India's Forest Biodiversity Management Regime

A FRAMEWORK FOR REFORM

India's forest biodiversity management regime is analysed at the policy, legal and institutional levels from the perspective of the triple objectives of the Convention on Biological Diversity and the principles of the Indian constitution. The forest biodiversity management regime has both structural and functional flaws that render it largely incapable of facing the challenge of increasing biodiversity degradation and deepening poverty among the Adivasis *and other forest-dependent communities. This paper argues for the reform of the forest biodiversity management regime and offers recommendations in regard to most aspects of the regime, with a view of putting the country's conservation enterprise on a course that is effective, sustainable and inclusive, rejecting the report of the High Power Committee or the Subramanian Committee, which is premised on easing corporate access to forests.*

S FAIZI AND M RAVICHANDRAN

INTRODUCTION

India has a fairly robust forest biodiversity management system, with extensive institutional arrangements and vast legal instruments; however, there has been a decline in biodiversity on one hand and an increase in impoverishment of biodiversity-dependent people on the other hand. India's biodiversity includes

96,373 known species of fauna and 56,515 known species of flora (including fungi and lichens) and comprises about eight per cent of the world's biodiversity, but demonstrates a declining trend in numbers, with a significant proportion of species becoming threatened (Ministry of Environment and Forests and Climate Change (MoEF, CC), *India's Fifth National Report to the Convention on Biological Diversity*, Government of India, New Delhi, 2014, online at https://www.cbd.int). Corresponding to biodiversity degradation is the deepening impoverishment of forest-dependent local communities, particularly the *Adivasis* (Planning Commission of India, *Eleventh Five Year Plan 2007–12*, New Delhi: Oxford University Press, 2008, online at http://planningcommission.nic.in), thus alienating natural partners in conservation.

India's biodiversity comprises about eight per cent of the world's biodiversity, but demonstrates a declining trend in numbers, with a significant proportion of species becoming threatened and a deepening impoverishment of forest-dependent local communities, particularly the *Adivasis*.

These twin crises can be addressed only through reform of the country's forest biodiversity management regime, based on the triple objectives of the Convention on Biological Diversity (CBD), namely, conservation, sustainable use and benefit sharing and drawing from the ecosystem approach as defined by Decision V/6 of the fifth meeting of the CBD's Conference of Parties, held in 2000, as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help in reaching a balance of the three objectives of the Convention—conservation, sustainable use and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources". The reform should be founded on the Indian constitutional provisions of Article 39.B, which direct that the ownership and control of natural resources should be distributed in such a way that it serves the public good and 48.A, which emphasises the state's responsibility to safeguard forests and wildlife.

The recommendations of the High Power Committee (HPC) (also known as the Subramanian Committee), constituted by the Government of India with the objective "to provide more freedom to private sector to function" (*Review of the Various Acts Administered by the Ministry of Environment, Forests and Climate Change*, Government of India, New Delhi, 2014, online at http://envfor.nic.

in), can only exacerbate the current twin crises of biodiversity degradation and deepening poverty within the forest-dependent communities, as pointed out by critiques of the HPC report (Leo F Saldanha and Bhargavi S Rao, "A Non-Trivial Threat to India's Ecological and Economic Security: A Critique", Environment Support Group, Bangalore 2015, online at http://www.esgindia.org). The report ought to be rejected as recommended by the Parliamentary Standing Committee on Science and Technology, Environment and Forests (*Two Hundred Sixty Third Report on High Level Committee Report to Review Various Acts Administered by MoEFCC*, Rajya Sabha Secretariat, New Delhi, 2015, online at http://rsintranet.nic.in). At the same time, there is a compelling need to reform the forest biodiversity management regime to effectively address the twin crises of biodiversity degradation and deepening poverty of the forest-dependent communities. Therefore, we propose a framework for the reforms to be undertaken, in an effort to arrest and reverse the twin crises, based on the CBD's principles and constitutional directives.

India's modem biodiversity management is evolving, albeit hesitantly, from its conventional protectionist and exclusionary domain to encompass the triple objectives of the CBD with equal importance to all, a process catalysed by the Forest Rights Act (FRA). While forest departments continue to maintain their central roles in biodiversity management, the Panchayati Raj institutions have come to play a rapidly growing role, supported by enabling legislation. There is a gradual departure from the colonial legacy, expanding the scope of building partnerships with local communities through village-level institutions, such as the Joint Forest Management Committees (JFMC) and statutory bodies, which include the Forest Rights Committee under the FRA and the Biodiversity Management Committees under the Biological Diversity Act.

