Deforestation in India: From a Forest, Water and Peoples Perspective

Presenter: Marimuthuram Mahendran
Introduction

- Two of 24 global biodiversity hotspots are in India
- Western Ghats and Eastern Himalayas
- Socio-economic, political and ecological consequences
- Western Ghats showed a loss of 25.6% in total forest cover (Jha et al, 2000).
- Decrease in open forest by 33.2% (Jha et al, 2000).
- Western and Eastern Himalayas constitute 30% forests in India.
- FSI reports steady increase in forest cover
- Laurence et al shows that this data is misleading (Laurence et al, 2010).
Forest culture and its erosion.

• ‘Forests have nurtured India's mind and India's civilization’ – Tagore
• Indian culture was cradled by Forests (Vedic era and times Buddha)
• Forests were central in civilizational evolution
• Aranya Samskriti
• Scientific research and cultural writings emerged from forests.
• Erosion – colonial methods of management
• Teak, Sal and coniferous trees – British Empire.
• Destruction of forests and the culture that conserved it.

(Romila.T, 2001).
Conflicts over forests

• First Phase - met the needs of British Empire

• Second Phase – Post colonial – rapid industrialization

• Third Phase – Social forestry and Waste land Development Programs

• Fourth Phase :
  - International Finance
  - Biomass conversion to petroleum products
  - Transnationalization of Forests
Conflicts over water

- Inter state conflicts
- State planned mining and timber extraction (downstream)
- State planned agricultural production
- Hydro electric power projects (ex. Kabini project)
- States plans benefit the economically powerful groups.
- Increases rich – poor gap – access to water resources.
Case Study

Analyzing deforestation rates, spatial forest cover changes and identifying critical areas of forest cover changes in North-East India during 1972 – 1999.

Nikhil Lele. P.K.Joshi
Fig. 1 Location map of North-East India with showing digital elevation map of the region
Questions

• What are the deforestation rates, spatial forest cover changes and critical areas of forest cover changes in North-East, India during 1972-1999?

• What are the factors influencing forest cover changes in North-East India?

(Nikhil & Joshi, 2009)
Approach

- Temporal forest cover datasets obtained from NRSA and FSI.
- Landsat MSS data in the time intervals 1972-75 and 1980-82, 1:250,000 scale.
- This scale, the region was mapped in multiple tiles of 1° x 1° acquired, scanned, geo-referenced and converted (digital).
- ERDAS Imagine 8.7, ArcGIS 8.3 was used to import into geo-spatial environment.

Variables:
- Open (40-10% canopy density)
- Closed (>40% canopy density)

\[
\text{Deforestation rate} = \frac{(\log F_{t2} - \log F_{t1}) \times 100}{t2 - t1}
\]

(Nikhil & Joshi, 2009)
Table 1  Forest cover in the North-East India 1972–1999

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<tbody>
<tr>
<td></td>
<td>Area (km²)</td>
<td>Area %</td>
<td>Area (km²)</td>
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<td>Area (km²)</td>
<td>Area %</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>51,438</td>
<td>61.54</td>
<td>52,104</td>
<td>62.34</td>
<td>69,002</td>
<td>82.3</td>
</tr>
<tr>
<td>Assam</td>
<td>21,055</td>
<td>26.81</td>
<td>19,796</td>
<td>25.21</td>
<td>24,832</td>
<td>33.2</td>
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<tr>
<td>Manipur</td>
<td>15,090</td>
<td>67.49</td>
<td>13,572</td>
<td>60.70</td>
<td>17,685</td>
<td>80</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>14,390</td>
<td>63.98</td>
<td>12,458</td>
<td>55.39</td>
<td>15,645</td>
<td>69.8</td>
</tr>
<tr>
<td>Mizoram</td>
<td>13,860</td>
<td>65.72</td>
<td>11,971</td>
<td>56.76</td>
<td>18,170</td>
<td>86.2</td>
</tr>
<tr>
<td>Nagaland</td>
<td>8,154</td>
<td>49.33</td>
<td>8,095</td>
<td>48.97</td>
<td>14,399</td>
<td>86.8</td>
</tr>
<tr>
<td>Tripura</td>
<td>6,330</td>
<td>60.40</td>
<td>5,138</td>
<td>49.03</td>
<td>5,535</td>
<td>50.08</td>
</tr>
<tr>
<td>Entire North-east</td>
<td>13,031</td>
<td>51.09</td>
<td>123,134</td>
<td>48.28</td>
<td>165,268</td>
<td>65.39</td>
</tr>
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Table 2  Deforestation rates for during 1972 to 1999 for total forest cover changes in the North-East India

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<tbody>
<tr>
<td>Arunachal Pradesh</td>
<td>−0.056</td>
<td>−0.0061</td>
<td>0.077</td>
<td>0.021</td>
<td>0.061</td>
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<tr>
<td>Assam</td>
<td>0.268</td>
<td>−0.00492</td>
<td>0.070</td>
<td>0.307</td>
<td>−1.023</td>
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<td>Manipur</td>
<td>0.460</td>
<td>−0.00575</td>
<td>0.00</td>
<td>0.078</td>
<td>0.265</td>
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<tr>
<td>Meghalaya</td>
<td>0.626</td>
<td>−0.00495</td>
<td>−0.316</td>
<td>0.110</td>
<td>0.060</td>
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<td>Mizoram</td>
<td>0.636</td>
<td>−0.00906</td>
<td>−0.801</td>
<td>0.160</td>
<td>0.434</td>
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<tr>
<td>Nagaland</td>
<td>0.032</td>
<td>−0.01251</td>
<td>0.117</td>
<td>0.022</td>
<td>0.495</td>
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<tr>
<td>Tripura</td>
<td>0.906</td>
<td>−0.00162</td>
<td>0.00</td>
<td>−0.005</td>
<td>−1.762</td>
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<td>Entire NE</td>
<td>0.246</td>
<td>−0.00639</td>
<td>−0.066</td>
<td>0.093</td>
<td>−0.079</td>
</tr>
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Fig. 3  Areas of forest cover dynamics in the north-eastern region

Fig. 4  Dynamic and unchanged areas in north-eastern states

(Nikhil & Joshi, 2009)
Conclusion

• Meghalaya, Mizoram, Nagaland and Tripura have dynamic areas of forest cover due to human interference.

• Reason: Conversion of forest to shifting cultivation or permanent agriculture, extensive mining.

• Arunachal Pradesh, Assam and Manipur have lower dynamic areas and an overall gain in forest cover.

• Reason: Strict measures to protect reserve forests, allowing regrowth of forest in the lands (jhum).

• Arunachal Pradesh, primary forest cover remained unchanged.

• Reason: Complexity of the terrain and high altitudes

(Nikhil & Joshi, 2009)
References

• Jain, S. The Hindustan Times (New Delhi), 11 December 1986.
• Krishnamurthy, B.V.K. Ecosystem of Southern Mysore. New Delhi, Environment Services Group, 1984.
Thank you