

UPSC INDIAN FOREST SERVICE TOOLKIT

The Ultimate Guide to Success

Module - 6

- © Forest Protection
- © Forest Utilization
- © Forest Legislation
- © Forest Economics
- © Wildlife Biology

Congratulations

To all our successful candidates in

INDIAN FOREST SERVICE (IFOS) 2023



1
AIR

Ritvika Pandey

Forestry Comprehensive
Course



3
AIR

Swastic Yaduvanshi

Forestry Comprehensive
Course



5
AIR

Vidyanshu Shekhar Jha

Forestry Comprehensive
Course + Test Series



6
AIR

Rohan Tiwari

Forestry Comprehensive
Course



10
AIR

Shashank Bhardwaj

Forestry Comprehensive
Course + Test Series



14
AIR

Ankan Bohra

Forestry Comprehensive
Course



16
AIR

Prachi Gupta

Forestry Comprehensive
Course



17
AIR

Raj Patoliya

Forestry Comprehensive
Course + Test Series



23
AIR

Vineet Kumar

Forestry Comprehensive
Course



27
AIR

Jatin Babu S

Forestry Comprehensive
Course



28
AIR

Gaurav Saharan

Test Series



37
AIR

Yash Singhal

Forestry Comprehensive
Course



41
AIR

Nitish Pratik

Forestry Comprehensive
Course



50
AIR

VAASANTHI P.

Test Series



54
AIR

Sourabh Kumar Jat

Forestry
Comprehensive Course



56
AIR

Ekam Singh

Forestry Comprehensive
Course + Test Series



57
AIR

Kunal Mishra

Forestry Comprehensive
Course



58
AIR

Atul Tiwari

Forestry Comprehensive
Course



60
AIR

Aman Gupta

Forestry Comprehensive
Course + Test Series



61
AIR

Sanket Adhao

Forestry Comprehensive
Course



63
AIR

Preeti Yadav

Forestry Comprehensive
Course



65
AIR

Nihal Chand

Forestry Comprehensive
Course + Test Series



66
AIR

Shashikumar S. L.

Forestry Comprehensive
Course



67
AIR

Dhino Purushothaman

Forestry Comprehensive
Course



68
AIR

Diwakar Swaroop

Forestry Comprehensive
Course



72
AIR

Rajesh Kumar

Forestry Comprehensive
Course



74
AIR

Krishna Chaitanya

Forestry Comprehensive
Course



75
AIR

Harveer Singh Jagarwar

Forestry Comprehensive
Course



76
AIR

Akash Dhanaji Kadam

Forestry Comprehensive
Course



78
AIR

Himanshu Dwivedi

Forestry Comprehensive
Course



80
AIR

Sumit Dhayal

Forestry Comprehensive
Course



82
AIR

Priyadarshini

Forestry Comprehensive
Course + Test Series



91
AIR

Suchet Balkal

Forestry Comprehensive
Course



93
AIR

Harshad Hinge

Test Series



96
AIR

Maharshi Kumar

Forestry Comprehensive
Course



97
AIR

Akash Kumar

Forestry Comprehensive
Course



104
AIR

P R Sarbajit

Forestry Comprehensive
Course



105
AIR

Pawan K. Meena

Forestry Comprehensive
Course



110
AIR

Keshav Prasoon

Forestry Comprehensive
Course + Test Series



111
AIR

Nagabhushana S

Forestry Comprehensive
Course



113
AIR

Shewale Vyankatesh G.

Forestry Comprehensive
Course



123
AIR

Chandra Bhushan

Forestry Comprehensive
Course



127
AIR

Shubham Kanoujia

Forestry Comprehensive
Course + Test Series



128
AIR

Harsh Verma

Forestry Comprehensive
Course + Test Series



134
AIR

Gaugin Gyanendra Singh

Forestry Comprehensive
Course

64 Out of **147** Total
Selections in

Indian Forest Service (IFoS) 2023

INDIAN FOREST SERVICE (MAIN) EXAM 2023

FORESTRY

MODULE - 6



EDITION : 2024

Contact : ☎ +917223970423 ✉ Hornbillclasses@gmail.com

Gole ka mandir, Morar, Gwalior (MP) 474005

SYLLABUS

- ❖ **FOREST PROTECTION & WILDLIFE BIOLOGY** : Injuries to forest – abiotic and biotic, destructive agencies, insect-pests and disease, effects of air pollution on forests and forest die back. Susceptibility of forests to damage, nature of damage, cause, prevention, protective measures and benefits due to chemical and biological control. General forest protection against fire, equipment and methods, controlled use of fire, economic and environmental costs; timber salvage operations after natural disasters. Role of afforestation and forest regeneration in absorption of CO₂. Rotational and controlled grazing, different methods of control against grazing and browsing animals; effect of wild animals on forest regeneration, human impacts; encroachment, poaching, grazing, live fencing, theft, shifting cultivation and control.
- ❖ **FOREST RESOURCES AND UTILIZATION** : Environmentally sound forest harvesting practices; logging and extraction techniques and principles, transportation systems, storage and sale. Anatomical structure of wood, defects and abnormalities of wood, timber identification general principles.
Need and importance of *wood seasoning and preservation*; general principles of seasoning, air and kiln seasoning, solar dehumidification, steam heated and electrical kilns. *Composite wood* – adhesives - manufacture, properties, uses, plywood manufacture-properties, uses, fibre boards-manufacture properties, uses; particle boards manufacture; properties, uses. Present status of composite wood industry in India and future expansion plans.
Non-Timber Forest Products (NTFPs) – definition and scope; gums, resins, oleoresins, fibres, oil seeds nuts, rubber, canes, bamboos, medicinal plants, charcoal, lac and shellac, Katha and Bidi leaves, collection; processing and disposal.
Pulp paper and *rayon* – present position of supply of raw material to industry, wood substitution, utilization of plantation wood; problems and possibilities.
- ❖ **FOREST POLICY** : History of forest development; **Indian Forest Policy of 1894, 1952 and 1988**. National Forest Policy 1988 of People’s involvement, Joint Forest Management, Involvement of women; Forestry policies and issues related to land use, timber and non-timber products, sustainable forest management; industrialisation policies; institutional and structural changes. Decentralization and Forestry Public Administration. **FOREST LAWS** : necessity, general principles, Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972 and their amendments; Application of Indian Penal Code to Forestry.
- ❖ **FOREST ECONOMICS** : Fundamental principles, cost-benefit analyses; estimation of demand and supply; analysis of trends in the national and international market and changes in production and consumption patterns; assessment and projection of market structures; role of private sector and co-operatives; role of corporate financing. Socio-economic analysis of forest productivity and attitudes; valuation of forest goods and service.
- ❖ **WILDLIFE BIOLOGY** : There is virtually no syllabus other than mentioning the subject title + Few things linked with wildlife are scattered over the entire syllabus.