However, the inherent resistance within the forest departments to share power with the local communities remains a challenge to the effective enforcement of these provisions. Multiple legislation pertaining to forests and biodiversity also retain the colonial legacy of exclusionary conservation. Constraints in the legislation and resistance within forest management institutions are factors impeding the tentative evolutionary process of devolving forest management powers to the people. Therefore, the reform of the forest management regime is necessary and urgent. This paper examines the current policy, legal and institutional matrix and proposes ways to implement reform in line with the founding principles of the CBD.

REFORMING THE POLICY REALM

National Forest Policy

Since its inception in 1988, the revised National Forest Policy has guided forest management in the country. The principles of local community participation and benefit sharing embodied in the policy have also provided the stimulus for the launch of the Joint Forest Management (JFM) programme. However, rapid developments that have occurred in the forestry sector since 1988 require a subsequent revision of the policy, particularly since forest managers at various levels give more weight to the prescriptions contained in the policy than to any other related policy instrument.

While the policy has stimulated the launch of JFM, it did not envisage JFM as it is. Additionally, changes in the legal ambience of forest management caused by the FRA 2006 should be reflected in the policy. This will also provide an opportunity for the policy to be informed by the CBD, its programme of work on forests and the overarching principle of the ecosystem approach. However, in the new Draft Forest Policy of 2016 (Indian Institute of Forest Management, online at http://www.moef.nic.in), the government invited public comments, but then withdrew the same policy with the same haste as it was drafted. This represents what a forward looking, inclusive and CBD-compliant forest policy should not be.

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Joint Forest Management Guidelines

Joint forest management is practiced in the country according to a circular letter issued by the Ministry of Environment and Forests (MoEF, recently renamed Ministry of Environment, Forests and Climate Change or MoEF and CC) in 1990, which was subsequently revised in 2000 and 2002. Since then, the JFM programme

has grown to include over a quarter of the forest area across the country.

While the country is set to further expand coverage of JFM, it is imperative to revise this guiding instrument in order to incorporate the changes in forest governance that have occurred in tandem with the JFM stream. The MoEF had recommended to state governments—through the MoEF's minister's letter to the chief ministers, dated 29 October 2010—to bring JFM under the supervision of the *gram sabha* (village assembly) and the JFMC to be recognised as an organ of the *gram sabha* under the relevant law concerning Panchayati Raj (local self-government) institutions. These recommendations are critical to effectively taking forward JFM, but they also need to be reflected in the national-level guidelines on JFM, in order to have an operational meaning. The revision will have an important bearing on the future trajectory of JFM.

National Biodiversity Action Plan

The National Biodiversity Action Plan (NBAP) of 2008 provides an excellent profile of the country's biodiversity, but the actions delineated are insufficient in addressing the multiple problems facing biodiversity management, such as the increasing loss of species, depletion of dense forest and gearing up the institutional system to face new challenges, especially since it does not provide the required implementation pathways. The Addendum to the NBAP was developed in 2014 in lieu of a second generation NBAP, basically as a requirement to be submitted to the CBD and perpetuate this deficiency.

A new generation of NBAP that provides a blueprint for the mainstreaming of biodiversity in multiple sectors, taking greater advantage of the potential of the statutorily empowered local-level institutions, should be developed, with an emphasis on feasible actions. Various levels of the new NBAP should more evenly address the triple objectives of the CBD and incorporate the ecosystem approach. The new strategy-making should adequately focus on the implementation mechanism and set measureable targets and also should incorporate the biodiversity–poverty reduction linkage as a crosscutting concern.

Biodiversity management cannot be limited to legally protected areas, but should cover the contiguous landscapes as well, in order for management efforts to be successful. The landscape-wide management of resources enables the effective application of the ecosystem approach and the influence of land-use patterns beyond the formally protected areas. This also provides an opportunity

for the often fragmented management agencies to work together towards a common goal in a given landscape and seek synergies, as will be discussed later.

Converging the Multiple Laws

The multiplicity of biodiversity-related laws in India creates a complex management situation, not least due to inconsistencies and conflicting provisions across different laws. The Indian Forest Act is a legacy of the colonial regime, while the Wildlife (Protection) Act (WLPA) has in it provisions that impede the emerging paradigm of devolution and community participation in biodiversity management.

