

Revamping Indian Forests

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Abhay Pratap Singh
Abhishek Singh
Priyanka Kumari
Shreya Mittal



Indian Forests

01

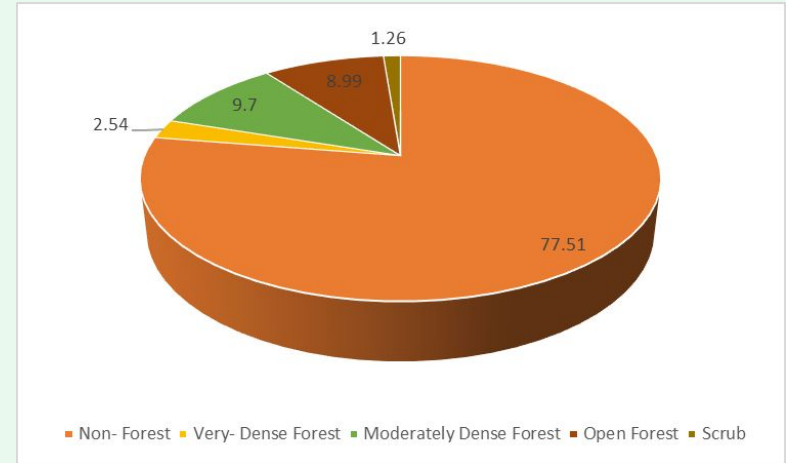
Indian forests represent one of the 12 mega biodiverse regions of the world.

02

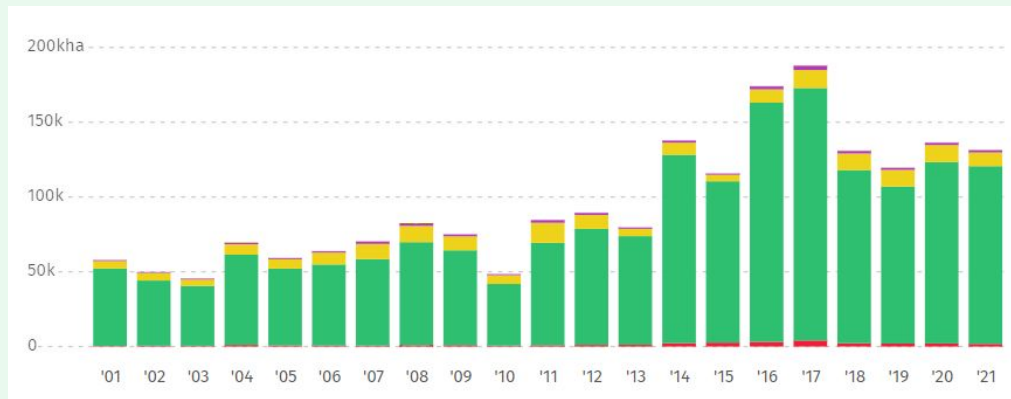
Of total Geographical area, 24.42 % is regarded as the Indian Forest.

03

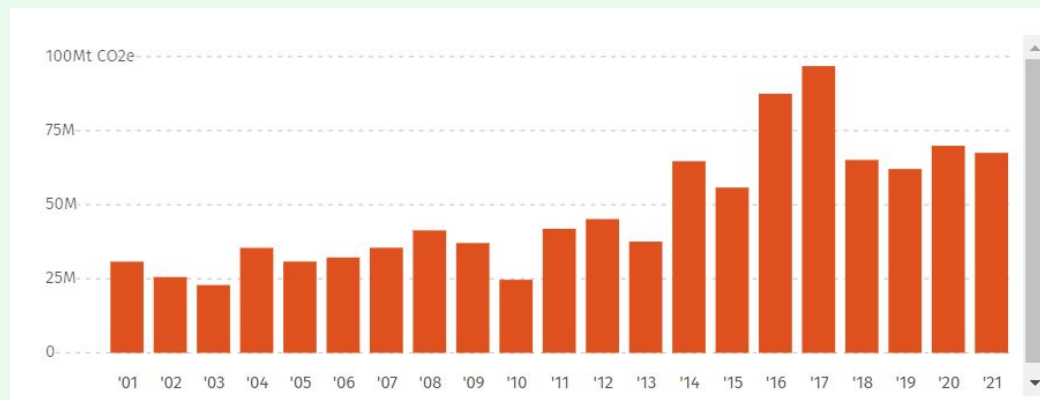
From 2001 to 2021, 2.8% of tree cover has been lost.



