

SEMINAR

De-fragmenting nature

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THE three proclaimed goals of the proposed law, ‘Scheduled Tribes (Recognition of Forest Rights) Bill’ – the bill hereafter – are: To redress past social injustices perpetrated against forest dwelling tribal people, to improve their socio-economic conditions, and to protect India’s natural biodiversity under a new conservation paradigm rooted in the traditional ecological wisdom of the tribal people. No one can disagree with these objectives expressed by activists who genuinely champion *adivasi* causes. However, the motives of others, who caricature this complex issue as some sort of class struggle between millions of poor tribal people on the one hand, and a handful of elite naturalists on the other, are more suspect, particularly when they originate from politicians of any colour.

The proponents of the bill make two fundamental assumptions (either explicitly stated or implicitly believed):

1. That past injustices perpetrated on tribal people can now be redressed through mechanisms in the bill for conferring the potential beneficiaries the right of occupancy within forests.
2. That there will be no major negative ecological impact from this bill, because forest dwelling tribal people have traditionally lived in ecological harmony with forests and provisions of the bill ensure continuation of this harmony.

The first premise, that this law will provide social security and economic gains to a large number of potential beneficiaries is not devoid of merit. The critics of this premise (incidentally, not all of them diehard wildlife conservationists) have pointed out some potential dangers too. Other dominant rural classes may usurp the privileges granted to tribals. Commercial interests like mining, logging, wildlife trade and thoughtless development projects may piggyback themselves on this law to penetrate deeper into rich forest areas hitherto kept out of their grasp by strong conservation laws. These counter arguments too have merit. The initial attempt to rush the bill through Parliament without wide public debate has now been stalled. The bill’s first fundamental premise, which relates to its potential social benefits, is receiving deeper scrutiny.

In this essay we critically examine the *ecological arguments* that form the bedrock of the second premise underlying the bill. Based on this analysis, and our own conservation experience in the state of Karnataka, we briefly examine whether the desired social justice

can be delivered to the disenfranchised tribal people (and other forest dwellers who got left out of this bill) in a manner that is not only socially responsible but also ecologically sound.

The fundamental ecological premise of the bill is that it will not have any negative impact on forests and wildlife. The explicitly stated corollary is that nature will actually benefit from ecologically wise resource use and husbandry traditions, which millions of newly empowered beneficiaries will begin to invest on these wild lands.

In passing, we would like to note that the basic ecological concepts of ‘balance of nature’ and ‘climatic equilibrium’ upon which this idea rests, have now been largely discarded by science, and replaced by more complex explanations of how ecological communities work.

More specifically, what does the accumulated worldwide scientific evidence say on the impact of ‘traditional forest dwellers’ and their lifestyles on forests and wildlife? Even more pertinently, how have these impacts changed in response to emergent factors like expanding markets, new technologies and cultural changes? With these questions as a backdrop, what is the evidence, particularly in the Indian context, that forest dwelling tribal people continue to maintain some form of enduring harmony with wildlife and forests? If so, where and at what geographic scale do we find any examples?

We explore how all these questions are in fact linked to the issue of habitat fragmentation – the single biggest driver of ecological changes seen around us.^{1,2}

A study of fragmentation of habitats has been the dominant theme in ecology during the last quarter century.¹⁻⁵ Fragmentation occurs when landscape continuity is broken – forests shrink into smaller patches to become honeycombed with settlements, and connectivity gets eroded. The perimeter length increases in relation to internal area and the changing shapes of habitat fragments expose new ‘edges’ where none existed before. The multiple and synergistic effects of such fragmentation on the demographic and genetic makeup of a single animal population, or the structure and functioning of entire ecological communities harbouring many species or even at the levels of landscapes or biomes are well-documented.^{1,4}

And, the overall scientific consensus is clear: effects of habitat fragmentation are largely deleterious to biodiversity conservation at all three critical scales – single populations of rare species, entire community of such species and diversity at the landscape level itself. As Princeton ecologist Simon Levin¹ has brilliantly illustrated, the ecosystem level consequences of such ecological changes are not hard to predict and are largely negative.

Fragmentation directly affects ecological and behavioural factors such as foraging movements, dispersal, migrations and colonization abilities of animal species.⁶

Fragmentation disrupts demographic functioning and genetic make up of populations, and drastically reduces long-term population viability in plants and animals.⁷ This is particularly true for extinction-prone species like the elephants, rhinos, tigers, lion-tailed monkeys, great hornbills and even rare plants.