Table 1: WLPA Provisions Inconsistent with the CBD and Ecosystem Approach

Section/Description	Impact on *Adivasis* and other Traditional Communities
18B and 19 / district collector to determine the rights claimed by people affected by the proposed sanctuary or national park, but no criteria provided to determine and settle claims	The collector's decision can be arbitrary and traditional forest dwellers can lose their rights. They often do not have formal proof of rights
34A / gives powers to the government to evict encroachers	Most forest dwellers are affected by this as their rights were not recognised in the first place and they thus could be categorised as encroachers
35.3 and 4B / extinguishes all rights in National Parks (NPs)	No rights are permitted in NPs; the continuation of rights legally permitted in a sanctuary (24.c) is undone, as is grazing permitted under section 33
18A.1 / the declaration of intention by the state government to recognise an area as a sanctuary (Section 18.1) is enough for the restrictive measures to take effect, rather than the final notification (Section 26A) after the settlement of claims	Even though claims are not settled in more than half of the sanctuaries, in order for the final notification to be issued, restrictive measures were applied in violation of the WLPA before the 2003 amendment and the new amendment has legalised this violation of natural justice

The Biological Diversity Act has the limited operational mandate of regulating access to biodiversity, failing to translate the triple objectives of the CBD and the principles of the ecosystem approach into domestic law. As an example of how

the conventional conservation laws constrain the concerns of the community, we provide an analysis of such provisions in the WLPA in Table 1. The FRA has marked a paradigm shift from the exclusionary notion of conservation to recognising community rights over forests and empowering local communities to protect and manage forest biodiversity.

It would be appropriate to create a single national legislation that covers multiple issues related to biodiversity management and community rights. Such a reform of the legal regime is also necessary to harmonise the national legislation with the CBD. A statutory convergence of the current forest departments, tribal welfare departments and Panchayati Raj institutions is also essential in creating a biodiversity governance system that would address both conservation and livelihood concerns and convert communities to partners in conservation rather than make them victims. Policy reform followed by legal reform will ease biodiversity management, reconciling conservation needs and community interests and create new institutional arrangements at various levels. The reform of the protected areas management system to make it participatory has been outlined by S Faizi ("An Institutional Framework for Community Participation in Protected Area Management", *Biodiversity*, vol7, no2, May 2006, pp16–20). Forest reform should be entirely based on the objectives of conservation, sustainable use and equitable benefit sharing and the ecosystem approach, grounded in the constitutional directions mentioned at the outset, specifically rejecting notions of reform in order to ease corporate access to forests, as the HPC has pursued.

PUTTING COMMUNITY RESERVES TO WORK

Incorporated in the WLPA in 2003, the community reserve is a statutory mechanism to accord the authority for the sustainable management of biodiversity in the local community. The management responsibility is vested with a local committee nominated by the village *panchayat* (council) and the reserve has a provision for sustainable resource use, based on an agreed management plan, marking a departure from the exclusionary sanctuaries and national parks. However, only four such reserves out of a total 668 protected areas have been established in the country so far.

The near absence of progress in the implementation of this provision is partly due to an inherent anxiety within a forest management system that is not accustomed to the concept of people managing biodiversity. The law is also

often interpreted by state forest departments in a manner that does not favour community reserves. Section 36.C of the WLPA states that community reserves can be declared on community lands or private lands where the community or individual has volunteered to do so, but outside existing protected areas. In the absence of legislation defining "community land", it is understood that public lands traditionally used by communities, irrespective of tenurial status, are regarded as community lands and this would include community forest lands as well. The categorical exceptions are areas designated as national parks and sanctuaries. Obviously, community forest lands where there is historical resource use by local communities could be considered as candidate sites, but this possibility is often excluded by many state forest departments.

Issues with interpretation that impede the implementation of this provision of the WLPA should be resolved in line with the spirit with which this progressive provision was introduced into law. It is also important to note that in the case of the first such reserve established in the country, the Kadalundi–Vallikkunnu Community Reserve (Malappuram and Kozhikode districts of Kerala), the tenure of the area rests with public agencies. It would be useful to issue formal clarifications on the establishment of community reserves, so that more protected areas can be designated in this category in the future, effectively capturing the triple objectives of the CBD and its ecosystem approach and without assuming the role of national guidelines. National guidelines cannot address the diverse socioeconomic contexts that exist in potential community reserve sites across the country.

A statutory convergence of current forest departments, tribal welfare departments and Panchayati Raj institutions is essential in creating a biodiversity governance system that would address both conservation and livelihood concerns and convert communities to partners in conservation rather than make them victims.

COMMUNITY MANAGED AREAS

The thousands of natural sites that are managed based on social sanctions and customary rules by local communities are important repositories of biodiversity. These sites have differing management systems since they

have differing ontogenies, but the underlying principles are conservation and sustainable use. The sites vary from village ponds to forest catchment areas or vestiges of previously dense forests. These sites reflect the historical practice of sustainable resource use and vary considerably according to the size of the area. Many community-managed areas also have complex social dynamics, in which the communities often have to face different types of pressure, increasingly commercial (Neema Pathak, "Community Conserved Areas in India: A Directory", Kalpavriksh, Pune, 2009, online at http://www.kalpavriksh.org), to undo the conservation system. The official machinery has often been less than supportive of such community initiatives, though it is slowly becoming cooperative.

