BOTANY (H) 5TH SEMESTER

Date : 16.01.2021

DSE 1 : NATURAL RESOURCE MANAGEMENT

UNIT – 6

Forest

(Part – 2)

Forest depletion and management :

Forest is a conditional renewable resource which can be regenerated but needs a certain period of time to maintain its sustainable functioning. In India, the forest resources have been found to be depleting at a pace which is much high. Rapid industrialization, urbanization and over-exploitation have resulted not only in decline but also in permanent loss of forest cover to an alarming rate. The major driver behind all these factors is the uncontrolled population growth of humans which leads to the dramatic increase in the demand for wood and forest products. The over-exploitation of forest resources has taken place beyond the sustained yields to fulfil the needs of humans, thus bringing a change in the net forest cover. Rational utilization and proper management of the forest resources are the most viable ways to prevent mass destruction of forests and large-scale species extinction. FAO has defined deforestation as the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold. Forest areas around the world are majorly cleared for agriculture, logging, mining and large-scale developmental projects.

The value of forest is simple to understand but sometimes tough to quantify. Forest has a major contribution on the global economy and supports livelihood of the majority of rural populations in the world. The direct uses of forest are most easy to quantify as it is directly related to economic returns. One of the major roles that forests play is that it acts as a major carbon sink. Also, there is a marked reduction in soil organic carbon with the loss of vegetation cover, thereby affecting the productivity of the ecosystem.

Impacts of deforestation :

1. Impacts on global climate

The association of deforestation with the increased CO_2 concentration in the atmosphere and changes in the mass balances and surface energy can result in climate change at the local and global level.

2. **Impact on hydrology and soil quality**

The global water cycle depends on the amount and distribution of precipitation for which one of the influencing factors is evapotranspiration. There is a direct effect on drinking water. Deforestation directly increases erosion and siltation rates.

3. **Impact on biological diversity**

Forests are very rich in biodiversity and store a vast gene pool, and the majority of species occur in the tropical forests. The biodiversity could be regarded as an important asset that is necessary to conserve for future utilization.

4. **Impact on economic and social welfare**

Forests contribute to the world economy in terms of timber production and other forest produces. The destruction of forest eliminates the sources of economic gain directly obtained and also eliminates the potential gain from the resources that the forest sustains as biodiversity, soil and water.

Drivers of deforestation :

The dynamics and causes of deforestation are multi-faceted and complex, and they vary from place to place. There are direct drivers of deforestation, which are associated with a complex set of indirect ("underlying") drivers that also need to be tackled if efforts are to be successful in the long term. Drivers can also classified be as human-induced or natural.

The principal direct drivers of deforestation at the global level are:

- commercial agriculture for food, feedstock, fibre and biofuel (e.g. palm oil, soybeans, beef, maize, rice, cotton and sugar cane);
- local or subsistence agriculture;
- infrastructure expansion;
- mining; and
- urban expansion.

Illegal or otherwise unsustainable logging is principally an agent of forest degradation, but it may also be a precursor to deforestation: selectively logged forests are

often deforested within a few years of logging if governance is weak and logging roads provide ready access to the land for agriculture and other development.

Underlying drivers are complex interactions of social, economic, political–institutional, technological and cultural factors that affect the direct drivers. They act at multiple scales, such as:

- global (e.g. markets forces, commodity prices, and a lack of international agreements or their enforcement);

- national (e.g. population growth or movement, domestic markets, unsound national policies, conflicting cross-sectoral policies, weak governance and institutions, market failures, lack of law enforcement, illegal activities, civil conflict, diverging interests, unequal power relations, and the centralization of services); and

- local (e.g. poverty, changes in household behaviour, landlessness, the unclear and asymmetric allocation of rights, technological change in agriculture, and a lack of investment in SFM).

The distinction between direct and underlying causes, and between human-induced and natural change, is often unclear. Deforestation usually involves long, complex chains of cause and effect.

The main drivers of deforestation are all likely to increase in coming years as a result of continued increases in population and economic growth; urbanization; meat consumption; global demand for wood products and agricultural commodities; and the impacts of climate change, such as increased fire frequency and intensity, and pest and diseases.

How to address deforestation :

Identifying and analysing drivers

Location-specific, comprehensive assessments of the drivers of deforestation are the essential first steps in addressing deforestation. The general requirements for such analyses are as follows:

- **Identify deforestation areas** (location and extent) using the most recent data obtained from existing monitoring systems or remote sensing, complemented by historical data, local knowledge, relevant reports and statistics, and an assessment of potential future threats in order to anticipate and minimize risk.

