

FORESTRY

CGPSC

STATE FOREST SERVICE

TOOLKIT

Detailed
Syllabus Based
study material

+

Linkage of
Concepts
with PYQs

+

Infused with
Infographics
& Maps

Paper - 4

- © Forest Protection
(including Forest Entomology & Pathology)
- © Wood Science & Technology
- © Minor Forest Produces (NTFPs)
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- © Forest Economics
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MODULE – 4



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Module - 4

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FOREST PROTECTION

INTRODUCTION

1.1 FOREST DISASTERS

HAZARD : A dangerous event, natural or man-induced, that could cause injuries, loss of life, damage of property, livelihood, or environment in a definite area. Events may be –

- **Natural**, e.g., Tsunami, Volcanic eruption, Earthquake, etc.
- **Man-induced**, e.g., Pollution, Flood, Drought, etc.

DISASTER : When a *natural* or *human-induced event* causes *widespread human loss*, accompanied by loss of livelihood, property, and the environment *in a definite area*.

- Means that an event becomes a disaster only when it happens at such a wide scale that the forest ecosystem is unable to cope with it, causing complete disruption of the normal functioning of the forest ecosystem.

[A **forest disaster** is a large-scale event that causes significant damage to a forest ecosystem]

TYPES OF FOREST DISASTERS

Based on speed

- Slow onset : Takes months/Years – Drought, Environmental / Forest degradation.
- Rapid onset : Triggered instantaneous – Cyclone, Landslide, Forest fire, etc.

Based on the agency

- Natural : Tsunami, Cyclones
- Man-induced : Forest fire

Based on the area of damage

- Climatic disasters : Drought, Flood in the Low lying area, Cyclone, Hail storm, Heatwave
- Geological disasters : Landslides, Volcanic eruptions, etc.
- Hydrological disasters : Tsunami, Limnic eruptions, etc.
- Man-induced : Forest fire, Heavy metal poisoning, etc.



Mt. Merapi volcano erupts, Indonesia, March 2023



Bhopal gas tragedy



The U.S. military used **Agent Orange**, a herbicide and defoliant, during the Vietnam War from 1962 to 1971.

PROTECTION AGAINST INJURIES BY ANIMALS

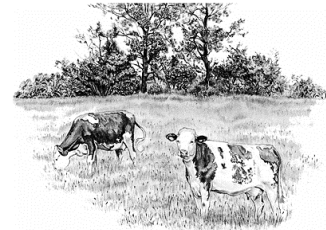
Animals cause damage to forests through grazing, browsing, debarking, trampling of plantations, and new growth.

Domestic animals often enter the forest to graze, which can have significant negative impacts on both the forest and its wild inhabitants. One major concern is the potential spread of diseases from domestic animals to wild animals. Additionally, domestic animals can inadvertently introduce new weed species by carrying the seeds on their bodies.

3.1 GRAZING

Grazing refers to feeding leaves and twigs of plants such as grasses and herbs.

Grazing Animals : Cow, Buffalo, etc.



Grazing

SIGNIFICANCE

- The backbone of the rural economy by providing milk, food, meat, and workforce.
- Contribute 6 % of GDP and 25 % of agricultural GDP.

GRAZING PATTERN

- (1) **Migratory grazing** : In this grazing, animals move from a higher to a lower altitude in winter seasons to avoid cool weather conditions uphill and go back to hills in summer (*i.e.*, Bakarwals in HP, Van Gujjar in JK).

☞ *Kharak* system in Uttarakhand, *Gol* system in Rajasthan,

- (2) **24 hour grazing** : In this, livestock remains inside the forest throughout the day. After the end of the designated period, animals are captured again for domestic use.
- (3) **Day grazing** : Here, animals are allowed inside the forest in the daytime for grazing. In the nighttime, livestock is returned back to cattle sheds located near the human settlements.
- (4) **Penning and stall feeding** : In this kind, fodder is collected from the forest and fed to the cattle in the cattle shed itself. Animals are not allowed to go out of the cattle shed.



Browsing :

[Goat, Elephant, Camel, etc.]

► GRAZING SYSTEM

- (1) **Continuous grazing** : In this grazing, the area subjected is *allowed for grazing throughout the year* without any control or regulation measures. This is not advisable because *continuous grazing*

PROTECTION AGAINST INJURIES BY INSECTS

Insects are a significant threat to forests as they cause a lot of damage. They can harm plants at any stage of growth, from the time the seeds are planted until the final product is ready. Some insects like weevils and moths can even attack the seeds before they are collected. The deterioration of seeds due to insect infestation can continue during storage as well.

