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Module - 3

Syllabus

Indian Forest Service (IFoS) [Paper 1 | Section A] & ***Uttar Pradesh*** PSC State Forest Service Exam 2025-26 [Paper 1]	***Tribology*** : Tribal scene in India; tribes, the concept of races, Principles of social grouping, stages of tribal economy, education, cultural tradition, customs, ethos and participation in forestry programs. ***JFM*** : Details of steps involved such as the formation of Village Forest Committees, Joint Forest Participatory Management. Principles, objectives, methodology, scope, benefits and role of NGOs. ***Environmental Conservation And Biodiversity*** ***Environment*** - components and importance, principles of conservation, impact of deforestation; forest fires and various human activities like mining, construction and developmental projects, population growth on environment. ***Pollution*** - types, global warming, greenhouse effects, ozone layer depletion, acid rain, impact and control measures, environmental monitoring; concept of sustainable development. Role of trees and forests in environmental conservation; control and prevention of air, water and noise pollution. Environmental policy and legislation in India. Environmental Impact Assessment. Economics assessment of watershed development *vis-a-vis* ecological and environmental protection ***Tree Improvement And Seed Technology*** : General concept of tree improvement, methods and techniques, variation and its use, provenance, seed source, exotics; quantitative aspects of forest tree improvement, seed production and seed orchards, progeny tests, use of tree improvement in natural forest and stand improvement, genetic testing programming, selection and breeding for resistance to diseases, insects, and adverse environment; the genetic base, forest genetic resources and gene conservation in situ and ex-situ. Cost benefit ratio, economic evaluation. ***Forests Soils*** : Classification, factors affecting soil formation; physical, chemical and biological properties. ***Soil Conservation*** : Definition, causes for erosion; types – wind and water erosion; conservation and management of eroded soils/areas, wind breaks, shelter belts; sand dunes; reclamation of saline and alkaline soils, water logged and other waste lands. Role of forests in conserving soils. Maintenance and build-up of soil organic matter, provision of lopping's for green leaf manuring; forest leaf litter and composting; Role of micro-organisms in ameliorating soils; N and C cycles, VAM. ***Watershed Management*** : Concepts of the watershed; the role of mini-forests and forest trees in overall resource management, forest hydrology, watershed development in respect of torrent control, river channel stabilization, avalanche and landslide controls, rehabilitation of degraded areas; hilly and mountain areas; watershed management and environmental functions of forests; water-harvesting and conservation; groundwater recharge and watershed management; the role of integrating forest trees, horticultural crops, field crops, grass, and fodders. Other state PSC exams also have similar syllabi to the IFoS exam, such as the ***Bihar PSC*** State Forest Service (ACF) Exam (paper 1), ***Uttar Pradesh*** PSC State Forest Service [Paper 1, Section A]; ***Odisha PSC*** State Forest Service (Main) Examination [Paper 1 | Section A]; ***Jharkhand PSC*** State Forest Service (Main) Examination [Paper 1].

Module - 3

CONTENTS

UPPSC STATE FOREST SERVICE (ACF/RFO) PYQs | 2017 – 2021

Joint Forest Management (JFM)

Year	Questions
2021	निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए / Write a short note on the following — संयुक्त वन प्रबंधन। / Joint Forest Management [P1/5(a) | 8 M] कैंपा योजना क्या है? उ.प्र. संयुक्त वन प्रबन्ध नियमावली के मुख्य प्रावधान क्या है? What is CAMPA scheme? What are the main provisions of the U.P. Joint Forest Management Rules? [P2/7(b) | 20 M]
2020	संयुक्त वन प्रबन्धन के विधियाँ एवं लाभ का वर्णन कीजिए। / Describe the methodology and benefits of joint forest management [P1/5(b) | 8 M] संयुक्त वन प्रबंध क्या है? वर्तमान परिदृश्य में पारंपरिक वन प्रबंध की तुलना में इसकी प्रासंगिकता को स्पष्ट करें। What is Joint Forest management? Explain its relevance in present scenario as compared to traditional forest management [P2/1(b) | 8 M]
2019	निम्नलिखित के बीच अंतर करें (अधिकतम 5 बिन्दु अथवा 5 पंक्तियाँ) / Differentiate between the following (Maximum 5 points or 5 lines) — सक्रिय जन सहभागिता बनाम निष्क्रिय जन सहभागिता / People's active vs passive participation [P1/5(a) | 8 M] — संयुक्त वानिकी प्रबन्ध बनाम सामाजिक वानिकी / Joint Forest Management vs Social Forestry [P1/5(e) | 8 M]
2018	निम्नलिखित पर एक संक्षिप्त नोट लिखें / Write a brief note on the following. — संयुक्त वन प्रबंधन / Joint Forest Management [P1/7(d) | 8 M] संयुक्त वन प्रबंध समितियों के गठन की प्रक्रिया का वर्णन करें। वन संरक्षण एवं आदिवासियों के विकास में संयुक्त वन प्रबंध समितियों के योगदान की चर्चा करें। Describe the process for set up of Joint Forest Management. Discuss the role of JFM in forest conservation and tribal development [P2/4(a) | 20 M]
2017	संयुक्त वन प्रबन्ध समितियाँ कैसे गठित की जाती हैं? वन तथा वन्य जीव संरक्षण में इनका किस प्रकार उपयोग किया जा सकता है? How Joint Forest Management Committees are formed? How can these be utilized in the conservation of forests and wildlife? [P2/4(b) | 20 M]