Such sites are recognised by the CBD's Programme of Work on Protected Areas and by the World Parks Congress. Since the socioeconomic ground on which these self-governed sites stand is changing and the pressures of competing land-use options are likely to increase, efforts to promote the sustainability of such sites should be made. However, such promotion should be done without altering the autonomous nature of these biodiversity management enterprises. Greater political recognition of such sites, comprehensive documentation and the removal of impediments to management, including the sustainable harvesting of resources, are among the initiatives that both the government and civil society can undertake to support community-managed areas. Certain sites, depending on local interest, may be developed as community reserves under the WLPA and some sites may legalise their autonomy by invoking the Forest Rights Rules (2008) (Section 4.3) and drawing the powers for biodiversity management as provided in Section 5 of the FRA. As part of conservation or rural development programmes, the government should provide financial incentives for the sustainable management of the sites.

DISPLACEMENTS AND THE CONSERVATION PROJECT

India has about 200 million people who live in the forests or on the peripheries, dependent on the forests for their very subsistence. About half of this population is comprised of the *Adivasis* (Forest Survey of India–Dehradun, *India State of Forest Report*, Ministry of Environment and Forests, Government of India, 2009, online at http://fsi.nic.in). The conservation project—and the designation of reserve forests and protected areas in particular—has caused the displacement of a large number of people. Along with the displacement caused by mining and other development projects, this has precipitated a challenging forest crisis.

There is no national-level data on the number of people living in the protected areas. By extrapolating figures available for 28 tiger reserves across the country, as provided by the Tiger Task Force (*Joining the Dots: The Report of the Tiger Task Force*, Ministry of Environment and Forests, New Delhi, 2005, online at http://projecttiger.nic.in), we estimate that there are 1.62 million people living in the country's protected areas, with a 10 per cent decadal growth in population over this figure. Mahesh Rangarajan and Gazala Shahabuddin ("Displacement and Relocation from Protected Areas: Towards a Biological and Historical Synthesis", *Conservation and Society*, vol4, no3, September 2006, pp359–78) have estimated that up to 120,000 people have been displaced by the establishment of protected areas. As shown in a long-term study of the Kuno Sanctuary in Madhya Pradesh (Asmita Kabra, "Conservation Induced Displacement: A Comparative Study of Two Indian Protected Areas", *Conservation and Society*, vol7, no4, 2009, pp249–67), relocation programmes, when undertaken, often tend to fail and this happens mainly due to inadequate investment as compensation, failure to address the livelihood needs of the people and a disregard for their cultural affiliation to the forests. Information about the number of people displaced due to reserved forest classification is not readily known, but a good part of the total estimate of 2.6 million *Adivasis* displaced from their forest homes includes reserved forest-related displacements.

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The Wildlife (Protection) Act (WLPA), 1972, under sections 21 to 25, does provide for the settlement of claims before the final classification of sanctuaries and national parks. However, as observed by the Supreme Court, this is far from being followed. The Supreme Court, in an order in 1997, directed the state governments and union territories to "issue proclamation under Section 21 in respect of the sanctuaries/national parks within two months and complete the process of determination of rights and acquisition of land or rights as contemplated by the Act within a period of one year" (Supreme Court order dated 22 August 1997 in Centre for Environmental Law versus Union of India and others). The Supreme Court emphasised this again in 2006 when the

petitioner pointed out that the process has not been completed in 14 out of 85 national parks and 170 out of 494 wildlife sanctuaries, as per the affidavits placed by the state governments before the court (Enviro Legal Defence Firm, "Conserving Protected Areas and Wildlife: A Judicial Journey", World Wide Fund for Nature–India, 2009, online at http://assets.wwfindia.org).

The avoidable crisis of the displacement of the forest-dependent poor can be effectively addressed within existing laws and policies, albeit with a shift in the approach in implementation, or by regarding the protected areas system as an inclusive conservation enterprise, in which the people who have been the traditional custodians of the forests and wildlife should be recognised as partners in conservation and their livelihood concerns respected, as envisaged in the CBD Programme of Work on Protected Areas. The FRA, which vests the forest communities with the right to protect the forests, strengthens this approach and provides the legal tools to operationalise the same, as well as sets categorical terms for the resettlement of people, whether for conservation or development purposes. This shift in approach within the conservation sector has already begun. In developing compensation packages for the resettlement of forest-dependent people, it is important to be cognisant of the recent estimates of the economic value of biodiversity and ecosystem services (Robert Costanza, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karlin Limburg, Shahid Naeem, Robert V O'Neill, Jose Paruelo, Robert G Raskin, Paul Sutton and Marjan van den Belt, "The Value of the World's Ecosystem Services and Natural Capital", *Nature*, vol387, 15 May 1997, pp253–60), rather than modelling on the conventional nominal packages that actually impose heavy costs on the affected people, mainly the scheduled tribes and other traditional forest dwellers (Recognition of Forest Rights Act, 2006).

