Sustainable Forest Management and REDD+ in India

The Energy and Resources Institute

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FOREWORD

It gives me great pleasure to introduce our publication "Sustainable Forest Management and REDD+ in India."

REDD+ (Reducing Emissions from Deforestation and Forest Degradation Plus) is an evolving financial incentive mechanism under the UN Framework Convention on Climate Change to compensate forest-dependent communities for their efforts in forest conservation and enhancement of carbon stocks. REDD+ echoes the philosophy of Sustainable Forest Management – the attainment of a balance between society's requirements of forest products and the maintenance of ecological services. Indeed, the evolution from REDD to REDD+ signifies the recognition that the enhancement of forest carbon stocks should also enhance, and not compromise ecosystem functions and local livelihoods.

India has stabilized its forest cover over the last decade, aided by a supportive policy, and an effective regulatory and institutional regime. India's ambitious Green India Mission aims to achieve enhanced carbon dioxide sequestration of 50-60 million tonnes annually by 2020. In this context, REDD+ could provide an avenue for communities to get rewarded for their conservation efforts.

TERI has been contributing to the policy thinking, both in India and at the global level, on REDD+ through a series of workshops, the publication of policy briefs and the conduct of pilot REDD+ assessments in six states of India.

This book brings together the key issues in the evolution and on-ground implementation of REDD+ activities, focusing on appropriate international architecture, livelihoods, governance, law and policy, carbon assessment methodologies, and maintenance of biodiversity and ecosystem services.

As the country prepares itself to reap the benefits of this financial mechanism, I hope that the messages of this book will find acceptance among practitioners, academics, NGOs and the wider community of forest stakeholders.

R K Pachauri
Director General, TERI

CHAPTER 1

Evolution of REDD+: From Kyoto to Doha

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Introduction

Deforestation and forest degradation in tropical regions have been cited as the second largest source of greenhouse gas (GHG) emissions, with different studies estimating its share in total global anthropogenic GHG emissions to be ranging from 12–20 per cent (Ghazoul et al. 2010; IPCC 2007). With increasing concern for climate change, the emphasis on the reduction of GHG emissions from deforestation and forest degradation has gained prominence as a major climate change mitigation measure. However, the widespread prevalence of deforestation and forest degradation in many developing and underdeveloped countries located in the tropics poses a major challenge to this reduction. Among several other factors, the critical interlinkage between forest ecosystems and rural livelihood systems, as well as the competing land use demand to further economic growth in these countries proliferate deforestation and forest degradation (Davidar et al. 2010; Chhatre and Agrawal 2009; Mahapatra and Kant 2005; Wunder 2001). Discourses on environmental conservation and economic growth have highlighted different aspects of the trade-offs involved, and tried to design solutions that assure win–win outcomes. REDD+ (Reducing Emissions from Deforestation and Forest Degradation Plus), a popular word in the climate change lexicon, has emerged as one such solution to incentivize conservation and sustainable management of forests in the last few years. The concept of reducing emissions from deforestation (RED) was introduced in the 11th Conference of Parties of the United Nations Framework Convention on Climate Change (UNFCCC COP 11) in 2005 as a compensation payment mechanism with potential win–win outcomes. Subsequently, its scope has been expanded to include forest degradation (REDD+) and sustainable management of forests (REDD+). REDD+ may also be understood as a strategy with multiple advantages like carbon effectiveness, cost-efficiency and equity — it is one of the most cost-effective climate change mitigation strategies (Wertz-Kanounnikoff and Kongphan-Apirak 2009).

REDD+ is a financial instrument to incentivize conservation and sustainable management of forests, and thereby achieve reduction in the GHG emissions resulting from deforestation and forest degradation. It aims at compensating forest owners in developing countries for conserving their forests by putting a value on the forest carbon stocks — one of the many ecosystem services that forests provide. The notion of REDD+ is based on two basic premises. First, the countries conserving forests forgo the economic gain of harvesting them as well as the benefits from alternative land uses, and hence need to be compensated for the same. Second, costs involved in conservation and sustainable management of forests need to be shared by other countries too, as forests provide a range of offsite ecosystem services that benefits all. Given the livelihood

linkage of forests in many developing countries, forest conservation imposes several direct and indirect costs. Hence, any financial mechanism required to compensate even some of these costs would encourage sustainable management of forests in developing countries, REDD+ has primarily emerged as the mechanism for such payments. There is a huge global market for carbon credits and all the developing countries with high forest cover have good potential to benefit from this through REDD+. The estimated value of transactions in the global forest carbon market in 2010 was put at $178 million. Carbon dioxide equivalent of 30.1 million metric tonnes was transacted in 2010 (Diaz et al. 2011). The payments for carbon credits as co-benefits from the standing forest will discourage deforestation and forest degradation, and the money gained would be used effectively to address the drivers of such processes. For example, when the livelihood dependence of the local community results in forest degradation in any region, this money may be used to create alternative livelihood opportunities and reduce dependence on forest.

REDD+ has evolved continuously through different international negotiations. Its scope has been increased to address the diverse drivers of deforestation/forest degradation and over the years, it has gained wide acceptability among the UNFCCC member nations. This chapter aims at discussing this path of evolution and the current state of affairs with the REDD+ mechanism.

From RED to REDD+: Tracing the Trail

The increased conviction among the scientific community and policy makers across the world that the conservation and sustainable management of forests could be an effective mitigation strategy to fight climate change has resulted in the widespread acceptance of REDD+. REDD+ in its earlier version as RED (Reducing Emissions from Deforestation) came into the discourse during the COP 11 in Montreal in 2005, in the form of a submission from the Coalition for Rainforest Nations led by Papua New Guinea. The concept was well received among several stakeholders in COP 11, and was officially adopted during COP 13, held in Bali, with further elaboration and expansion to include forest degradation along with deforestation, as in some developing countries forest degradation proved to be as damaging as deforestation. With the addition of forest degradation in COP 13 in 2007, RED became Reducing Emissions from Deforestation and Forest Degradation (REDD). The scope of RED was limited only to changes from 'non-forest' to 'forest' land cover types, whereas with the inclusion of forest degradation in REDD, the scope has increased to include the changes in forest from 'lower' to 'higher' carbon stock densities.

Subsequently, REDD has evolved to REDD+ to expand the scope of this compensatory financial instrument even further to accommodate the concerns of diverse stakeholders. 'REDD+ goes beyond merely checking deforestation and forest degradation, and includes incentives for positive elements of conservation, sustainable management of forests and enhancement of forest carbon stocks' (MoEF, undated, p. 2). It includes reforestation, sustainable management, and benefits such as biodiversity conservation, improving livelihood for local communities, and food security into the scope of this compensatory framework. REDD+ was also a key point of discussion during the 15th COP in 2009 in Copenhagen. The Copenhagen Accord, a non-binding international instrument having a broad political consensus outlining the measures to control global

warming, also acknowledged the importance of protecting natural forests for reducing emissions and recognized REDD+. However, it did not refer to any binding emission reduction targets and specific mechanisms for the implementation and governance of REDD+.

REDD+ got prominence in international climate negotiations with its due acknowledgement in the Copenhagen Accord in 2009, and all subsequent COPs have seen its significant evolution. The notion of REDD++, which is yet to be formalized, advocates increasing the scope of REDD+ further by including all land cover changes that affect carbon storage.

REDD: Various Definitions and Scope

RED(D)(+)	Definition and Scope
RED	Reducing emissions from (gross) deforestation; only changes from 'forest' to 'non-forest' land cover types are included; details very much depend on the operational definition of 'forest'
REDD	As above, plus (forest) degradation, or the shifts to lower carbon stock densities within the forest; details very much depend on the operational definition of 'forest'
REDD+	As above, plus restocking within and towards 'forest'; in some versions, REDD+ will also include peatlands, regardless of their forest status; details still depend on the operational definition of 'forest'
REDD++	As above, plus all transitions in land cover that affect carbon storage, whether peatland or mineral soil, trees outside forest, agro-forest, plantations or natural forest; does not depend on the operational definition of 'forest'

Source: Minang et al. 2009, p. 4

These evolutions in terms of expanding the scope of REDD are due to differential trends and drivers of land-use change or change in tree cover across countries. The trends and drivers could also vary across regions within any specific country with diverse agro-ecosystems and varying socio-economic conditions. Therefore, the suitability of any such compensatory conservation programme depends largely on the drivers of forest cover change, sources of emission, and the technical and economic mitigation potential of the region or country (Minang et al. 2009). Though there is a gradual increase in the clarity on conceptual issues of REDD+ among the international community, REDD+ as a mechanism to avoid deforestation and forest degradation is still evolving.

The Evolution of REDD+

REDD+ in its current form is significantly different from the initial notion of RED when it was introduced at COP 11 in 2005. It is not only that it has alpha-symbolical (one more D and +) expansions, but it also has undergone changes in terms of 'how it is perceived and what it has become in practice' (Angelson et al. 2012, p. 32). Along with the

changes in REDD nomenclature, as discussed in the previous section, there have also been changes in terms of its objectives, policies, approaches, scale of implementation, and funding prospects. Given the multilateral nature of REDD+ mechanisms, evolution of its architecture involves engagement of a diverse set of actors with varied interests. Though political and financial agendas have shaped the changing architecture of REDD+, different ideological narratives like the green growth approach of market liberals, the governance concern of institutionalists, the ecological value of forests put forth by bio-environmentalists, and 'the rights over resources' concern of social greens have influenced this path of transition (Hiraldo and Tanner 2011).

Though the idea of RED was formally introduced in COP 11 in 2005, its philosophical basis can be traced back to the Kyoto Protocol. The genesis of REDD+ lies in the notion of carbon trading and Clean Development Mechanism (CDM) that were initiated in COP 3 held in Kyoto in 1997. The global treaty that emerged out of this COP is popularly known as the Kyoto Protocol and it laid down the mechanisms for carbon trading among the nations. Among the different market mechanisms, CDM created opportunities for developing countries to trade their Certified Emission Reductions (CERs) credits with Annex 1 countries (the developed countries). However, CDM recognized only a very limited role of forests as carbon sink, and allowed only afforestation and reforestation under its ambit. CDM as a market instrument has limited scope to address the drivers of deforestation and forest degradation and this has led to the emergence of RED(D) in subsequent negotiations. The major issues that are being debated in all these multilateral forums are the institutional architecture; the payment mechanism that includes crediting criteria; measurement, reporting, and verification (MRV) issues; and the safeguards.

As mentioned earlier, the global discourse on RED started through a proposal by the Coalition of Rain Forest Nations to consider financial incentives to reduce deforestation under the Kyoto Protocol in line with other carbon credit mechanisms. This proposal was taken up by the UNFCCC, and it was agreed to initiate this consideration at the 24th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA), held at Bonn in 2006. The SBSTA considered RED favourably and the idea was discussed in greater depth in several workshops involving different stakeholders. These stakeholder consultations made SBSTA consider the inclusion of 'forest degradation' along with deforestation in the incentive payment mechanism in COP 13. The inclusion came about after much pressure from countries that recorded low deforestation but high forest degradation.

The COP 13 held in Bali, Indonesia, in 2007 recognized the contribution of emissions from deforestation as well as forest degradation. This COP also recognized the urgent need to reduce these emissions in developing countries by halting forest cover loss by the year 2030 at the latest, and reducing gross deforestation by at least 50 per cent by 2020, as compared to the current levels. This has resulted in the emergence of REDD and the Bali Action Plan (BAP); the outcome of UNFCCC's COP 13 has provided a further road map for its development. The BAP has also recognized the 'complexity of the problem, different national circumstances and multiple drivers of deforestation and forest degradation' and emphasized that 'needs of local and indigenous communities should be addressed' while implementing the measure (UNFCCC 2007, p. 8). However, there has been no consensus in many operational and technical aspects of REDD+,

and the five main issues that still remain contentious are (i) scope and definition of REDD; (ii) MRV; (iii) the rights of indigenous people; (iv) financing options; and (v) operational scales and institutional arrangements in implementing countries (Holloway and Giandomenico 2009). Two ad hoc working groups and a SBSTA were established to further discuss these contentious and other related issues.

The 29th session of SBSTA held at Poznan in December 2008 had in-depth discussions on the definition and scope of REDD, addressing contentious issues. Some countries, such as India, advocated the expansion of the scope of REDD to recognize the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in reducing emissions in developing countries. This was duly accepted by the SBSTA in its report and REDD with this expanded scope became 'REDD+'. Other countries like USA, Canada, New Zealand and Australia blocked the inclusion of reference to 'indigenous people' and the 'explicit mention of rights'. This along with other contentious issues were further discussed in several meetings of the ad hoc working groups in Bonn and Barcelona in 2009, and a negotiating text was prepared without much consensus among different parties. As a result, the negotiating text for COP 15 had increased from 56 pages to around 200 pages to include all the issues and interests (Holloway and Giandomenico 2009).

REDD+ got prominence with its due acknowledgment in the Copenhagen Accord in 2009. The Cancun Agreement of COP 16 in 2010 emphasized the role of REDD+ not only as a mechanism for reducing emissions, but also for halting and reversing the loss of forests. It also encouraged countries to explore effective ways to slow, halt, and reverse forest cover loss in their respective territories by identifying the drivers and addressing them through appropriate measures. The Cancun REDD+ text further delineates details about the readiness guidance for countries seeking implementation of REDD+. The readiness activities include the national plan, institutional reform for governance, national reference emission level, and mechanism for MRV. There have also been references to the principles and safeguards that all the actors implementing REDD as well as providing finance need to follow for effective REDD+ programmes.

The negotiations at COP 17 held at Durban in November-December 2011 also marked some progress on REDD+, though there are several unresolved issues concerning the implementation of REDD+. The major issues include lack of clarity on definitions of terms like 'forest degradation', 'sustainable management of forests', and 'conservation'; inadequate and imprecise guidelines on reference emission levels, safeguards, and linkages with Nationally Appropriate Mitigation Actions (NAMAs); and uncertainty over finance as well as the institutional mechanism for financing REDD programmes at a global scale (Daviet' 2011). There has been some agreement in COP 17 on social and environmental safeguards and exploring the mechanisms and sources for a result-based finance to developing countries. However, the methodological issues concerning MRV and other issues concerning the policy approaches and incentives still remain unresolved. The negotiations at COP 18 held in December 2012 at Doha have not yielded any significant progress on these issues either. There was a deadlock over negotiations on methodological issues in verification with Brazil and other developing countries advocating an internal verification process by the individual countries and Norway arguing for an independent, transparent and internationally accepted verification mechanism (Das, 2012). There has not been much progress on matters

related to REDD+ finance during COP 18 as the parties could not reach an agreement on this. These issues need to be resolved in future COPs to make REDD+ operational.