4.1 HARMFUL POLYPHAGOUS INSECTS

- **Termites (White ant)** : Species - *Odontotermis* obesus & *Microtermis* mycophagus

- ✘ Order : Isoptera
- ✘ Harmful stage : Larvae / Pupae / **Adult only** / All
- ✘ Caste responsible for all types of damages : Larvae / **Workers** / Queen / Soldiers.
- ✘ Termite problems are more serious in *Arid and Semi-arid* conditions/Sandy and Sandy loam soil.
- ✘ Positive Role of Termite in *Nutrient Recycling*
- ✘ Chemical control can be achieved by spraying *Aldrin* and *Chloropyrifos*.



Termite



White grub

- **White Grub or Chaffer Beetle or June Beetle or Cock Chaffer** : It is a *soil-dwelling root feeder polyphagous* larva.

- ✘ Order : Coleoptera
- ✘ Example : *Holotrichia* Consanguinea***
- ✘ Serious Nursery pest of *Teak, Sal, Deodar, Babool, Ber* and *Khejari*.
- ✘ Attackers stage : Grub (Root feeder, attack on seedlings), Adult (Leaf feeder).



Cut-worm

- **Cut-worm (*Agrotis epsilon*)** : The *caterpillar* is mainly active *during the night* and cut young shoots *near the base* to suck sap.

- ✘ It attacks primarily on - *Acacia, Albizzia, Prosopis (AAP), and Eucalyptus*.



Inderbela quadrinotata

- **Bark-eating caterpillar (*Xyleborous*)** : Caterpillars such as the *Inderbela quadrinotata* consume the bark of many species and form shelters around it.

- ✘ Attacks on *Acacia, Albizzia, Prosopis (AAP), and Ziziphus*.

CHAPTER 3

TIMBER DEFECTS

Defects in timber can occur naturally or as a result of various environmental and processing factors. These defects can affect the strength, appearance, and overall quality of the wood.

DEFECTS DUE TO INSECT ATTACKS

- **Borer Holes** : Caused by insects, Birds, marine borer, etc.

DEFECTS DUE TO FUNGAL ATTACKS

- **Rot or decay** : when fungi feed both soft and heartwood, *i.e.*, White rot, Brown rot, red rot, etc.

The fungi group that digests/Attacks on	Type of rot
Cellulose, but not lignin	Brown rot
Both Cellulose and lignin (All components of cell wall)	White rot
Cellulose in the secondary cell wall makes it brittle	Soft rot

Note : **Dry rot** – Decomposition of *felled timber* caused by the action of *various fungi* (Lack of proper ventilation).

Wet rot – Decay of timber caused by *alternate wetting and drying* [RPSC AE 2013; Nagaland PSC CTSE 2017].

- **Strain** : When fungi attack and feed sapwood portion only, where food material is stored, it causes strains (markings). This activity only affects the sapwood, leaving the heartwood unaffected. As a result, the strength of the wood remains unchanged; however, the colour will be changed.



Soft – rot



Wood Strain

DEFECTS DUE TO NATURAL DEFECTS (GENETIC)

- **Fluted stem** : Common example – *Teak*^{***}
- **Tapering** :
- **Pith**^{***} : its presence in wood is also considered a defect

CHAPTER 9

USES OF WOOD

- ▶ **Aircraft Industry** : requires light wood with straight fibres and great strength, i.e., *Picea sitchensis*, *Picea smithiana****, *Ochroma pyramidalis**** (Balsa = *Lightest wood*)***, etc.
- ▶ **Agriculture Implements** : only the strongest, hardest wood can be suitable to hold pressure developed during uses in bullock carts, Plough, handles, etc. With this, species also must be locally available.

Example : Babool (*Acacia nilotica*), *Xylia xylocarpa*, *Anogeissus latifolia*, etc.

- ▶ **Battery Separators** : wood should be light, sufficiently strong, straight grain, and especially free from volatile acids, tannins and resinous material so it couldn't affect electrolytes.

Examples : *Conifers**** – *Abies pindrow*, deodar, pines, spruce, etc.

- ▶ **Boat and Shipbuilding** : should be strong, elastic, durable and free from defects to stand the enormous strains and marine environment. With this, it should be light in weight and corrosion-resistant

Examples : **Teak***** (*Best ship building timber****)

Ochroma pyramidalis (Balsa) and *Bombax ceiba* for life-saving apparatus.

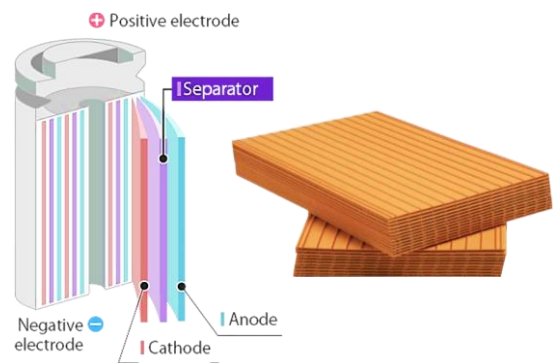
- ▶ **Furniture Industry** : The essential qualities required are good colour, handsome grain or figure, non-liability to crack, split, warp or ease of working and finishing.