The FRA (2006) best translates the key CBD provisions and its ecosystem approach into domestic legislation and is as much about managing forest biodiversity at the local level as about undoing the "historical injustice" committed to the indigenous people. The law seeks to "strengthen the conservation regime of the forests while ensuring the livelihood and food security" of these communities. It provides for the sustainable harvesting of forest produce by local communities, in addition to the recognition of historical rights over forests, extinguished by the British colonial regime through the Indian Forest Act (1927), a legacy carried on by the post-independence government. Equally important is that in Section V of the act, it empowers the local communities to protect and manage forest biodiversity and associated ecosystems.

This groundbreaking legislation devolves the power for biodiversity management to the local communities and the rules issued under the act provide for the creation of the necessary local level institutions for forest management, as well as require the government to provide capacity-building support to such institutions. This enabling statutory provision of capacity-building remedies the legal institutional ambiguities and lacunae in community-based forest management to the satisfaction of resource protection and sustainable use. There is, however, bureaucratic apathy and political indifference with regard to the enforcement of the act. The forest departments in many states seek to impede its implementation, although tribal departments are the designated nodal agencies for its implementation. An illustrative example is the case in which the central minster of environment and forest, accompanied by the chief minister of Maharashtra, had to go himself to Mendha Lekha village in Maharashtra, where the community has traditionally protected forests, to affirm their right to minor forest produce under the FRA, in response to hurdles created by the state forest department (online at http://www.thehindu.com). Parliament had anticipated bureaucratic subversion of the act and that was why a provision to prosecute such officials for impeding the enforcement of the act is incorporated under Section VII.

India has about 200 million people who live in the forests or on the peripheries, dependent on the forests for their very subsistence. The conservation project—and the designation of reserve forests and protected areas in particular—has caused the displacement of a large number of people. Along with the displacement caused by mining and other development projects, this has precipitated a challenging forest crisis.

This law can be used to effectively address the twin crises of poverty and biodiversity degradation in the forest areas. It is imperative to harness the law's strength to turn the local communities into effective resource managers and to build partnerships with them in the conservation enterprise. The government agencies working in the forest landscapes, especially the forest departments, tribal departments and the Panchayati Raj institutions should shed their fragmented approaches and develop meaningful coordination among themselves, providing much needed capacity-building support to the *gram sabhas*, in order to enable them to effectively discharge the statutory forest management responsibilities vested with them. That is particularly important considering the fact that up to 71.7 per cent of

the country's dense forest cover is found in the 188 tribal districts (Forest Survey of India–Dehradun, *India State of Forest Report*, Ministry of Environment and Forests, Government of India, 2011, online at http://fsi.nic.in). The recommendation of the HPC to weaken the enforcement of the FRA ought to be firmly resisted.

HUMAN–WILDLIFE CONFLICTS

Human–wildlife conflicts (HWC) remain a perpetual problem in a large part of the wildlife habitats and are emblematic of the struggle for survival within the local communities. It is imperative to seek meaningful solutions to this seemingly intractable problem. The attacks on humans that sometimes lead to death, crop raiding and the killing of livestock are on the increase and pose a threat to biodiversity, human life and goods. Elephants, tigers, sloth bears, leopards, wild boars, blue bulls, etc are the species that often run into conflict with the human populations in the adjoining villages. Human–wildlife conflicts often arise as a result of a reduction in size, degradation and fragmentation of the habitats. Animals also move to villages for easily available food and sometimes for more palatable food. Reduction in prey base also prompts predatory animals to foray into the villages, as does the search for water when water sources in their natural habitats dry out. Table 2 provides an overview of the HWC issue in India.

Table 2: Human–Wildlife Conflicts in India

Species Involved	Nature of Conflict	Main Areas of Occurrence
Panthera pardus (Leopard)	Cattle depredation/ Attacks on humans	All over its range
Panthera tigris (Tiger)	Cattle depredation/ Attacks on humans	All over its range
Panthera leo (Lion)	Cattle depredation/ Attacks on humans	Gir forest of Gujarat
Canis lepus (Wolf)	Cattle depredation/ Child-lifting	All over the country, child-lifting happens mainly in Uttar Pradesh
Elephas maximus (Elephant)	Crop raiding/ Attacks on humans	Southern Ghats, Western Ghats, parts of Eastern Ghats, Northeast region
Melurus ursinus (Sloth bear)	Attacks on humans	All over its range, particularly in central India
Sus scrofa (Wild boar), antelopes	Crop raiding	All over their ranges