ENVIRONMENTAL CONSERVATION & POLLUTION

Year	Questions
2021	निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए / Write a short note on the following — पर्यावरण संरक्षण पर विकासोन्मुखी परियोजनाओं का प्रभाव। / Impact of developmental projects on environmental conservation [P1/5(d) | 8 M] निम्नलिखित का कारण सहित वर्णन करें / Describe the following with reasons — ग्लोबल वार्मिंग। / Global warming [P1/7(a) | 8 M] — पारिस्थितिक तंत्र पर अम्लीय वर्षा का प्रभाव। / Impact of acid rain on ecosystem [P1/7(b) | 8 M] — ध्वनि प्रदूषण और मानव स्वास्थ्य। / Noise pollution and human health [P1/7(c) | 8 M] निम्नलिखित को विस्तृत रूप से स्पष्ट कीजिए / Explain the following in detail: — पर्यावरण प्रभाव आकलन। / Environment Impact Assessment [P1/8(a) | 8 M] — ओजोन परत क्षरण। / Ozone layer depletion [P1/8(d) | 8 M]

2017	निम्न के तकनीकी व्योरों एवं लाभों का वर्णन कीजिए / Describe the technical details and benefits of the following — मृदा उपजाऊपन की पद्धतियाँ /Soil enrichment methods [P1/3(a) | 4 M] निम्नलिखित में से प्रत्येक का उत्तर लगभग 150 शब्दों में दें / Answer the following in about 150 words each: — उसर (लवणीय-क्षारीय) मृदा कैसे बनती है? इसके सुधार की क्या विधियाँ हैं? / How usar (saline-alkaline) soil is formed? What are the methods for reclamation of this soil? [P2/5(b) | 5 M]

WATERSHED MANAGEMENT

Year	Questions
2019	निम्नलिखित के बीच अंतर करें (अधिकतम 5 बिन्दु अथवा 5 पंक्तियाँ) / Differentiate between the following (Maximum 5 points or 5 lines): — जल संग्रह बनाम जल पुनर्भरण / Water harvesting vs water recharge [P1/5(c) | 8 M] अनुरोध के अनुसार निम्नलिखित पर वर्णन कीजिए / Describe the following as requested: — जल-विभाजक प्रबन्ध का धार (टोरेंट) नियंत्रण में भूमिका / Role of watershed management in torrent control [P1/8(d) | 8 M] — जल-विभाजक प्रबन्ध का निष्कृष्ट क्षेत्र के पुनर्वास में भूमिका / Role of watershed in rehabilitation of degraded areas [P1/8(e) | 8 M]
2018	जलविभाजन को परिभाषित करें। सतत विकास में जलविभाजन प्रबंधन की भूमिका का वर्णन करें / Define watershed. Describe the role of watershed management in sustainable development. [P1/6 | 40 M]
2017	जलागम विकास के संदर्भ में निम्न की भूमिका पर प्रकाश डालिए / Describe the role of the following in watershed development — पानी संचय / Water harvesting [P1/8(a) | 5 M]

CHAPTER 1

INDIAN TRIBES

Since prehistoric times, India has been a country of multi-racial community, spread throughout the Indian peninsula with its definite cultural variations and level of development. Among them, many groups are still in a primitive state and are very weakly affected by so-called modernization. Therefore, those people are called *aboriginals,* and the popular names we often used for them are Vanvasi, Pahari (in HP, UK), Adimjati (Primitive People), Adivasi (Indigenous People), Anusand Janajati (Scheduled Tribes (ST), etc.