REDD+: Current Trends and Concerns

The UN-REDD programme and World Bank's Forest Carbon Partnership Facility are the two REDD payment programmes in operation. The current approach for REDD+ initiatives has three phases of implementation. Phase 1 is characterized as the 'readiness' phase where the countries prepare their national REDD+ strategies; Phase 2 involves development of implementation polices and recognizing emission reduction in national strategies which is, in fact, the advanced readiness phase; and Phase 3 is the compliance phase where the forest-owning countries are compensated for quantified reduced carbon emission and removals due to reduction in deforestation and forest degradation or due to sustainable forest management.

The major contentious issues concerning REDD+ implementation are the MRV methodologies and the reference baseline for the emission measurement along with the financial mechanism. Some countries argue for a country-specific (historical) baseline, whereas others advocate using a global baseline (Dooley 2008). There has been disagreements over verification processes as well with some countries arguing for internal verification by the implementing parties while others advocating for internationally accepted verification. Along with these issues, implementation of REDD faces a host of ethical and operational challenges which need to be addressed for its effective implementation (see Box). Some of these operational challenges can be resolved with more clarity on REDD+ governance in future COPs. It is also important that the implementation of REDD+ draws lessons from the discourses on existing forest governance in different parts of the world. Understanding the mechanisms that focus on enabling the implementation of already-agreed upon requirements on forest certification as well as Payments for Ecosystem Services (PES) schemes may provide important insights and lessons to address similar challenges for REDD+ implementation (Kanowski et al. 2011).

Key Challenges Facing REDD Implementation

Challenges	Description
Ethical dilemma	REDD allows rich nations or corporations to 'absolve their sins' of carbon emission through carbon offsetting with REDD credits. Some opponents of REDD argue that this would create disincentives for genuine efforts to reduce emissions or develop cleaner technologies.
Additionality	A key criterion for valuing carbon stocks in a REDD project is 'additionality', that is, the net emissions savings calculated using baseline deforestation and carbon emission rates. Establishing the baseline deforestation rate is technically challenging. It might also be prone to political meddling that can inadvertently lead to environmentally damaging land-use policies. Furthermore, the criterion of additionality may also castigate countries that have maintained their forests prior to the establishment of baseline dates. Not only have they paid the opportunity cost of not using their lands, but they may have fewer opportunities to access REDD payments.

System leakages	The avoidance of deforestation in one area can displace it to another area. Such leakages can be difficult to quantify. Unless there is coordination among REDD and other conservation strategies, forest clearing and degradation activities can still occur in areas not under REDD protection.
Permanence	It may be difficult to ensure the permanence of carbon storage after the REDD project period has ended or even within the project period. Forests and carbon stocks could be lost or degraded through human activities, and also from natural events such as drought causing tree die-offs, or natural fires burning huge tracts of forests.
National Sovereignty and Native Land Rights	Participation in REDD schemes imposes long-term constraints on land use that can be construed as an infringement of a nation's sovereign right to manage their land according to their needs. To allay fears of compromising future development options and national sovereignty, some have suggested a carbon rental option as a temporary measure, whereby developed nations rent carbon credits from developing countries. Similarly, there is concern about the future rights of indigenous communities to access or use land, although the latest draft text of REDD offers better prospects in protecting the rights of indigenous people.
Equity	REDD rhetoric emphasizes the equitable distribution of REDD benefits, with particular recognition of the needs of the rural poor, yet arrangements and mechanisms remain unclear. Notions of equity within REDD policy proposals are often inconsistent. Prevailing ideas focus on market-based benefit distribution, which are less likely to serve the interests of poor and indigenous people.
Crashing carbon market	Finally, there are concerns by some environmental groups that allowing larger volumes of REDD credits to be traded in the compliance market would drive carbon prices down and crash the market.

Source: Ghazoul et al. 2010, p. 397

There have been concerns that REDD+ activities would result in the commodification of ecosystem services which may ignore biodiversity conservation concerns, and adversely affect the rights of local and forest-dependent communities (Hiraldo and Tanner 2011). However, emission reduction is not the only objective of REDD+, and as highlighted in COP 16, it also aims at supporting sustainable rural livelihoods of local communities and promoting biodiversity conservation. Neglecting these later objectives may not yield desired outcomes from REDD+ programmes. Therefore, efforts have been made to initiate adequate safeguards to ensure that broader social, governance, and environmental objectives are met while implementing REDD+ activities. Some important safeguard measures were discussed during COP 16 at Cancun to protect against any possible environmental and social damage due to REDD+. The participating member countries duly agreed to adopt some safeguard measures and these safeguards represent social, environmental, and governance objectives (Moss and Nassbaum 2011). UN-REDD programme laid down a set of social and environmental principles as safeguard measures (see Box). Adopting these principles while implementing REDD+

has the potential of ensuring conservation of biodiversity and ecosystems, respecting the rights and interests of local communities, and improving forest governance. The Forest Carbon Partnership Facility (FCPF) of the World Bank also has a similar set of safeguard measures.

Social and Environmental Principles of UN-REDD programme

Principle 1:	Democratic Governance
Principle 2:	Respect and Protect Stakeholders' Rights
Principle 3:	Promote Sustainable Livelihoods and Poverty Reduction
Principle 4:	Policy coherence
Principle 5:	Protect and conserve natural forests
Principle 6:	Maintain and enhance multiple functions of forests
Principle 7:	Avoid or minimize adverse impacts on non-forest ecosystem services and biodiversity

For more details please see: UN-REDD Programme Social and Environmental Principles and Criteria 2012 (http://www.unredd.net/index.php?option=com_docman&task=doc_view&gid=8142&tmpl=component&format=raw&Itemid=53)

Both UN-REDD and World Bank's FCPF consider the government as the implementing agency for REDD. This state-centred approach has been questioned by many for the differential dynamics of forest governance in many developing countries targeted to be covered under REDD+. Implementation by government agencies may not result in the desired REDD+ outcomes given the inadequate capacities of the government in many of these countries to enforce rules, and inherent limitations in involving all the stakeholders (Thompson et al. 2011). Apprehensions have been raised that this would recentralize forest governance in many countries that have gone through governance reforms by devolving power to the local communities (Phelp et al. 2010). The issue of defining indigenous communities and the development of the institutional structure to involve the community should receive focus in the preparatory activities. Studies have found that community forest management regimes have the potential to secure livelihood and carbon storage benefits from forests used and managed as commons. The two critical conditions influencing this win–win outcome is the size of the forest managed by the community and autonomy to the community in designing the rules of the management (Chhatre and Agarwal 2009).

Conclusion

REDD+ has created an opportunity for many developing countries to contribute to climate mitigation efforts and at the same time gain from the process. The payments for the carbon would generate additional funding to support forest conservation efforts in developing countries and reduce emissions from deforestation and forest degradation. REDD+ is also understood to be a cost-efficient approach for climate change mitigation. In due course, REDD+ has emerged as a popular idea among the international community. It has accommodated the interests of diverse stakeholders. Among the

different changes that it has undergone, the most significant is the move from carbon-oriented to multiple objectives like sustainable forest management, livelihood concerns of the forest-dependent communities, and biodiversity conservation. In its new avatar, carbon is one of the co-benefits of the forest conservation effort. The international architecture which is still evolving has made some progress in spite of the complexities and uncertainties in international climate diplomacy. However, there are still several contentious issues which need to be resolved. There is a need for consensus among the member countries on different operational aspects for its effective implementation. The consensus on funding sources, MRV methodologies, and institutional mechanism for implementation have strong implications on REDD+ design and outcomes at national level. The readiness of the implementing countries at different levels poses the most significant challenge and needs considerable effort by the international community. It is important that this 'payment for carbon' mechanism be implemented with adequate safeguard measures to address the concerns raised by REDD+ sceptics.

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CHAPTER 2

Forest Governance and Implementation of REDD+ in India

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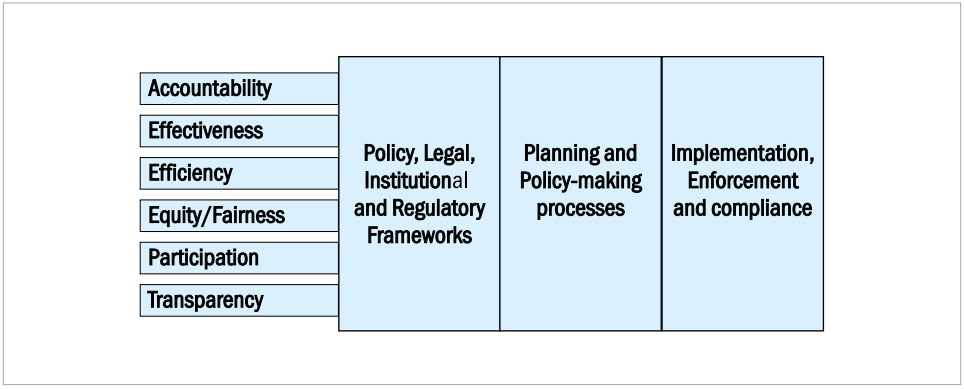
Introduction

Good governance is pillared by three key elements the legality to resolve conflicts, legitimacy to ensure accountability, and participation in the decision-making process. It is the outcome of a mutually supportive and cooperative relationship shared among multiple stakeholders. The principles of good governance are based on accountability, effectiveness, efficiency, equity, participation, and transparency. Policy–legal framework, planning, implementation, and monitoring constitute the framework of good governance.

Pillars and principles of Governance



The main components of governance machinery are the government, the civil society, and the private sector.

Governance issues are important for successful implementation of REDD+ in India. Keeping the national policy and legal framework in mind, community-based forest governance serves to be an appropriate governance model to implement REDD+ in India.

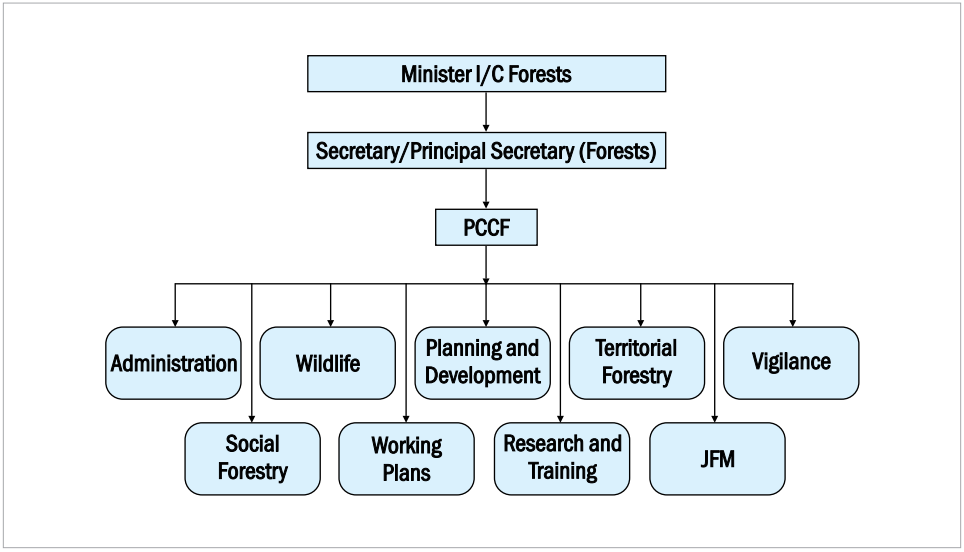
Evolution of Forest Governance

At the outset, the Indian Forest Service (IFS) remained occupied with exploration, demarcation, and reservation of forests, and their protection and exploitation to meet the national demands for timber in the nineteenth century. During the period 1871–

1900, preparation of Working Plans had started, and scientific forest management had also commenced. As the work relating to Working Plan preparation increased, posts of Working Plan Conservators with other staff were created. Forestry research and description of flora and fauna also engaged the attention of forest officers during the latter half of the nineteenth century. During this period, construction of buildings and development of communications were also taken up. Forest settlement work was actively undertaken during 1880–1900. As a result of intensive management of forests as per the Working Plans, the work load of silvicultural and management operations increased considerably, and the forest service was gradually strengthened to handle the increasing work. The idea of re-organizing the IFS and of having a Chief Conservator of Forests in each province crystallized in 1903, but appointments of Chief Conservators of Forests could be done only after the First World War. In the 1920s, afforestation work on degraded areas outside forests (ravines and wastelands) was undertaken to meet the demands of the rural population, and further enhancement of the Forest Department was done. After the First World War, there was further interest in wildlife management and a few sanctuaries were established in different parts of the country. Forests became a transferred subject in 1921, and their administration was transferred to the provincial governments. Consequently, the importance of the Inspector General of Forests (IGF)'s post was diluted and it was amalgamated with the post of President, Forest Research Institute, Dehradun. This position continued for the next two decades. Consequently, Chief Conservators of Forests (CCFs) in the provinces became independent heads of their forest departments, responsible only to their respective provincial administrations. The IFS cadre was set out for each province with a provision for deputation to the Government of India. The unified system of recruitment, training and service conditions, however, continued the way it had been. With the promulgation of the Government of India Act, 1935, 'forests', which became a transferred subject in 1921, became entirely the concern of provincial governments. Changes in forest administration took place after Independence in 1947. Most of the British forest officers left and the responsibility, consequently, passed on to Indian officers. As a result of taking over of the princely states/*zamindari* forests, the forest administration had to be further strengthened to manage the increased area under forests, and also to handle reforestation and improvement of degraded forests. Recruitment in different cadres was increased to handle increased work. Forest administration in many states had to be re-organized as a result of the re-organization of states in 1956. The Wild Life (Protection) Act, 1972 led to greater emphasis on wildlife conservation and management. It also led to the creation of appropriate structures in different states to handle this work.

The Stockholm Convention on Human Environment in 1972 has impacted many changes in the forestry sector. The then Prime Minister of India participated proactively in this conference and her participation impacted the forestry sector considerably. The shift of forests from the State list to the Concurrent list of the Constitution, creation of a separate ministry in the Central Government and promulgation of the Forest Conservation Act, 1980 are examples of this impact. . The recommendations of the National Commission on Agriculture (NCA 1976) regarding production and social forestry were also a turning point, resulting in the establishment of organizations to handle harvesting and marketing of forest produce (Forest Development Corporations) and social forestry works (Social Forestry Directorates / Wings). Implementation of

the Joint Forest Management (JFM) programme necessitated the creation of suitable structures in the service to handle this work. In some states, separate Ranges and Divisions for JFM were created. The Forest Service structure is broadly similar in the different states, with minor variations to suit specific requirements. In most of the states, the forest organization is broadly structured in two parts, viz., the State Forest Department (SFD), and the Forest Development Corporation (FDC). Details of the present set up of forest administration is broadly shown in the figure below.



Present set up of Forest Administration

The Department of Forests and Wildlife in the state is headed by a Minister, assisted by a Principal Secretary (Forests and Wildlife) who, for administrative matters, generally acts as a link between the Forest Department and the political executive.