It is estimated that on average 400 people are killed annually by elephants and that 100 elephants are killed in retaliation by people (Ministry of Environment and Forests, *Gajah: Securing the Future for Elephants in India*, Report of the Elephant Task Force, 2010, online at http://www.moef.nic.in). Annually, elephants also damage 0.8–1 million hectares of crops, affecting over 50,000 families (SS Bisht, "An Overview of Elephant Conservation in India", *The Indian Forester*, vol128, no2, 2002, pp121–36). In a three-year study in two elephant range districts of Assam, Tammy E Davies, Scott Wilson, M Nandita Hazarika, Joydeep Chakrabarty, Dhruba Das, David James Hodgson and Alexandra Zimmermann ("Effectiveness of Intervention Methods against Crop Raiding Elephants", *Conservation Letters*, vol4, no5, 2011, pp346–54) found 1,761 cases of elephant–human conflicts that damaged crops in a 359 hectare area. According to the Madhya Pradesh Forest Department, 166 human deaths and 3,131 injuries from wildlife attacks occurred in the state during the five-year period of 1998–2003. Fourteen thousand and ninety heads of cattle were also reported to be killed by carnivorous predators during this period.

In developing compensation packages for the resettlement of forest-dependent people, it is important to be cognisant of the recent estimates of the economic value of biodiversity and ecosystem services rather than modelling on the conventional nominal packages that actually impose heavy costs on the affected people, mainly the scheduled tribes and other traditional forest dwellers.

According to information obtained from the Tamil Nadu Forest Department, 259 human casualties occurred in the state during the period 2002–03 to March 2010, 139 of which were caused by elephants. The Odisha Forest Department reported 3,425 cases of animal depredations during the period of 1994–95 to 2003–04 ("Wild Life Conservation in Odisha", 2004, online at http://odishawildlife.org). There were 400 cases during 2008–09. According to information from the forest department, there were 51 deaths and 752 cases of human injuries caused by wildlife attacks during the period of 2000–05 in Gujarat and mainly involved leopards and sloth bears. Blue bulls and blackbucks cause extensive damage to the crops here.

In the Bhadra Tiger Reserve of Karnataka, 219 livestock heads were lost

to predators and crop damage to the order of ₹5,100 per household, or the equivalent of 30 per cent of the average annual income of a household, occurred over the course of a year in five sample villages studied in the early 2000s (MD Madhusudan, "Living amidst Large Wildlife: Livestock and Crop Depredation by Large Mammals in the Interior Villages of Bhadra Tiger Reserve, South India", *Environmental Management*, vol31, no4, 2003, pp466–75). The official reports of damage and death caused by wildlife are often inaccurate. The wildlife attacks, apart from their human and social costs, also turn communities against the wildlife species in question, as well as the wildlife authorities.

The HWC is a global problem, though it varies in scale and intensity across regions. The Fifth World Parks Congress has recommended the establishment of a multi-stakeholder global platform to address HWC issues and called for international cooperation in developing measures to address HWC in conflict areas. It also called on international donor agencies to provide funding for HWC prevention and mitigation programmes. India has been making efforts to develop HWC prevention and mitigation measures to address this seemingly intractable problem, in which the victims are the rural poor and the wildlife itself. Habitat improvement of wildlife areas and the prevention of habitat fragmentation provide a long-term solution to the problem in relation to most species.

Apart from addressing the basic issues arising from habitat fragmentation, village-level mechanisms led by Panchayati Raj institutions should be set up and supported for addressing this vexing issue. This mechanism can include representatives of different government agencies at the local-level, in particular the forest department and peoples' representatives. Resources and training should be provided to the people involved in this mechanism. On the other hand, species like the wild boar, the blue bull and the rhesus macaque, which are pervasive sources of conflict, may be shifted to Schedule V (vermin) of the WLPA for states in which the conflicts caused by these species are acute and subsequent conditional culling exercises undertaken, as was done recently by the Uttarakhand, Himachal Pradesh and Bihar states.

CAPACITY DEVELOPMENT

The staff of the state forest departments, totalling about 115,000, is the most important governmental force in the country in managing biodiversity.

However, they lack adequate training in handling social issues as well as wildlife management. The conventional policing approach will not be successful and as the forest staff is increasingly getting involved in community activities such as JFM and eco-development, they need to be given adequate training in community development issues and extension work. Many local conflicts could be readily resolved if the forest staff were better trained to handle such issues. Although wildlife management is a specialised area, the forest staff training curriculum does not place enough emphasis on this. Inadequate staff training was also identified as a key management issue in an evaluation of the tiger reserves of the country in 2006 (Project Tiger Directorate, *Evaluation Reports of Tiger Reserves in India*, Ministry of Environment and Forests, New Delhi, 2006, online at http://projecttiger.nic.in). In fact, when there is greater devolution of biodiversity management to local community institutions, the size of forest staff can be progressively reduced.

