Glossary[1]

AFOLU. Agriculture, forestry and other land use is a grouping used in greenhouse gas accounting under the United Nations Convention on Climate Change (UNFCCC), combining the GHG inventories from agriculture with land use, land use change and forestry (LULUCF).

Agroforestry. Collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components.

Afforestation. Conversion to forest of land that historically has not contained forests. (IPCC 2019)

Biodiversity. Biodiversity or biological diversity means the variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Bioenergy. Energy derived from any form or biomass (IPCC 2019).

BECCS. Carbon Capture and Storage (see CCS) technology applied to a bioenergy facility.

Blue carbon ecosystem. According to Ramsar Convention on Wetlands, Blue Carbon is the "carbon captured by living organisms in coastal (e.g., mangrove forests, salt marshes and seagrass meadows) and marine ecosystems and stored in biomass and sediments". The coastal and marine ecosystem that captures blue carbon is referred as Blue Carbon Ecosystem (BCE) (Convention on Wetlands, 2021)

Blue Water. Refers to freshwater in lakes, rivers, and groundwater aquifers

Climate change. A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/ or the variability of its properties and that persists for an extended period, typically decades or longer.

Climate (change) mitigation. Means for reducing or capturing emissions of greenhouse gases to limit their impacts on global temperature rise and the global climate system.

Climate mitigation measures. In climate policy, mitigation measures are technologies, processes or practices that contribute to mitigation, for example renewable energy technologies, waste minimisation processes, public transport commuting practices.

Co-benefits. The positive effects that a policy or measure aimed at one objective might have on other objectives, thereby increasing the total benefits for society or the environment.

Convention on Biological Diversity (CBD). The Convention on Biological Diversity (CBD) is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" that has been ratified by 196 nations.

CCS. A process in which a relatively pure stream of carbon dioxide (CO_2) from industrial and energy-related sources is separated (captured), conditioned, compressed and transported to a storage location for long-term isolation from the atmosphere (IPCC 2019).

Carbon sequestration. The process of storing carbon in a carbon pool (IPCC 2019).

Deforestation. Conversion of forest to non-forest.

1. Reference: IPCC, 2019: Annex I: Glossary [van Diemen, R. (ed.)]. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.). *Plain text produced by report authors.* *11_Annex-I-Glossary.pdf (ipcc.ch)*

Emission scenario. A plausible representation of the future development of emissions of substances that are radiatively active (e.g., greenhouse gasses (GHGs), aerosols) based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socio-economic development, technological change, energy and land use) and their key relationships. Concentration scenarios, derived from emission scenarios, are often used as input to a climate model to compute climate projections

Ecosystem services. Ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation. (IPCC 2019)

Floodplain. Floodplains are land areas along the watercourse. Floodplains are usually formed by alluvial sediments deposited during floods of varying magnitude and associated geomorphological processes (Jakubínský, et al., 2021).

Freshwater. Water over land in any form, including evaporation, transpiration, precipitation, atmospheric moisture, soil moisture, frozen water, surface water, and water in the technosphere. In the context of this report, we are particularly concerned about the dependence on and impact of mitigation measures on freshwater sources and freshwater-dependent systems.

Freshwater-dependent systems. Any terrestrial, aquatic, coastal, and marine ecological and social-ecological system supported and influenced by freshwater.

Global warming. An increase in global mean surface temperature (GMST) averaged over a 30-year period, or the 30-year period centred on a particular year or decade, expressed relative to pre-industrial levels unless otherwise specified. For 30-year periods that span past and future years, the current multi-decadal warming trend is assumed to continue (IPCC 2019)

Green water. Refers to plant-available water in the soils, or more broadly all evaporation fluxes and soil moisture on land.

Governance. A comprehensive and inclusive concept of the full range of means for deciding, managing, implementing and monitoring policies and measures.

Greenhouse gas (GHG). Gaseous constituents of the atmosphere, both natural and anthropogenic, absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary GHGs in the Earth's atmosphere.

