



Conserving India's Forests



Dr J V Sharma
Director, Forestry and Biodiversity
Division
TERI

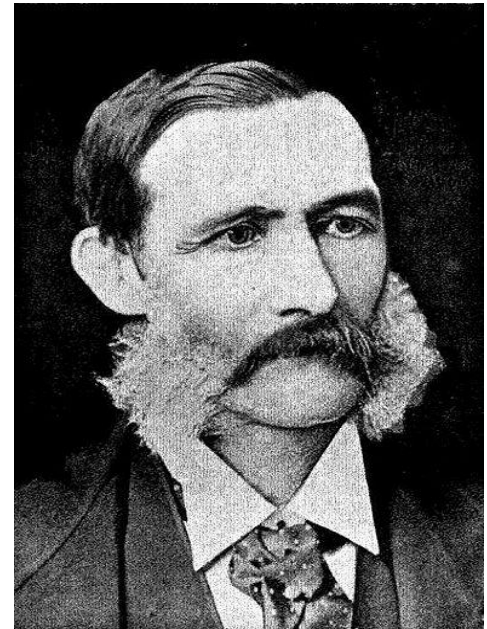
Date: 1st August, 2019

PRE-1947 HISTORY

1800: East India Company appointed a commission to enquire into the availability of Teak in Malabar Forests.

1806: Captain Watson, a Police Officer was appointed 1st Conservator of Forests to procure maximum possible quantity of Indian Timber for British ships.

1864: Establishment of Forest Department & Appointment of Dietrich Brandis, a German forester, as the first Inspector General of Forests.



Provision of Forest Conservation in the Constitution of India

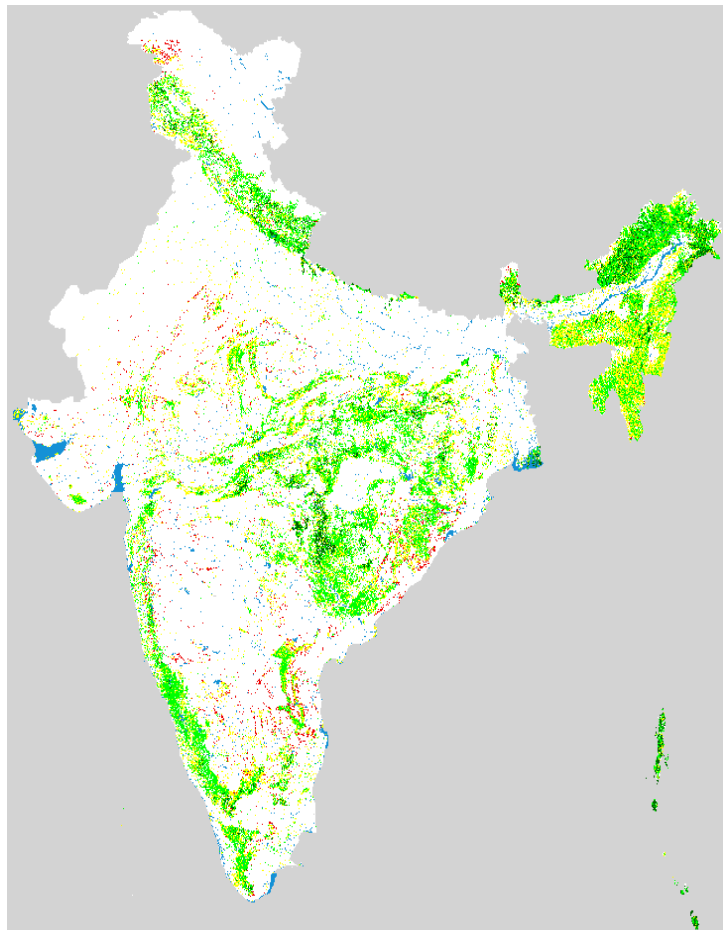
ARTICLE 48-A : "The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.

ARTICLE 51-A(G) : "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.