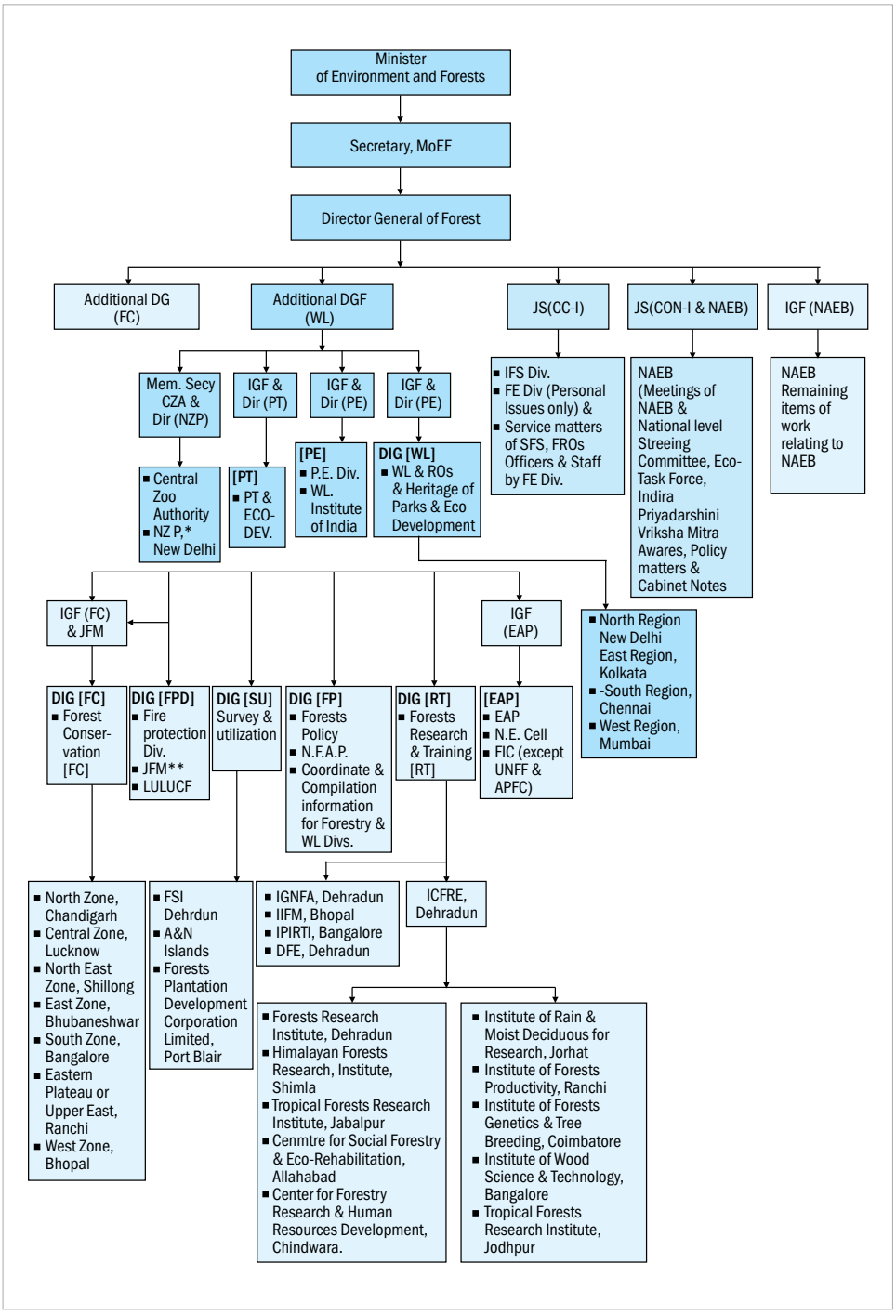
Forestry Administration Set-up in States

Sl.No.	Designation	Responsibilities
1.	PCCF	Head of the Forest Department or special assignment/ forest development corporation
2.	Addl. PCCF	Either entrusted with the supervision of two or three wings of the department, or entrusted with duties and responsibilities separately like that of a CCF
3.	CCF	Heads a wing of the department like territorial, wildlife, social forestry, development, planning, Working Plans, research, training, vigilance, JFM, administration, etc..
4.	CF	Heads a Circle at the regional level/non-functional circle/ special assignment.

5.	DFOs/DCFs/ WL Warden/WPO/ Research M&E	Incharge of a Dorest Division which can be a territorial or a functional division/special assignment in the department
6.	ACF	Either is in charge of a subdivision or a division or functional post/assignment
7.	FRO	Heads a forest range/special assignment
8.	Dy.RO	Given special assignment or charge of a block/forest station
9.	Forester	Incharge of a section/block/circle/special assignment
10.	Forest Guard	Incharge of a beat/special assignment
11.	Forest Watchers	Generally employed to assist the field staff in protection matters

Administration in SFDs has to take into account the requirements of forestry such as the organizational structure, administrative units, number and strengths of different cadres, inter-cadre linkages, co-ordination with other departments, and dealing with the public and politicians.

The size of the organization in different states / union territories is not necessarily proportional to the forest area, but may vary with various types of work to be handled. Protection of forests is a major consideration in deciding the strength of forestry staff. However, the strength of forest staff has not increased to cope with the increasing work load and biotic pressures—the size of the beat, the lowest protection unit in the department, has remained constant. The number of posts (from PCCF down to Forest Guards) in 1985 was 132,385. In 2004, it was about 140, 000, the increase being mainly at senior levels and its supportive administrative staff but the number came down in 2010 to 115,066. Even though the problems related to forest protection and management have increased manifold, the strength of the frontline staff that has to actually handle these matters at the grass root level has not increased. 24,624 field staff were positions were vacant in 2010 and still remains so. A large number of posts have been abolished under the downsizing policy of the government, or are lying vacant, with no prospects of their being filled up in the immediate future. In the states, the structure of the forest administration broadly remains the same irrespective of the nature of work to be handled, and the changed needs of today. There is limited dissemination of knowledge pertaining to forestry and forest-related problems, and a general lack of inclination to publish papers or undertake field surveys and data collection. The unplanned growth of forest administration has in many cases resulted in multiplicity of reporting and control systems. The job of each level of functionary is not often not well defined, particularly of the attached officers and of the posts recently created/re-designated (CCF, Addl. PCCF). The job description of posts given in the old forest codes/manuals do not hold good today because of changed roles and responsibilities of the SFDs. The culture of staying in headquarters and of avoiding field visits has adversely affected forest protection and management activities — even field officers are sometimes not fully familiar with the forests in their charge. This lacuna is further compounded by the frequency of transfers.


Minister of Environment and Forests
Secretary, MoEF
Director General of Forest
Additional DG (FC)
Additional DGF (WL)
JS(CC-I)
JS(CON-I & NAEB)
IGF (NAEB)
Mem. Secy CZA & Dir (NZP)
IGF & Dir (PT)
IGF & Dir (PE)
IGF & Dir (PE)
■ IFS Div.
■ FE Div (Personal Issues only) &
■ Service matters of SFS, FROs Officers & Staff by FE Div.
NAEB (Meetings of NAEB & National level Streeing Committee, Eco-Task Force, Indira Priyadarshini Vriksha Mitra Awares, Policy matters & Cabinet Notes
NAEB Remaining items of work relating to NAEB
■ Central Zoo Authority
■ NZ P,* New Delhi
[PT]
■ PT & ECO-DEV.
[PE]
■ P.E. Div.
■ WL. Institute of India
DIG [WL]
■ WL & ROs & Heritage of Parks & Eco Development
IGF (FC) & JFM
IGF (EAP)
■ North Region New Delhi East Region, Kolkata
■ -South Region, Chennai
■ West Region, Mumbai
DIG [FC]
■ Forest Conser-vation [FC]
DIG [FPD]
■ Fire protection Div.
■ JFM**
■ LULUCF
DIG [SU] Survey & utilization
DIG [FP]
■ Forests Policy
■ N.F.A.P.
■ Coordinate & Compilation information for Forestry & WL Divs.
DIG [RT]
■ Forests Research & Training [RT]
[EAP]
■ EAP
■ N.E. Cell
■ FIC (except UNFF & APFC)
■ North Zone, Chandigarh
■ Central Zone, Lucknow
■ North East Zone, Shillong
■ East Zone, Bhubaneshwar
■ South Zone, Bangalore
■ Eastern Plateau or Upper East, Ranchi
■ West Zone, Bhopal
■ FSI Dehrdun
■ A&N Islands
■ Forests Plantation Development Corporation Limited, Port Blair
■ IGNFA, Dehradun
■ IIFM, Bhopal
■ IPIRTI, Bangalore
■ DFE, Dehradun
ICFRE, Dehradun
■ Forests Research Institute, Dehradun
■ Himalayan Forests Research, Institute, Shimla
■ Tropical Forests Research Institute, Jabalpur
■ Cenmtre for Social Forestry & Eco-Rehabilitation, Allahabad
■ Center for Forestry Research & Human Resources Development, Chindwara.
■ Institute of Rain & Moist Deciduous for Research, Jorhat
■ Institute of Forests Productivity, Ranchi
■ Institute of Forests Genetics & Tree Breeding, Coimbatore
■ Institute of Wood Science & Technology, Bangalore
■ Tropical Forests Research Institute, Jodhpur

Source: MoEF

Over the years, the structure of forest administration in the Government of India has undergone changes to meet the emerging requirements. Forests were brought on the concurrent list of the Constitution in 1976, whereby the Government of India can formulate broad policy, can legislate on forestry matters and issue guidelines to the states. The Forest (Conservation) Act, 1980 was enacted by the Government of India with a view to regulating transfer of forest land for non-forestry purposes. Forest administration at the level of the Government of India remained a part of the Ministry of Agriculture till 1985 when the Ministry of Environment and Forests (MoEF) was created. To provide funding for plantations on a large scale, particularly on wastelands, the National Wastelands Development Board (NWDB) was created in 1985 in the MoEF which was later bifurcated into two. While the NWDB was made part of the Ministry of Rural Development, a new body known as the National Afforestation and Eco-development Board (NAEB) was created in the MoEF in 1991. Two posts of Addl. IGF (now Addl. DGF), were created to look after matters relating to forest conservation and wildlife protection. The present governance system at the national level is depicted in the figure below.

After Independence, the functions of forest administration got diversified and enhanced. These new and increasing demands required appropriate strengthening of SFDs through increase in staff strength, reorientation in training, capacity building measures, and improved infrastructural facilities. Such measures to strengthen SFDs have not been taken to the desirable extent . As mentioned before, the workload has increased beyond the capacity of the present staff of the SFDs. The increased pressure on the biota requires more stringent protection. However, while the posts at the high echelons have increased, there has been no increase at the level of the Forest Guards and Forester. The average size of the Forest Guard's beat has remained the same for a century or more—about 15 to 20 sq km per beat on an average. Foresters are now required to interact with the people for implementing participatory modes of management and for forest extension outside forest lands. The staff is not geared up as yet for these new tasks and duties, either at the level of recruitment or in training. The expenditure on works have increased several fold without a corresponding increase in staff strength. There is reduction in the allocation of funds for the conservation, protection, and management of forests. The performance has consequently been adversely affected. There is a growing feeling in the forest service that work is thrust upon it without involving it in decision-making. Under such circumstances, the forest administration does not feel accountable for the success of the programmes thrust upon it. There is an urgent need to restructure the forest service in the states to provide adequate staff at different levels. Powers, both administrative and financial, need to be decentralized to improve efficiency at all levels. There is also a need to change the regimen in training, recruitment, and in cadre management to meet the current requirements. Historically, the forest department, which was set up in 1864 under the Government of India with Dietrich Brandis as its first Inspector General of Forests, dealt with all matters related to forests (Sarap 2004). Thereafter, the Indian Forest Service was created in 1867 and the Provincial Forest Service created in 1891 to provide a link between the Indian Forest Service and subordinate executive service. Following this, scientific forest management began in 1871. In India, forest governance was established towards the middle of the 19th century. Over time, the forestry sector has been adversely impacted by several factors such as rapid increase in human and

livestock population, inadequate investments, and the transformation of forest land to non-forestry activities. Currently, forests are considered natural resources of local, national, and global concern. Globally, the major issues affecting the forestry sector are biodiversity conservation, and enhancing carbon sequestration potential of the forests. The key national issues concerning the sector include biodiversity conservation, recognizing and maintaining the ecosystem services, and ensuring a sustainable supply of forest products. Besides these, forests are locally important as a source of livelihood to billions, and are often associated with traditional practices (as the case of sacred groves). Other problems include lack of public awareness on the ecosystem services of forests, undervaluation of forest contributions to GDP, technological gaps, insufficient funding, and lack of adequately trained 'frontline' forest staff.

Evolution of Forest Policy Regime in India

The British takeover of Indian Forests started in the mid-19th century. It gave a new intensity and orientation to state involvement in the forest sector, with a focus on revenue generation or meeting state needs The meeting of local needs and the maintenance of local management systems were clearly not priorities. A forest bureaucracy was created with a mandate to implement a state-oriented forest policy. There were some notable exceptions though; the Chotanagpur Tenancy Act in Jharkhand, the Van Panchayat institution in Uttarakhand, the individual forest privileges granted in the Western Ghats and North–East region were untouched by British policy. The need for orientation of forest policy towards conservation was felt in 1972 with the promulgation of Wildlife Protection Act followed by shift of forests from state list to the concurrent list of the Constitution , and the enactment of Forest Conservation Act in 1980. National Forest Policy, 1988 marked a major shift from a regulatory to a participatory mode of forest governance with a focus on ecosystem services and sustenance and livelihood needs of the people living in and around forests, particularly tribals. The Government of India issued the Joint Forest Management Resolution and started the process of regularization of eligible encroachment in 1990. More than 3.67 lakh hectare of forest encroachments have been regularized in 10 states largely in central India. This process was halted by an order of the Supreme Court in 2001. The Panchayat Extension to Scheduled Areas (PESA) Act was enacted in 1996. The processes reached a stage of culmination with the enactment of Forest Rights Act, 2007 and its enforcement on 31.12.2007. The Government of India has subsequently issued advisories to the State Governments to put Joint Forest Management Committees the under Gram Sabha. The Governance model in the Green India Mission is also Gram Sabha centric. This process of evolution has been elaborated further in the following paragraphs.