Module - 6

CONTENTS



PART – I : FOREST PROTECTION		
1.	Introduction	1 – 2
2.	Protection against injuries by man	3 – 16
3.	Protection against injuries by Animal	17 – 24
4.	Protection against injuries by Insects	25 – 30
5.	Protection against injuries by Diseases	31 – 34
6.	Remaining Part	35 - 38
PART – II : FOREST UTILIZATION		
1.	Wood Science & Technology : Introduction	39 – 48
2.	Timber transportation & Storage	49 – 52
3.	Timber grading	53 – 58
4.	Wood Properties	59 – 67
5.	Wood Seasoning	68 – 73
6.	Wood preservation	74 – 78
7.	Modified Timber	79 – 84
8.	NTFP	85 – 101
9.	Uses of wood	102 – 103
10.	Sale of forest produce	104 – 105
11.	Paper & Pulp manufacturing	106 – 108

PART – III : FOREST LEGISLATION		
1.	Forest Policies	109 – 119
2.	Forest Laws	120 – 135
3.	Other related Laws	136 – 138
PART – IV : FOREST ECONOMICS		
1.	Forest Economics : Intro	139 – 145
2.	Forest Market	146 – 151
3.	Role of Private Sector	152 – 154
4.	Forest Valuation	155 – 164
PART – V : WILDLIFE BIOLOGY		
20.	Wildlife Biology : Intro	165 – 167
21.	Wildlife management	168 – 174
22.	Wildlife Census	175 – 180
23.	Wildlife Conservation	181 – 182
24.	Human-Animal Conflicts	183 – 188
25.	Protected areas	189 – 192
26.	IUCN & Red data book	193 – 194
27.	Wildlife Projects	195 – 199
28.	Animal Diseases	200 – 201

FOREST PROTECTION

2023	<ul style="list-style-type: none"> What constitute <i>fire environment</i> in a forest? Describe different types of forest fires and write the significance of fire line [15 M]. Explain <i>rotational grazing</i> and discuss its significance to restore natural regeneration [10 M]
2022	<ul style="list-style-type: none"> What are the <i>biotic and abiotic stresses</i> on trees? Explain the responses of trees to these stresses (8m) [Linked Q : Silviculture]
2021	<ul style="list-style-type: none"> What is <i>controlled burning</i>? How does it help in improving forest regeneration? (10 m) <i>Unscientific harvesting</i> of NTFPs has led to depletion of NTFP resources. Discuss (8m)
2020	<ul style="list-style-type: none"> What is the need to protect the forests? Enumerate the <i>major threats responsible for forest injuries</i>. Suggest suitable preventive and protective measures to safeguard the forest wealth (15m). What is the <i>significance of afforestation and reforestation</i> to the ecosystem? How are the National Afforestation programme, Green India Mission and Forest Fire Prevention and Management Scheme helping in restoration of forests? (15m) [Linked Q]
2019	<ul style="list-style-type: none"> Describe how <i>controlled fire</i> can be used as a tool in forest management (8 m). What is <i>controlled grazing</i> ? Describe how it helps in the better management of forest pasture land (10 m). Describe the <i>causes of deforestation</i>. What are the measures to be taken for the control of deforestation ? (10 m). What do you mean by <i>deforestation</i> ? Explain the major causes of deforestation (P1/8 m).
2018	<ul style="list-style-type: none"> What are the causes of <i>forest fire</i>? What measures are taken to protect forests against damage by fire? (P1/10 m).
2017	<ul style="list-style-type: none"> Discuss briefly the <i>impacts of humans on forest health</i>. Explain different measures to check forest encroachment (15 m). Describe <i>types of forest fires</i>, their ill-effects and preventive measures. Briefly discuss the role of forest fire on forest ecosystems (15 m). What are the major <i>grazing systems and grazing regions</i> in India? Describe briefly, methods to prevent pressure from grazing in forests (8 m).
2016	<ul style="list-style-type: none"> <i>Forest fire</i> still remains a <i>major threat to forest ecosystems</i> across the globe. How do you address this issue? (10 M). Describe the benefits and limitations of <i>chemical and biological control of diseases</i> in forest nurseries and plantations (10 M).
2015	<ul style="list-style-type: none"> There are measures which are taken to protect the forests from <i>fire damage</i>. Which are those and how effective have they been ? (8 m). Does <i>rotational grazing</i> have an advantage over <i>controlled grazing</i> in the smooth

	management of forest ecosystems ? Give your reasons for and against, both (10 m).
2014	<ul style="list-style-type: none"> Do you think that the <i>controlled fire</i> is beneficial to forest vegetation ? Discuss (10m).
2013	<ul style="list-style-type: none"> Discuss different <i>methods of disease control</i> in forest nursery with examples (8m) Describe the <i>anthropogenic causes of forest destruction</i>. How can these be checked ? (10 m).
2012	<ul style="list-style-type: none"> Briefly discuss – <i>Lopping</i> management (4 m) Comment on the view that after deforestation <i>forest fires</i> are most important cause of forest destruction. Also give different types of forest fires and their causes, and preventive measures for forest fires (8m). Describe the extent, method of cultivation and effects of <i>shifting cultivation</i>. Suggest some suitable alternatives to shifting cultivation (5 m). What are the main reasons for <i>decline of the forest cover</i> in our country ? (5m) Distinction between Potential and Deferred Grazing (5m). What are the causes of <i>forest fire</i> ? Discuss in brief the damage caused to forest by fire along with its control (5m). Describe the prevention and control of termite damages in timber (5 m). State what are the plant parasitic nematodes associated with nursery forest plant species (5 m). Describe various <i>types of grasslands</i> mentioning the associations of grasses and their environmental locations in the different regions of India [as described by Whyte (1957)].
2011	<ul style="list-style-type: none"> Write short notes on – <i>Forest decline</i> (2.5 m) How severe is the damage of <i>Ganoderma</i> in Indian Forests? Discuss with some case history (10 m). How grazing is managed for the <i>browsing animals</i>? Discuss various management options for <i>sustainable grazing</i> in forest (10 m).
2010	<ul style="list-style-type: none"> What are <i>fire-prone areas</i>? How are these detected? What precautionary measures need to be taken to overcome this problem ? (8m). How is damage due to <i>teak defoliator</i> and stem borer managed in the plantations? (10m). Write causal pathogens of important <i>diseases of poplar and Gmelina arborea</i>. Write integrated management of any one disease in each species (10 m). Write short notes on – <i>Lopping management</i> (5 m) What are <i>live fences</i> ? Name 5 plant species most commonly used as live fences. How do these differ from the other types of fences (10m).
2009	<ul style="list-style-type: none"> What is the role of <i>rotational</i> and <i>controlled grazing</i> to overcome damage due to grazing animals? (10 m) How is the <i>forest damage report</i> framed in encroachment cases having nearby human settlements (10m) Write short notes on – Damage caused by <i>Forest fire</i> (5 m).
2008	<ul style="list-style-type: none"> What is <i>controlled burning</i>? Discuss the advantages and disadvantages of burning in pine

	<p>forest (10m).</p> <ul style="list-style-type: none"> Describe major diseases and their control in forest nursery plantation. Explain necessity of bio-control by giving suitable example (20m).
--	--

FOREST UTILIZATION

2023	<ul style="list-style-type: none"> What are <i>gums</i>? How do they differ from resins? Write the botanical names of two plants of each [8 M]. Write the botanical names of six tree species yielding <i>essential oil</i> [8 M]. Compare different types of <i>composite wood</i>. Name the tree species which are mainly preferred for it. Write the future prospects of composite wood industry in the country [15 M]. Explain the present status, scope and constraints of <i>biofuel production</i> in India. Write the botanical names of five tree-borne oilseeds [15].
2022	<ul style="list-style-type: none"> Mention any eight <i>specialized uses of wood</i> with examples (8 m) Explain the role of renewable energy sources like solar energy in <i>wood seasoning</i> (8m) Trace the <i>History of logging</i> in India. Explain how mechanization in harvesting and extraction helps in reducing the wastage and improving efficacy of logging (15 m) “Increasing usage of <i>composite woods</i> necessitates the needs for increased raw material from plantations for short rotation trees” Explain (10 m)
2021	<ul style="list-style-type: none"> Write the general principles of <i>wood seasoning</i>. How is electrical kiln seasoning advantageous over air seasoning? (15m) What are <i>gums, Resins, Oleoresins</i> and <i>gum resins</i>? Classify and give at least two examples under each group (15 m).
2020	<ul style="list-style-type: none"> What are the recommended practices for <i>strategic harvest planning</i>? (8m). What are the rules laid down for <i>efficient felling</i>? Classify the timbers based on industrial use (8m). Describe the process of <i>wood formation</i>. Write in details about the physical, chemical and mechanical properties of wood (15 m).
2019	<ul style="list-style-type: none"> What is <i>Reduce impact logging</i> (RIL) ? What is its composition? Explain the benefits of RIL (8 m). Define <i>Non-timber forest products</i> (NTFPs). Explain their importance to human societies and economy (8m). Define wood. Explain the microscopic/<i>Anatomical features</i> which aid in identification of timber species in details (15 m). What are <i>particle boards</i> ? Explain the features of different types of particle boards (15 m). List different system and methods of <i>sale of forest produces</i>. What are the different methods of sales adopted in state forest department? (15 m)
2018	<ul style="list-style-type: none"> What are the industrial uses of <i>gums and resins</i> ? Discuss the factors affecting the production