Provision of Forest Conservation in the Constitution of India

Article 21- SC defined in many judgements :
Right to clean Environment and health as right to life, and sustainable development
Forest and wildlife in the Concurrent list of the Constitution

Forest Cover in India – ISFR 2017



Class	Area (sq km),	Percent of Geographic Area
Forest Cover		
Very Dense Forest	98,158	2.99
Moderately Dense Forest	3,08,318	9.38
Open Forest	3,01,797	9.18
Total Forest Cover*	7,08,273	21.54
Tree Cover	93,815	2.85
Total Forest and Tree Cover	8,02,088	24.39
Scrub	45,979	1.40
Non-Forest	25,33,217	77.06
Total Geographic Area	32,87,469	100.00

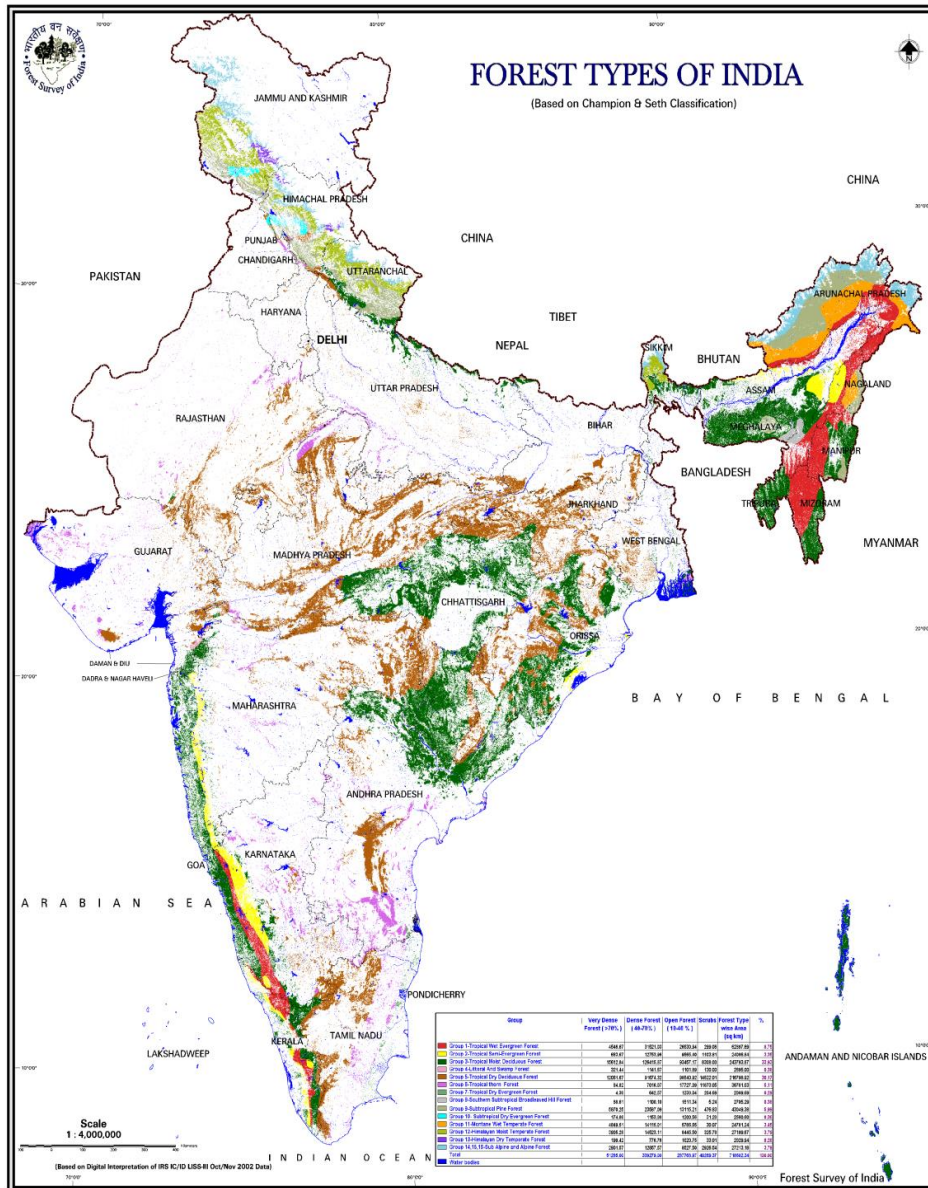
Forest cover change matrix for India between ISFR 2015 and ISFR 2017

Forest Cover Change Matrix						(Area in sq km)
Class	2017 Assessment					Total ISFR 2015 (updated)
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	84485	3380	357	7	404	88633
Moderately Dense Forest	12183	283036	11210	307	6003	312739
Open Forest	1337	17928	263822	2389	14647	300123
Scrub	5	522	5833	31437	4505	42302
Non Forest	148	3452	20575	11839	2507658	2543672
Total ISFR 2015 (Updated)	98158	308318	301797	45979	2533217	3287469
Net Change	9525	-4421	1674	3677	-10455	

India in Relation to the World (% of World Total)

Area	2.4
Forest Area	1.8
Grazing Land	0.5
Human Population	16.0
Cattle Population	18.0
Flowering Plants	6.0

