

GLOSSARY

- Above-ground biomass** The AGB carbon pool consists of all living vegetation above the soil, inclusive of stems, stumps, branches, bark, seeds and foliage.
- Activity / Flux Accounting** One of the main approaches to emissions accounting by estimating the net balance of additions to and removals from, a carbon pool.
- Baselines** Also called a counter-factual, the baseline scenario is a reference level that shows what would have happened in the absence of a policy or project designed to reduce emissions.
- Bamboo** *Pure*: 151 and more clump/ha for clump forming bamboo or 9001 and more culms / ha for non clump forming
Dense: 51 to 150 clump/ha for clump forming or 3001 to 9000 culms / ha for non clump forming
Scattered: 1 to 50 clump/ha for clump forming or 1 to 3000 culms / ha for non clump forming
- Below-ground biomass** The BGB carbon pool consists of the biomass contained within live roots.
- Biodiversity** The variety of life found on earth (plants, animals, fungi and micro-organisms) as well as the communities that they form and habitats in which they live.
- Biomass** Forest biomass is organic matter expressed as oven-dry tonnes per unit area: it can be referred to as biomass density when expressed as mass per unit area. Approximately 50% of dry forest biomass is carbon.
- Biomass Expansion Factor (BEF)** The ratio of aboveground biomass and bole biomass (defined by a merchantable measure or a minimum DBH). It is used to quantify carbon stock in forests.
- Block Plantation** Tree plantations in compact blocks of more than 0.1 ha on lands outside recorded forest areas.
- Canopy** The cover of branches and foliage formed by crowns of trees.
- Canopy Cover** The percentage of ground covered by a vertical projection of outermost perimeter of natural spread of foliage of plants.
- Canopy Density** Percent area of land covered by canopy of trees. It is expressed as a decimal coefficient, taking closed canopy as unity.
- Carbon dioxide equivalent (CO₂eq)** It is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
- Carbon Pool** Carbon pools are major components of an ecosystem that can either accumulate or release carbon.
- Carbon Sequestration** It is the long term process of storage of carbon in plants, soil, geologic formations and the ocean.
- Cartographic Limit** The minimum area of a feature which can be presented on a map at a given scale.
- Change Matrix** It presents change in forest cover classes for a given region (State or UT) during the period of two consecutive assessments in a matrix form by showing the changes of area from one class to another.
- Conservativeness** Where accounting relies on assumptions, values and procedures with high uncertainty, the most conservative option in the biological range should be chosen so as not overestimate sinks or underestimate sources of GHGs. Conservative carbon estimates are often achieved through omission of minor carbon pools.
- Crown Area** It is the area of horizontal projection of a tree crown on the ground.

Culturable Non Forest Area (CNFA)	It is the net geographical area, lying outside recorded forest and forest cover, which can support tree vegetation (thus, excluding areas under wetlands, riverbeds, perennial snow covered mountains, etc.). CNFA is the area over which the sample data on tree cover is aggregated for the assessment.
Dead Organic Matter	The DOM carbon pool contains all non-living woody biomass and can be divided into wood (fallen trees, roots and stumps with diameter over 10cm) and litter (greater than 2mm and less than 10cm diameter) components.
Dense Forest	All lands with a forest cover having a canopy density of 40 percent and above.
Digital Image Processing (DIP)	Interpretation and classification of digital satellite data using computer and a DIP software.
Drone	A drone, also known as Unmanned Aerial Vehicle (UAVs), is a flying device that is controlled remotely. Such devices fly using multiple propellers and are capable to digitally scan and capture photos, record videos using cameras from the air.
Emissions factor	Emissions factor gives gains and losses in carbon stock as a standard rate of emissions per unit activity. It is used to scale emissions to activity data.
Error Matrix (Confusion matrix)	It is a means to quantitatively assess the accuracy of classification of a interpreted satellite data. Under this, the reference data (ground truth) is compared with the corresponding results of the classification on the randomly selected locations on category-by-category basis. It is presented in a square matrix.
False Color Composite	The image generated by projecting any three spectral bands of the satellite data on the red, green and blue channels and does not show features in true colours.
Farm Forestry	The practice of cultivating and managing trees in compact blocks on agricultural lands.
Forest Area	The area recorded as a forest in the Government records. It is also referred to as “Recorded Forest Area”.
Forest Blank	A patch within a forest which bears few or no trees.
Forest Cover	All lands, more than one hectare in area, with a tree canopy density of more than 10 percent irrespective of ownership and legal status. Such lands may not necessarily be a recorded forest area. It also includes orchards, bamboo and palm.
Forest Fire Danger Rating	It is a system for rating the risk of forest fires on the basis of qualitative or numeric indices of fire potential. It is used as a guide in a wide variety of fire management activities.
Forest Inventory	The measurement of certain parameters of forests to assess the growing stock and other characteristics of forests.
Forest Fringe Villages	The villages located in the proximity of forest areas.
Forest Reference Level	FRL is base line emission levels from the forests. It is used for determining performance of the country towards REDD+ implementation.
Gain Loss Approach	A method to estimate annual emissions or removals of CO ₂ as the sum of gains and losses in carbon pools occurring on areas of land subject to human activities.
Global Forest Resources Assessment (GFRA)	GFRA, led by Forestry Department of FAO of UN, is an assessment of status and trends of the global forest resources. It contains information on various thematic elements of sustainable forest management and conservation.
Geographic Information System	A computer based system for capturing, storing, manipulating, analyzing and displaying data, which are spatially referenced to the earth.