At the time of advent of the East India Company and the subsequent establishment of the British Raj in India, there was no formal forest policy. However, various princely states had different approaches to forestry resources available in their areas. Generally speaking, the approach was two-fold. While no protection was accorded to the forest area in general, and rulers tried to encourage agrarian extension by remitting revenues and providing credit to the peasants who cleared fresh land for agriculture, certain specific pockets of forests were protected, either as hunting areas (*shikargahas*) or for defence purposes. No one was allowed to disturb the flora and fauna in the *shikargahas* and accordingly, these areas were well preserved. There are instances of protection being accorded to the forest area from the defence point of view as well. The *zamindars*

of Avadh protected the thickest of bushes and trees around their forts so as to have a 'secure asylum' from revenue collectors. They even tried to maintain and increase the vegetation in forests and on river fronts by curbing grazing, tree felling and cultivation by peasants. After the establishment of a structured forestry set-up in 1864, and the appointment of Dr Dietrich Brandis as the first Inspector General of Forests, the first National Forest Policy was formulated in 1894. This document, Circular No.22-F, dated October 19, 1894, was based on the 8th and 9th chapters of Dr Voelcker's 'Report on Improvement of Indian Agriculture and Review of Forest Administration in British India for 1892–93'. However, the policy and the report differed considerably in their approach. While Dr Voelcker attempted to recommend the role of forestry as subservient to agriculture, the Inspector General of Forests adopted a conservative approach and discussed in detail the principles, which should underline the management of a state forest in India. However, efforts were made to accommodate both viewpoints and to produce a document which would lay down the general policy regarding management of forests in British India. According to this policy, forests, being state property were broadly classified under four headings, namely, forest for preservation, forest for commercial purposes, minor forests ,and pasture lands. Though the aim of this policy was to manage state forests for public benefit, certain regulation of rights and restriction of privileges for the use of forest by the neighbouring populations was provided in this policy. After Independence, the 1894 policy was replaced by another policy in 1952. This policy identified vital national needs which included a system of balanced and complementary land use, need to check denudation of mountainous regions, erosion of river banks, and invasion of sea sands on coastal tracts, and the need to ensure supply of fodder and small wood, etc. This policy also classified forests into four groups, namely, protected forest, national forest, village forest and tree lands.

The major milestones in the history of Indian forestry were shifting the subject from state to concurrent list, enactment of the Forest Conservation Act, 1980, promulgation of the National Forest Policy, 1988, judgement of the Supreme Court on December 12, 1996 in the Godavarman case and the enactment of the Forest Rights Act, 2006. The National Forest Policy, 1988 marked a paradigm shift in the forestry sector from regulatory to participatory mode of forest governance, keeping sustenance and the livelihood need of the people living in and around forests as the first charge of the people along with the ecological security of the nation as the prime objective of the policy. The new forest policy framed in 1988 radically differed from the previous policies of independent India. It stressed that forests were not to be commercially exploited for industries, but were meant to conserve the soil and environment, and meet the subsistence requirements of local people prioritizing environmental stability than to earn revenue. Deriving direct economic benefit from forests was subordinated to the objective of ensuring environmental stability and maintenance of ecological balance. It discouraged monocultures and promoted mixed forest. The focus shifted from 'commerce' and 'investment' to ecology and satisfying basic needs of the people such as providing fuelwood and fodder, and strengthening tribal–forest linkages. Para 4.3 of the new policy reads, "The life of tribal and other poor living within and near forests revolves around forests. The rights and concessions enjoyed by them should be fully protected. Their domestic requirements of fuelwood, fodder, minor forest produce, and timber should be the first charge on forest produce." Similarly, Para 4.6

of the policy states, "With regard to the symbiotic relationship between the tribal people and forests, a primary task of all agencies responsible for forest management, including the Forest Development Corporations (FDCs), should be to associate the tribal people closely in the protection, regeneration and development of the forest as well as to provide gainful employment to people living in and around the forest. While safeguarding the customary rights and interests of such people, forestry programmes should pay special attention to undertake integrated area development programmes to meet the needs of the tribal economy in and around the forest area, including the provision of alternative sources of domestic energy on a subsidized basis to reduce the pressure on the existing forest areas." The policy stressed the importance of NTFPs and states in Para 3.5 that "minor forest produce should be protected, improved and their production enhanced with due regard to generation of employment and income". Referring to supplies to industry, the first part of Para 4.9 states, "Industry should be encouraged to use alternative raw materials. Import of wood and wood products should be liberalized". Para 4.3.3 determines that production forests, which were in the past used exclusively for timber, while meeting national needs should also be oriented to narrowing the increasing gap between demand and supply of fuelwood. Para 4.4.2 bans the giving of mining leases without a proper mine management plan appraised from the environmental perspective and enforced by adequate machinery. Therefore, we can see that there has been a drastic change in the policy orientation towards forests. The new policy recognizes the ecological value of the forest and identifies the stakes of its primary stakeholders, the forest-dependent communities. The National Forest Policy, 1988 framed four years before the Rio Earth Summit embodies all elements of sustainable forest management. Sustainable forest management in India focuses on maintenance of ecosystem services followed by social and cultural aspects of forestry. The enactment of the Forest Rights Act, 2006 further strengthened sustainable forest management with more focus on social and livelihood issues. Forests are a national resource, of global concern, and of local importance. The forestry at the global level is largely governed by the Forest Principles, 1992 which authorize member countries to use their forest resource according to their needs and priorities.

Functions of Forest Administration

Forest administration handles protection, management and utilization of forest resources (land, forests, wildlife, water, etc.) to produce various goods and services to meet the ever-increasing and at times conflicting demands of the human population. The functions of the forest administration are consequently varied in view of its varied duties. They broadly include the following: (i) forest protection, (ii) silviculture and management, (iii) survey, demarcation and Working Plans, (iv) harvesting, transport, processing and marketing, (v) supervision, budgeting, policy formulation and legislation, (vii) research, training and extension, (viii) wildlife management, (ix) social forestry, (x) joint forest management, (xi) watershed management, including soil and water conservation, and (xii) non-wood forest product collection and marketing.

Forest Protection

The strategy adopted by the forest department for protecting forest resources is of policing and persuasion. Patrolling is done by the SFD staff and offences are dealt with in accordance with various enactments, rules, and orders. The SFD is required to take

protection measures against illicit felling, encroachments, forest fires, grazing in areas closed for regeneration/plantation purposes, poaching of wild animals, illegal quarrying and mining, theft of gene pool material, unauthorized removal of medicinal and aromatic plants, etc. However, the department is generally ill-equipped to fight against forest offenders. Protection against illicit fellings and poaching is becoming increasingly difficult. Organized gangs of offenders sometimes use fast means of communication and lethal weapons. The Forest Department (FD) follows traditional approaches in protecting the forests. Beat Guards patrol their beat to prevent and detect offences spread over an area ranging from 11 to 200 km^2. Apart from the responsibility of protecting the forest, a Beat Guard is required to handle other forestry operations such as nursery and plantation work, construction and maintenance of forest paths, fire lines and boundary pillars, soil and water conservation works, silvicultural operations, arranging labour, maintenance of muster rolls, etc. However, the Beat Guards are not trained for these kind of jobs and they are ill-equipped to handle all these works. In case of JFM areas, a lot of their time is taken up by activities relating to community participation. The area of the Beat is vast and they are not provided with any means of transport either. Effective forest protection suffers because of this. They also have the responsibility of seeking peoples' co-operation and participation in protection activities. Beat Guards mainly deal with compounding of offences under the Forest Act, but they have not been trained to search, seize, and gather evidence which is necessary for the prosecution of offences. As a result, a large number of cases fail due to procedural faults and weaknesses. Likewise, the jurisdictions of other SFD executive staff members senior to the Beat Guard are very large and in the absence of transport facilities, effective forest protection is rather difficult. It is not uncommon to find one Forest Guard manning a check-post for 24 hours without proper or basic facilities for quick communication, or of arms to confront organized gangs of offenders. Compared to the magnitude of protection problems and other responsibilities, the staff and facilities provided at all the levels in forest administration are meagre and primitive. At times, the SFD staff members have to risk their lives to protect the forests. There have been several incidences of forest staff being murdered by forest offenders. Staff strength needs to be considerably increased, and modern facilities need to be provided to fight forest offenders and ensure effective protection of forests. People's participation is essential in protecting forests as there have been several cases of illicit felling, fire, and encroachments in JFM areas. Besides protection against illicit cutting and encroachments, protection against forest fire is another major concern. Forest fires are quite frequent and damage the forests considerably. Fire control methods adopted by the SFDs are obsolete and old, involving cutting and burning of fire lines and beating fires manually. Fire incidences are deliberately under-reported because the staff is held responsible for the occurrence of fire. The assessment of damage due to fire is, however, not given any importance and, in fact, knowledge in this regard is also very minimal. The loss due to fires include destruction of humus containing micro-organisms, leaf litter, regeneration, herbs and shrubs, and wildlife, decrease in annual increment, physical burning of felled wood, increased soil desiccation and resultant increase in soil erosion and run-off, susceptibility to diseases and pests, change of forest community structure, replacement of more valuable tender species by less valuable hardy species, etc.

Forest Management

Forest management including silvicultural operations and harvesting still constitute the main functions of the forest administration. Silvicultural operations include all activities from regeneration to final fellings in the forests, and establishment of nurseries and plantations. Forest management activities include regulation of rights and concessions, grazing, fuelwood collection, fire control measures, construction and maintenance of paths and boundary pillars, implementation of laws concerning forest conservation, etc. Most of these operations are handled by the field executive staff with the help of labour employed for the purpose.

Survey, Demarcation and Working Plans

Forest administration undertakes survey and demarcation of areas required to be notified as forests or the areas to be taken up for plantation or for some other specific work. Inventory of forest resource is undertaken at the time of Working Plan preparation. Working Plans are revised normally at 10-year intervals; in some states, this interval may be longer. Each state has a Working Plan Organization to undertake this work. Working Plans prescriptions are at times, too general vague. In some states, they are not revised on a regular basis. The lack of priority given to this work has attracted the attention of the Supreme Court as well. Funds are normally not available to carry out the Working Plan prescriptions, which are at times too ambitious to be feasible within the financial resources available. Age-old methods for inventory and mapping are still being used, and modern tools and techniques have not been adopted as yet. Inventory methods for assessment of biodiversity have not been standardized and the management is consequently not being geared towards sustainable management for biodiversity conservation. Working Plans must be revised according to a laid down schedule by competent officers of the requisite seniority and the prescriptions therein must be implemented with the required financial and infrastructural support.

Harvesting, Transport and Marketing

Forest administration is required to handle extraction of various forest products. Timber extraction is now handled by Forest Development Corporations (FDCs) in most states and, in some cases, by the Production Divisions and similar structures. The FDCs draw most of their staff on deputation from SFDs. The forest administration regulates collection of NWFPs (Non-Wood Forest Products) in accordance with Working Plans and the rules and regulations applicable to their collection. The collection and sale of nationalized NWFPs is handled by FDCs. The level of extraction of timber has been considerably reduced as a result of the ban on fellings. The FDCs created for these purposes are finding it difficult to sustain activities on the reduced out-turn. Nationalization of NWFPs goes against the interests of local communities entitled to collect them. The whole question of collection and sale of NWFPs needs to be examined in the context of giving NWFP ownership rights to local bodies in specified areas.

Supervision, Budgeting, Policy Formulation and Legislation

The Divisional Forest Officer (DFO) is required to handle general administration and budgeting, and make contributions to policy formulation and legislation. The administrative work has increased to a great extent. The work of interaction with a number of stakeholders in forestry, both public and private, is increasing. The DFO is required to attend several meetings; attend to the visits of VIPs and inspecting senior

officers, and carry out a number of other miscellaneous jobs. In the present scenario of developmental activities, public awakening, multiplicity of development schemes, the DFO does not find time to do justice to each of these assignments. A study shows that to attend to professional work relating to silviculture and management, the DFOs are able to invest only about half their time, the remaining half of their time is spent in attending various other jobs.

Research, Education and Training

The research units under SFD are generally manned by SFD staff. In case of State Forest Research Institutes, the staff consist of forestry officials from SFDs as well as scientists recruited from concerned institutions. In the ICFRE (Indian Council of Forestry Research and Education) institutes, both forest officials and scientists constitute the research staff.

Wildlife Management

Forest administration handles wildlife management both in protected areas (PAs) as well as in forest areas outside PAs. A separate structure or Wildlife Wing has been created to handle this task. In other forest areas, the territorial staff of SFDs handles wildlife work. The staff in the Wildlife Wings and Territorial Wings in an SFD is interchangeable and frequent transfers hinder specialization. There is also a tendency to post unwanted and inefficient personnel in the Wildlife Wings, in keeping with the low priority that is accorded to this work within the SFDs. The personnel, therefore, have neither the aptitude nor the training and skills for the specialized work, and try to get themselves posted back to the so-called "mainstream" forestry jobs.

Social Forestry

Separate directorates/wings have been created in most states to handle social forestry work. After switching over to joint forest management (JFM), social forestry directorates/wings have been amalgamated with territorial divisions. In some states, separate social forestry staff still continues to handle plantation work outside forest areas and extends support to farm forestry/agroforestry. Social forestry work is continuing at a low key level because of the shift to JFM, and also because of paucity of funds. It is a matter of concern that the social forestry programme which was considered very important to meet the requirements of fuelwood, fodder and small timber of rural population, has been given up without making any alternative arrangements to meet the demands of two-third of the rural population that live in areas where there are no forests and where JFM cannot help.

Watershed Management

Soil and water conservation is an important activity of forest administration, particularly for erodible sites and degraded forests. It is taken up along with afforestation work by the territorial staff. In some states, separate forest divisions for soil conservation have been created. Moisture stress being an important factor for failure of plantations, water conservation is important. Sustained water supply and improvement of water regimes is an important objective of forest management, and the significance of forests as regulators of water flows is being increasingly realised.

Non-Timber Forest Products

Non-Timber Forest Products (NTFPs) are assuming increasing importance because of their contribution to the livelihood of communities living in and around forests. The

National Forest Policy of 1988 rightly emphasizes on improving production of NTFPs. Silviculture and forest management practices must also aim at biodiversity conservation and increased production of NTFPs, instead of concentrating only on commercially important timbers. However, no special silvicultural and management measures have been taken to increase the production of NTFPs. In some states, Forest Corporations have been created to handle collection and marketing of nationalized NTFPs. Forest administration in most states regulates collection of NTFPs in accordance with rules and regulations applicable in that state. In JFM areas, the JFM resolutions and MoUs signed govern the collection of NTFPs by the participating communities.

Joint Forest Management

The Joint Forest Management (JFM) Programme has been undertaken on an ambitious scale, and an area of 22.3 million ha is reported to have been brought under the JFM already. The work of JFM is handled by the territorial staff. Special units created to handle this work, as done in Karnataka, were not found practical and had to be abolished. JFM requires working closely with village communities and results in an increased workload for the field staff. However, re-organization in SFDs to provide more staff for this work at the field level has still not been done and the work has been hampered. With the increase in targets and inadequate attention for dialogue and interaction with village communities because of shortage in staff, JFM is gradually becoming a government-driven programme like any other forest activity. Restructuring of forest administration is necessary to handle JFM. It is also necessary to restructure the staff training and orientation. JFM requires a very different approach and handling; tasks which the present Forest Guards, Foresters, and Rangers are not adequately trained in.