1.1 DEFINITION

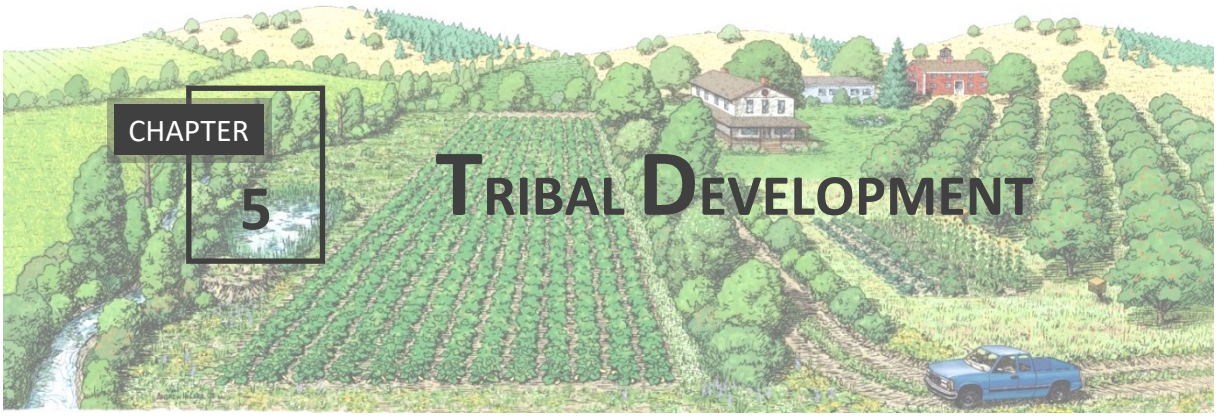
- The tribe is a collection of families bearing a common name, a common living homeland, members of which speaking the same languages and observed certain taboos regarding marriages and occupations.
- A tribe is a group speaking a common dialect and inhabiting a common territory.
- A tribe is a small isolated, closely-knit society.

The term 'tribe' is derived from the *Latin* word '*tribus*' which is used by the Romans for a social group of poor people among its citizens.

1.2 CHARACTERISTICS OF THE INDIAN TRIBE

- *Definite territory* - members of a tribe occupy a common and well-defined territory, *i.e.*, the Bharia tribe of MP lives in the Patalkot (Chindwada district).
- All the members of a tribe *speak a common language* or dialect but *usually lack script*, *i.e.*, Koru by the Korku tribe, Gondi by Gonds, etc. [The Santhali has its own script called C*hikiscript*].
- The members of a tribe are claimed to be *originated from a common ancestor* and blood related to each other.
- Have *common folk arts* & culture, *common religion*, beliefs, customs, Taboos, and myths.
- Names have *common types of surname*.
- *Common occupation* primarily *depends upon the forest* for their livelihood. Hunting and food gathering are common practices.
- Shows *strong social and political unity*. Govern by their own laws through tribal assembly to maintain peace, justice and punish if someone violates customs. Generally, Mukhia commands the tribe with the help of the body of warriors and tribal assembly, and his decisions are final.
- Habitation in *remote and inaccessible forest areas*, Illiteracy.

Tribal prefer to live in thatched house



CHAPTER 5

TRIBAL DEVELOPMENT

Tribal communities continue to be vulnerable even today, not because they are poor and illiterate compared to the general population, but their inability to negotiate and cope with the consequences of their integration with the mainstream economy, society, cultural and political systems. The requirements of planned development brought with them the dams, mines, industries, and roads, all located on tribal lands. Tribal institutions and practices were forced into an uneasy coexistence.

► SOCIO-ECONOMIC AND CULTURAL PROBLEMS OF TRIBALS

- Problems related to the forest – rapidly decreasing natural resources, climate change and erratic rainfall, misuse of rights, and concessions by some.
- Agricultural still in primitive phase & irrigation issue
- Illiteracy and Poverty
- Health issues & alcoholism
- Inadequate employment opportunity and Bondage labor
- Lack of credit and market facility = Indebtedness.
- Land alienation
- Exploitation of tribals by Middle-man, Traders, contractors, and NGO gang.
- Migration for employment
- Poor governance & corruption
- Displacement due to developmental programs.

