12.89 would be eligible for reforestation and JFM activities in these degraded forests leading to reforestation would be eligible for CDM inflows. But such a higher range may not help agro-forestry as the farmers would have to create a tree crown density of more than 30% on their agriculture lands for the end result to be accepted as a forest and thereby earn carbon credits. This may not work with many agricultural crops that are less shade tolerant and intercropping may not be an option available to the farmers unless they are willing to sacrifice heavily on their agricultural productivity. Only farmers who decide to convert their farmlands to tree cover alone would be able to benefit from CDM.

With regard to the minimum area requirement ranging from 0.05 ha to 1.0 ha, the lower values offer apparent advantage to both afforestation on farmlands and reforestation of degraded forests; in the former case by enabling the farmers to earn carbon credits by raising even small clusters of trees and, in the latter case, by enabling taking up of very small sized gap plantings in the large number of small sized gaps that one encounters in the degraded forests of India.

Considering the above, India has chosen the threshold values of 15% for crown coverage, 0.05 Ha. for forest area and 2 m for tree height for the purpose of CDM forest.

Further the definition of forest becomes very crucial in legal context as it helps in correct interpretation of what constitutes forest and to distinguish forest from other land uses. The definition of forest by the Hon'ble Supreme Court of India in WP. No. 202/95 for the purpose of Forest Conservation Act 1980 i.e *the term 'forest land' will not only include "forest" as understood in the dictionary sense, but also any area recorded as forest in the Government records irrespective of the ownership,* has had significant impact in giving teeth to the Forest Conservation Act and thereby reducing the diversion of forest land for non forest purposes to a great extent. Further the said definition has also helped the cause of forests in realisation of equivalent non forest land, cost of afforestation and NPV from the user agencies, in lieu of diversion of non notified forests such as lands recorded as '*jangal jhadi*', '*bada jangal*', '*chota jangal*' etc., in revenue records, which otherwise would not have been possible.

## **CONCLUSION:**

Forest is generally understood by a layman from its dictionary meaning as a woodland or a large area covered with dense growth of trees and shrubs. However in defining the word 'Forest', different countries or regions within the countries, have different definitions keeping in view the objectives or the purposes of managing those forests. No single definition of forests would meet the requirement of all the countries, but some common workable definitions have been evolved by FAO, UNFCCC etc., by including certain parameters with threshold values in the context of requirement of global efforts to mitigate the adverse effects of deforestation, environmental degradation and climate change, as they are transboundary. The threshold values of the parameters and the wordings in the definition of 'Forest' play a crucial role in legal interpretation of land use, assessment of extent of forest area or its resources locally, regionally or globally, development of policy framework and planning, conservation, and sustainable forest management.

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