	<p>and supply of gums and resins (8 m).</p> <ul style="list-style-type: none"> • Write down four advantages of timber <i>seasoning</i> and suggest which one is commercially suitable over other methods, with suitable examples (8 m). • List out <i>different types of preservatives</i> used for protection of timber against fungi and insects and classify them based on solvent used (15 m). • What are the key elements of the wood industry and paper industry strategies? Explain (15). • Describe the <i>defects that appear during seasoning</i> in timbers (10 m).
2017	<ul style="list-style-type: none"> • Briefly write about the <i>natural defects</i> observed in wood (8 m). • What is <i>wood seasoning</i>? Write in detail the aims of wood seasoning and explain salient steps in manufacturing of plywood (15 m). • What is <i>logging</i>? What are the objects of felling? Briefly write the general rules of felling and basic cuts of tree felling (15 m). • What are the differences between <i>gums</i> and <i>resins</i>? How are gums and resins classified? Enlist different methods of tapping resins (10 m).
2016	<ul style="list-style-type: none"> • Dry deciduous forests are rich in Non-Timber Forest Products (NTFPs). Justify the statement with examples (10 m) • Give an account of <i>mechanical properties</i> of wood and suggest the standard tests for the same (10 m). • <i>Bamboos</i> become the major raw material for many cottages as well as corporate industries. Explain (10m). • What are the general principles and <i>advantages of wood seasoning</i>? Describe the solar kiln seasoning with neat sketches (10 m). • Write critical notes on the following (10 m). (a) <i>Gums</i> (b) <i>Oilseeds</i> (c) <i>Katha</i> (d) Bidi leaves • Give an account of <i>composite wood</i> products and their utilities (10 m). • Explain the recent developments in mechanization of <i>logging operations</i> and their impact on the efficiency and wastage (10 m).
2015	<ul style="list-style-type: none"> • There are various processes involved in the expression and <i>extraction of oilseeds</i> available in forests. Elaborate on the processes involved and their utilization (8m). • Timber encounters many different problems during the process of <i>drying</i>. What are those problems and how are they overcome? (8m). • Indian forests are found to be rich in <i>different kinds of non-timber forest products</i> (NTFPs). Can you list at least 10 NTFPs ? (10 m). • What are the major <i>fibres</i> and <i>flosses</i> which are obtained from forests in India? Citing at least ten species, discuss their commercial importance (10 m).
2014	<ul style="list-style-type: none"> • Write in detail the processing and uses of <i>Tannins</i> in India (8m). • Explain the term <i>logging</i>, its purposes and stages (8m). • What is wood preservation? Why is <i>preservation of wood</i> necessary ? Mention main types of

	wood preservation methods (15 m).
2013	<ul style="list-style-type: none"> • What are advantages of <i>wood seasoning</i>? Describe the various methods of wood seasoning and mention classification of timbers for seasoning (15 m). • Write critical notes on – importance of <i>Butea monosperma</i> (2.5 m). • Give the <i>classification of timbers</i> based on air dry weight with suitable examples (7m).
2012	<ul style="list-style-type: none"> • Explain properties of good <i>Wood Preservatives</i> and classify the various Wood Preservatives with the help of a flowchart (12 m). • Describe the <i>Boucherie process</i> of Wood preservation with its advantages (6 m). • Briefly comment on the extent of wastage (in approximate percentage of total timber content) from harvesting to marketing stages and give the reasons for such wastages (5 m). • What are the set of tools used in <i>rill method</i>? Briefly highlight their features (10 m)
2011	<ul style="list-style-type: none"> • List 10 bamboo species of commerce in India with their scientific name & state of origin (10 m) • Write Common and scientific names of 10 tree species yielding resins and Oleo-resins (10 m). • What are the <i>wood composites</i>? How they are prepared? What are the common gluing agents used in wood composites? (20 m) • Discuss the various common defects encountered after harvesting of the wood during stacking (10 m).
2010	<ul style="list-style-type: none"> • What are the <i>keys to identify timbers construction purpose</i> ? • Name five important tree species used for axle and wheels of different carts. In which regions of country is this sort of transportation more prevalent? State the reasons (8 m). • Name five aromatic grasses with their uses and methods of extraction (10 m) • There is no replacement for rattans in forest-based industry” Justify this statement and list five important species reported from different parts of the country (10 m). • What are the different types of water soluble wood preservatives ? (10 m).

FOREST LEGISLATION

2023	<ul style="list-style-type: none"> Discuss the salient features of the <i>Wildlife (Protection) Act, 1972</i> and write its significance in dealing with wildlife offences [15 M]
2022	<ul style="list-style-type: none"> Write the provisions of the <i>Indian Forest Act, 1927</i>, applied to declare village forests and protected forests (8 m) Write the salient features of India's <i>National Forest Policy, 1998</i>. Justify the statement "India needs a revision of Forest Policy" (15 m) Describe the provision of the <i>Forest (Conservation) Act, 1980</i> on (i) restriction on the de-reservation of forest land for non-forest purpose, and (ii) diversion of forest land for regularisation of encroachment (15 m)
2021	<ul style="list-style-type: none"> Write the provisions of sections 35, 37 and 38 under the <i>Indian Forest Act, 1927</i>, applied to control over forests and land not being the property of the government (15 m). Describe the provisions of sections (3 – 27) of the <i>Indian Forest Act, 1927</i> applied to declare any forest land or wasteland as a Reserve Forest over which the government has proprietary rights (15 m).
2020	<ul style="list-style-type: none"> What are the direct roles of the <i>biodiversity act, 2002</i> in conservation of wildlife? (8m) Write in details about the historical background of forest policies in India and their aims. Describe in brief about the organization of forest sector in India (15 m). How has the <i>National Forest Policy of 1988</i> changed the national scenario? Describe in brief. Highlight some major achievements in relation to the above policy (10m).
2019	<ul style="list-style-type: none"> Write in detail regarding the appointment of authorities and restrictions of hunting of wild animals under the <i>wildlife (Protection) Act of 1972</i> (Marks 15).
2018	<ul style="list-style-type: none"> What are the main differences between forest policy and forest laws? Give <i>salient</i> points of the National Forest <i>Policy of 1952</i> and <i>1988</i> (15 m).
2017	<ul style="list-style-type: none"> Narrate the <i>background</i> and <i>objectives</i> of implementation of national <i>forest policies</i> of India (8 m).
2016	<ul style="list-style-type: none"> Compare and contrast the Indian Forest Act, 1927 and the Forest Conservation Act, 1980 (10 m). How are "Environment", Environmental pollutant" and "Hazarous substance" narrated in environment (protection) act, 1986? (10 m).
2015	<ul style="list-style-type: none"> Give a comparative and appropriate statement on the Natural Forest <i>Policy of 1988</i> with that of <i>1952</i> (15 m).