Greenhouse Gas	There are six recognized major greenhouse gases; CO ₂ (carbon dioxide), CH ₄ (methane), HFCs (hydro fluorocarbons), PFCs (perfluorocarbons), N ₂ O (nitrous oxide) and SF ₆ (sulphur hexafluoride). Carbon accounting often refers to the accounting of all major GHGs using a carbon dioxide equivalent (CO ₂ eq) that standardises these gases based on their global warming potential.
Green Wash	The extent of wooded areas generally shown in light green colour on the Survey of India toposheets.
Growing Stock	The sum (by number or volume) of all the trees growing/living in the forest or a specified part of it.
Hill District	A district with more than 50 percent of its geographic area under “hill talukas” based on criteria adopted by the NITI Aayog for Hill Area and Western Ghats Development Programmes.
Invasive Species	The species not native to a specific location (an introduced species) and has a tendency to spread to a degree believed to cause damage to the environment, human economy or human health.
Inventory/Periodic Accounting	One of the main approaches to emissions accounting by measuring the difference in carbon stocks between two points in time.
Kyoto Protocol	In 1992, the Convention on Climate Change was agreed at the United Nations Conference on Environment and Development. In 1997, the Kyoto Protocol made this convention operational. Under the Convention Annex I (developed) countries committed to reduce GHG emissions to, on average, 5.2% of 1990 levels before 2012.
Land Cover	Broad land use classes interpreted from satellite data. It includes very dense forest, moderately dense forest, open forest, scrub and non-forest for the purpose of this report.
Litter	Woody material of trees having diameter <5cm which is not decomposed.
Land Use, Land-Use Change and Forestry (LULUCF)	It is a category within UNFCCC accounting framework for greenhouse gas (GHG) emissions. LULUCF includes carbon pools of living biomass (above and below ground), dead organic matter (dead wood and litter) and organic soil carbon.
Mangroves	Salt tolerant evergreen forest ecosystem found mainly in tropical and sub-tropical coastal and/or inter-tidal regions.
Mangrove Cover	Area covered under mangrove vegetation as interpreted from remote sensing data. It is included in the forest cover.
Moderately Dense Forest	All lands with forest cover having a canopy density between 40 to 70 percent.
Moderate Resolution Imaging Spectro radiometer (MODIS)	It is an extensive program using sensors on two satellites (Terra and Aqua), each providing complete daily coverage of earth. With the MODIS sensor, it is generally possible to obtain images in the morning (Terra) and afternoon (Aqua) for any particular location. Night time data are also available in the thermal range of the spectrum. The data have a variety of resolutions; spectral, spatial and temporal.
Nationally Determined Contributions (NDC)	NDC articulates commitments by each country to reduce its national emissions and adapt to the impacts of climate change. Countries across the globe adopted this international climate agreement at UNFCCC Conference of the Parties (COP21) in Paris in December 2015.
Net Change (in Forest Cover)	The sum of positive and negative changes in forest cover over a period of two assessments for a given area.
Non Forest Land	Land without forest cover.

