India's forest surveys conceal a deep institutional failure

Forest Survey of India's assessment of tree cover not only reveals a deeply flawed methodology but also points to a circular accountability problem.

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The jhum cultivation in the Karbi Anglong hill district of Assam is witnessing rampant deforestation. Despite repeated criticism, over several decades, from various quarters, no changes have been seen in India's forest monitoring policy. | Photo Credit: Ritu Raj Konwar/The Hindu

Forest cover monitoring in India seems to be stuck in a time loop. Every two years, the India State of Forest Report (ISFR) produced by the Forest Survey of India (FSI) is released with much fanfare by the government, each time showing an infinitesimal increase in the country's so-called forest cover. And each time, conservationists and independent scientists (including this author) critique it along the same lines: natural forest is not being distinguished from plantations, the decline in dense natural forest cover is overshadowed by the increasing plantation area and the data on legal forest area are inconsistent.

With enhanced imagery and advanced methods available, and citizen science becoming the norm, a new approach is possible. Yet, the FSI remains unresponsive. This raises a fundamental question: why continue this charade and what deeper issues are truly at play?

Beyond the binary

Why do we monitor forests? At the heart of this exercise is the idea that forests represent the environmental health of the country. Forests, according to ISFR, are "sentinel guardians; nurturing life, preserving biodiversity, and safeguarding the delicate equilibrium of our ecosystems." But such poetic words deify forests and create a puerile binary between "forests" and "non-forests", representing "environmental health/benefits" and "environmental harm" respectively. This simplification needs to be unpacked.

Forests offer multiple environmental and social benefits. To India's estimated 250 million forest-dependent, they provide firewood, fodder, food, medicinal plants, building material, and are crucibles of local cultural practices; they sustain the lives of people living downstream in river basins by reducing soil erosion and enabling non-monsoon flows. To people who do not inhabit forests—tourists, for example—they educate, offer experiences, and create memories. For the global community, they sustain wild species and play a critical role in carbon sequestration.

But ecosystems that may be classified as "non forests"—grasslands or tree savannas—have their vital uses too: They harbour a different variety of wildlife, sequester some carbon, and support pastoral livelihoods.

Among other non-forest land uses, coffee plantations with shade trees harbour an intermediate level of biodiversity and conserve soil and water, while generating income. Rubber or areca nut plantations, while low on biodiversity, also sequester carbon and also create income.

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Moreover, just as "non-forest" is not a homogenous category, neither is a "forest." While relatively untouched forests may have high biodiversity value and standing carbon, keeping them intact means the products they offer cannot be used. Meanwhile, forests used intensively by local communities for firewood and fodder collection may not look pristine (such as the soppinabettas of Uttara Kannada, the

oak forests of Garhwal, or grazed savannas across the country), but they also harbour moderate levels of biodiversity and carbon.

Monocultural "forest plantations" of teak, eucalyptus or pine, however, harbour the least amount of diversity and may even adversely affect streamflow. They do, however, maximise timber or pulpwood production, or, if left untouched, can rapidly sequester carbon.

Table 1: Trade-offs between benefits and beneficiaries from forest and non-forest uses of land

Land use type		Forest product, service or benefit								
		Local beneficiaries				Regional beneficiaries			Global beneficiaries	
		Fuel wood	Leaf manure	Fodder	Minor produce	Timber	Hydrological regulation	Soil conservation	Bio-diversity	Carbon-sequestered
Forest	Dense natural forest	++	++	0	+++	0	+++	+++	+++	+++
	Dense lopped forest	+++	+++	+	++	+	++?	++	++	++
	Open tree savannah	++	++	++	+	0	+?	++	+	+
	Pure grassland	0	0	+++	0	0	+++?	++	+	+
	Timber plantation	+	+	0	0	+++	+/-?	+	+	+++
Non-forest	Coffee plantation	+	+	0	0	+	++?	++?	+	++
	Terraced paddy	0	0	++	0	0	+?	+?	?	0
	Slope cultivation	0	0	+	0	0	0?	-	?	0
	Barren land	0	0	0	0	0	-	-	0	0