	<ul style="list-style-type: none"> Describe the <i>role of Permanent Forest Policy</i> after its enactment for the regulation of forestry management in India (10). Discuss the important role of The <i>Wildlife Protection Act, 1972</i> in forest management. Give salient points only (10 m).
2014	<ul style="list-style-type: none"> Describe the salient features of <i>National Forest Policy 1988</i>. How does it differ from the 1952 Forest Policy? (10 m).
2013	<ul style="list-style-type: none"> What are the factors responsible affecting forest policy ? Discuss (8 m). Mention the salient features of <i>National Forest Policy, 1988</i>, and discuss its advantages over <i>N.F.P. 1894</i> (10 m). Describe the <i>salient features mentioned in the new Draft Forest Bill, 1994</i> (10 m).
2012	<ul style="list-style-type: none"> Bring out the <i>background</i> and <i>need</i> for <i>Forest Policy of 1988</i> with its basic objectives (15 m). Attempt the following, keeping your answers brief and to the point : (a) Describe Section (2) of Forest Conservation Act of 1980 (8 m).
2011	<ul style="list-style-type: none"> Write the composition of <i>National board of wildlife</i>. Explain the provisions of the Sections of wildlife (Protection) Act 1972, Used to declare an area as 'Sanctuary' (20 m).
2010	<ul style="list-style-type: none"> What are the functions of <i>Indian board for wildlife</i> with regard to conservation of wildlife ? (10 m).
2009	<ul style="list-style-type: none"> Explain the application of the <i>Indian penal code</i> in forestry (10m).

FOREST ECONOMICS

2023	<ul style="list-style-type: none"> Explain the fundamental principles involved in forest economics [8 M] What is <i>cost-benefit</i>? Explain demand and supply with respect to forestry [15 M]
2021	<ul style="list-style-type: none"> Mention different <i>methods of valuation</i> of intangible services from forest ecosystem and explain any one (8m)
2020	<ul style="list-style-type: none"> How does inflation influence forest goods? Briefly explain the <i>types of inflation</i> that directly influence the price of forest goods (8m). Discuss the role of forest resources in the Indian economy. Suggest suitable storage methods for wood or other forest produce and their management strategies (10m). What do you understand by <i>forest valuation</i>? Discuss in brief. Describe various valuation techniques for forests (10 m).
2019	<ul style="list-style-type: none"> Discuss various <i>channels for marketing</i> of forest products (8m). What is <i>forest valuation</i>? Write its objective and briefly explain the methods of forest valuation (15 m).
2017	<ul style="list-style-type: none"> Explain the <i>discounting measures in forest business management</i> with different formulae used in forest economics (15 m). Discuss in detail the roles and interventions of Government and Private agencies in marketing of forest produce (15 m).
2016	<ul style="list-style-type: none"> Explain the <i>concept of demand</i> with the help of demand curve and its application in forest trade (10 M). Describe the role of <i>Corporate Social Responsibility</i> (CSR) towards sustainable forest production through Public-Private Partnership (PPP) approach (10 M).
2013	<ul style="list-style-type: none"> Give the important features of <i>demand and supply curves</i>. What are the factors responsible for demand and supply of forest produce ? (7 m).
2009	<ul style="list-style-type: none"> Why is it necessary to take up <i>cost benefit analysis</i> of forest plantation? Describe the main point to be taken into consideration while conducting cost : benefit analysis of short rotation commercial species and traditional timber species (20m).
2008	<ul style="list-style-type: none"> What are the bottlenecks in the <i>marketing of medicinal plants</i>? Why is the cultivation of medicinal plants not aggressively adopted by the farmers? Suggest the measures to tackle the teething problems (20m). Write the processing and <i>sale procedure</i> of katha and beedi leaves (10m)

WILDLIFE BIOLOGY

2022	<ul style="list-style-type: none"> What do you understand by <i>Human-Wildlife conflict</i> ? Explain with examples (15 m)
2021	<ul style="list-style-type: none"> Justify the statement “Wildlife animals are one of the biotic components of the forest ecosystem” How do they help in forest regeneration? (10 m)
2020	<ul style="list-style-type: none"> What is the <i>significance of wildlife</i> in today’s perspective? Discuss in brief about the components of wildlife ecology (8m).
2019	<ul style="list-style-type: none"> NO
2018	<ul style="list-style-type: none"> What is the <i>ecological and economical importance of biodiversity</i>? Mention the salient measures for conservation of biodiversity (8 m). How is <i>enumeration of animal population</i> in natural forests carried out in general? Also specify the method(s) adopted in the case of tigers (15 m).
2017	<ul style="list-style-type: none"> NO
2016	<ul style="list-style-type: none"> NO
2015	<ul style="list-style-type: none"> To protect the wild animals venturing out from their core areas, some administrative and management arrangements are made. What are those ? Discuss (8 m).
2014	<ul style="list-style-type: none"> Discuss in detail the importance, success and limitations of the '<i>Project Tiger</i>' (8m). Discuss the role of National Parks in conservation of biodiversity (10 m).
2013	<ul style="list-style-type: none"> What do you understand by <i>wildlife census</i> ? Write different methods of census in brief (10 m).
2012	<ul style="list-style-type: none"> Describe the mathematical expression for <i>Biotic Potential</i> and <i>Environmental resistance</i> (6 m). Describe the <i>importance of pug marks</i> and illustrate sex differentiation based on pug marks. How do these help in Forest management system? (10 m).
2011	<ul style="list-style-type: none"> NO
2010	<ul style="list-style-type: none"> List five each of the important resident and migratory birds noticed in Indian forests (8m).

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 MAN

On the one hand, man is responsible for the establishment and cultivation of new forests, as well as the regeneration and sustainable management of natural forests in a scientific manner. However, on the other hand, man is also the primary cause of damage and destruction to these forests. Due to human activities, numerous forests around the world have already vanished, and some continue to be destroyed even today

KINDS OF DAMAGES BY MAN (ANTHROPOGENIC)

- Deforestation
- Shifting cultivation
- Illicit felling and illicit removal of forest produce
- Forest fire
- Encroachment
- Defective management
- Other damages, such as *lopping, removal of leaf litter, removal of flowers and fruits, poaching, environmental pollution, etc.*

IFoS 2017 : Discuss briefly the *impacts of humans on forest health*. Explain different measures to check forest encroachment (15 m).

IFoS 2013 : Describe the anthropogenic causes of forest destruction. How can these be checked ? (10 m).

2.1 DEFORESTATION

DEFINITION : Deforestation is defined as the *removal of tree crops* from a piece of land *without the intention of reforesting*.

The damaging or removal of forest vegetation to such an extent that it failed to support its natural flora and fauna.

CAUSES OF DEFORESTATION

- *Diversion of forest land for non-forestry purposes* – like river valley projects, *Dams, Roads, Communication Lines, Railway Tracks, Mining*, etc. which have done a lot of damage to the forests. Since independence about. [*Major causes = Expansion of Agriculture land*]

Example : Establishment of fruit belts in hills, *i.e.*, Chamba-

Mussoorie fruit belt of UP govt during the 1960s clear large area of deodar-oak forest of Shivalik and lesser.

IFoS 2019 : Describe the *causes of deforestation*. What are the *measures to be taken for the control* of deforestation? (10 m).

IFoS 2019 : What do you mean by *deforestation* ? Explain the *major causes of deforestation* (Paper-1 | 8 m).

IFoS 2012 : What are the main reasons for decline of the forest cover in our country ? (5m).

IFoS 2011 : Write short notes on – *Forest decline* (2.5 m).

About **7.5 million hectares** of forest land has been diverted for non-forestry uses since independence, of which approximately **4.5 million ha** was diverted between 1950-1980 and **2.8 million hectares** from 1980 to 2000. The central government admitted that *in 2019, 11500 hectares of forest land had been diverted in 22 states*.

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.