Human–wildlife conflicts often arise as a result of a reduction in size, degradation and fragmentation of habitats. Animals also move to villages for easily available food and sometimes for more palatable food. Reduction in prey base also prompts predatory animals to foray into the villages, as does the search for water when water sources in their natural habitats dry out.

Neither the state forest staff nor the members of the elite Indian Forest Service are provided with training in social issues, which hampers them in viewing conservation issues in the larger perspective. This weakness is also reflected in the formulation of the Divisional Working Plans and Protected Area Management Plans. It is imperative to revise the training curricula for the state forest staff, as well as the members of the Indian Forest Service, to incorporate wildlife management, social issues and community development. The standard formats for preparing these plans also need to be revised in order to address community concerns.

The Biological Diversity Act (BDA) has created a number of statutory institutions, such as the state biodiversity boards and village-level biodiversity management committees, apart from the National Biodiversity Authority. In addition, there are dedicated funds to be established and managed at the national, state and village levels. Most of the state biodiversity boards have limited capacities

to address the mandate with which they are vested. Massive capacity-building exercises at the *panchayat* level would be required in order to produce the Peoples' Biodiversity Register for all villages and as envisaged in the act.

STRENGTHENING THE ACCESS AND BENEFIT SHARING REGIME

India values the CBD provisions for access and benefit sharing (ABS)—namely, prior informed consent, mutually agreed terms and equitable benefit sharing and enacted the BDA to domestically operationalise these legally binding articles of the convention. The Nagoya Protocol on ABS, based on the CBD provisions on ABS, came into force in October 2014 as a legally binding international instrument. With the CBD in force in 1993 at the global level and the BDA in force in 2003 at the national level, the tide of biopiracy was expected to be reversed. However, there has been no let-up in biopiracy. The MoEF has pointed out that over 2,000 patents based on Indian biodiversity and traditional knowledge were taken out in Western patent offices every year (MoEF press note dated 4 January 2010, online at http://envfor.nic.in).

There are practical difficulties and resource limitations to oppose every such illegal patent in Western patent offices. The issue can be effectively addressed in a three pronged way. Patents taken out abroad without following the binding ABS provisions of the CBD constitute infractions of the convention and hence cases of such infractions could be addressed by the Indian government in the civil courts of the concerned countries that are contracting parties to CBD, invoking CBD provisions on access and benefits. The patent laws and hence the patent offices do not recognise ABS provisions of the CBD or the national sovereign rights recognised in the convention, but the civil court of a party (country) must. This approach has not yet been pursued by India.

Second, the country needs to build the capacity of the institutions created by the BDA especially that of the National Biodiversity Authority and state biodiversity boards, to track and create an inventory of cases of infractions of the CBD and the BDA and to pursue legal measures. Third, the cases of infractions of the CBD should be brought to the attention of the Conference of Parties (CoP), since the CoP is mandated to review the progress of the implementation of the convention (S Faizi, "Putting the Focus on Enforcement", *Square Brackets*, issue7, October 2012, pp18–19, online at https://www.cbd.int). The CoP may also be encouraged to address the non-compliance of Article 15.7 of the

convention, which commits parties to take legislative, administrative or policy measures to enforce ABS provisions of the convention. The capacity of local-level institutions like the *panchayats*, biodiversity management committees, local-level institutions created under the FRA, etc should be strengthened in order to be able to negotiate ABS agreements with entities seeking access to local biodiversity and traditional knowledge.

It is pertinent to note that the community-level institutions established under the FRA have far more statutory powers than the biodiversity management committees, which only need to be "consulted" by the National Biodiversity Authority in matters of access to biodiversity and therefore FRA institutions are to be especially strengthened. Legal assistance should also be provided to these institutions when dealing with corporate bodies. Case studies of appropriate ABS ventures should be widely disseminated, in addition to building large-scale public awareness on the issue of partnership with civil society. Since biodiversity and traditional knowledge are shared with countries of the region, India may also seek to promote regional cooperation initiatives in South Asia, as called for by the Nagoya Protocol.

Neither the state forest staff nor the members of the elite Indian Forest Service are provided with training in social issues, which hampers them in viewing conservation issues in the larger perspective. It is imperative to revise the training curricula to incorporate wildlife management, social issues and community development. The standard formats for preparing these plans also need to be revised in order to address community concerns.