Non-Timber Forest Products (NTFPs)	It is defined as product or service other than timber that is produced in forests. NTFPs are useful materials or commodities obtained from forests without harvesting (logging) of trees.
Open Forest	Lands with forest cover having a canopy density between 10 to 40 percent.
Protected Forest	An area notified under the provisions of the Indian Forest Act or other State Forest Acts, having limited degree of protection. In protected forest all activities are permitted unless prohibited.
Physiographic Zone	A physiographic zone constitutes geographical areas that exhibit broad similarities in factors responsible for the growth of tree vegetation. Physiographic zones have been used as strata for assessing tree cover in the country.
Recorded Forest Area	Forest Area recorded as forests in Government records.
Reducing Emissions from Deforestation and Forest Degradation	A framework to reduce emissions from deforestation and degradation, conservation of existing carbon stocks and enhancement of carbon stocks.
Remote sensing	Remote sensing is the acquisition of data, such as total forest area, forest type, canopy cover and height, from sensors on board aircraft or space-based platforms.
Reserved Forests	An area so constituted under the provisions of the Indian Forest Act or other State Forest Acts, having full degree of protection. In Reserved forests all activities are prohibited unless permitted.
Scrub	Degraded forest lands having canopy density less than 10 percent.
Shannon-Weiner Index	A measure of species richness and abundance. It is used for comparing diversity of species between various habitats.
Shuttle Radar Topography Mission (SRTM)	An international research effort that generates the most complete, high-resolution digital topographic database of the Earth.
Sink	A carbon sink is a carbon pool from which more carbon flows in than out: forests can act as sink through the process of tree growth and resultant biological carbon sequestration.
Soil Organic Matter (SOM)	It is the organic component of soil containing small plants residues, small living soil organism and decomposed organic matter.
Source	A carbon source is a carbon pool from which more carbon flows out than flows in: forests can often represent a net source of carbon due to the processes of decay, combustion and respiration.
Spatial Resolution	The minimum area on earth's surface that can be captured by a satellite sensor as being separate from its surroundings and is represented by a "pixel".
Spectral Resolution	It refers to the width and number of spectral bands. The range of wave lengths that a satellite imaging system can detect. The narrower the bands, the greater the spectral resolution.
Stratification	Stratification is the division of the area into more homogenous units of carbon density. The purpose of stratification is to increase the accuracy and precision of accounting by reducing field data variability.
Stock Difference Approach	An approach to estimate mean annual carbon emissions for land subject to human activities such as deforestation and forest degradation. It is estimated as the ratio of difference in carbon stock at two points in time and the number of intervening years.



Sustainable Development Goals (SDGs)	The SDGs, also known as global goals, are adopted as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. These goals are adopted by all United Nations Member States in 2015.
Thematic Maps	Maps, generally on 1:50,000 scale, showing forest types, major species composition, crown density, other land uses etc. prepared by interpretation of aerial photographs and verified by ground truthing.
Transparency	Transparency requires sufficient and clear documentation of the accounting process so that credibility and reliability of estimates can be assessed by a third party.
Tree	A large woody perennial plant having a single well defined stem (bole or trunk) and more or less definite crown. It also includes bamboos, palms, fruit trees, etc. and excludes non-perennial non-woody species like banana and tall shrubs or climbers. For the purpose of assessing growing stock and tree cover, only those trees having diameter at breast height (dbh) of 10 cm or more are measured.
Tree Cover	It comprises of tree patches of size less than 1 ha occurring outside the recorded forest area. Tree cover includes trees in all formations including scattered trees.
Trees Outside Forests (TOF)	TOF refers to all trees growing outside recorded forest areas irrespective of patch size.
Tribal Districts	Districts identified as tribal districts under Tribal Sub-Plan (Government of India).
Uncertainty	Lack of knowledge of the true value of a variable often expressed as a probability density function.
Unclassed Forests	An area recorded as forest but not included in reserved or protected forest category. Ownership status of such forests varies from state to state.
Very Dense Forest	Lands with forest cover having a canopy density of 70 per cent and above.
Visual Interpretation	A manual method of satellite data interpretation, normally by using magnifying glass and light table.

UNITS AND THEIR DIMENSIONS USED IN ISFR 2019

Sl. No	Name of Unit	Symbol	Value
1.	Meter	m	1 m = 100 cm
2.	Tonnes	t	1 t = 1,000 kg
3.	Hectare	ha	1 ha = 0.01 sq km 100 ha = 1 sq km
4.	Million hectare	m ha	1 m ha = 1,000,000 ha = 10^6 ha = 10,000 sq km
5.	Million cubic meter	m cum	1 m cum = 1,000,000 m ³
6.	Giga tonnes	Gt	1 Gt = 1,000,000,000 tonnes = 10^9 tonnes = 1,000 million tonnes = 1 billion tonnes
7.	CO ₂ equivalent	CO ₂ eq	1 C = 44/12 CO ₂ eq = 3.67 CO ₂ eq