Forest Cover in Different Forest Type Groups



Type Group	%
Group 1 Tropical Wet Evergreen	2.92
Group 2 Tropical Semi-Evergreen	13.79
Group 3 Tropical Moist Deciduous	19.73
Group 4 Littoral & Swamp	0.69
Group 5 Tropical Dry Deciduous	41.87
Group 6 Tropical Thorn	2.25
Group 7 Tropical Dry Evergreen	0.13
Group 8 Subtropical Broadleaved Hill	2.69
Group 9 Subtropical Pine	2.63
Group 10 Subtropical Dry evergreen	0.03
Group 11 Montane Wet Temperate	0.69
Group 12 Himalayan Moist Temperate	4.12
Group 13 Himalayan Dry Temperate	0.84
Group 14 Sub-Alpine Forests	1.89
Group 15 Moist Alpine Scrub	0.23
Group 16 Dry Alpine Scrub	0.43
Sub Total	94.93
Plantation/TOF	5.07
Total*	100.0

Biodiversity Wealth of India

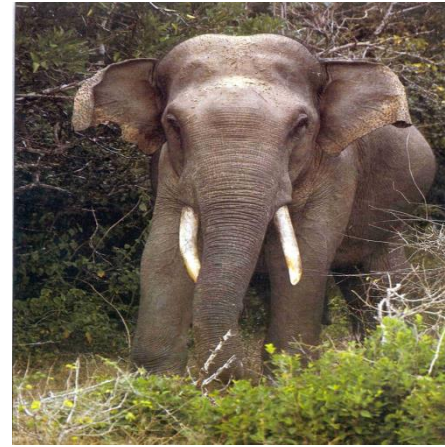


- 11.4% of the world's recorded flora
- 7.43% of the global fauna
- India ranks among the top 10 countries in terms of forest area

With only 2.4% of the World's land area, India accounts for 7.8% of the global recorded species

Species Diversity

- India has 60% of the world population of tigers(2967). This majestic cat is the symbol of conservation in India
- With between 28,000 to 30,000 Asiatic Elephants, India holds half of the world's population of this species
- Leopard is the most adaptable large cat of India found in practically all habitats. It is very much at home at degraded forests as well
- India has a very rich avifauna. 1,308 species of birds are found here which make more than 13% of the total species diversity of the world.



Importance of Forest Sector

Forest & tree cover occupies **one fourth** of country's landmass

Forests are home to **80% of country's biodiversity**

The sector provides livelihood support to one fourth of population living in **1,73,000** forest dependent villages

40 % of energy needs; **30 %** of fodder supply; and **50 %** of grazing requirement is met from forests along with other NTFP,s

It contributes in Sustainable Development & meeting the SDGs

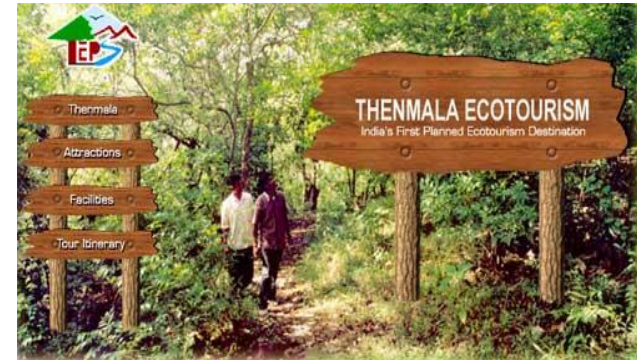
Source of sustenance to over 275 million people