SIGNIFICANCE

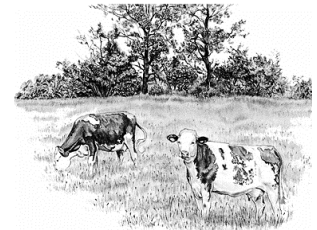
- The backbone of the rural economy by providing milk, food, meat, and workforce.
- Contribute 6 % of GDP and 25 % of agricultural GDP.

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 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.

► 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 decreases the palatable crops inside the forest* besides *increasing the weeds*. We can say that this type is a *low input – low output system* of grazing.



Grazing



Browsing

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* *Consanquinea****
- ✎ 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 ipsilon*)** : 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 1

WOOD SCIENCE & TECHNOLOGY [Introduction]

INTRODUCTION

Forest utilization is defined as the *process of harvesting, conversion, transportation and disposal of forest produce. It includes the market and manufacturing of various usable commodities**** from it.



1.2 HISTORICAL BACKGROUND

Upto 1860s

Until this time, Forest clearing was common, and timber extraction was common for fuel and construction purposes. It was largely unorganized and merchants only had to pay a nominal fee for timber extraction. The extraction itself was limited to a few specific species such as Teak, Sal, Sandalwood, and Rosewood (*Dalbergia latifolia*). Axes served as the primary tools for cutting, resulting in significant wastage.

From 1860s to 2nd World War

During this time, *forest departments were established* in all states to ensure systematic working and conservation efforts. The period witnessed a *significant increase in the demand for timber, driven by both infrastructural needs such as railway sleepers and domestic requirements*. Additionally, advancements in forest engineering allowed for logging in previously inaccessible areas.

IFoS 2022 : Trace the *History of logging* in India. Explain how mechanization in harvesting and extraction helps in reducing the wastage and improving efficacy of logging (15 m)

The *introduction of modern tools for timber extraction greatly improved efficiency in the process*. Furthermore, the demand for timber escalated during the World Wars, leading to an increase in its price. This shift in the market

CHAPTER 2

TIMBER TRANSPORTATION & STORAGE

2.1 TIMBER TRANSPORTATION

► TYPES

Based on the Distance of transportation

- *Minor* or *Off-road* transport : for a short distance
- *Major* transportation : for long-distance

Medium of transportation

- *Land* transport, *i.e.*, by road
- *Water* transport, *i.e.*, by river, canals or coastal routes
- *Overhead* transportation, *i.e.*, By ropeway, chopper

► CHOICE OF METHODS OF TRANSPORTATION

- Cost of transportation and labour requirements
- Damages or losses to the products during this
- Volume of timber available in Local area + Size of Market & Sawmill
- Topography + Available transportation facilities, *i.e.*, Land, Water, Air

TRANSPORTATION by LAND

- Human-powered : Uphill terrain + small to medium-sized timber + Short distances. This method is the costliest but causes the least damage.
- Animal-assisted : Mules, Elephants, Camels, etc.
- Bullock carts
- Dragging
- Rolling
- Sliding
- Motorized methods : Trucks and Trackers



What are the rules followed in the felling of trees?
Explain the different methods of land transportation of timber followed in India [OPSC Civil (Main) 2011].

TRANSPORTATION by WATER

The oldest and cheapest mode of transportation, particularly in the *Forest* area. Widely practiced in the Himalayan region, Peninsular India, Eastern & Western Ghats.

Types : (1) Floating, (2) Rafting and Boom, and (3) Wet slide

CHAPTER 4

WOOD PROPERTIES

WOOD PROPERTIES

Gross structural	Minute structural	Gross physical	Mechanical	Chemical properties
------------------	-------------------	----------------	------------	---------------------

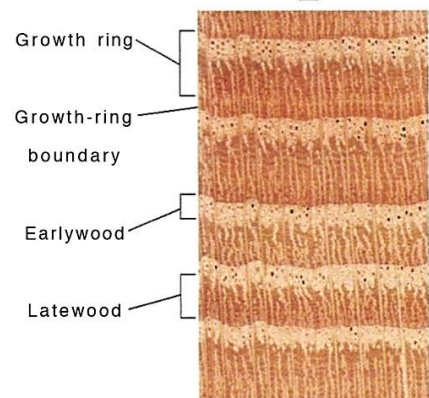
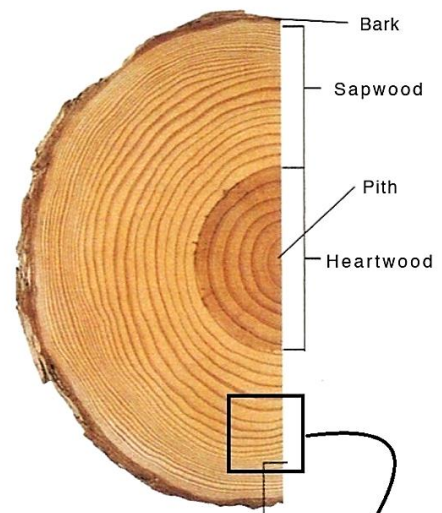
GROSS STRUCTURAL

Gross structural means what we can easily identify when we see a timber (log) through the naked eyes

- Bark
- Pith
- Sapwood & heartwood
- Growth rings or Annual rings
- Spring and Autumn wood
- Grains & Textures

- ▶ **Bark** : the *outermost part* of the timber. The outer part is usually dead and has diagnostic value (Species identification).
- ▶ **Pith** : *Small soft mass of tissue in the central portion*** of tissue, usually lighter in colour. It neither has any specific function nor any diagnostic value.
- ▶ **Sapwood & Heartwood** : *Sapwood (Alburnum)* is the Lighter, younger outer portion of a tree trunk. Composed mostly of living cells and, as its name implies, is for the conduction of sap (liquids), and storing food.

Heartwood (Duramen) is the central dark part of the wood that has become heavier and darker due to the deposition of gum, resin, oil, and chemicals.



<i>Sapwood (Alburnum)</i>	<i>Heartwood (Duramen)</i>
It forms the outer wood part	It forms the central wood part
It is light-coloured	It is dark-coloured
Lighter in weight	Heavier /Denser
It contains living cells	Dead cells

Seasoning refers to the process of *removing excess moisture*^{***} that is presented in timber in its green state. Green timber typically contains moisture content ranging from *50 to 200%*. In well-seasoned timber, *10 to 12 % (as per ISI code)*. [For doors and windows, the recommended moisture content for wood is between *10 – 20%*.]

▶ HOW WATER IS HELD IN WOOD

- **Free water**^{***} : held by capillary action inside the free space in the cells and fibres
- **Bound water** : Absorbed by the chemical substance of cell walls.
- **Water vapours**

▶ DETERMINATION OF MOISTURE CONTENT IN WOOD

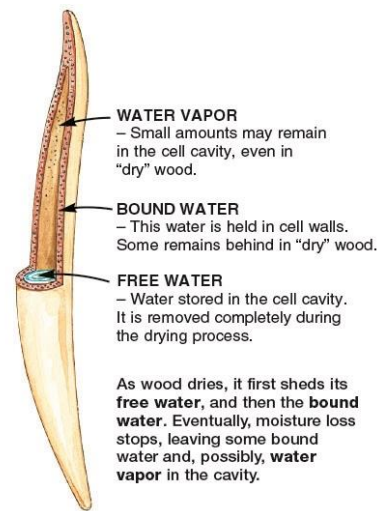
$$\text{Moisture Content} = \frac{\text{wet weight} - \text{oven dry weight}}{\text{oven dry weight}} \times 100$$

▶ OBJECTS OF SEASONING (Advantages)

- To reduce the risk of fungal and insect attacks
- To reduce weight = ↓ transportation cost
- To avoid seasoning defects like shakes, splits, and cracks = *More dimensional stability*^{***}
- To secure proper penetration of preservatives.
- To make timber fit to receive painting and
- Controlling the drying rate and regulating it within limits so that the wood seasons with the least possible damage.