Genesis of Participatory Forest Management in the Indian Context

The concept of people's participation in forest management is quite traditional in India. Since the 1920s, village forest management institutions (Van Panchayats) have been created in the Uttarakhand hills. This was because of the strong demand by the villagers to exercise their rights to extract fuelwood, timber and fodder from the forests. The first rules of the Van Panchayat were framed in 1931 under the Scheduled District Act 1874. Subsequently, they were amended in 1972 and then in 1976 under Section 28 of the Indian Forest Act 1927. A large number of Van Panchayats were formed to manage the forest areas and till 2004; 6777 Van Panchayats were managing 5241 sq km of forest area. Some successful examples of the past in which people had participated in forest protection and improvement were in the Arabari area of Midnapur district in West Bengal, where people managed degraded Sal forest of 272 ha in 1972 (IBRAD 1990) and Sukhomajri village near Chandigarh in Haryana wherein severe soil erosion was checked by making check dams, raising massive plantations and construction of water harvesting ponds with the participation of the local community. In Jharkhand and Odisha, some villagers took similar initiatives that proved very successful. Following the mandate of the National Forest Policy, 1988, the Government of India issued guidelines for regularization of eligible encroachment and conversion of forest villages into revenue villages in 1990. Consequently, ten states have regularized 367,000 hectare of forest

land, but the process was stopped due to the order of the Supreme Court banning de-reservation of forests. Simultaneously, in 1990, the Government of India initiated the process of people's involvement in the conservation, management and protection of forests using a benefit sharing mechanism based on the principle of 'care and share' through joint forest management (JFM)—the so-called 'JFM 1990 Resolution'. Under JFM, the user (local communities) and owner (Government) manage the resource and share the cost equally. However, it is difficult to generalize the JFM concept and approach in the light of variations across the nation with respect to geography, resource base, socio-economic status, cultural diversity, and pressure on forests. The programme was yet another initiative by the Government of India to involve the forest-dwelling communities in the management of forests. The same has been implemented by most state governments in India.

The JFM programme has generated many positive outcomes in different locations (MoEF 2005). The programme has improved protection and increased the availability of minor forest produce and fuelwood in many places. However, in some places, the JFM institution is not functioning well as there is lack of a benefit sharing mechanism (MoEF 2010). The implementation of JFM in the country has so far been a mixed experience. At some places, JFMCs have done good work and at many places few JFMCs have not taken interest in the conservation, protection, and management of forests. The essence of the programme is empowerment at the grass root level. However, necessary decentralization has not been attempted in the forest department nor has any change been noticed in the hierarchical structure. Further delegation of power and decentralization of authority are yet to take place at various levels. Entry point activities have not been able to stimulate the local villagers to participate fully in the developmental activities. In many areas, people have been found to demonstrate withdrawal symptoms, once entry point activities have been completed and the periodic input intervention by the department is either withdrawn or made irregular. Examples of Arabari in West Bengal, Harda in Madhya Pradesh and many other places highlight the fact that direct benefits from forests to the forest dependent communities attracts them to actively participate in the conservation, protection and management of forest resources. The entry point activities such as employment and other development works in the village give strength to the participatory mode of forest management (MoEF 2010) In the absence of a clear relationship between the JFM committee and the existing village Panchayat the progress of the entire JFM process has been hampered in many places. Because of the absence of this relationship, in the wake of increased decentralization of powers to the Panchayati Raj Institutions (PRI) through the 73rd Constitutional Amendment, a host of problems are coming to the fore (MoEF 2010). The Ministry of Environment & Forests, Government of India, has sent an advisory to all state governments to place JFMCs under Gram Sabhas.

Status of Joint Forest Management Committees (JFMCs) in India

Joint forest management is now a well-established integral part of forest management all over the country. Currently, JFM spans 29 states with 118,213 JFMCs which manage 22.94 million ha of the forests in the country. The recorded forest area of

the country is estimated to be 76.962 million ha and the JFM covers 29.80 per cent of the total (ICFRE 2011). JFMCs are largely involved in plantation and other forestry activities and getting benefits of the forest produce as wages. The mechanism of benefit sharing of 'minor' and 'major' forest produce has not been adequately translated from government circulars to action. The empowerment of the Gram Sabha with ownership of minor forest produce (MFP) under the Panchayati Raj (Extension to the Scheduled Areas) Act, 1996 has created conflict between JFMCs and Gram Sabhas. JFM rules are under Section 28 of IFA in Uttarakhand and Uttar Pradesh. All Van Panchayats are covered under the JFM programme and governed by Van Panchayat Rules 2005, unlike in Andhra Pradesh, where a chapter on Community Forest Management needs to be included in the AP Forest Act 1967. In states like Gujarat, Maharashtra, Tamil Nadu, and Haryana, forests are managed according to the Societies Registration Act. Karnataka follows the legislation under Section 31-A of the Karnataka Forest Act and the rest of the states like Bihar, Chhattisgarh, Madhya Pradesh, Goa, Himachal Pradesh, J&K, Odisha, Punjab, Rajasthan, West Bengal and Kerala work under the guidelines notified under JFM. Figure 4 gives shows the percentage of forest covered by JFM in each of the 29 states in India.

Managing forest wealth through JFM mechanism has been practised in India for more than 20 years now. Some noteworthy examples of the success of JFMCs are OFSDP, a JICA-assisted project in Odisha, adoption of JFM policy in Jharkhand on September 21, 2001, and the achievement of JFMCs in Hazaribagh East Forest Division and Palakkad district (the only tribal block of Kerala). One of the 24 JFMCs operating under the FDA Central Forest Division of Tripura has also shown exemplary achievement (MoEF 2011). At this point of time, apart from the Government of India and state governments, donor agencies are also giving highest priority to JFM functioning. However, the activities under JFM have been in practice since long and have become slightly out-dated in the

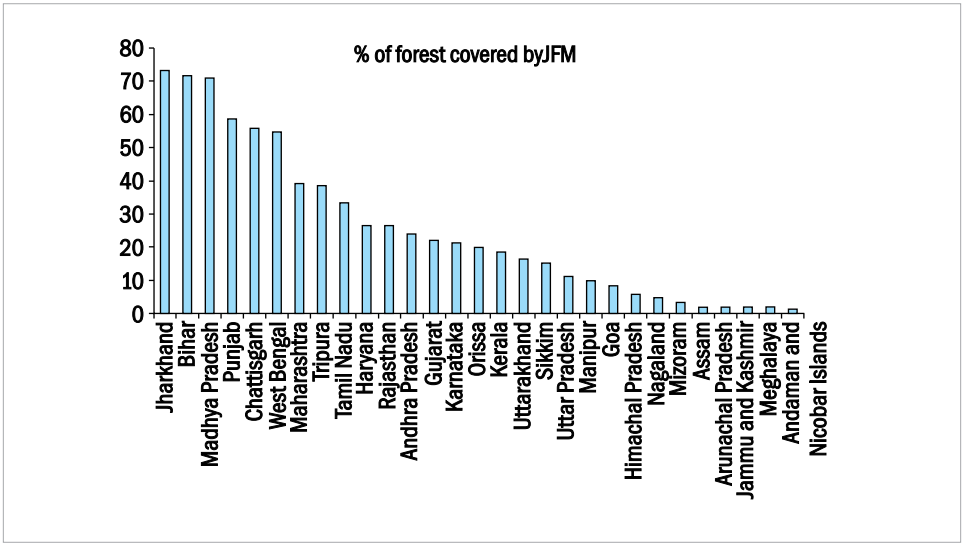


Figure 4 (Source: ICFRE 2011)

present scenario. These need to be further strengthened by merging them with the Gram Sabhas to achieve the mandate of sustainable forest management in India which is an integral part of REDD+.

Community-based Forest Governance as mandated in Forest Rights Act, 2006

The process of regularization of forest land was halted due to the order of the Supreme Court in 2001 which banned de-reservation of forests. Huge numbers of forest dwellers suffered loss as eligible encroachment process could not be regularized. Therefore, the Central government brought in a legislation named 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, popularly known as the Forest Rights Act, 2006 to recognize the tenure and occupational rights of forest dwellers. The Forest Rights Act was the first Act enacted in independent India that addressed the question of community ownership of minor forest produce and rights and management/governance of forests at the legislative level. The FRA, 2006 has been implemented in India for the last three years with the help of rules framed for its implementation. Until now, more than 1.23 million titles have been recognized covering 1.8 million hectare forest land. Most of the titles are held by individuals except 8498 community rights (MOTA 2012). The implementation of FRA, 2006 is slow with respect to recognition of other rights such as community rights, conversion of forest village into revenue village, and the right to protect, regenerate, and conserve community forest resources. The implementation of FRA has tended to focus on individual rights to cultivate and live. In fact FRA makes significant contributions towards changing forest governance from being exclusively state-centred to being much more community-centred and democratic. The enactment of this Act broadened the scope of cooperation between JFMCs and Gram Sabhas by putting JFMCs under Gram Sabhas it with the ownership of Minor Forest Produce and the right to protect, regenerate, and conserve community forest resources (CFR) (MoEF 2006). JFMCs and the Gram Sabhas have overlapping control on forests. The Gram Sabhas do not have a legal tool to protect forests; therefore FRA authorizes them to take assistance of any government department, as the Forest Department has powers under the Indian Forest Act, 1927 and State Forest Acts. They also lack the capacity to conserve and manage forests scientifically, in spite of having traditional knowledge (MoEF 2010). FRA provides a statutory procedure to recognize community forest resource (CFR) and community forest rights. Equally important are the rules framed for the implementation of FRA which provide a statutory basis for protection of CFR and other forest resources. Section 5 of FRA empowers Gram Sabhas and communities to protect, regenerate, and conserve CFR (Sharma 2009). In this context, the rules framed for the implementation of FRA lack the mechanism of the community-based forest governance as mandated in the legislation. Rights, powers, and responsibilities given to local communities on such scales must be accompanied by clear rules and mechanisms by which those responsibilities will be discharged. The rules do not provide mechanisms for sustainable harvesting of MFP, requirement of democratic and fair forest governance within the Gram Sabhas and its accountability for non-performance (MoEF 2007a). The FRA, 2006 takes the first national level legislative step to recognize this right, and sets in motion this process of devolution

and democratization in the context of forest use and management (MoEF 2007; MoEF 2007a). The rules framed for the implementation of FRA are inadequate. Section 12 of FRA empowers the Ministry of Tribal Affairs in the Central Government of India to frame rules for the implementation of FRA in the spirit of its preamble.

Community-based Forest Governance

Community-based forest governance is the key to the institutional set up of REDD+ in the Indian context. Its functions are based upon the following principles:

- Democratization has to include decentralization of power to the community of forest user groups.
- Democratic decentralization of power and governance requires operational autonomy for the lower level entity (such as community) within a transparent regulatory framework.
- Safeguarding against elite capture at the local level is necessary to protect the community and individual rights and resources.
- Monitoring the sustainable use of resources and enforcing norms by the government to conserve these resources is required.
- State support will be required by many communities in any decentralized system for forest protection, conflict resolution between the Gram Sabha and the JFMCs, technical knowledge for harvesting, resource mapping and monitoring, marketing and trade of minor forest produce.
- Local forest governance and management must be nested within a larger landscape, enabling sustenance of ecosystem functioning, corridors for movement of wildlife and genetic flow, and other functions and benefits that are external to the community.
- The shift to community-based management not only involves devolution of power but also requires changes in rights, responsibilities, structure of institutions and attitude of governing bodies.
- Besides this, the government must play a pro-active role in ensuring that the interests of the weaker sections of the society are safeguarded and no elite capture takes place.
- The national level framework should be flexible enough to adapt to regional variation accomplishing the overall goals.

Community-based forest governance institution at the village level may be headed by the Gram Sabha/Panchayati Raj Institution under the following governance models:

- In FRA and PESA areas, the Community Forest Resource Management Committee (CFRMC) should be an elected, democratically constituted body of the Gram Sabha/ Panchayati Raj Institutions for a period of 5 years. It should include women (minimum 50% members) and the president must be from among the Scheduled Tribes Forest Dwellers or Other Traditional Forest Dwellers. The CFR management committee can carry out the following rights and functions on behalf of the GS/PRI. (MoEF 2010).
- Gram Sabha/Panchayati Raj Institutions should ensure fair access to right holders (right holders are those who have rights under the community forest rights and other members of Gram Sabha as well as external right holders such as nomads).
- Gram Sabha must ensure sustainable utilization of forest produce including minor forest produce.

- Gram Sabha is empowered to make rules for use, harvesting, protection, and regeneration of community forest resource.
- CFRMC office bearers are empowered to put a stop to forest offences and penalize violators.
- Gram Sabha is responsible to generate revenue, and thereafter receive and spend grants to carry out its forest-related activities.
- With the technical support of the state forest department, the Gram Sabha should be encouraged to prepare community forest management plans.
- CFRMC can be merged with Biodiversity Management Committees, or any other existing natural resource-related committees existing in the village, with the choice of the Gram Sabha.

The role of state forest departments (FD) is also important for the success of community-based forest governance. The role is identified below:

- FD is responsible for providing protection and support to the Gram Sabha/ Panchayati Raj Institutions
- FD may be empowered to carry out monitoring to check unsustainable use and implement conservation regulations in community-based managed areas.
- FD will continue to exercise additional powers in relation to implementing regulatory provisions of the Wildlife Protection Act 1972 and other forest-related state level acts.
- FD must ensure strong interaction between foresters and forest dwellers and involve their participation in the implementation of CBFG.
- FD must emphasize on understanding and managing complex ecosystems, conserving the range of native biodiversity and should also aim to promote livelihood activities within the sustainable use and conservation framework, apart from ensuring the tenurial security of forest-dwellers on forest land for their occupation and habitation rights.

Non-PESA and FRA Areas could follow the existing JFM structure with the following modifications:

- JFMC will be at the village level and not the Panchayat level
- The chairman will be elected from the village
- Sarpanch/gram pradhan will be the patron
- FD would provide technical support from within the committee
- Gram Sabha may appoint Forester/Forest Guard as members
- Village forests may be notified under IFA and assigned to JFMCs

North East (NE) states could follow the following structure:

- Community-based forest governance is particularly for community-owned and government-owned forests.
- FD will provide protection, monitoring and technical support to the Gram Sabha/ Panchayati Raj Institutions.
- FD may be empowered to carry out monitoring, i.e., the extent of compliance to sustainable use and conservation regulations, in community-based managed areas and can take action on any violation.

- FD will continue to exercise additional powers to implement regulatory provisions of the Wildlife Protection Act, 1972 and other forest-related state level acts and adjustments according to the need of the specific NE state.
- In the NE states, the Mandatory Management Plan is for private forests.