► SOLUTION

- To save their rights : give special status to the tribal area and socio-cultural linked programs, promoting the proper implementation of forest right act.
- Economic development through -
  - IPR and bio-prospecting
  - Geotagging of their produce
  - fair and festivals like Bhagoria haat, Hornbill festival of Nagaland, etc., to promote cultural tourism, ecotourism, etc.
  - Joint forest management & promotion of cottage industry.
  - Marketing their products through Flipkart/Amazon.
  - Promotion of social forestry and agroforestry on their own land.
  - Promotion of forest-based cottage industry, collection of MFP in a sustainable manner.
  - Agriculture development programs like solar pumps for irrigation.

CHAPTER 1

JOINT FOREST MANAGEMENT

Chapter outline

Joint Forest Management (JFM) is an approach and program initiated by the *National Forest Policy of 1988*. Under this, the state forest departments support local forest-dwelling and forest fringe communities to protect and manage forests by sharing the costs and benefits of the forests with them. Communities organise themselves into a JFM Committee to preserve and manage nearby forests, guided by locally prepared guidelines and micro-plans.

JFM is a *participation of the local community* in the management of forest

1.1 HISTORICAL BACKGROUND

In 1931, Van Panchayats in Uttarakhand started participating in forest management, as the remote Himalayan region where creating hardness to the forest department because of the poor Cost-benefit ratio.

Later, the Forest Department of West Bengal successfully started a pilot project in the Arbari*** village (hilly area) during 1971–72, and it was a major success.

Followed by Haryana and Odisha, but all these (WB, HR, Odisha, etc.) were pilot projects or individual efforts of some dedicated forest officers and had no forest policy or legal back-ups.

Other similar efforts, *i.e.*, Forest Cooperatives in the Madras Presidency (the 1900s) and cooperative Forest Societies in Kangra (1940s, earlier Punjab, now Himachal Pradesh). Woodlots on panchayat lands under Social Forestry (the 1980s - with Revenue sharing agreements).

The actual initiative by MoEFCC on JFM started with the ***National Forest policy – 1988***** on its past experiences, followed by the ***Guideline of 1990***** to utilize forest wealth to improve local livelihoods. This guideline explains how the forest committee was formed, its powers & functioning, NWFP sharing %, etc. *This guideline forms the basic foundation of JFM in India. That's why most Academicians consider this as the year of initiation of JFM in India*.

- To increase transparency & accountability in the forest department
- Economic empowerment of tribal people and job creation. Eliminating the issue of shifting cultivation by adopting alternative farming, *i.e.*, tree farming.
- More effective management of forest resources.
- Speedily achieving ecological needs, INDC, and other aims/targets.
- More effective managing issues of forest degradation, soil erosion, deforestation, and wildlife conservation through people's actions.

1.3 SALIENT FEATURES OF JFM

The JFM has institutionalized people's participation in each and every stage of the decision-making process and helps to manage forestlands jointly.

- The JFM provides a common structure for consultation and negotiations between the forest department and the local people and assures legalized access for the local communities to forestlands.
- It facilitates the benefit-sharing mechanism and ensures livelihood opportunities for the local community.
- The JFM process encourages local people to protect the forest from fire, grazing, and other illegal activities.
- The JFM process facilitates the involvement of local people in all decision-making processes.

1.4 STRUCTURE OF JFM

In general, the basic structure of JFM comprises a village-level committee called - *The Forest Protection Committee* or *Van Samrakshana Samiti* (VSS). These bodies include (a) a "*General Body*" and (b) a "*Forest Management Committee*" (FMC) - a *core Executive* elected by the General Body to discharge the assigned functions.