Indian Forests



Total	174kha
Wildfire	251ha
Drivers of permanent deforestation:	
Urbanization	1.92kha
Shifting Agriculture	8.90kha
Forestry	160kha
Commodity Driven Deforestation	3.16kha



About FSI

- ❖ Organization under Ministry of Environment and Forests, Government of India.
- ❖ It started as an organization called Pre- Investment Survey of Forest Resources (PISFR) in 1965 as FAO/UNDP/GOI Project.
- ❖ Organization under Ministry of Environment and Forests, Government of India.
- ❖ The Services provided by FSI are:
 - Training, research, extension.
 - Helps in the Forest Fire Monitoring
 - Biennial state of forest report.
 - Conducts surveys on Indian forest cover and resources.

The latest 'State of Forest' report, prepared by the FSI which used data from NFI , said the country's forest and tree cover has increased in two years by 2,261 sq. km which is a contrasting fact looking at data on carbon emissions and hence the methodology involved in calculating forest cover can be questioned .

Problems



Problems

01

Definition of Forest Cover

- Is forest cover really increasing?

02

Irregularities and Lack of transparency

- No pre planning of CAMPA Funds.
- Non existence of plantations

03

- **Unverified data**
Ambiguous data on E-Green watch.
- No public body for verification.

04

Mapping for fragmented forest

- Non-accountability for patches in forest.

Problems

05

Many Crops are considered as forest in satellite Image.

06

Compensatory Afforestation

- No clear definition for CA lands.
- Degrading Grasslands.

07

Land Banks

08

Cash for Land Policy and NPV

- No accountability for biodiversity.



Solution

You could enter a subtitle here if you need it

Solution

01

Inclusion of Locals and Panchayats

- Channelising funds
- Locals to verify
- Application for transparency
- Committee for periodic checks

02

Consideration of Seasonal Variations

- Data collection for different seasons

03

Higher Resolution Satellite System

- Newly launched satellite should be included in inventory

04

Afforestation to restoration

- Moving from Economic to Ecological.
- Training and Specialisation in Bio-restoration.

Solution

05

Division in forest Lands

- Bio-corridors and Eco-sensitive zones as Protected areas.
- Distinction of lands for Tribal People.

07

Expert Body formulation

- Statistical information and relaxation
- Forest diversion projects check
- CAMPA funds check

06

Special provisions for Roadways and Highways

- Subsidies and Relaxation in Taxes.
- Reduction in NPV values.

08

Strengthening ML Models and GVC

- Supervised classification
- Grid based approach for vegetation monitoring for two different times

Solution

09

Hyperspectral Remote Sensing Model

- Different wavelength bands can be used
- Different time periods can be taken into consideration

Road Stabilization

- poorly-maintained roads cause half of the fatal auto accidents that happen each year in the World.
- road problems like potholes and iced-over stretches of highway cause more than 42,000 deaths a year.
- Similarly the roads in forest is also important, poor roads can cause cause problems in long term .

Inadequately constructed forest roads can cause :

- road surface erosion and sediment yield
- pollution of off-site waters
- slope failures
- loss of habitat



Need for Road Stabilization

Necessity of road stabilization:

- To alter the properties of soil
- To increase shear strength of soil.
- To minimize the swelling due to wetting and shrinkage bearing.
- To increase bearing capacity of soil.
- Prevent the crack in soil due to reduction of moisture content.