Hydrological cycle. The cycle in which water evaporates from the oceans and the land surface, is carried over the Earth in atmospheric circulation as water vapour, condenses to form clouds, precipitates as rain or snow, which on land can be intercepted by trees and vegetation, potentially accumulating as snow or ice, provides runoff on the land surface, infiltrates into soils, recharges groundwater, discharges into streams, and ultimately, flows out into the oceans as rivers, polar glaciers and ice sheets, from which it will eventually evaporate again. The various systems involved in the hydrological cycle are usually referred to as hydrological systems.

Indigenous knowledge. The understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For many Indigenous peoples, Indigenous knowledge informs decision-making about fundamental aspects of life, from day-to-day activities to longer term actions.

Integrated water resources management (IWRM). A process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Lake. Lakes are characterized by standing water forming in depressions of the landscape. Lakes can also be formed by tectonic, volcanic, or riverine activity, as well as landslides, wind erosion, dissolution of limestone, or biological activity such as beaver dams (Hutchinson, 1975) (Wetzel, 2001) (Fluet-Chouinard, et al., 2018)

Landscape approach. A Landscape Approach is broadly defined as a framework to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change

Land use. The total of arrangements, activities and inputs applied to a parcel of land. The term land use is also used in the sense of the social and economic purposes for which land is managed (e.g., grazing, timber extraction, conservation and city dwelling). In national GHG inventories, land use is classified according to the IPCC land use categories of forest land, cropland, grassland, wetlands, settlements, other lands (see the 2006 IPCC Guidelines for National GHG Inventories for details).

Land-use change. The change from one land use category to another. [Note: In some of the scientific literature assessed in this report, land-use change encompasses changes in land-use categories as well as changes in land management.

Nature-based Solutions (NbS). NbS are defined by IUCN as "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature."

Nationally Determined Contributions (NDCs). A term used under the United Nations Framework Convention on Climate Change (UNFCCC) whereby a country that has joined the Paris Agreement outlines its plans for reducing its emissions. Some countries' NDCs also address how they will adapt to climate change impacts, and what support they need from, or will provide to, other countries to adopt low-carbon pathways and to build climate resilience. According to Article 4 paragraph 2 of the Paris Agreement, each Party shall prepare, communicate and maintain successive NDCs that it intends to achieve.

Negative emissions. Removal of greenhouse gases (GHGs) from the atmosphere by deliberate human activities, i.e., in addition to the removal that would occur via natural carbon cycle processes

Net-Zero Emissions. Net-zero emissions are achieved when emissions of greenhouse gases (GHGs) to the atmosphere are balanced by anthropogenic removals. Where multiple greenhouse gases are involved, the quantification of net-zero emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon).

1.5°C pathway. A pathway of emissions of greenhouse gases and other climate forces that provides an approximately one-in-two to two-in-three chance, given current knowledge of the climate response, of global warming either remaining below 1.5°C or returning to 1.5°C by around 2100 following an overshoot. The pathway concept ranges from sets of quantitative and qualitative scenarios or narratives of potential futures of natural and/or human systems to solution-oriented decision-making processes to achieve desirable societal goals (IPCC 2019).

Paris Agreement. The Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in December 2015 in Paris, France, at the 21st session of the Conference of the Parties (COP) to the UNFCCC. The agreement, adopted by 196 Parties to the UNFCCC, entered into force on 4 November 2016 and as of May 2018 had 195 Signatories and was ratified by 177 Parties. One of the goals of the Paris Agreement is 'Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels', recognising that this would significantly reduce the risks and impacts of climate change (IPCC 2019).

Peat. Peat is classified as an organic soil, derived from incomplete decomposition of plant matter due to saturated soils, cool temperature, and acidic environment (Soil Survey Staff, 2014). Various species of Sphagnum mosses and tree species form peat in temperate and boreal regions (Inglis et al., 2015). Furthermore, organic matter that forms tropical peat is derived from diverse forest formations (Anderson, 1963; Morley, 1981).