Examples : Teak (*Tectona grandis*), Rosewood (*Dalbergia latifolia*), Siris (*Albizia spp.*).

- ▶ **Matchwood Industry** : required wood should have straightness of grain, good fissility, strength, good white color, freedom from knots, easily peelable, and capacity to absorb paraffin

Examples : *Boswellia serrata**** (Salai), *Populus tremula*, *Ailanthus excelsa****, *Bombax ceiba**** (Semul, mainly planted in North India for the matchwood industry)* etc.

- ▶ **Packaging Industry** : would be light, free from knots and should have straight fibres to provide excellent packaging with not increasing packaging weights. Examples : Conifers.



The *Beypore Uru* is a traditional dhow that was built in Beypore, India, with a legacy that dates back to the 11th century. Made from pure Malabar teak and coir, these vessels have been used for generations to facilitate trade, and are renowned for their unique design and skilled craftsmanship.

FOREST MARKET

SYLLABUS : Analysis of trends in the national and international market and changes in production and consumption patterns. Assessment and projection of market structures.

- ❖ **MARKET** : an area or place where buying and selling of various goods and commodities taken place.
- ❖ **MARKET STRUCTURE** : The term *structure* refers to something that has organization and dimension (*i.e.*, shape, size and design), and which is evolved for the purpose of performing a function. By the term *market structure*, we refer to *the organizational characteristics of a market including its size, design and manner of operation that affect the nature of competition and pricing, and the operations of business firms.*

COMPONENTS OF MARKET STRUCTURE

1. Concentration of Market Power – means, the element that determining the nature of competition, Conduct & performance of the market. This is measured by the number and size of firms existing in the market. A high degree of market concentration restricts the movement of goods between buyers and sellers at fair and competitive prices, and creates an *oligopoly*^{***} or *oligopsony*^{***} situation in the market.
2. Degree of Product Differentiation - Homogeneous or other nature of the product affects the market structure. If products are homogeneous, the price variations in the market will not be wide. When products are heterogeneous, firms have the tendency to charge different prices for their products.
3. Conditions for entry of Firms in the Market - Sometimes, a few big firms do not allow new firms to enter the market or make their entry difficult by their dominance in the market.
4. Flow of Market Information - A well-organized market intelligence information system helps all the buyers and sellers to freely interact with one another in arriving at prices and striking deals.
5. Degree of Integration - The behavior of an integrated market will be different from that of a market where there is no or less integration either among the firms or of their activities. Firms plan their strategies in respect to the methods to be employed

Monopoly (mono = Single + Poly = Supplier) : a market situation where a specific person or enterprise is the only supplier of a particular commodity.

Oligopoly (some suppliers) - a market situation when there are only a few suppliers (sellers) for the supply of goods or services

Monopsony (Single buyer) - a market situation where a specific person or enterprise is the only buyers of a particular commodity

Oligopsony = few buyer

Perfect (Open) market : a market structure, where a large number of small firms compete against each other. In this scenario, a single firm does not have any significant market power.

OTHER RELATED LAWS

CHAPTER 3

Before the enactment of the IPC, the criminal laws in India were not uniform and followed the European, Mohammedan, and Local laws. It was thus decided that a uniform criminal law should be framed. *Macaulay* was entrusted with this task, and the IPC came into operation from 1862. It is now the substantive criminal law of the country.

[Indian penal code – enacted on 6 **October 1860**. However, commenced by 1 **January 1862**]

The Cr. PC is primarily an adjective law of procedure that provides the mechanism for the punishment of offenders by -

- * Creating different grades/levels of courts and defining their powers.
- * Laying down the duties of the police in the investigation of offenses, arresting offenders, and producing them before the court of law.
- * Framing rules of procedure for the production of documents and other matters.

Indian penal code (IPC)

It was drafted by *Macaulay*, who presided over the *first Indian law commission*. The IPC is considered to be one of the most detailed criminal laws in the world. Its coverage includes –

1. Criminal conspiracy
2. False evidence
3. Criminal trespassing
4. Murder, attempt to murder
5. Mischief
6. Counterfeiting
7. Abetment
8. Wrong confinement
9. Theft
10. Unlawful assembly and many more

Applicability of IPC in forest laws/offenses: The Indian Forest Act and Wildlife (Protection) Acts are fairly comprehensive and cover most types of offenses in connection with forests and wildlife, the IPC is also applicable both directly and indirectly to forest offenses/laws and forest administration. This includes the following offenses where the provisions of the IPC are attracted –

- Theft of timber from government sale depots outside the limits of a forest.

Congratulations

To all our successful candidates in

INDIAN FOREST SERVICE (IFOS) 2023



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64 Out of **147** Total Selections in

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