Provides over 56% rural fuel and fodder needs



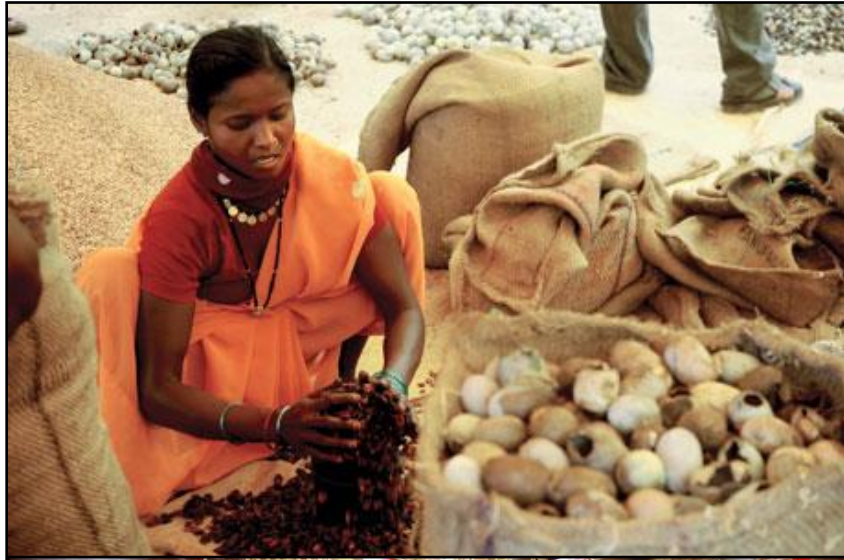
Ecotourism



TIMBER AND NON-WOOD FOREST PRODUCTS



Direct employment of 350 million man days





Ecosystem Services

Provisioning
Services

Regulating
Services

Supporting
Services

Cultural
Services

Provisioning Services

Goods provided by forest ecosystems

- Food
 - Different edible foods
 - Livestock fodder
 - Fisheries
 - Wild foods
- Fiber
 - Cotton, silk & other fibre
- Timber, fuelwood & other NTFP
- Genetic resources
- Freshwater



Regulating Services

Benefits obtained from regulation of ecosystem processes

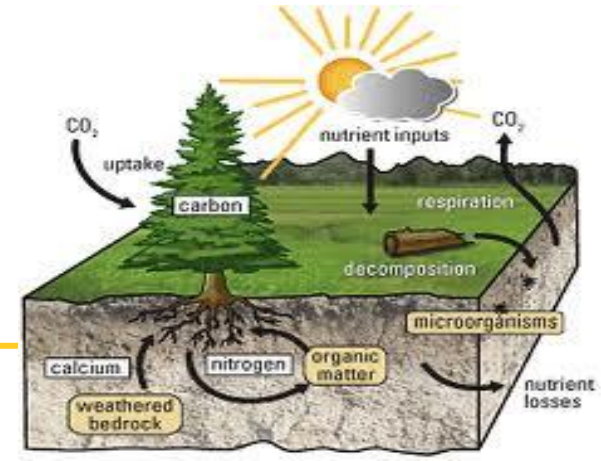
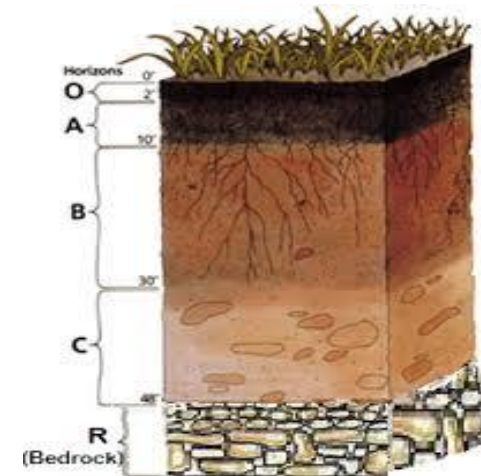
- Air Quality Improvement
- Climate Regulation
 - Global (C-sequestration)
 - Regional and local
- Prevention of soil erosion
- Enhancement of water quality
- Biological control
- Pollination



Supporting services

Key ecosystem services necessary for production of all other ecosystem services

- Soil formation
- Nutrient cycling
- Primary production
- Biodiversity



Cultural Services

Non-material benefits obtained from forest ecosystems

- Spiritual and Religious Values
- Educational & Research
- Aesthetic Values
- Recreation and Ecotourism



Natural hazard mitigation

Forests mitigate floods, reduce the impacts of storms, cyclones, tsunamis, avalanches and landslides. They act as buffer against natural disasters.

Eg: Coastal plantations & Mangroves.



Framework for forest management

- **Indian Forest Act ,1927: Forest protection instrument**
- **Wildlife Protection, Act 1972: Wildlife protection and management**
- **Forest Conservation Act, 1980: Regulatory Act, no use of forest land for non forestry use without permission of Govt. of India**

Framework for forest management

National Forest Policy, 1988: Working with people; target of 33% forest & tree cover.

JFM Guidelines, 1991: Sharing benefits with people

Biological Diversity Act, 2002 and the rules made there under

Forest Right Act, 2006: Translate NFP into action

Participatory Forest Management

- **JFM: 1,12,816 JFM committees are managing more than 24 million hectare forests**
- **Participatory processes followed**
- **Micro plans prepared and executed**
- **Usufruct sharing arrangements**
- **CFRR under FRA,2006**
- **Ownership of MFP under FRA,2006**

Human Resource

Category	Sanctioned Strength	In - Position	Vacancy
IFS	3034	2650	284
SFS	3337	2734	603
Field executive Staff	134309	109685	24624
Forest rangers	9881	7731	2150
Deputy rangers	7118	6052	1066
Foresters	32459	28206	4253
Forest guards	84851	67696	17155

Pressure & threats on Forests

- **Fuelwood & Fodder Collection**

- Over 216.42 m tonnes of fuel-wood is consumed in the country out of which 58.75 m tonnes comes from the forests.
- Fodder collection by local people in addition to grazing of cattle in forests, about 200 m tonnes of green fodder collected annually.