▶ FACTORS AFFECTING THE SEASONING PROCESS

- Temperature, Humidity, and Air Circulation
- Nature of woods and its staking pattern
- Adopted Seasoning methods
- Market/Industrial requirements & Size
- Availability of required infrastructure



5.2 SEASONING DEFECTS

- **Shrinking & Swelling** : Occur as the wood changes its moisture content in response to both daily and seasonal fluctuations in the relative humidity of the atmosphere, *i.e.*, when the air is humid, wood absorbs moisture and swells; when the air is dry, wood loses moisture and shrinks.

CHAPTER 8

NON-TIMBER FOREST PRODUCTS (NTFP)

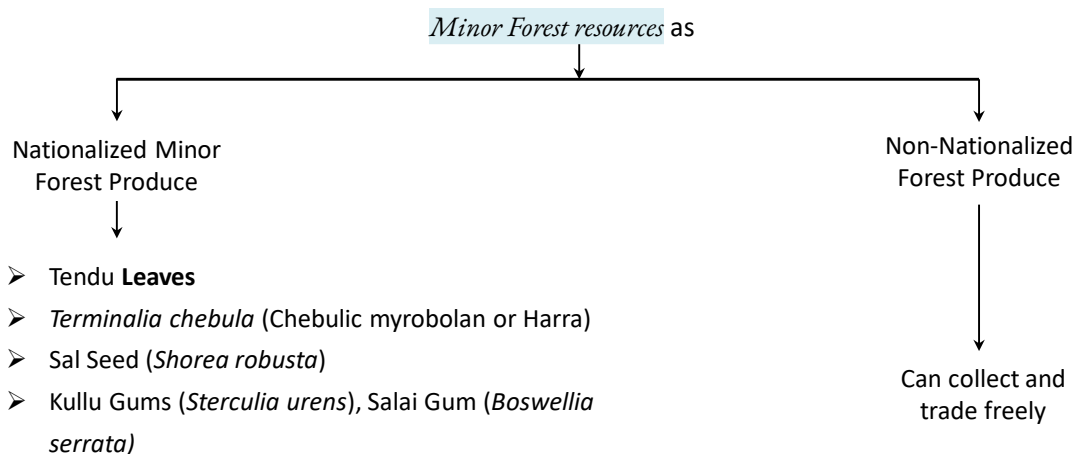
► **TIMBER** : Major timber species are Teak, Sal, *Albizia lebbek*, *Adina cordifolia*, *Cedrus deodara*, *Dalbergia latifolia*, *Dalbergia sissoo*, *Gmelina arborea*, *Hardwickia binata*.....and many more.

► **INDUSTRIAL WOOD**

- Pulp and paper : Bamboos, Eucalyptus, Casuarina
- Plywood : Teak, Rosewood, Terminalia
- Packing cases : Dinus spp., Silver oak, Fir,
- Matchwood : Ailanthus, Simaruba, Bombax
- Toys : Adina, Redsanders, rose wood

Non-Timber Forest Product (NTFP)*** covers all forest products “*other than Major Forest Products*” which consist of timber, small wood, and fuelwood. It specifically includes grass, fruit, leaves, bark, animal, and mineral products found in the forest and collected therefrom.

Some states like Madhya Pradesh (MP), Chhattisgarh (CG) classified their



The minor forest products of commercial importance may be divided into the following classes.

- Fibers and Flosses
- Grasses, Bamboos, and Canes
- Distillation and Extraction Products, including Grass Oils.
- Oil Seeds
- Tans and Dyes
- Gums, Resins, and oleo-Resins

CHAPTER 11

PAPER & PULP MANUFACTURING

11.1 PULP

Pulp is a semi-finished product made from fibrous materials, typically wood or other plants, as well as waste paper. It is a crude fibrous material produced from cellulosic fibers and serves as the fundamental component for manufacturing paper, paperboard, and rayon

- Raw material for pulp making
 - Woods
 - Jute sticks
 - Mixed Grasses (Sabai Grass *Eulalippsis binata*)
 - Bamboos, *i.e.*, *B. vulgaris*, *B. tulda*
 - Agricultural residue
 - Rags and waste paper
- Factors affecting pulp material
 - Fibers should be long, strong, soft, and tender
 - The material should contain a large quantity of cellulose
 - It should be light in color, capable of being ground and free from knots
 - It should be free from gums, tannins, etc.
 - The cost of production, collection of material, and transport costs are minimal.
- Manufacturing : Mechanical process, Chemical process, and Semi- chemical

Mechanical process : Wood is disintegrated into a fibrous state entirely by mechanical means without adding chemicals. Materials suited for the mechanical process -

- Light colored conifers
- Hardwood like poplar and eucalyptus
- Uses for a cheap paper like newsprint

Advantage	Disadvantage
Cheaper process	Consume more power
Lignin content is present in the wood	Poor paper quality
Easy install	Low strength
	Less durable

Process flowchart

- Debarking
- Grounded into a fibrous mass

CHAPTER 1

FOREST POLICIES

SYLLABUS : History of forest development; Indian Forest Policy of 1894, 1952 and 1988. National Forest Policy 1988 of People's involvement, Joint Forest Management, Involvement of women; Forestry policies and issues related to land use, timber and non-timber products, sustainable forest management; industrialization policies; institutional and structural changes. Decentralization and Forestry Public Administration.

1.1 HISTORY OF FOREST ADMINISTRATION

- [Chandragupta Maurya](#) was the first king who made an effort to look after the forest of his kingdom by appointing [Kupyadhyaksha](#).

Kautilya *Arthashastra* : head of forest dept "[Kupyadhyaksha](#)" assisted by several *vanpalas* (Forest guards). They classified forest into four parts (1) forest reserve for the king, (2) reserve forest for the state, (3) forest donated to the Brahmins, and (4) forest for the public.

- **GUPTA PERIOD** (4th – 5th Century AD)
- **DURING ISLAMIC RULE** : Religious persecution by Muslim rulers, threats of forced conversion, forcefully abducting their women, collapse of many empires, displacement of people to forests = increasing pressure on it.
- **BRITISH RULE** : The destruction of forests began during colonial rule, fuelled by the Industrial Revolution, politics, religion, and greed.

In 1890, the colonial government appointed [Dr. Volker](#) to study Indian agriculture. This was due to the rise of Congress and nationalism. [Dr. Volker](#) presented his report "[Reforms in Indian Agriculture](#)" in 1893. The report included a separate chapter on forests (Chapter 8), which laid the foundation for the forest policy of 1894. The report aimed to suggest ways to improve Indian agriculture.

1.2 FOREST POLICY 1894

- ▶ **BACKGROUND** : Dr. Voelker's report (1893) on Indian agriculture.

- ▶ **SALIENT FEATURES**

- The main object of forest management is – to promote the general well-being of the country.
- The maintenance of adequate forests is dictated primarily for the preservation of the climatic and physical conditions of the country and also for meeting the basic requirements of the people.
- The government-owned forests have been classified in this forest policy as -
- Preservation of the climatic and physical conditions of the country

CHAPTER 2

FOREST ACTS

SYLLABUS : Forest Laws - necessity, general principles, Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972, and their amendments.

Laws are a body of principles recognized and applied by the state in the administration of justice.

Forest Law : All principles, regulations, or acts that govern the forest and its related activities either inside or outside of the forest.

- Law is a generic term, whereas 'Acts' pertains to a specific situation.
- Forest law is a **Special law**

IFoS 2018 : What are the main differences between forest policy and forest laws ? Give *salient* points of the National Forest Policy of 1952 and 1988 (15 m).

Forest Policy : policy is a purposeful course of action, undertaken by an organisation that deals with the uses and management of forest resources.