- **Analyze the specific drivers** based on data obtained from existing monitoring systems, local knowledge, and other available sources of information.

- **Evaluate the impact of drivers** at the local, national and, where possible, global scales, looking beyond the forest sector and considering the relationship of such drivers to all land-use activities.

- **Analyze the underlying drivers**, particularly those at the international level. This may need to be done using economic and social indicators, statistical analyses and modeling.

- **Collect qualitative information** from stakeholders in order to understand the dynamics of the drivers. Of particular interest are the views of stakeholders living or working in areas where deforestation or forest degradation are occurring, and those living or working at sites that are showing signs of forest recovery.

Actions to address deforestation drivers

There are different actions that could be taken to address different types of deforestation drivers. Some of the deforestation drivers and their actions are as follows :

1. **Expansion of commercial agriculture (e.g. cash crops, biofuels, livestock production):**

(i) **Integrated landscape approaches**, including by:

- Promoting cross-sectoral approaches to ensure the development, harmonization and coherent enforcement of sectoral laws, policies and plans.

- Undertaking participatory land-use planning and management so as to clarify which areas should be used for different land use.

(ii) **The sustainable intensification of commercial crop production** to avoid the further expansion of agricultural land and forest conversion, including by:

- Adopting sustainable intensification practices (e.g. conservation agriculture; practices that maintain healthy soils, such as no-tillage and cover crops; water- and energy-efficient practices; the use of a wide range of species and varieties in associations, rotations and sequences, including agroforestry systems; the use of quality seeds and other propagation materials of well-adapted, high-yielding varieties; and the integrated management of pests, diseases and weeds).

- Transferring new technologies (e.g. high-yielding varieties, new crops, integrated fertilizer application and pest management, and improved fallows).

- Strengthening the supply chain to reduce the amount of food loss and waste during harvest, storage and processing and therefore increasing the overall productivity of agricultural systems.

(iii) **The sustainable intensification of livestock systems** in an integrated management approach, including by:

- Increasing the productivity of grassland production (e.g. through fertilization, association with nitrogen-fixing herbs and trees, grass-cutting regimes and irrigation practices)

(iv) **Increasing agricultural production on degraded lands**, including by:

- Restoring soil fertility and curbing degradation processes (e.g. erosion, salinization and pollution)

- Promoting economic incentives, extension services and adaptive research

(v) **Forest protection**, including by:

- Enforcing laws against forest encroachment

- Encouraging sustainable ecotourism activities

- Putting in place disincentives such as fines for forest clearing, laws and regulations to protect forest, and zoning for production and protection

2. Subsistence and smallholder farming/ shifting cultivation :

(i) **Intensification/strengthening of smallholder systems**, including by:

- Promoting capital/input-saving practices and technologies (e.g. crop-residue management strategies, erosion control measures, integrated pest management practices and legume cover crops)

- Promoting labour-saving technologies (e.g. timing of soil preparation and sowing)

- Enhancing the access of farmers to capital and inputs (e.g. micro-loans, tailored credit, funds for transition costs and government inputs)

- Enforcing land-tenure security and clarifying forest and tree rights

3. **Coastal farming (e.g. aquaculture), causing deforestation of mangroves and other coastal forests :**

(i) **Sustainable coastal farming with an integrated approach**, including mangrove management, for example by:

- Developing long-term management plans for coastal environments that consider the requirements and aspirations of indigenous peoples and local communities, as well as the various natural resources involved

4. **Unsustainable/illegal logging :**

(i) **Strengthening forest governance**, including by:

- Reviewing and improving the policy, legal and regulatory frameworks (e.g. taxes, incentives, trade regulations and export/import controls)

- Promoting forest law enforcement

(ii) **Strengthening local forest management**, including by:

- Strengthening capacities and extension services for the sustainable management of forests, including community forestry and joint forest management schemes

- Supporting farmer-assisted natural regeneration, reforestation and tree planting in agriculture lands to reduce pressure to natural forest and current stocks

5. **Infrastructures (roads, hydropower), mining, oil and gas extraction, settlement expansion :**

(i) **Encouraging integrated land-use planning and management**, including by:

- Institutional strengthening, cross-sectoral coordination and adequate information systems

- Enforcing harmonized laws to prevent different ministries operating at cross-purposes

(ii) **Promoting forest protection**, including by:

- Reinforcing and expanding protected areas

- Enforcing laws against forest encroachment

(iii) **Promoting best industry practices** (e.g. those of the International Council on Mining and Minerals, and Good Practice Guidance on Mining and Biodiversity), including by:

- Seeking continual improvement of environmental performance

- Benefit-sharing with local communities.