- **Forest Fires**

- 54 % of country's forests prone to fire.
- 90% forest fires human induced.
- Mostly ground fire cause damage to nutrients in top soil, natural regeneration, micro organisms and small ground animals.

- **Pest diseases and invasive species**

- Major forestry species e.g. Sal, Teak, and Sissoo suffer from diseases
- Vast tracts of forests are infested with invasive species like *Lantana*, *Parthenium*, *Eupatorium*.

**Loss of forests – habitat fragmentation,
diversion, encroachment**

Forest productivity - low

**Rural energy sources – inadequate,
Lack of viable alternatives**

**Grazing pressure – high cattle population,
Inadequate fodder production**

People – Increasing Population

**Planting – for regeneration and
enrichment**

Shifting cultivation

Major Challenges in Forest Management

Wildlife Conservation

- **Protected Area Network extends 16.15 mha (5% of GA) with**
 - 166 National Parks (1.19% of GA),
 - 515 WL Sanctuaries (3.6)% of GA),
 - 44 Tiger Reserves
 - 28 Elephant Reserves
 - 47 Conservation Reserves (0.04% of GA)
 - 4 Community Reserves

Key Challenges for Wildlife Conservation

- Mitigation of Human-wildlife conflicts.
- Delineation of Eco-Sensitive Zones (ESZs).
- Management of Invasive Alien Species.
- Mainstreaming of wildlife conservation in development planning.



Climate Change Mitigation Services

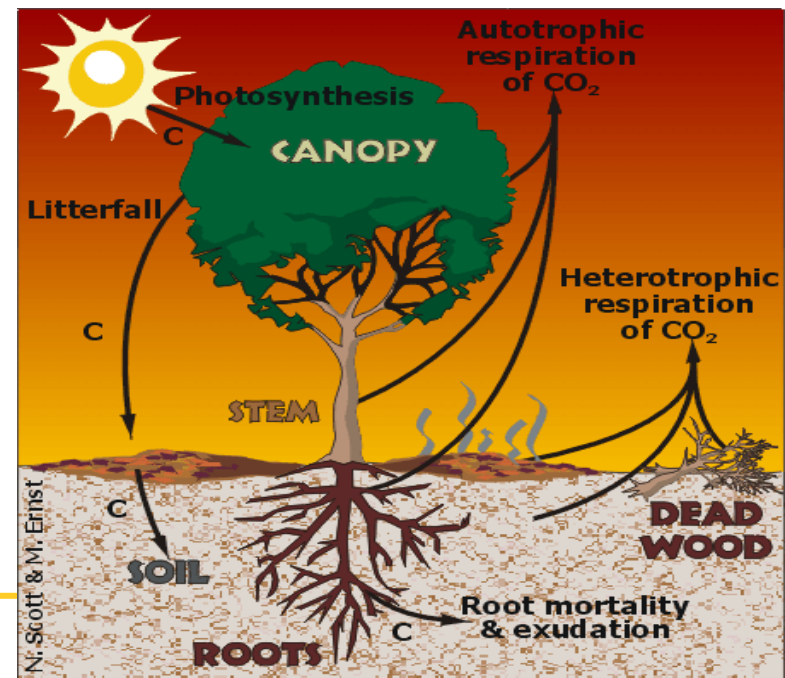
- **Carbon storage**

Total carbon stock of India's Forests is 7044 m tons of C.

- **Carbon sequestration**

Carbon flow is 52 m tons per year.

Source: ISFR, 2015



India's NDC Target and Road Map

- Forestry sector can create an additional carbon sink of 2.5 to 3.0 billion tonnes of CO₂ equivalent (680-817 million tonnes C stock) in forests through interventions on forest and non-forest lands.
- It requires conservation efforts and plantation of around 6800 to 8700 million seedlings with success rate of 40% after 10 years.
- Increasing productivity
- Filling of the vacancies of frontline staff in the Forest Department.
- Involvements of different stakeholders

India's NDC Target and Road Map

- Agroforestry is potential area to achieve NDCs
- Lack of quality planting material, MSP regime and regulatory constraints are major gaps to promote Agroforestry
- Gram sabha based forest governance required
- Carbon Neutrality Policy will boost the financial resource to the forestry sector.
- The politically driven hype of massive plantation must be discouraged. Whatever we plant, must maintain minimum five years.

THANK YOU