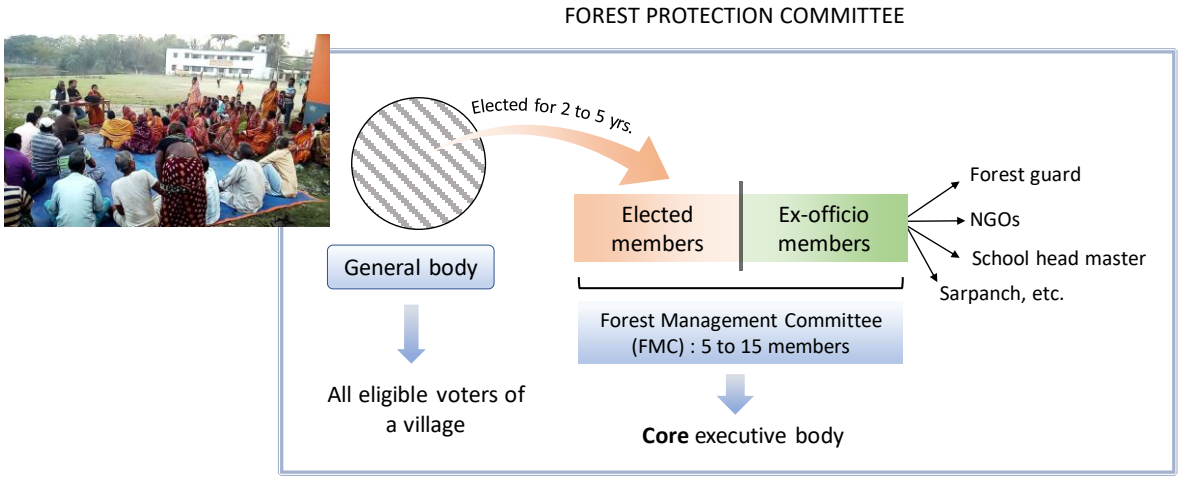


Figure : Forest management committee structure in **Madhya Pradesh**

- The General Body comprises eligible members of the village. The eligibility criteria for membership vary from State to State. In most states, adults are eligible for joining the General Body. The General Body elects the local community representatives in the Executive Committee.
- The Executive Committee has elected members from **5 to 15**. It *also includes ex-officio, non-elected members drawn from the Forest Departments, local NGOs, village schools, village administrative and development officers, and representatives of the Gram or Mandal Panchayats* [Vary with states].

CHAPTER 2

PARTICIPATORY RURAL APPRAISAL (PRA) AND RAPID RURAL APPRAISAL (RRA)

Chapter outline

Collection of information for planning rural development activities, including JFM, involves detailed surveys, data collection, and extensive field visits. In the past, the staff of the department or project used to collect information on their own. However, this method had the following drawbacks

- High time, money, and workforce-consuming.
- Most of the time proved to be beyond the capacity of the staff resources.
- The data generated was not very reliable (and sometimes forged)
- The local communities were not involved in this process, resulting from which their views did not get adequately reflected.
- The efforts by the staff were prone to be biased, leading to severe distortions.
- Often the information was not reliable.

As a result, many schemes launched after detailed planning could not achieve the desired results despite the best intentions of those who planned and implemented it. The perceptions of staff could be different than that of the participating local communities. Planners realized that participation of the communities in plan formulation was essential. To collect information and enhance the level of communities involvement, the following two processes have been evolved.

A. Participatory rural appraisal (PRA)
B. Rapid rural appraisal (RRA)

IFoS 2019 : Why are participatory rural appraisal (PRA) techniques important for planning and execution of Joint forest management (JFM) Activities? Explain the tools and techniques of PRA (15 m).

2.1 PARTICIPATORY RURAL APPRAISAL (PRA)

Participatory Rural Appraisal (PRA) is a tool to facilitate the collection and analysis of information by and for community members. It emphasizes local knowledge and involves communities in the

CHAPTER 5

SUSTAINABLE FOREST DEVELOPMENT

Chapter outline

In recent years, environmental issues have attracted a tremendous amount of attention worldwide. It was the Brundtland Commission report in 1987 and the Rio summit in 1992 that sparked major motivation. This interest is focused mainly on sustainable ways to better management of resources and carry out the development in a harmonious fashion in relation to the environment. Although, the world needs new development to run its economies and to make progress. This puts pressure on us to think about how we can manage our resources in a sustainable way. This resulted in the institution of new legislation originating from national and international sources where potential adverse effects of future development activities are tried to mitigate or avoid at the planning stage. Environmental impact assessment (EIA) is such an example that assesses the impacts in advance.

5.1 DEFINITION

Sustainable forest management (SFM) is defined as a *dynamic and evolving concept*, which aims to *maintain and enhance the economic, social, and environmental values* of all types of forests, for the benefit of present and future generations. Forests and trees, when sustainably managed, make vital contributions both to people and to the planet, bolstering livelihoods, providing clean air and water, conserving biodiversity, and responding to climate change (F.A.O.)