0 = no impact; + = positive benefits; – = negative impacts; ? = significant uncertainty about nature of impact
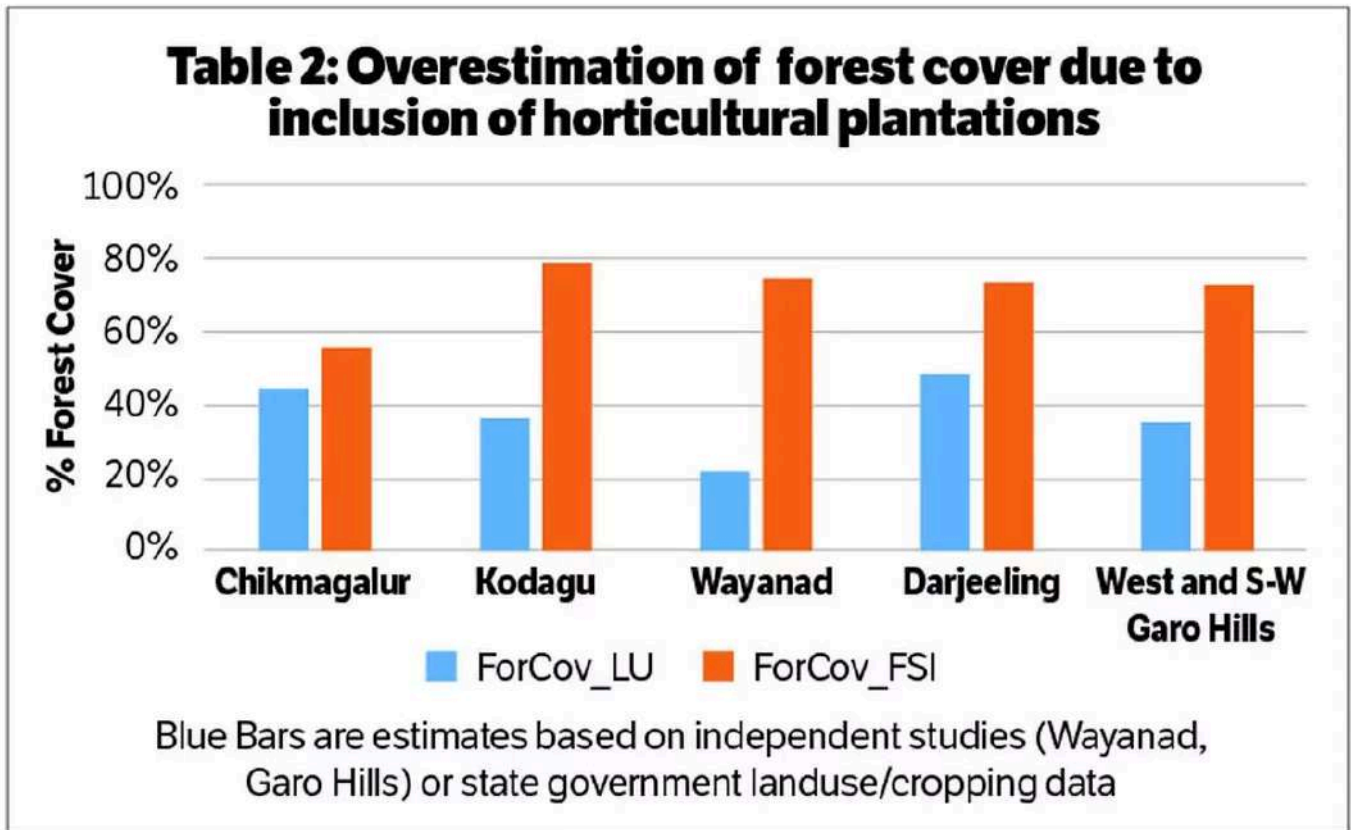(Source: Lélé 1994).

It is clear, therefore, that where we draw the line between "forest" and "non-forest" is ultimately subjective, and reflects what benefits we prioritise. Conservationists are only interested in biodiversity and hence focus exclusively on "natural" forests, criticising FSI's decision to include forest plantations and horticultural plantations (coffee, tea, rubber, cashew nut, areca nut, coconut) in its definition of forest cover. For foresters, teak plantations should be treated as forests because they have historically valued timber production. Local communities may include tree savannas in their definition of "forest," because it represents a wild, uncultivated area. In fact, "forest" and "non-forest" may occur on the same piece of land, when they are under shifting or jhum cultivation, burnt down only to regenerate over time.

A 'plural' classification

The "forest"-"non-forest" binary urgently needs to shift to disaggregated data on the condition of the uncultivated half of India. Instead of "forest" as a single variable, the monitoring agency should present information on the status of each of the uncultivated and semi-cultivated land uses: relatively untouched forests, heavily used forests, tree savannas, grasslands, jhum lands, forest plantations, and

even rubber, cashew and areca plantations, and leave it to the user to decide which land use they want to focus on.

While implementing such a "plural" classification will take time, the current mismatch between what FSI clearly champions (a semi-natural land cover providing multiple environmental benefits) and what it measures (everything that has more than 10 per cent tree canopy cover) is completely untenable. It is also in violation of the Forest Conservation Act, 1980, which explicitly classifies coffee, tea, rubber, cashew, areca, etc. as "non-forest land uses".