Strengthening Institutions

Local institutions play a significant role in forest conservation and its sustainable utilization. The institutions dealing with forests at the local level are: Joint Forest Management Committees, Community Forest Management groups (a large number in Odisha, for example), Van Panchayats (Uttarakhand), traditional village level institutions/village councils (Schedule VI area), Biodiversity Management Committees, Forest Committees set up under Rule 4 of FRA, etc. Self-help groups/common interest groups have also been set up at the village level to promote forest-based livelihood activities. Since JFMCs have certain limitations such as tenurial insecurity, inadequate silvicultural development, restricted harvesting, lack of legal back up and market access, they need to work in coordination with the Gram Sabha/Panchayati Raj Institutions.

Panchayat Raj Institutions are constitutionally mandated bodies for decentralized development planning at the local level. The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006 empowers the Gram Sabhas with the ownership of MFPs and the responsibility to set up institutions to make sure that the individual and community forest rights are strengthened.

Gram Sabhas are required to set up a village level institution to protect and manage forests. This would not only help in strengthening the Gram Sabhas, but would also help in the necessary union of resources and integrated planning at the village level that would surely benefit all stakeholders. Livelihood activities and enterprises as well as protection of forests have often been effectively addressed at the cluster level / sub-landscape level, led by federations of SHGs/common interest groups (CIGs) and federations of forest committees. The Government of India should therefore encourage federations of thematic committees/groups such as JFMCs/CFM/VPs/FRA committees as well as livelihood promotion groups like SHGs/CIGs to plan for forest protection, conservation, and livelihood activities. However, the creation of such federations needs to be the decision of communities, with the consent of their respective Gram Sabhas.

There is a need felt for revamping the JFMCs. To allow greater decentralization of decision-making, transfer of power, and adequate support. The following steps would be needed to reform the JFMCs.

- The JFMC will be set up by the Gram Sabha. Its constitution and processes need to be harmonized with the provisions as laid out in the state Panchayat and PESA 1996 legislation. The JFMC, as a committee of the Gram Sabha, must be given power to protect and manage as well as derive benefits from forests.
- The JFMC must be provided necessary resources and support to achieve its mandate.
- Silvicultural management of the area assigned to JFMC must be according to the plan approved by the Gram Sabha, following technical consent by the forest department.
- The Forest Department's role would be to provide demand-based support, as required by the Gram Sabha and its mandated committees to strengthen decentralized forest governance leading to sustainable management of forests.

The Forest Development Agency (FDA) was formed at the beginning of the 21st century, basically to provide direct financial support to the JFMCs and the Panchayati Raj Institutions. The need of the hour is to reform the FDA structure and its role. This would make it a principal institution in contributing to decentralized forest governance and providing valuable services for forest conservation and improved livelihoods of people living in and around the forests that would further achieve poverty eradication and enhance carbon sequestration. The key measures in this context would be the following:

- The FDA at the district level will be headed by elected representatives such as the Zila Parishad president which would help in programme convergence with the Panchayat Raj Institutions. The FDA at the state level will be chaired by an elected representative such as the Minister of Forests.
- The executive body of the FDA would have elected representatives from clusters/ wards, comprising of revamped JFMCs.
- Federations of the Committees of Gram Sabha would also be represented at the district/division level. The CEO of the FDA will be the DFO.
- SHGs/UGs and their federations involved in forest-produce-based enterprise would be represented at the division level/district level FDA.
- Representation of civil society organizations and agencies particularly rural development, agriculture, livestock, fisheries, horticulture, revenue, drinking water, health, tribal welfare, and education will be secured. All government officials will be ex-officio members and would not have voting rights.
- The function of the FDA will be to facilitate demand-based planning and implementation of forest conservation and community development by the local bodies mandated by the Gram Sabha. It will need to create partnerships with local NGOs/CBOs, academia, PRIs, research, and training organizations, people's representatives, media, and government line agencies to carry out its function and to strengthen forest governance.

The Government of India will also support capacity building of the local community institutions to facilitate long-term protection, regeneration and management of forests, and initiate forest-based livelihood enterprises. Sustainable forest management (SFM) and forest produce utilization will require good skills and knowledge in inventorization, adaptive silvicultural practices, sustainable NTFP harvesting, value addition and marketing, and monitoring of impacts. Indigenous knowledge, forestry science, information, and communication technology will further promote capacity-building activities. Moreover, the involvement of community institutions in facilitating grass roots actions will require sensitization of the forest department officials and frontline staff. The forest department will also need to ensure compliance with technical prescriptions as per the management plan. It would be essential to respond to the community institutions by providing greater support in 'protection' in case of sensitive areas. The technical knowledge of the department will be important to assist developing quality planting material, designing eco-restoration programmes, pilot testing of climate change adaptation measures, creating an enabling regime that helps farmers and communities to plant, protect, and harvest trees/forests without having to incur huge transaction costs. The GoI consider supporting the recruitment process by focused advocacy, and even provide financial support for salaries of frontline staff for a limited period. Capacity

building of frontline staff will be given high priority. Teams of experts at the level of reformed FDAs could bring in new knowledge, expertise and innovative ideas in fields such as information and communication technology (including RS/GIS capabilities), community mobilization, watershed/soil moisture/water harvesting, hydrogeology, finance, ecological restoration/REDD issues, etc. The GoI will support strengthening of the Range Offices, inter alia, developing them as forest and wildlife resource centres (with library, documentation, map room, GIS, and MIS cell facilities). This support could also be availed by the partner agencies working in the sub-watershed /sub-landscape. Infrastructure support in terms of enhanced mobility and communication at Forest Range and Section level will enhance the rapid response needed for forest protection, fire protection, control of crop-raiding wildlife, etc.

Key Issues and Action Points

- Although policy and legislative framework is adequate to ensure meaningful participation of the local communities in implementation of REDD+, capacity of the government machinery in the field is lacking to accomplish the task. Functionaries of FD at all levels specifically at local level need to be adequately sensitized and trained to ensure that the processes, procedures and methodologies for REDD+ are followed in letter and spirit. This will require a country-wide campaign of capacity building for the government officials as well as the members of the local communities on a war footing.
- Local communities may show a distrust or disinterest towards their participation in REDD+ because of lack of knowledge and sensitization, which may adversely impact the nationwide implementation in due course of time. To address this concern, it will be essential to launch a string of pilot projects at micro level aimed at sensitization and capacity building of the forest officials and local communities to help them understand the finer points and benefits of REDD+ implementation.
- There is no dedicated mechanism to ensure adherence to the UNFCCC safeguards for upholding the rights of the local communities on forest resource, and for biodiversity conservation in natural forests. Guidance would need to be provided in shape of simple guidelines detailing roles, responsibilities and actions on part of the stakeholders including FD, local communities, Panchayats and Gram Sabhas.
- REDD+ incentives would flow from Central Government to State Governments, and further down to local communities in proportion to their REDD+ performance. To ensure a transparent and just mechanism governing the flow of incentives, it will be imperative that guidelines are put in place by the Central Government in consultation with the State Governments and civil society to channelize flow of incentives from Centre to States, and subsequently to local communities. For ease of implementation, it will be desirable to have two separate set of guidelines – one governing incentive flow from Centre to States, and second from States down to the local communities

Conclusion

It is evident that the policy moves in the recent past indicate a transition towards community based forest governance. This however needs to translate into tangible benefits for the community.

Though the FRA, 2006 has empowered the community with the ownership of MFP, so far, communities are receiving less than 10 per cent of total turnover of MFP which is in the tune of 27 billion US$ per annum (Sharma 2009). States like Madhya Pradesh, Chhattisgarh, Odisha, and Uttar Pradesh have taken proactive initiatives to enhance the income of forest-dependent communities and build capacity of the community towards value addition, processing and marketing of MFPs (Sharma 2009). Public–private partnership (PPP) models for helping the communities with respect to value addition, processing, and marketing of MFP will definitely enhance their income.

The JFMCs should be merged with the Gram Sabhas under the umbrella of the Forest Rights Act, 2006 to strengthen the functions of the PRIs. Community-based forest governance strengthened by the FRA, 2006 is certainly the future of the Indian forestry sector. Rules framed for the implementation of the FRA, 2006 are inadequate and need to be revised in order to formulate additional rules which can provide a mechanism for sustainable harvesting of MFP, enhance income of forest-dependent communities and recognize CFRs. The dynamic change in forest governance from a participatory approach of forest governance (JFM) to community-based forest governance could lead to an explicit transformation of power across the nation, leading to an expansion of the JFM concept to a JFM + concept. JFM+ will be JFM constituted at the village or hamlet level and will be represented by a chairman elected from the village and Sarpanch as patron where it is applicable. It will be assisted by the forest department for capacity-building to protect and conserve the resources by providing technical support and use of forest legislation. In JFM+, the JFMCs will work under the Gram Sabhas. The power from the forest department will be decentralized to the Gram Sabha, who are proposed to work in co-ordination with the JFMCs. The management plan for JFM+ will incorporate both scientific and traditional knowledge, which could be used in resource management with regular flow of funds. The JFM+ concept not only nourishes JFM but also enhances the intensity of good governance under the Gram Sabha to promote sustainable management of forests in addition to improving the livelihoods of local people who are dependent on forest for their bona fide livelihood needs. This will provide a strong platform for REDD+ to emerge in India. In short, community-based forest governance (CBFG) is a process to achieve the mandate of REDD+ in India,

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CHAPTER 3

Legal and Policy Framework for REDD+ in India

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Introduction

Forests are a national resource of global concern. Forests have been a subject of global negotiations on account of their key role in sequestering carbon from the atmosphere. REDD+ (Reducing Emissions from Deforestation and forest Degradation) is a policy instrument with a legal framework meant to incentivize conservation and sustainable management of forests, and thereby reduce GHG emissions from deforestation and forest degradation. The '+' sign signifies the enhancement of forest carbon stocks without compromising the ecosystem services and keeping in mind the rights of the forest dependent communities . In the Indian context, carbon service from forests and plantations is considered a co-benefit and not the sole benefit under REDD+.

The Forestry sector impacts other sectors and these are in turn impacted by the forestry sector. The policies of rural development, energy, water, tribal affairs, and agriculture sector are important for sustainable forest management and many of these policies are in consonance with the National Forest Policy.

Forest is a concurrent subject under the Constitution of India. Policy and planning is the sole responsibility of the Central government, while role of implementation lies with the state government. Forests in India are primarily treated as social and environmental resources, and secondarily, as commercial resources. Ecological security of the nation is the prime objective, followed by sustenance and livelihood security of forest-dependent communities. Over the years, forests in the country have suffered serious degradation due to unprecedented pressures arising from an ever-increasing demand for fuelwood, fodder, and timber; inadequacy of protection measures; diversion of forest land for non-forest purposes without ensuring compensatory afforestation and essential environmental safeguards; and last but not the least, the tendency to look upon forests as only a source of revenue.

India is one of the countries which has a strong policy and regulatory framework for REDD+. This chapter provides an overview of this framework.

Policies and Acts to Synchronize the Legal Framework for REDD+

The National Forest Policy, 1988 is under implementation with the prime objective of conserving forests to ensure environmental stability and maintain ecological balance, which includes preservation, maintenance, sustainable utilization, restoration, and enhancement of forest carbon stock; these are also the key elements of REDD+. The policy also emphasizes the need to provide sufficient fuelwood, fodder, minor forest

produce and small timber for rural and tribal populations. This is necessary in order to prevent depletion of forests beyond their sustainable limit and also encourage alternatives such as augmenting fuel wood production to meet the increasing gap between demand and supply of fuel wood. The long-term solution for meeting the existing gap lies in increasing the productivity of forests. Since the life of tribals and other marginalized communities living within and near the forest revolves around the forests, the rights and concessions from the forests should primarily be for the bona fide use of these communities and should be fully protected. Their domestic requirements for fuelwood, fodder, minor forest produce and construction timber should have priority over commercial uses. The policy lays down alternative sources of domestic energy like biogas, LPG, solar energy, and fuel-efficient chullas as a measure to reduce the pressure on forests. Social acceptability of these alternative sources depends on several factors; one of which is the availability of funds for the dissemination of these substitutes to the local communities.

Diversion of forest land for any non-forest purpose is subject to careful examination by specialists from the angle of social and environmental costs and benefits. Such projects should provide, in their investment budget, funds for regeneration or compensatory afforestation. The primary task of all agencies including Forest Development Corporations should be to associate the forest-dependent communities closely in the protection, regeneration, and development of forests as well as to provide gainful employment to people living in and around the forests. The policy mandates the development of forest villages at par with revenue villages. The damage caused to the forests from encroachments, forest fires, and grazing should be checked. A forest-based industry should raise the raw material needed for meeting its own requirements, preferably by establishing a direct relationship between the factory and the individuals who can grow the required raw material. Constant technical support, finance, and harvesting and transporting services should also be made available to provide forest-dependent communities with suitable employment opportunities.

The Indian Forest Act, 1927 is an Act which consolidates the laws relating to forests, the transit of forest produce, and the duty leviableed on timber and other forest produce. Section 26 of the Indian Forest Act, 1927 prohibits activities such as making any fresh clearing in Reserve Forests as prohibited by Section 5; or setting fire to a reserve forest; or permitting cattle to trespass; or causing any damage by negligence in felling any tree or cutting or dragging any timber; or felling, girdling, lopping, or burning any tree or tree or striping off the bark or leaves; or quarrying stone, burning lime or charcoal or removing any forest produce; or clearing or breaking up any land for cultivation or any other purpose. According to Section 27, the state government has the power to notify that any forest or portion thereof reserved under the Act shall cease to be a reserved forest, but the rights (if any) which have been extinguished therein shall not revive in consequence of such cessation. Section 28 of the Act focuses on the formation of village forests by state governments, assigning the rights of government to the village community, over any land which has been constituted as a reserved forest. The state government also has the right to cancel such assignment. The forests so assigned are called village forests. The state government may make rules for regulating the management of village forests, prescribing the conditions under which the community, to which any such assignment is made, may be provided with timber

or other forest produce or pasture, and their duties for the protection and improvement of such forests. All the provisions of the Act relating to reserved forests shall apply to village forests. Under Section 29 of the Act, the government can declare any forest land or wasteland as protected forests by notification, and under Section 30 , the state government may notify any tree or part of the forests as reserved for the purpose of conservation. According to Section 32, the state government has the power to make rules for protected forests to regulate matters such as the cutting, sawing, conversion and removal of trees and timber, and the collection, manufacture, and removal of forest produce; the granting of licences to the inhabitants of towns and villages in the vicinity of protected forests to take trees, timber or other forest produce for their own use and the production and return of such licences by such persons; the granting of licences to persons felling or removing trees or timber or any other forest produce from such forests for the purposes of trade; the payments, if any, to be made by persons for the permission to cut such trees, or to collect and remove timber or other forest produce; the examination of forest produce passing out of such forests; the clearing and breaking up of land for cultivation or other purposes in such forests; protection from fire of timber lying in such forests and of trees reserved under Section 30; and the cutting of grass and pasturing of cattle in such forests. Section 36(2) of the Act says that the net profits, if any, arising from the management of such forest or land shall be paid to the said owner. Section 41 of the Act prohibits the import and export of such timber or moving of such timber or other produce without a pass from an officer duly authorized to issue the same, or otherwise gives permission in accordance with the conditions of such a pass. Indian Forest Act, 1927 and Its state specific amendments provides enough provisions for the protection of forests and forest land.