'Sustainable forest management is the process of managing forests to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services, without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.' (ITTO, Criteria, and Indicators for Sustainable Management of Natural Tropical Forests, 1998)

CHAPTER 13 CARBON CYCLE

13.1 EXERCISE

IFoS 2021 : What is the role of forest plantations in *Carbon Sequestration*? (10 m)

- Discuss the role of forest for *carbon sequestration* [Odisha Civil (Main) 2015 | 20 Marks]

IFoS 2020 : Why is *carbon cycle important* ? How do human activities affect carbon cycle? (10 m).

IFoS 2018 : What is *carbon sink* ? How do forest soils act as important carbon sinks? (8 m).

IFoS 2015 : Why is *carbon recycling important* ? What are its influences on climate? Discuss your points for or against (10 m).

IFoS 2012 : Write short notes on - *Source-sink relationship* with respect to carbon cycle (5 m).

- Explain the role of *afforestation* in *carbon sequestration* [Odisha Forest Service (Mains) 2015 | 20 Marks]

13.2 CARBON CYCLE

Carbon is the foundation of all life on Earth, required to form complex molecules like proteins and DNA. This element is also found in our atmosphere in the form of carbon dioxide (CO_2). Carbon helps to regulate the Earth's temperature, makes all life possible, is a key ingredient in the food that sustains us, and provides a major source of energy to fuel our global economy.

The carbon cycle describes the *process in which carbon atoms continually travel from the atmosphere to the Earth and then back into the atmosphere*. Since our planet and its atmosphere form a closed environment, the amount of carbon in this system does not change.

On Earth, *most carbon is stored in rocks and sediments*, while the rest is located in the ocean, atmosphere, and in living organisms. These are the reservoirs, or sinks, through which carbon cycles. Carbon is released back into the atmosphere when organisms die, volcanoes erupt, fires blaze, fossil fuels are burned, and through a variety of other mechanisms. In the case of the ocean, carbon is continually exchanged between the ocean's surface waters and the atmosphere or is stored for long periods of time in the ocean depths.

IMPORTANCE OF CARBON CYCLE

- The carbon cycle is *vital to life on Earth*. Studying the movement of *carbon energy* helps us to understand the *working of forest ecosystems* and the factors that influence it.
- Carbon dioxide *traps the long-wave radiation* from the Earth, *causing temperatures to rise*. Understanding the absorption and release of carbon dioxide is crucial in comprehending climate dynamics and predicting global warming.

CHAPTER 15

VARIATIONS

Variation refers to the variability in a species that includes genetic and morphological variances, *i.e.*, Dogs come in many different sizes, People have many different hair colours, etc.

► **CAUSES OF VARIABILITY** : Variability arises in a population due to the following –

- The trees grow in *differing environments*, *i.e.*, in foothills *v/s* coastal areas.
- When the trees have *different genetic makeups* due to mutation, polyploidy, genetic drift, natural selection, interbreeding depression, mating systems, man-made variations, etc.

► **IMPORTANCE OF VARIATIONS** : variations mean species of the same genus have different adaptation mechanisms and survival strategies to similar growing conditions, or members of the same species have this under different growing conditions due to changes in their genotypes and phenotypes, *i.e.*, leaf variations in *Dalbergia sissoo* and *Dalbergia latifolia*.

These variations provide us with vast genetic resources linked with particular insect-pest resistance, quality or quantity of wood, or any specific characteristics to easily select them and choose to develop a species of desired characteristics.

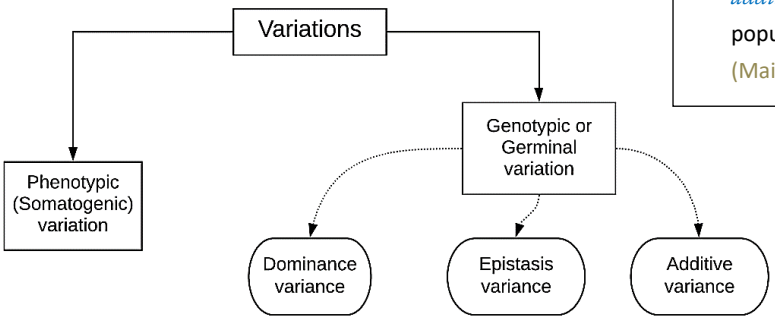
IFoS 2023 : Discuss the *significance of variation* in tree improvement [10 M]

IFoS 2019 : Define - (i) *Variation* (2.5 m).

IFoS 2015 : How can *magnitude and type of variability* be manipulated to obtain good gains in some tree characteristics ? (8m).