Table 2: Overestimation of forest cover due to inclusion of horticultural plantations

Blue Bars are estimates based on independent studies (Wayanad, Garo Hills) or state government landuse/cropping data

Some overestimations are distinctly absurd. For instance, for the past 20 years, the FSI has consistently reported that Kodagu (Coorg), Karnataka, has 78-81 per cent "forest" cover; but just a casual glance at official land statistics shows that more than 25 per cent is under coffee, another 36 per cent under agriculture, not to mention illegal coffee expansion. This leaves less than 40 per cent of the land as "forest". This story is repeated in all horticulture-dominated regions. (See table 1)

Approximately right or precisely wrong?

Many years ago, I had questioned the FSI about this disparity. I had pointed out that even their own visually interpreted, coarse-scale forest cover maps of the 1990s showed coffee plantation areas as distinct from forest. So, what prompted the amalgamation? Their reply was that the high level of uncertainty in separating forest from coffee forced them to merge those categories. But in fact, playing it safe produces a greater misrepresentation than having approximate maps (and saying so).

Union Minister for Environment, Forest & Climate Change Bhupender Yadav during the launch of the India State of Forest Report (ISFR) 2023, in Dehradun on December 22, 2024. | Photo Credit: ANI

Moreover, the quality of satellite data has improved and new methods are available that use texture and object-oriented classification rather than simple pixel-level spectral signatures to overcome this problem. Intriguingly, the FSI has mapped rubber plantations in Tripura in a 2019-20 study, using higher resolution data (ISFR 2023), but does not explain why it could not do so for the rest of the country. It doesn't explain why it depended upon coffee planters to supply boundaries of their plantations.

The FSI also needs to shed its "forester" lens and distinguish between so-called "forest plantations" of teak, pine, eucalyptus or acacia and natural forest. Even as of 20 years ago, the Karnataka forest department had produced visually interpreted land cover maps in which it distinguished forest plantations. The maps show that even in heavily forested districts such as Uttara Kannada, 10 per cent of the forest cover was, in fact, plantations. The proportion was much higher for the sparsely forested eastern plains districts.

The mysterious 'unclassed' forest

Does the legal status of the land on which "forest cover" is present matter? Yes, because if forests provide public benefits, the responsibility of sustainably generating those benefits lies with the agency managing those forests. Even privately owned forests face some restrictions for this reason (although the judiciary and bureaucracy have possibly over-regulated private forested lands). But surely publicly owned forests should be held to a higher standard.

To do so, however, the FSI must provide information on the status of forests (or land-cover more generally) on public lands, so as to hold the public forest managers accountable. But for the past four

decades or more, the FSI has claimed it has been unable to delineate the boundaries of "recorded forest area" (RFA) in the country. This is because it insists on including "unclassed forests" in the RFA, although it is not a legal category. Unclassed forests are the creation of forest departments to claim other forest-like lands that they would like to take control over. Shifting cultivation lands in the northeast, for instance, are called "unclassed forest": in Meghalaya, 88 per cent of the RFA is "unclassed forest" according to ISFR 2023.

The strange fluctuations in the area reported as "unclassed forests" over the years are simply an artefact of the category being without any basis. The FSI should now stick to reporting notified forest areas. The boundaries of notified forests should not be difficult to obtain, as all State forest departments today have GIS maps of their reserve, protected and other legal categories of forests.

Monitoring the monitor

Why is it that repeated criticism, over several decades, from various quarters, have not resulted in any changes in India's official forest monitoring policy? To understand this, we need only to look at the genesis of the ISFR and the composition of the FSI. The FSI is an agency created by the Central Forest Ministry and headed by foresters on deputation from State cadres.

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This may have been fine in the 1960s when the agency was created to provide inventory services to State departments. But when the National Remote Sensing Agency produced the first country-wide forest cover maps based on satellite imagery in 1983 and showed a decline of 18 per cent between 1973 and 1982, foresters across States felt threatened and successfully lobbied for this exercise to be handed over to "their" FSI, which then produced ISFR 1987. And so, forest monitoring has been controlled by those very actors whose effectiveness is sought to be monitored.

But forest monitoring is too important to be left to foresters. It is best carried out by an independent agency working in a transparent manner, in collaboration with academia and with inputs from civil society, and answerable to the public. Forest cover mapping must adopt a plural approach, allowing users to merge and unmerge categories rather than provide a single category and number.

These maps of the uncultivated half of India must be publicly accessible, with mechanisms for feedback on errors and mis-characterisations in a public "Wiki" mode. They must be overlaid with public land boundaries including their varied legal categories through state-of-the-art technologies for democratic environmental governance.

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