The Forest (Conservation) Act, 1980, came into force with effect from October 25, 1980. Under the provisions of this Act, prior approval of the Central government is essential for diversion of forest lands for non-forestry purposes. In national interest and in the interest of future generations, this Act, therefore, regulates the diversion of forest lands for non-forestry purposes. The basic objective of the Act is to regulate the indiscriminate diversion of forest lands for non-forestry uses and to maintain a logical balance between the developmental needs of the country and the conservation of natural heritage. Guidelines have been issued under this Act from time to time to simplify the procedures, to cut down delays, and to make the Act more user-friendly. The Act has succeeded in controlling the indiscriminate release of forest land for non-forestry purposes. Prior to 1980, the rate of diversion of forest lands for non-forestry purposes was about 1.43 lakh ha per annum. However, with the advent of the Forest (Conservation) Act, 1980, the rate of diversion of forest lands has come down to around 15,000 ha per annum. Diversion of forest land is mostly allowed to meet developmental needs like drinking water projects, irrigation projects, transmission lines, railway lines, roads, power projects, defence-related projects, mining, etc. For such diversions of forest lands for non-forestry purposes, compensatory afforestation is stipulated and catchment area treatment plan, wildlife habitat improvement plan, rehabilitation plan, etc., are implemented to mitigate the ill-effects of diversions of such vast areas of green forests. To monitor the effective implementation of compensatory afforestation in the country, an authority named the Compensatory Afforestation Management and Planning Authority (CAMPA) has been constituted at the national

level. A monitoring cell has been set up in the Ministry of Environment and Forests (MoEF) to monitor the movement of proposals at various stages and the compliance of the conditions set in the forestry clearances by the user agencies (MoEF 2004). This legislation is regulatory in nature. It does not prohibit any non-forestry activity but only after prior approval of Central Government, and also the consent of Supreme Court. The country is targeting 8% economic growth during 12th plan period. The forest land will be required to maintain the economic growth so we have to maintain balance between development and conservation. This legislation provides right kind of regime to maintain forests intact. So it is meeting many objectives of REDD+ in India.

The Biological Diversity Act, 2002 is an Act which provides for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge, and for matters connected therewith or incidental thereto. It reaffirms the sovereign rights of the state over biological resources. Section 2(a) of the Act defines 'benefit claimers' as the conservers of biological resources and their by- products. They are the creators and holders of knowledge and information relating to the use of such biological resources, innovations and practices associated with such use and application. Section 2(b) of the Act defines 'biological diversity' as the variability among living organisms from all sources and the ecological complexes of which they are a part. It includes diversity within species or between species and of ecosystems. Section 2(o) defines 'sustainable use' as the use of components of biological diversity in such manner and at such a rate that does not lead to the long-term decline of the biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations. Section 7 of the Act explains that no person, who is a citizen of India or a body corporate, association or organization which is registered in India, shall obtain any biological resource for commercial utilization, or bio-survey and bio-utilization for commercial utilization except after giving prior intimation to the State Biodiversity Board concerned, provided that the provisions of this section shall not be applied to the local people and communities of the area, including the growers and cultivators of biodiversity, and *vaids* and *hakims*, who have been practicing indigenous medicine. Section 18(1) of the Act lays down the functions and powers of the National Biodiversity Authority (NBA) to issue guidelines for access to biological resources and for fair and equitable benefit sharing. NBA may advise the Central government on matters relating to the conservation of biodiversity, sustainable use of its components, and equitable sharing of the benefits arising out of the utilization of biological resources; advise the state governments in the selection of areas of biodiversity importance which has to be notified under Sub-section (1) of Section 37 as heritage sites and measure for the management of such heritage sites; and perform other such functions as may be necessary to carry out the provisions of this Act. Section 27(2) of the Act provides that the funds under the NBA shall be applied for channelling benefits to the benefit claimers; conservation and promotion of biological resources and development of areas from where such biological resources or knowledge associated thereto has been accessed; and socio-economic development of areas concerned, in consultation with the local bodies concerned. The implementation of this legislation has to be speed-up. The constitution of Biological Diversity Management Committees at the village level is pending in a large number of cases. The capacity of the community is to be built to implement this legislation in the spirit of its preamble.

The Wildlife Protection Act, 1972 was enacted to provide for the protection of wild animals, birds, and plants and for matters connected therewith or ancillary or incidental thereto (Upadhyay and Upadhyay 2002). It extends to the whole of India except the state of Jammu and Kashmir. Section 2(36) of the Act defines a 'wild animal' as any animal found wild in nature and includes any animal specified in Schedule I, Schedule II, Schedule III, Schedule IV or Schedule V, wherever found. According to Section 9 of the Act, no person shall hunt any wild animal specified in Schedules I, II, III, and IV except as provided under Section 11 and Section 12. Section 12 of the Act grants/permits to hunt for purposes such as education, scientific research, and scientific management. Section 17(A) of the Act permits no person to wilfully pick, uproot, damage, destroy, acquire, or collect any specified plant from any forest land or any area specified by notification by the Central government. No person shall possess, sell, offer for sale, or transfer by way of gift or otherwise, or transport any specified plant, whether alive or dead or part or derivative thereof, provided that nothing in this section shall prevent a member of a Scheduled Tribe from picking, collecting or possessing in the district he or she resides any specified plant or part or derivative thereof for his bona fide personal use. According to Section 19 of the Act, the collector shall inquire into, and determine the existence, nature, and extent of the rights of any person in or over the land comprised within the limits of the sanctuary. Section 29 of the Act states that no person shall destroy, exploit or remove any wildlife from a sanctuary or destroy or damage the habitat of any wild animal, or deprive any wild animal of its habitat within such a sanctuary except under and in accordance with a permit granted by the Chief Wildlife Warden, and no such permit shall be granted unless the state government, being satisfied that such destruction, exploitation or removal of wildlife from the sanctuary is necessary for the improvement and better management of wildlife therein, authorizes the issue of such a permit. Section 65 of the Act clearly explains that rights of Scheduled Tribes should be protected. There is regulatory mechanism available in the country to protect endangered flora and fauna under the umbrella of CITES.

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 popularly known as Forest Rights Act,2006, was enacted to recognize and vest forest rights and rights to occupation of forest land to forest-dwelling Scheduled Tribes who have been residing in such forests for generations, but whose rights could not be recorded; to provide a framework for recording the forests rights so vested; and to determine the nature of evidence required for such recognition and vesting in respect of forest land. Section 2(a) of the Act defines 'community forest resource' (CFR) as customary common forest land within the traditional or customary boundaries of the village, or a seasonal use of landscape in the case of pastoral communities, including Reserve Forests, Protected Forests, and Protected Areas such as sanctuaries and national parks, to which the community has traditional access. Section 2(i) of the Act defines minor forest produce as all non-timber forest produce of plant origin including bamboo, brushwood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu leaves, medicinal plants and herbs, roots, tubers, and the like. Section 2(o) of the Act defines Other Traditional Forest Dwellers as any member or community who has for at least three generations prior to December 13, 2005, primarily resided in and who depend on the forest or forests land for bona fide livelihood needs. The Act addresses 13 individual and community rights such as the right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood;

community rights such as *nistar*; right of ownership; access to collect, use, and dispose of minor forest produce; rights for grazing; rights in and over disputed lands; rights for conversion of *pattas* or leases or grants; rights of settlement and conversion of all forest villages into revenue villages; right to protect, regenerate, conserve or manage any CFR; right to access to biodiversity; right to in situ rehabilitation in cases where communities have been displaced without receiving their legal entitlement to rehabilitation prior to December 13, 2005. Under this Act, the Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest-dwelling Scheduled Tribes and OTFDs within the local limits of its jurisdiction. It does so by receiving claims, consolidating, and verifying them and passing a resolution of the same to the sub-divisional level committee (SDLC). If any person is aggrieved by the decision of the Gram Sabha, they can move on to the SDLC and SDLC can pass it further to the District Level Committee for a final decision (MoEF 2010). The Forest Rights Act, 2006 provides tenurial security to live, cultivate, harvest forest produce on sustainable basis and also empowered for community based forest governance. The empowerment of the community for the ownership of minor forest produces under this legislation will enhance the income of forest dependent communities which is key for sustainable forest management.

Judicial Intervention

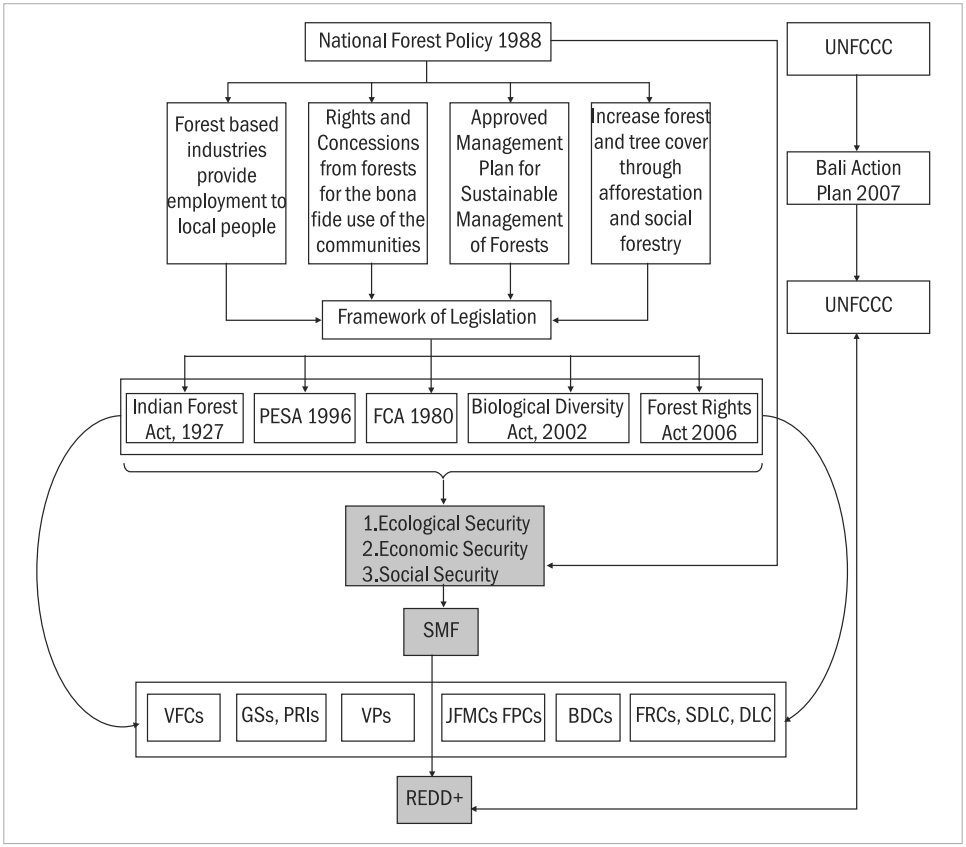
The Godavarman case is the most appropriate description of 'judicial intervention'. It can also be described as an endeavour to refine and re-define forest principles in the Indian context. It represents the single biggest judicial intervention in forest administration in the country (Upadhyay 2009). This judicial activism has impacted all dimensions of policy framework, both at the national and the state level. It is, thus, important to analyse the impact of the judicial pronouncements and interventions on forestry practices and wildlife management in this case. In 1995, T N Godavarman filed a civil writ petition titled Thirumulpad vs. Union of India. The case initially addressed timber felling in the Nilgiri range of Tamil Nadu. The Supreme Court clubbed the Godavarman case with another writ petition with similar issues, and expanded its scope from ceasing illegal operations in particular forests into a reform of the entire country's forest governance and management (Rosencranz and Lele 2008). The most significant order was passed on December 12, 1996. It defined 'forest' for the first time to cover all statutorily recognized forests, whether designated as reserved, protected or otherwise for the purpose of the Forest Conservation Act, irrespective of the ownership of the land. It affirmed that prior approval of the Central Government is required for non-forest activity within the area of any forest. According to Section 2 of the Act, all ongoing activities in the forest in any state of the country require the prior approval of the Central government. This historic definition brought in all the notified and recorded forests under the scrutiny of the Supreme Court. It was expressed that the felling of trees in all forests was to remain suspended except in accordance with the Working Plans of the State Governments, as approved by the Central government. Over the last 15 years, the Apex Court has followed the strategy of continuous mandamus and evolved several methods to deal with the case such as appointment of amicus curiae, forming an expert committee to deal with fact finding and quasi-judicial matters. The most important impact of the case was the formation of a Central Empowered

Committee (CEC) in 2002 for monitoring the implementation of the Apex Court's orders. The most important challenge faced by the judiciary was the enforcement of the Forest Conservation Act (FCA) in equilibrium with the commercial interests ecological concerns, without undermining the principles of sustainable development. This has evolved the concept of Net Present Value (NPV) in the context of use of forest land for non-forest activities. This NPV is charged at the time of diversion of forest land for non-forestry purposes in addition to 'compensatory afforestation', which is the mandatory requirement under the FCA. Another issue that emerged before the Apex Court was the issue of non-utilization of money collected by the state on account of compensatory afforestation, after which the Compensatory Afforestation Fund was formed in 2004. Other issues that became the focus of the Apex Court include illegal timber extraction, issuance of transit passes, encroachment, buffer area, investigation into tiger poaching, temporary working permits, mining, etc. (Upadhyay 2009). A further issue is the exploitation of forests by forest-based industries such as saw mills, veneer mills and plywood mills. The Court has directed that all unlicensed wood-based industries be closed over the country and that the CEC's permission shall be required for opening any new wood-based industry all over the country. The Apex Court also mandated the constitution of a Forest Advisory Committee under Forest Conservation Rules, 2004. In the Lafarge case judgement, the Supreme Court stated that policy implementation should also be monitored along with monitoring of the implementation of legislations. The Apex Court has also widened the scope of the definition of forests to include forest-like areas.