Peatland. Peatlands are wetlands with a thick water-logged soil layer made up of dead and decaying plant material. Peatlands include moors, bogs, mires, peat swamp forests and permafrost tundra. Peatlands represent half of the Earth's wetlands and cover 3% of the global total land area. They are found all over the world (Wetlands International, 2022).

REDD+. REDD+ refers to reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks

Reforestation. Conversion to forest of land that has previously contained forests but that has been converted to some other use.

Resilience. The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/ or transformation

Reservoir. Reservoirs (artificial lakes) are created by impounding streams and digging shallow ponds for the purpose of flood protection, water supply, irrigation, and hydropower production, etc. (Fluet-Chouinard, Messager, Lehner, & Finlayson, 2018).

Risk. The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and well-being, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species.

River. A river is a natural watercourse, usually freshwater, flowing towards an ocean, a lake, a sea, or another river.Rivers originate as rain on high ground that flows downhill into creeks and streams. They connect to major wetland systems and deltas, which are found on the lower reaches of rivers, where the flow of water slows down and spreads out into expanses of wetlands and shallow water (Wetlands International, 2022).

Social-ecological system. An integrated system that includes human societies and ecosystems, in which humans are part of nature. The functions of such a system arise from the interactions and interdependence of the social and ecological subsystems. The system's structure is characterised by reciprocal feedbacks, emphasising that humans must be seen as a part of, not apart from, nature.

Source-to-Sea. Source-to-sea refers to the connections between what we do on land and along rivers, and the impact this has further downstream, along coasts and in the ocean. Water, sediment, plants, and animals provide such connections as does human waste and pollutants.

Sustainable Development Goals (SDGs). The 17 global goals for development for all countries established by the United Nations through a participatory process and elaborated in the 2030 Agenda for Sustainable Development, including ending poverty and hunger; ensuring health and well-being, education, gender equality, clean water and energy, and decent work; building and ensuring resilient and sustainable infrastructure, cities and consumption; reducing inequalities; protecting land and water ecosystems; promoting peace, justice and partnerships; and taking urgent action on climate change.

Sustainable forest management. The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.

Sustainable land management. The stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions

Tidal wetlands. Tidal wetlands, often called coastal wetlands, are typically made up of organic and mineral soils that are "covered or saturated, for all or part of the year, by tidal freshwater, brackish or saline water (<0.5, 0.5-18, and >18 ppt salinity, respectively) and are vegetated by vascular plants" (Kennedy et al. 2013 page).

United Nations Convention to Combat Desertification (UNCCD). A legally binding international agreement linking environment and development to sustainable land management, established in 1994. The Convention's objective is 'to combat desertification and mitigate the effects of drought in countries experiencing drought and/or

desertification'. The Convention specifically addresses the arid, semi-arid and dry sub-humid areas, known as the drylands, and has a particular focus on Africa. As of October 2018, the UNCCD had 197 Parties.

United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was adopted in May 1992 and opened for signature at the 1992 Earth Summit in Rio de Janeiro. It entered into force in March 1994 and as of May 2018 had 197 Parties (196 States and the European Union). The Convention's ultimate objective is the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. The provisions of the Convention are pursued and implemented by two treaties: the Kyoto Protocol and the Paris Agreement

Wetland. According to The Ramsar Convention, wetlands are "areas of marsh, fen, peatland, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Ramsar Convention on Wetlands, 2016). Under this definition wetlands can include "all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fish ponds, rice paddies, reservoirs and salt pans" (Ramsar Convention Fact Sheet 6, 2015). Different types of wetlands have different characteristics in terms of hydrology, ecology and their role in the carbon cycle. No single classification is likely to meet all needs of different wetland inventories, and hence it is recommended by Ramsar Convention on Wetlands to choose or develop classifications suited to the purposes of a particular wetland inventory (Ramsar Convention on Wetlands, 2002) (Anisha, et al., 2020).