Fragmentation affects populations of single species as well as composition of entire animal communities. Rare interior forest species are replaced by common, adaptable ‘trash’ species of plants and animals. Animal species with specialized foraging needs and ranging patterns that are unfulfilled in fragmented forests get eliminated from the biological communities and their niches are occupied by other species. Such compensatory shifts change the structure of entire animal communities, for example, by altering the relative numbers and impacts of carnivores on herbivores, or herbivores on plants.

Changing structures of animal communities can significantly reduce overall community biomass, changes guild structure and shifts relative abundance of size classes among species. Cascading consequences of these changes for plant-animal relations may involve diverse interactions: pollination, seed dispersal, seed predation and herbivory. As a consequence, over time, even the forest itself changes, driving further changes in animal communities. All this is not some fairytale conjured up by anti-human conservationists: massive evidence, in the form of best of ecological science supports this urgent need to de-fragment nature.³⁻⁷

Habitat fragmentation has other consequences at more practical levels. It exposes *more* of the forest edge to other land uses like agriculture and animal husbandry that prevail in more densely populated landscapes. It exposes *more* of the forested natural areas in India to *increased* contact with human settlements, roads, railway lines, power lines, pipelines, irrigation canals and such formations. This increased exposure brings in two factors inimical to conservation: *increased* human-wildlife conflict and intensified exploitation of forests and wildlife products.⁸⁻⁹

Competing with humans for the same food sources, tigers kill cattle, wolves lift children and elephants raid crops, setting up perennial conflicts in which humans inevitably prevail.¹⁰ Fragmentation and its consequences have already restricted the distribution of even charismatic endangered species like tigers and lion tailed macaques to less than 5% of their natural range in India. Other species have been even less fortunate: there are virtually only single surviving populations of the Asiatic lion, Indian rhino and Eld’s deer. The cheetah, banteng, Javan and Sumatran rhinos have been totally extirpated.

Even in prehistoric times going back thousands of years, primitive hunters colonising new lands have wiped out entire communities of vulnerable animals. Scholarly overviews of hunting practices worldwide show that even in the vastly more extensive remote tropical forests of Africa and Latin America, even low density tribal hunters have pushed many species to the brink or depressed their numbers. Globally, hunting practices alone have driven 80 species to extinction in the last 400 years.¹¹

Species that are most vulnerable live in tropical forests. The few apparently successful examples of wildlife consumptive use come from highly productive savannas of eastern and southern Africa and arise from three factors that don't exist in India: vast tracts of land, low densities of humans, and presence of huge un-hunted protected reserves that serve as reservoirs for wildlife. Even this delicate balance is now in danger from increasing human densities and economic aspirations.

There is very little evidence that tribal people (or any other human group) can live at population densities comparable to those that prevail in Indian forests without imposing severe negative impacts on the forests and wildlife around them.^{6,7,10} The reason is simple: high-density human populations cannot live off the land in some sort of imagined harmony with nature, so to speak on love and fresh air alone. They have to raise crops and livestock, collect plants and kill animals for the pot or for sale to make a living. There is simply no escape from such ecological fallouts of habitat fragmentation.

For a long time after the first prehistoric humans from Africa set foot in India (about 60,000 years ago), ecological conditions that are assumed as a fundamental premise of the bill prevailed at least broadly. This premise has not held true for centuries now. Since the advent of agriculture (10,000 plus years ago), the subcontinent has seen successive waves of agricultural expansion. Fire, axe and plough have replaced jungles with farms. Fragmentation and its consequences have followed, leaving us today with about 10% land area under somewhat natural looking forests (by no means all intact), about 3.5% of it under designated nature reserves with perhaps less than 1% of the land still possessing a reasonable complement of plants and animals that once thrived over much of the subcontinent.

Implementation of the bill will increase land under cultivation and change land-cover patterns resulting in small patches of cultivation scattered throughout the remaining forests. The process creating these patches will be driven by the dynamics of rural politics and not by any ecological or conservation considerations. Delivery of necessary social services and infrastructure (schools, health care, roads, canals, electricity) into these remote patches (driven by popular demands as well pressures on the official machinery for expending the huge budgetary outlays earmarked for these sectors) will become inevitable – driving the fragmentation process further. The bill will certainly unleash another wave of habitat fragmentation hitherto held in check to some extent by our 'draconian' conservation laws.