- Differentiate between (a) *Genotypic* and *phenotypic* variations [Himachal PSC Civil (Main) 2011; UPPSC (ACF) 2018].
- What are the *additive* and *non-additive* genetic variations in a tree population? [Arunachal PSC Civil (Main) 2015-16].

► **TYPES OF VARIATIONS**

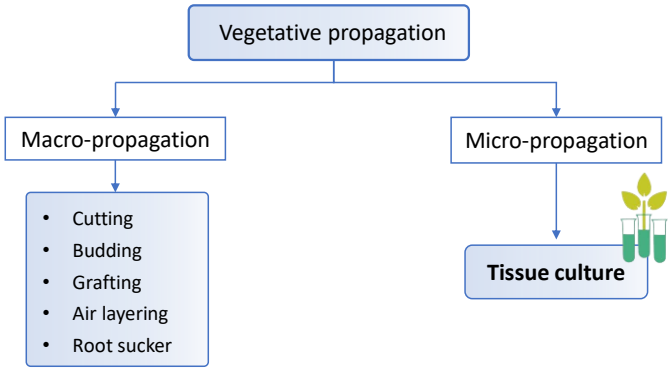


1. **PHENOTYPIC (SOMATOGENIC) VARIATION** : when trees grow under different environmental conditions, they will alter various physiological mechanisms, the colour of leaves, shape, and size of

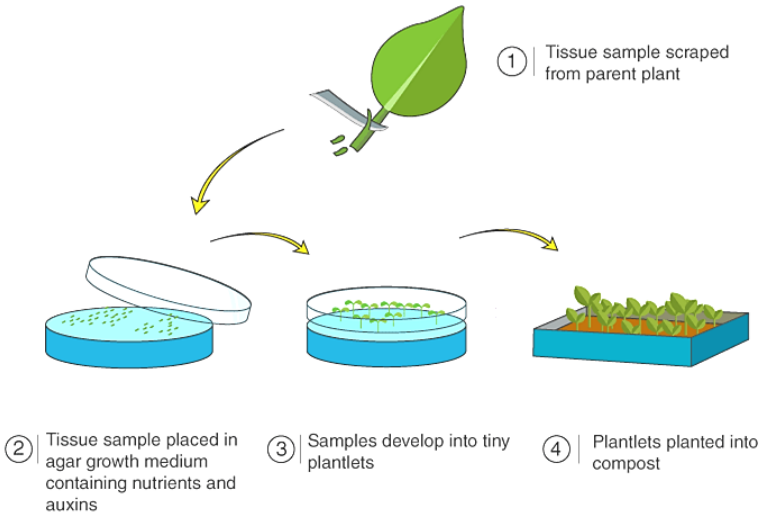
CHAPTER 22

BIOTECHNOLOGY IN TREE IMPROVEMENT

Due to rapid deforestation and depletion of genetic stocks, concerted efforts must be made to evolve new methods for mass propagation and production of short-duration trees with a rapid turnover of biomass and induction of genetic variability for the production of novel fruit and forest trees, which are high yielding, resistant to pest and disease associated with increased photosynthetic efficiency. Tissue culture techniques have already revolutionized the mass-scale propagation of many horticultural crops.



TISSUE CULTURE : In vitro culture of the plant cell, tissue, or organ under ascetic and controlled environmental conditions.



IMPORTANCE OF MICRO-PROPAGATION / TISSUE CULTURE TECHNIQUES

- A relatively large number of clones can be preserved in a small space and for a long time.
- Rapid and large-scale multiplication of clones is possible in a small space.
- Transportation is more accessible because plants can be stored, preserved, and transported in small culture flasks, and quarantine is easy.