Skid Trails

Temporary
Roads

Secondary
Roads

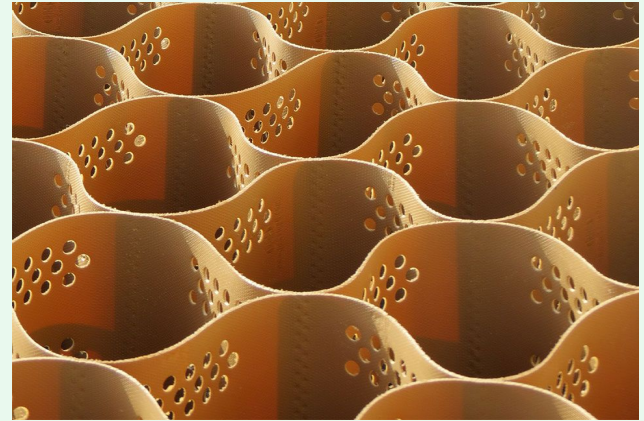
Primary Roads

Road Stabilization : Neoloy cells

Neoloy tough cells- Tough Cell is a unique cellular confinement system or “geocell” for soil stabilization & reinforcement that enables cost-saving and sustainable road construction on challenging and problematic soils.

Benefits:

- Cost Reduction
- Sustainability
- Easy Deployment, Fast Installation
- Non-Cohesive Local Infill Materials
- Green Solution
- Less Structural Layer



Road Stabilization: Consolid System

Consolid system -

- speeds up the natural process of solidification
- remains treated for permanent
- allows to incorporate up to 50 to 70 % of clayey, silty fines material

Benefits:

- There is no soil exchange - (May be some material has to be borrowed to improve the in-situ soil) ,substantially savings in material and transportation costs.
- per km construction of rural road cost savings Rs.12,342/-
- Bituminous course thickness is reduced
- Construction time can be saved.

Road Stabilization: Consolid System

Cost calculation for Rural road crust with stabilization				
Sr No.	Crust layer	Quantity for 1 Km	Rate	Total cost
1	250 mm thick treated soil	825.0 m ³	951.00	784575
2	13 mm thick bondage layer	42.9 m ³	706.42	30305
2	Prime coat =0.85 Kg/sq.mt	3000 m ²	32.22	96660
3	20 mm thick OGPC	3000 m ²	94.22	282660
4	Tack oat=0.275 Kg/sq.mt	3000 m ²	10.39	31170
5	5 mm thick seal coat	3000 m ²	38.77	116310
			Total	1341680

Cost calculation for Rural road crust without Consolid treatment				
Sr No.	Crust layer	Quantity for 1 Km	Rate	Total cost
1	175 mm thick GSB	577.5 m3	491.78	284002
3	75 mm thick WBM	225 m3	804.44	181000
4	Prime coat =7.5 Kg/sq.mt	3000 m2	32.22	96660
5	Modified penetration macadam-50 mm thick (M.P.M.)	3000 m2	122.83	368490
6	Tack Coat=0.275 Kg/sq.mt	3000 m2	10.36	31080
7	20 mm thick OGPC	3000 m2	92.16	276480
8	5 mm thick seal coat	3000 m2	38.77	116310
			TOTAL	1354022

Road Stabilization: Lime Stabilization

Lime stabilization :

- exchange of ions between lime and soil when added
- useful to construct sub-base and base course
- increases soil resilient modulus values
- substantial improvements in shear strength
- Plasticity reduction and Swell reduction

Economical benefits-

- In short term, reduces cost. In pennsylvania , traditional design approach- \$29.3 million , design using lime stabilization-\$21.6 million . more than 25 percent savings.
- In the longer term, reduces maintenance costs. stabilizing an 8-inch native clay subgrade with lime can reduce 30-year life cycle costs from \$24.49 to \$22.47 per square yard.

Innovations: Coconut Coir

1. good alternative for soil stabilization
2. made from 100% natural coconut fiber
3. biodegradable and has less durability that can be improved by coating the surface by bitumen material

Future scope-

- to increase the life, treatment with Bitumen, copper based chemicals, phenol and some other patented chemical compounds.
- Use in Concrete Structures to increase its strength.



Innovations: Self Healing Roads

The high strength concrete used to make the road is bolstered using hydrophilic nano-coated HY5 Fiber reinforcement , which makes the concrete absorb water while keeping the road hydrated.

- Can stay intact for 15 years
- high strength and reduced carbon footprint
- Self repairing using natural and synthetic fibers coated with hydrophilic nano coating.

❑ Benefits in recent project -

- 60% less thick than the standard Indian road, makes it 30% cheaper.
- 60% of the cement was replaced with fly ash, less GHGs.



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THANKS