Forest Law	Forest Policy
Laws or 'Acts' are related to regulating and governing a particular situation or act. If you violate it you will be punished.	The policy is a guiding principle and is related to our future Goal where we want to go. If someone violates it, there is a provision for punishment.
Passed by Parliament	By Executive decision, no need to go through parliament

2.1 INDIAN FOREST ACT (1927)

- ▶ 21st September 1927
- ▶ Act to consolidate the law relating to forests, the transit of forest produces and the duty leviable on timber and other forest produce.

Chapter : 1 Preliminary	Section 1 : This act may be called the Indian Forest Act of 1927 Extent – Whole India. Section 2 : Definitions –
	<p>[2.1] Cattle includes elephants, camels, buffaloes, horses, mares, geldings, ponies, colts, fillies, mules, asses, pigs, rams, ewes, sheep, lambs, goats and kids.</p> <p>[2.2] Forest officer</p> <p>[2.3] Forest offences - offence punishable under this Act or under any rule made thereunder</p>

- *The increased role of states* : The amendments say if the state government, after consultation with the central government, feels that the rights under the Forest right act (2006) will hamper conservation efforts, then the state "may commute such rights by paying such persons a sum of money in lieu thereof, or grant of land, or in such other manner as it thinks fit, to maintain the social organization of the forest-dwelling communities or alternatively set out some other forest tract of sufficient extent, and in a locality reasonably convenient, for the purpose of such forest dwellers".
- Introduces a new category of forests, "*production forest*" for the production of timber, pulp, pulpwood, firewood, non-timber forest produce, medicinal plants, etc., to increase production in the country.
- Proposes a forest *development cess of up to 10%* of the assessed value of mining products removed from forests and water used for irrigation or in industries. This amount would be deposited in a special fund and used "exclusively for reforestation; forest protection and other ancillary purposes connected with tree planting, forest development, and conservation."

Concerns with regard to the present draft bill

- The draft mentions that the state governments could take away the rights of the forest dwellers if the government feels fit.
- The draft Bill reinforces the idea of bureaucratic control of forests, providing immunity for actions such as the use of firearms by personnel to prevent an offense.

2.2 FOREST CONSERVATION ACT (1980)

Preamble

- (1) Conservation of forests and, (2) matters connected therewith
- (2) Enable achievement of national targets of **Net Zero Emission by 2070** and maintain or enhance the forest carbon stocks through ecologically balanced sustainable development.
- (3) Nationality Determined Contribution targets of the country envisage creating a carbon sink of additional 2.5 to 3.0 billion tons of CO₂ equivalent by 2030
- (4) Increase in the forest and tree cover to one-third of its land area

Forest (Conservation) Amendment Act 2023 | 4th August 2023

1. SHORT TITLE, EXTENT, AND COMMENCEMENT -

- (1) This Act may be called the "~~Forest (Conservation) Act, 1980~~" [Now, Van (Sanrakshan Evam Samvardhan) Adhiniyam 1980]
- (2) It extends to the whole of India ~~except the State of Jammu and Kashmir~~.
- (3) It shall be deemed to have come into force on the **25th day of October 1980*****.

Section 1A : The following land shall be covered under the provisions of this Act, namely:— (a) the land that has been declared or notified as a forest in accordance with the provisions of the Indian Forest Act, 1927 or under any other law for the time being in force; (b) the land that is not covered under clause (a), but has been recorded in Government record as forest, as **on or after the 25th October 1980**

FOREST ECONOMICS

[INTRODUCTION]

SYLLABUS : Fundamental principles, cost-benefit analyses. Estimation of demand and supply

- ▶ **FOREST ECONOMICS** : Application of the principles and practice of economics to the management of forestry (Biological resources).

Application

- * Managing the demand and supply of forest products.
- * Planning and development of forest operations from the harvesting to the marketing & sale of forest products.
- * Capital budgeting and resource allocation.
- * Sustainable management and exploitation of forest resources.
- * Economic management of Human resources (including forest labor), Infrastructure & associated problems, and forest operations.
- * Value addition in forest products.

- ▶ **PRODUCTION** : it means transforming inputs into outputs such as planted saplings growing into a tree and being harvested after a specific time period.

Factors of production : production factors mean inputs required for the production of a good or service.

In the case of forestry, we required -

1. Land
2. Labour : The form of human resources that work in the forest during the production of goods (*i.e.*, Timber) or forest-based service (*i.e.*, Ecotourism).
3. Capital : the monetary resources that are used for the production of something
4. Planting material
5. Technical inputs

- ▶ **PRODUCTION FUNCTION** : a production function is a technological or engineering relation between quantities of physical inputs and quantities of the output of goods. As long as the natural laws of technology remain unchanged, the production function remains unchanged.

Example : Consider a manufacturer who produces shoes. She employs two workers – worker 1 and worker 2, two machines – machine 1 and machine 2, and 10 kilograms of raw materials. Worker 1 is good in operating machine 1 and worker 2 is good at operating machine 2. If worker 1 uses machine 1 and worker 2 uses machine 2, then with 10 kilograms of raw materials, they can produce 10 pairs of shoes. However, if worker 1 uses machine 2 and worker 2 uses machine 1, which they are not good at operating, with the same 10 kilograms of raw materials, they will end up producing only 8 pairs of shoes. So with efficient use of inputs, 10 pairs of shoes can be produced whereas inefficient use results in production (*Source* : NCERT).

FOREST VALUATION

SYLLABUS : Valuation of forest goods and services.

Economic development is often associated with rising demand for environmental amenities. Forests are a particular focus of environmental concern, in many countries the value of non-timber forest benefits - many of them nonmarketed - may be increasing faster than the prices of wood products. One result is that certain forest areas are increasingly valued more for the environmental benefits they provide than for their timber. Hence the “set-aside” of timber-rich areas for wildlife conservation, and the increasing attention of public agencies to managing forests for recreational or aesthetic values

4.1 FOREST GOODS AND SERVICE

Forest provides many goods and services, in this, the forest brings both tangible benefits like wood, and biomass and intangible benefits like controlling pollution, recreation, etc. Forest benefits are peculiar in the sense that their value may differ temporally and spatially. Its benefits may be valued according to the level of economic development of the host country. Ex: certain forest areas are increasingly valued, by the public as well as their political representatives, more for the environmental benefits these forests provide than for their timber.

IDENTIFYING THE FOREST BENEFITS

Forests provide a range of goods and services, some of which have significant economic value. These include fertile soil and timber, of course, but also non-timber products, recreation, landscape value and a wide range of environmental benefits such as climate regulation, watershed protection and the conservation of biodiversity. Forest benefits may be grouped into general categories

Use value (UV)			Non- Use Value (NUV)
Direct use	Indirect Use	Optional use	Existence
Wood product (timber and fuel)	watershed protection	Future direct and indirect use	Biodiversity (Wildlife)
Non- wood product (food, medicine, genetic material)	Nutrient cycling		Cultural heritage
Educational, recreational and cultural use.	Air pollution reduction		Intrinsic worth
Human habitat	Micro- climate regulation		Bequest value
Amenities	Carbon storage		

Table 1 : Classification of use of forest

WILDLIFE BIOLOGY

[INTRODUCTION]

The term 'Wildlife' is commonly referred to all forms of undomesticated animals, including mammals, birds, reptiles, amphibians, fish, and invertebrates, that exist and thrive in their natural habitats.