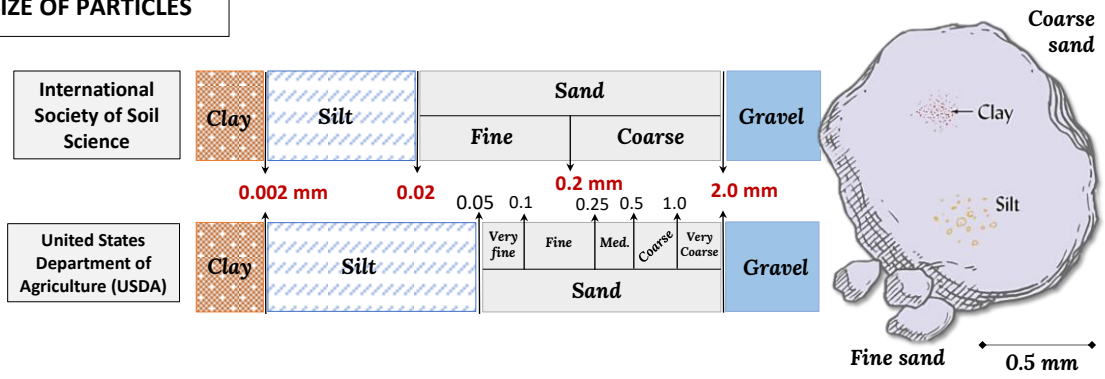
CHAPTER 6

SOIL PHYSICAL PROPERTIES

6.1 SOIL TEXTURE

The *relative percentage of sand, silt, and clay in the soil*[***]. Where *sand and silt work as a skeleton* of soil in which *clay particles fill as flesh*. The size of particles in mineral soil is not subject to change (*i.e.*, by cultural practices). Therefore, this composition is considered a permanent feature and a *basic property* of soil. Mechanical analysis of soil separates, *i.e.,* the percentage of sand, silt, and clay done by the *hydrometric method*.

SIZE OF PARTICLES



- Clay particle size : < 0.002 *mm*[***]
- Soil texture refers to the relative amounts of sand, silt, and clay, and it directly affects a soil's *cohesion*, *adhesion*, and *plasticity*. Clay soils have a characteristically *fine/heavy texture*.
- **Loam soil** – (a) best suitable soil for agriculture purposes, (b) it contains *sand, silt and clay minerals in an equal property*[***] proportional and *not in equal percentage*.
- **Soil texture determination methods** : (a) Feel methods – Ball formation, Ribbon formation. (b) Laboratory method – Mechanical analysis.

6.2 SOIL STRUCTURE

The *arrangement of primary soil particles*[***] and their aggregation into a certain definite pattern is called soil structure.

Primary soil particles : Sand, Silt, clay

Types

- **Plate-like** : arrangement of soil aggregates in a thin horizontal plane like plates or lamina, *i.e.*, Alluvial soil.
- **Prism** or **Columnar-like** : vertically oriented aggregation or pillars. Occurs in the B horizon of clay soil in *arid* and *semi-arid* regions (Salt-affected soil).
- **Block-like** : aggregation shape like a block of the irregular face. Found in *Humid zone*.

CHAPTER 8

AFFORESTATION OF DIFFICULT SITES

CONTENT

1. Hot desert and shifting sand dunes
2. Acidic soil
3. Saline alkaline area
4. Ravine land
5. Cold desert
6. Coastal land
7. Wetland
8. Mined area

8.1 HOT DESERT AND SHIFTING SAND DUNES

► **DISTRIBUTION** : The total area of hot desert in India is ~~*31.7 million hectares*~~, 61 % of which lies in Rajasthan.

Types	2008 - 09	2015 – 16 (% to TGA)
Ravines Sand	3165 km^2	3121 km^2 (0.09)
Coastal Sands	709 km^2	671 km^2 (0.02)
Desertic sand	8323 km^2	8191 km^2 (0.25)

(*Source* : Westland Atlas of India 2019)

► **LOCALITY FACTORS** : Mean annual rainfall = 100 mm to 450 mm. The rainfall in these regions is irregular, and droughts are frequent.

- **Temperature** : 48 °C in may-June to 15°C during winter, even sometimes it goes below freezing point at several places.
- **Wind** : 100 to 150 km per hour are experienced during summer.
- **Soil** : Sandy in character with a well-developed *hardpan* of *calcium carbonate* at varying depths. Desert soils are purely mineral soils obtained by the mechanical disintegration of rocks. Characteristics : (i) Very low organic matter, (ii) High percentage of soluble salts, (iii) Low nutrient status, particularly nitrogen, (iv) High pH and calcium carbonate, (v) Structureless and coarse-textured,

IFoS 2022 : Discuss the components of desert ecosystem. Write steps to control shifting of sand dunes (15 m)

IFoS 2017 : Describe the technique of *sand dune fixation* in the thar desert. Also mention the choice of species for plantation (15 m).

IFoS 2013 : What are the specific problem of the following wasteland ? suggest at least 3 species for planting in each of them – (a) Hot desert.

IFoS 2012 : Describe the technique of Sand Dune Fixation in the Thar Desert. Also mention the choice of species for planting (15 m).

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