ECONOMIC VALUATION OF BIODIVERSITY

Efforts are being made to estimate the economic value of biodiversity and to reflect these values in the national accounting system following the estimation of the value of the Earth's biodiversity and ecosystem services (Costanza, *et al*, *ibid*). The inherent methodological constraints in estimating the monetary value of biodiversity are progressively being overcome, especially with the convergence of the corresponding multiple disciplines. While tangible benefits

such as harvested resources or even genetic resources could be readily accorded financial values, methodologies for valuing the ecosystem functions are still being developed. The Central Statistical Organisation (CSO) of India has been producing the Compendium of Environmental Statistics since 1997. The CSO also established a Technical Working Group on Natural Resource Accounting in 1999, with the aim of streamlining methodologies for fiscal accounting of natural resources and their monetary evaluation and integration into national economic accounting. Advances over the early methodology outlined by David Pearce and Dominic Moran (*The Economic Value of Biodiversity*, Abingdon: Earthscan, 1994) are being made. Accounting for the declining natural capital can strengthen the political will to achieve environmental sustainability.

While the commercialisation of ecosystem services can indeed harm the resource base and the dependent communities in the long-term, the economic valuation of biodiversity and ecosystem functions provides insights into the scale of contribution of natural capital to the rural economy and helps, for example, to design compensatory measures for forest-dependent communities in proportion to the value of the ecological resource base that they are often asked to forego for the sake of long-term conservation, discarding the current approach of nominal compensation. Sound incorporation of natural resource depreciation into national accounting exercises and corporate operations and internalisation of environmental costs is one important way to achieve the mainstreaming of biodiversity. However, caution must be applied so that the economic valuation of biodiversity does not lead to the commercialisation of biodiversity, which will only sharpen the twin crises of poverty and biodiversity loss.

TOWARDS A LANDSCAPE APPROACH

Protected areas constitute 4.9 per cent of the geographical area of the country and this, together with reserve forests and protected forests, means that close to a quarter of the area of the country is legally protected for bioresource management. However, the contiguous areas, mostly comprised of production areas and human settlements, while ecologically related, are outside the reach of biodiversity management interventions. Further, there are multiple agencies involved in regulating or promoting land use in these areas, but hardly any coordination among them. Moreover, the land-use options are often competing and at times could be at odds with biodiversity management goals. Conventional

biodiversity management objectives are often limited to the protected areas, although the reserve forests and protected forests are also protected by law. The landscape approach will, irrespective of the ecosystem type where it is applied, pursue an integrated and comprehensive method of management covering the entire matrix of land-use forms, including protected areas, in a given landscape.

The landscape approach will address conservation, sustainable use and production as well as other land-use needs, involve the local populace in planning and management exercises and be governed by the existing laws, albeit with the necessary institutional reform. Protected areas will be a pivotal component here and the management of the rest of the land-use mosaic will be re-oriented to be biodiversity-compatible and also protect the integrity of ecological processes by incorporating these objectives in the larger development agenda of the area through management strategies and plans. This would provide the much-needed biodiversity corridors and buffer zones and protect ecological processes that operate on a larger space, without entailing extra costs to local communities. The landscape approach would in fact be a re-invention of the old practice of sustainable natural resource use that was in vogue long before the arrival of the Western-inspired protected area system that regarded these sites as isolated islands of conservation.

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The landscape approach entails the progressive unmaking of the sectoral approach to biodiversity management and forges coordination among agencies dealing with a wide range of issues in the landscape, including forests and wildlife, tribal affairs, agriculture, rural development, etc. The realignment of the institutional mechanism remains a huge challenge given the inherent immutability that is characteristic of institutions of any kind. However, once achieved, the complementarity between conservation and development objectives can be secured and synergies can be harnessed to scale up the entire landscape management programme. The integrated and comprehensive landscape approach enhances the operationalisation of the triple objectives of the CBD, with equal importance given to each of the three elements.

The landscape is essentially a social construct that has ecological, cultural

and socioeconomic attributes and is in large part a creation of nature–people interactions over a long period of time. The size of the landscape selected for management can be determined on the basis of the local ecological and socioeconomic features. The current legislative and policy objectives could be better achieved by employing the landscape approach, with the devolved local self-government institutions playing a pivotal role. India's vast experience in five-year planning, which cuts across sectors and institutions at both the national and state levels, though currently given up at the national level, provides a sound basis for introducing and expanding landscape-level planning and management.

The complex experience gained from exercises such as district-level planning, watershed management, forestry working plans, protected area management plans, etc would provide valuable lessons for launching the landscape approach in the country. This paradigm could provide a new impetus for successfully managing the country's remarkable biodiversity and ecosystem resilience and promoting the livelihood security of the biodiversity-dependent communities.

CONCLUSION

India's forest biodiversity management regime ought to be reformed in order to be able to effectively address the twin crises of biodiversity degradation and deepening poverty among the forest-dependent communities. In addition to law and policy reform, the institutional systems and the implementation praxis should also be reformed so that the historical bias of the forest departments against the *Adivasis* and other local communities can be removed. They can then work as equal partners in a win-win conservation enterprise. The HPC report should be rejected, as its assumptions and objectives are deeply flawed and the reforms must be based on the triple objectives of the CBD and the fundamental principles of the constitution.

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