IMPORTANCE OF WILDLIFE / POSITIVE VALUES

- Ecological Value : play an important role in the food chain, biogeochemical cycles, and through positive and negative population regulation, maintains the delicate balance of an ecosystem. For example, illegal killing of snakes (for illegal skin trade or from fear or taboo) leads to the increase of the rodent population, which ultimately results in huge economic loss in terms of loss of a certain quantity of crop, as well as, increased cost towards pest management by using rodenticides.
- Economic value : Various products obtained from wildlife include timber, firewood, natural rubber, gums, resins, tannins, essential oils, honey, etc. Wild medicinal plants are the source of several medicines. Animal products like hides, horns, ivory, fur, etc., are good sources of income for many countries.
- Sports and Enjoyment : Wild animals are also a good source of game, fun, and recreation for people from all walks of life. In some countries, people spend a large amount of money on hunting, fishing, bullfighting, cockfighting, etc. 'Bird watching' and 'Wildlife photography' are two very popular and growing hobbies for many people.
- Scientific Value : Several life-saving drugs have been discovered from different species of flora and fauna. The efficacy of new medicine or any new surgical method is often tested first on animals. Sea urchins helped to understand human embryology, rhesus macaques to understand the human blood group, antlers of deer are used to study radioactive contamination, and birds' feathers help assess the heavy metal pollution in the environment.
- Genetic Resource : Genes from wild flora and fauna are used to devise better and more productive crop varieties and breeds through genetic engineering. Thus, wildlife serves as a resource for traits like higher productivity, better disease and pest resistance, greater climatic adaptability, etc.
- Cultural and Religious Value : Wildlife is protected by different cultures like the Bishnois of Rajasthan protecting and worshipping blackbuck. Epics such as Ramayana and Mahabharata depicted that deer, birds, and several animals and plants were protected and roamed freely in the vicinity of the ashramas of the saints.

IFoS 2020 : What is the *significance of wildlife in today's perspective?*

Discuss in brief about the components of wildlife ecology (8m).

IFoS 2018 : What is the ecological and economical importance of biodiversity ? Mention the salient measures for conservation of biodiversity (8 m).

🌿 Why wild life conservation? Comment [OPSC Civil (Main) 2018].

🌿 Differentiate between - Positive and negative values of wildlife [HPSC Civil (Main) 2017]

NEGATIVE VALUES OF WILDLIFE

- Destruction of properties (*i.e.*, by elephant), food crops, vehicles, etc.

HUMAN - ANIMAL CONFLICT

Human-animal conflict refers to interactions between wild animals and human populations that result in negative impacts on either or both sides. This can include damage to crops, property, injury or death of people or animals, and the spread of diseases. It can also include competition for resources such as food and water. The conflict often arises when human activities, such as urbanization and land use change, encroach on wild animal habitats and disrupt their natural behaviors. Examples - Elephants raiding villages for food, wolves preying on livestock, and bears breaking into homes for food.

Such conflict situations generally lead to growing antipathy among the people towards wildlife conservation resulting in retaliatory killings or injuries to animals.

TYPES OF DAMAGES

- Loss of agricultural crops, *e.g.*, eaten by wild boars
- Loss of livestock, *e.g.*, leopards become cattle lifters
- Loss of life, *e.g.*, **Lion-Human** conflict in Gir Forest,
 - Tiger** becomes Man-eater in Sundarban area + Lakhimpur Kheri
 - Leopard – Human** counter in Sanjay Gandhi (Mumbai), Sugarcane farms in Maharashtra
 - Wolves – Human** = Eastern UP
 - Rhesus Monkey (HP), Wild boars (UK), and Nilgai (Bihar)
- Transmit diseases, *e.g.*, Monkey fever in Karnataka (Human beings), Rabies (Domestic animals).
- Environmental damages, *e.g.*, Exotic species

CAUSES OF MAN-ANIMAL CONFLICT

- Loss, Degradation and fragmentation of wildlife habitat : Human activities such as urbanization, illegal encroachment, Mining, Linear projects, deforestation, and pollution can disrupt the balance of ecosystems, leading to changes in animal behavior and forcing them to adapt to new environments, which can lead to conflicts with people, *e.g.*, Sanjay Gandhi National park, Mumbai; Proposed Khandwa – Akola rail line upgradation project passes through Melghat Tiger reserve, etc.
- Competition for resources : rapidly expanding tiger population in their natural habitats after project tiger with other carnivores, they start competing for food and water, leading to conflicts over these limited resources. The substantial recovery of once dwindling population of Blackbuck (Antelope) and Nilgai (*Boselaphus tragocamelus*) outside forest has also resulted in increased conflict in agriculture landscapes. Highly nutritious and palatable food crops also promote conflicts with herbivores.

PROTECTED AREAS

Wildlife protected areas (PA), also known as conservation areas or nature reserves, are designated locations that are managed and protected for their in-situ conservation, ecological, cultural, or recreational value.

Types of Protected Areas

- **Wildlife sanctuary** : A designated areas created under *Section 26 A* (By State govt) and *Section 38* (By Central govt) of the *Wildlife (Protection) Act of 1972* for the *In-situ* conservation and protection of wildlife species, their habitats, and associated ecosystems.
- **National parks** : National parks are designated locations created under *Section 35* (State governments), and *Section 38* (by the central government) of the *Wildlife (Protection) Act of 1972* for the purpose of protecting, conserving, and managing wild animals, birds, and plants, as well as ensuring ecological and environmental security.
- **Biosphere reserve** : a unique type of protected area that combines the conservation of biodiversity with sustainable development. Biosphere reserves are designated by the UNESCO under the MAB Program. These reserves aim to reconcile the conservation of ecosystems, species, and genetic diversity with the socio-economic needs of local communities.
- Community reserves : Under *Section 36 C* (By state govt)
- Conservation reserves : Under *Section 36 A* (By state govt)
- Wildlife corridors
- Wetland

Community reserve and conservation reserved was added by **Wildlife (Protection) Amendment Act 2002**, come into effect in **2003** ***

IFoS 2014 : Discuss the *role of National Parks* in conservation of biodiversity.

✿ What is meant by *wildlife protected areas* and its different forms? Give the status of protected areas and details of special conservation projects of H.P. and India? [HPSC Civil (Main) 2015]

✿ Write in brief *about protected areas* of India. What are the causes of wild life extinction? How will you mitigate the human wildlife conflicts? What are the endangered species of wildlife in Himachal Pradesh? [HPSC Civil (Main) 2018].

✿ Differentiate between –

- National parks and wildlife sanctuaries [HPSC Civil (Main) 2011, 2013, 2015, 2016]
- Biosphere reserve and wildlife sanctuary [HPSC Civil (Main) 2017]

6.2 BIOSPHERE RESERVES

The idea of "Biosphere Reserves" was initiated by **UNESCO in 1973-74** under its Man and Biosphere (MAB) Programme (The MAB, launched in 1971 by UNESCO). Later broadly adopted under the Convention on Biological Diversity (CBD) 1993. The CBD has two principal objectives –

- Conservation and Sustainable Use of Biological Diversity
- Fair and Equitable sharing of benefits arising from its utilization



3

Anuradha Mishra



5

Ajay Gupta



6

Shobhit Joshi



11

Dinesh Jangid



17

Yash Dhoble



19

Udayan Subbudhi



23

Akarsh B.B.



24

Swarnadipta
Rakshit



26

Senthilkumar V



30

Suchet Balkal

35 Out of **149** Total Selections in

Indian Forest Service (IFoS) 2022



6

Ayush Krishna



9

Vinod Jakhar



10

Gurleen Kaur



11

Apoorv Dixit



30

Mohammed Abdul
Rawoof Shaik



32

Shinde Sandeep
Karbhari



35

Chandra Kumar
Agrawal



42

Anshul Tiwari



52

Vikas Yadav



57

Subburaj G

21 Out of **108** Total Selections in

Indian Forest Service (IFoS) 2021



1

Ashish Vijayar



2

Ankit Kumar Jain



3

Sachindra
Singh Tomar



4

Shubham Soni



6

Rahul Chouhan

05 Out of **06** Total Selections in

Assistant Conservator of Forest (ACF)

MPPSC State Forest Service 2020