Increased access will facilitate intensive, market-driven exploitation of forests and wildlife products. Increased interface between forest and cultivation will escalate conflicts between wildlife and humans. As human population densities in these forest areas increase, new generations and social groups looking for more land will expand these enclaves, and the country would pass a point when no potential solution to this crisis will remain open. Despite the pious strictures in the bill that direct its beneficiaries to live harmoniously with

nature, the apocalypse of ecological fragmentation and its four horsemen – human wildlife conflict, illegal hunting, forest exploitation and invasive alien species – will stalk the wild lands of India.

The above consequences of fragmentation are not idle speculations: they can be objectively and quantitatively monitored from space using satellite imagery and ground-based ecological surveys that track wildlife declines and increased threats that drive them. The proponents of the bill in the Ministry of Tribal Affairs (MoTA) are indulging in a dangerous fantasy when they argue that none of these predictions will come true. They will, and the truth of this can be demonstrated through objective data.

The central issue is simple: in the specific ecological context of India, if forest fragmentation has to be reduced, or at least arrested, the present interspersed human settlements, agriculture, livestock-raising, as well as the intensity of forest product collection must be reduced. We must now begin to de-fragment forests, not increase their fragmentation further.

Most ecological scientists know this, but dodge the pesky issue in public. However, the same scientists then go on to generate a veritable flood of professional papers, projects, landscape ecological maps and hold endless seminars to bemoan the dreadful ecological consequences of advancing fragmentation on biodiversity. As a result of their irresponsible evasiveness, not only the general public, even many environmentalists complacently accept the false ecological premises underlying the bill. We recall a glossy report produced by the well-known development charity a few years ago, which proclaimed its goal was ‘putting people back into the woods.’ It is hardly fair to blame the proponents of the bill alone for the failure of ecological scientists and environmental activists to honestly educate such folks about their fundamentally false premise.

Moreover, these ecological arguments pointing out the adverse impacts of the bill in no way negate the need for addressing the core issue of redressing past injustices and current aspirations of tribal forest dwellers. They have been brutalized by both the insensitive forest department and by the even more inept revenue and tribal welfare departments who largely serve the interests of more dominant caste groups. Let us not forget that after independence, under India’s revenue land grant rules, an even greater wooded area than proposed under this bill was actually parcelled out in exactly similar ‘inalienable’ land grants to millions of tribal families. It is a matter of record that most of this ‘inalienable’ land was promptly grabbed by higher caste farmers, miners, loggers, eco-tourism operators and other powerful social forces.

Our long-term involvement with three voluntary resettlement schemes for forest dwellers marooned inside protected areas in Karnataka suggests some alternative solutions may be feasible. The first experience involved over 400 rural (non-tribal) families who lived in 18

enclaves within the Bhadra Tiger Reserve. Thanks to two decades of tireless effort by wildlife conservationists, aided in the latter stages by a few committed officials in the forest and revenue departments, this project has been completed and provides a good example of what can be achieved. The ongoing effort in Nagarahole involving voluntary relocation of tribal families has traversed a bumpier path, but still looks promising.

Our third pilot experiment was with just eight families (and 500 cattle) who had encroached Kudremukh National Park. They were resettled on alternative land bought with private conservation funding, demonstrating another promising model. We believe the key factor in all three cases was the motivational and watchdog role played by wildlife conservation NGOs. This is what set apart the initiatives from all those poorly executed resettlement projects implemented solely by government agencies without any external checks and balances.

To de-fragment nature and protect interests of forest dwellers, we must now think out of the box and innovate radically. There is no dearth of financial resources necessary for meeting forest people's livelihood needs: the huge amounts of money being wasted on corruption-ridden ecodevelopment projects of the forest department and even larger sums being splurged by tribal welfare schemes that fail to reach the intended beneficiaries, flood of money generated by mining companies with leases on forest lands, the rich harvest of dollars earned by eco-tourism companies that benefit from intact forests and abundant wildlife, numerous jobs in the forest departments being grabbed by more privileged caste groups under false labels, and many more such potential cash cows do exist. The forest dwellers should have the first claim on their milk.

We argue that the past injustices meted out to forest dwellers must be redressed, but not with the same old failed 'land give away' formulas that destroy nature too. The fact is that no one, including tribals, now wants to be deprived of decent livelihood opportunities, education, roads, hospitals and other modern social amenities. And, we believe there are sufficient resources, ingenuity, human concern – and perhaps even agricultural land – in this country to redress injustices and spur the economic progress that tribal people are demanding.

We believe this goal can be achieved without further damaging the already weakened ecological foundations of our common future. What is required is the political will not to take the path of least resistance we have historically found so expedient: to keep on chipping away at fragments of natural India until we are left with none.