Conclusion

India has an adequate legal and policy regime in the country to implement REDD+. Indian Forest Act, Wildlife Protection Act and Biological Diversity Act provide an effective regime for the protection of forest wildlife and biodiversity. The Forest Conservation Act, 1980 maintains balance between development and conservation while the Forest Rights Act, 2006 assigns occupation and habitation rights to the people who are residing primarily in forests and depend on forests for their bona fide livelihood, The Forest Rights Act, 2006, empowers communities with tenurial rights to live, cultivate, and access forest produce, and provides a means for community-based forest governance. It also empowers communities to protect, regenerate, and conserve Community Forest Resources (CFR). The big question is how can communities protect CFR without legal empowerment when the Forest Department is protecting the forest and wildlife of the country with the help of the Indian Forest Act, 1927, and the Wildlife Protection Act, 1972. Forest officers have the legal power to protect forests and wildlife. It would be unfair to expect communities to conserve forests and wildlife without empowering them. The Biological Diversity Act, 2002, and the Forest Rights Act, 2006, accepts the concept of sustainable harvest of forest produce. However, the mechanism to achieve sustainable harvest is lacking. India has many laws and policies to implement sustainable forest management and enhance livelihood of the people living in and around forests. The state governments have not however taken sufficient initiative to apprise the community of these laws and policies. The Supreme Court is also taking measures towards conservation of forest through its various judgements. The approach of the Supreme Court will be more effective if its orders are merged with poverty alleviation programmes. Forest degradation cannot be checked without alleviating poverty.

In a word, the legal and policy regime needs to be backed up by efforts to empower communities to reap the benefits of the regime. In the REDD+ context, such efforts would go a long way in ensuring that the objectives of forest conservation and livelihood enhancement maintain a healthy relationship of complementarity - a theme that is explored further in Chapter 5. The appropriate legal and policy arrangement for REDD+ is given below:



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CHAPTER 4

Institutional Framework for Implementing REDD+ in India

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Introduction

Forests in India have always held a special place in the socio-economic, cultural, and religious facets of Indian society. Though blessed with diverse forest resources that support a rich diversity of flora and fauna, the geographical distribution and quality of forests is not uniform in India. India has 78.29 million hectare (Mha) under forest and tree cover (Forest Survey of India, 2011) which is 23.81 per cent of the total geographical area of the country. Of this total, forest cover constitutes 69.20 Mha (21.05 per cent), whereas tree cover is 9.84 Mha (2.76 per cent).

However, improving the quality of forest cover is a major concern today in terms of density classes, since very dense forest covers, having canopy density more than 0.7, constitutes only 8.347 Mha (2.54 per cent), and medium-density forests with canopy density of 0.4–0.7, constitute 32.07 Mha (9.76 per cent). The remaining forest cover is open forest or scrub which requires to be rehabilitated. India's forests are facing immense pressure due to unsustainable use of forest produce. Poverty and forest degradation are inextricably linked and curbing forest degradation requires convergence of various poverty alleviation policies and schemes. The role of local communities is vital in not only addressing the drivers of forest degradation but also enhancing carbon stock through conservation, protection, and reforestation. The carbon stock of Indian forests in 2004 has been estimated by the Forest Survey of India (FSI) to be 6,663 metric tonnes (FSI, 2011). Carbon stock in India's Forests has increased by 592 metric tonnes from between 1994 and 2004,but it can be increased significantly through the involvement of local communities. The institutional mechanism for REDD+ will leverage on the strengths of the existing forest management system in the country while also ensuring sectoral integration and inter-departmental coordination to address some of the key drivers of deforestation and forest degradation in the country.

Forest Management

The scientific management of forests in the modern era that dates back to 1864 started with the appointment of a German forester, DE Brandis, as the first Inspector General of Forests of the country, which subsequently led to the setting up of Forest Departments (FDs) across India. Thereafter, the process of large-scale survey of forests, preparation of working plans, and development of essential infrastructure started. Under the then prevailing socio-economic and technical situation, forests were viewed predominantly as

a revenue-generating resource for meeting the growing demand of timber for expansion of railways, shipping, and building other infrastructure. As a result, more emphasis was laid on harvesting of timber from forests on a commercial basis. However, the 1988 National Forest Policy brought in a major shift and enunciated that the principle aim of forest policy was to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for the sustenance of all life forms — human, animal, and plant. The derivation of direct economic benefit must be subordinated to this principal aim. However, removals from forests continued to occur in order to meet the increasing demand for forest goods and services. Inadequate investment in managing this unique and renewable resource, contributed to deforestation and degradation pressures.

Policy and Regulatory Framework

Since the 1860s, Indian forests have been managed on the principle of sustained yield of timber. A number of policies, legal and administrative measures were introduced over the years keeping space with changing socio-economic conditions and recognition of the role of 'forests'. India adopted its first National Forest Policy in 1894, which was subsequently revised in 1952 and again in 1988. Similarly, forest legislation in India dates back to 1865, when the first Indian Forest Act (IFA) was passed. Since then, the Act has been amended several times and has led to the IFA of 1927, which is still applicable with state-specific amendments in some states, wherein some states have enacted their own Acts based primarily on the IFA, 1927. Later on, several other legislations including the Wildlife (Protection) Act, 1972; Forest (Conservation) Act, 1980; the Environment Protection Act, 1986; and the Biological Diversity Act, 2002, were promulgated which, along with the Indian Forest Act, 1927, or the State Forest Acts, constitute the basic legislative framework for forestry, wildlife, and biodiversity. India has a multi-tier forest administration system comprising the Indian Forest Service constituted in 1966 under the All India Services Act, 1951, by the Government of India supported by State Forest Services and Forest Rangers, and frontline forestry personnels — the foresters and the forest guards — who have a reach in to the remotest and most interior parts of the country. The main mandate of these forest services is to protect, conserve, and manage forest and wildlife resources of the country by ensuring Sustainable Forest Management[1] for various products and services under the policy and legal framework.

Local Communities and Participatory Forest Management

The intricate relationship between local communities and forests, based on the principle of co-existence, is integral to the conservation and sustainability of ecological systems. The people living in and around forests have been dependent on forests for their sustenance and livelihoods and have traditionally played a significant role in the conservation of

[1] *The term 'Sustainable Forest Management (SFM)' has been agreed upon under the umbrella of forest-related international instruments such as the Forest Principles (adopted at UNCED 1992) and the Non-legally Binding Instrument on All Types of Forests (adopted at the UN General Asembly 2007). The term 'Sustainable Management of Forests (SMF), though agreed upon in the REDD context, is yet to be defined adequately at the international level. In the Indian context, SFM and SMF could be used interchangeably until a specific definition of SMF is agreed upon.*

forests. The National Forest Policy, 1988, has recognized this symbiotic relationship between the tribal people and forests and advocated association of communities living in and around forests, including tribals, towards the protection, regeneration, and development of forest as well providing gainful employment to local people. Considering the fact that life of tribal and other people living within and near forests revolve around forests, the policy stressed that the domestic requirements of fuel wood, fodder, Minor Forest Produce, and construction timber should be the first charge on forest produce.

Joint Forest Management (JFM) was started formally in 1990, as a participatory forestry programme based on the principle of care and share, and has taken roots in the country with over 1,00,000 Joint Forest Management Committees (JFMCs) covering more than 20 Mha of forests. This has formalized and strengthened the partnership between local communities and the FD in forest management.

Institutionalizing REDD+ in India

India has a long history of scientific forest management, spanning over a century. This resulted in the formulation of a robust legal and regulatory framework and a formalized system of forest governance. Over the years, India has also built the technical capability for assessing its forest and tree cover; the Forest Survey of India (FSI) (along with its zonal offices) has been carrying out national forest carbon stocks accounting for the country. The FSI has also been publishing a series of biennial assessment reports on the state of the forest cover in India since 1987. India is one of the few tropical countries where forest cover has stabilized over the years. A strong policy and legal framework with due recognition of the rights of local forest-dependent and tribal communities over forest resources has been a significant contributing factor. Policy and legal instruments in the form of JFM programmes and provisions under Forest Rights Act 2006 and Biological Diversity Act, aim at safeguarding and ensuring the rights of the tribals and forest dwellers while enabling the local communities to be key players in local-level governance of the natural resources. JFM has been fairly successfully involved communities in protection and management of forests and has recently been integrated into more democratic organizations of local governance like the Gram Sabha. Today, JFM is gradually evolving into JFM+ by strongly incorporating the livelihood concerns of the forest dependent communities along with protection and management of forests.

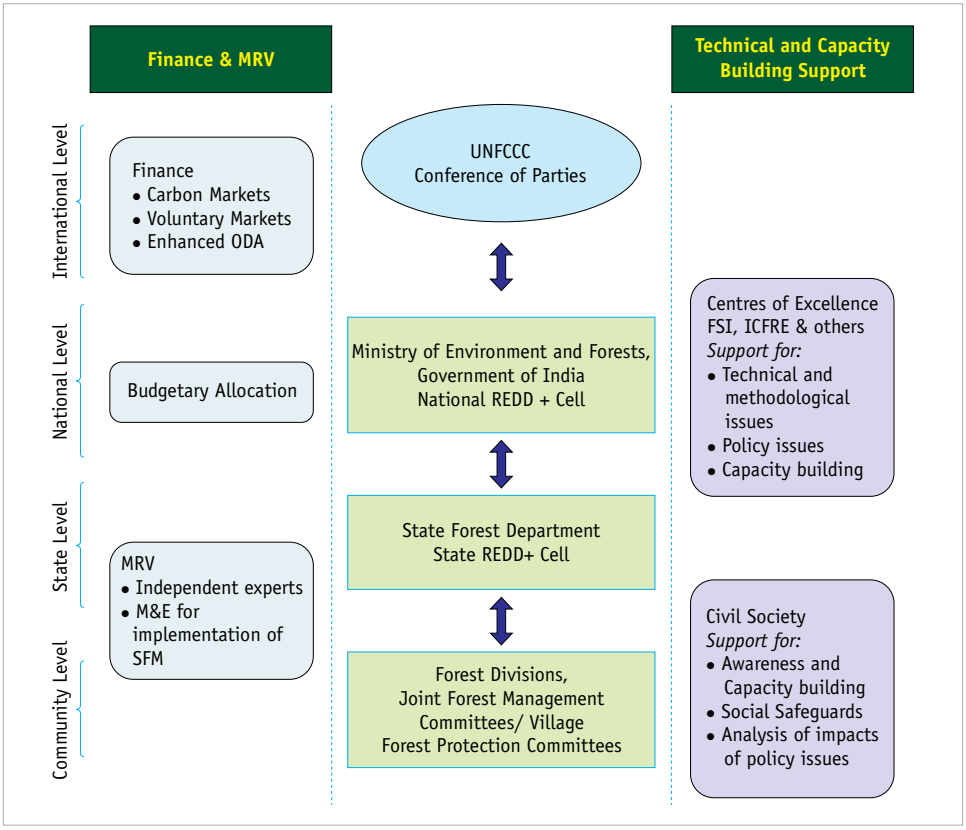
The broad institutional framework for implementing REDD+ is already in place. However, to be eligible for REDD+, a system need to be place for Forest Carbon Accounting (FCA), Monitoring, Reporting and Verification (MRV), social and environment safeguards among other specifications. The institutional mechanism and the governance structure needs to be strengthened by enhancing capacity for operationalizing REDD+.

REDD+ will not only help addressing capacity gaps under the current forest management system but most importantly would benefit the local forest dependent communities. The financial incentives generated through carbon added or carbon saved will supplement the incentives already derived by JFMCs through the harvesting of Non-Timber Forest Produce (NTFP) and would help support livelihoods of communities and contribute to overall socio-economic development besides. The incentives received from REDD+ are to be passed on to the local communities involved in protection and management of the forests to ensure sustained protection of India's forests. India's submission to the UNFCCC/Ad hoc Working Group on Long-term Cooperative Action (2011)

states its commitment to transfer the REDD+ benefits to the local, forest-dependent, forest-dwelling, and tribal communities that are contributing to forest conservation and enhancement of forest carbon stocks.

Institutional Arrangement

In accordance with the Forest Principles that were agreed upon during the Earth Summit in 1992, the REDD+ architecture that is being discussed at the international level, takes cognizance of the sovereign rights of the nations to design and implement nationally appropriate policies and measures. The institutional mechanism at the international level, while providing overall oversight for REDD+ mechanism, will incentivize measurable actions on REDD+ that are in accordance with the principles of the United Nations Framework Convention on Climate Change (UNFCCC). Therefore, the Conference of Parties (COP) to the UNFCCC needs to have provisions for balanced representation from both developed and developing country parties to ensure transparency, equity, and accountability in the decision-making process. At the national level, a planned and coordinated approach with active stakeholder engagement will help develop technically



Notes : M&E : Monitoring and Evaluation
FD : Forest Department
ICFRE : Indian Council of Forestry Research and Education
IIRS : Indian Institute of Remote Sensing

sound and locally relevant strategies. The National REDD+ Cell set up at the Ministry of Environment and Forests (MoEF) will play a key role in the design and implementation of REDD+ strategies at the national and subnational level which are in consonance with the international framework. The National REDD+ Cell will coordinate and guide REDD+ related actions at the national level, and engage with the State FDs to collect, process, and manage all relevant information and data relating to FCA. It would also help identify REDD+ opportunities in different regions and work with State FDs for REDD+ project development. The Cell would also assist MoEF and its affiliated agencies in developing and implementing appropriate policies relating to REDD+ implementation in the country, mobilizing and disbursement of resources, and will engage with centres of excellence to provide technical guidance and support to the states, as required. The Cell would also actively participate in the deliberations of the UNFCCC on REDD+.

A State REDD+ Cell could be set up in the State FD (SFD) for overseeing the project preparation and implementation by the Joint Forest Management Committees (JFMCs) or Village Forest Protection Committees (VFPCs). It shall also be responsible for ensuring that projects are designed in compliance with the national guidelines and are eligible for financing. In addition, the State REDD+ Cell shall organize training and capacity-building seminars and workshops for officials of the SFD and village level institutions through Forest Divisions which will be the main implementing agency for REDD+ programmes on the ground. The village-level forest governance unit shall be responsible for REDD+ project formulation. The JFMCs and VFPCs could directly be involved in the implementation of REDD+ projects under the technical guidance of the Divisional Forest Officer concerned or his representatives. The Gram Sabha will be the central body to constitute the JFMC for conservation, protection, and management of forests, with benefit sharing from forests on the principle of sustainable harvests as laid down in the management plan of the respective area within their jurisdiction. The FD shall provide technical guidance to the Gram Sabha, and also monitor implementation of the management plan. MRV of the REDD+ projects shall be carried out by independent experts not involved in any of the processes of preparing the forest carbon stocks inventory. For conducting the evaluation, they will be supported by the National and State REDD+ Cell. The data on changes in forest carbon stocks for estimating forest degradation can be collected using Remote Sensing (RS)/Geographic Information System (GIS) techniques along with required ground truthing (actual measurements on the project site). To ensure transparency, provisions will be made to involve and engage local communities, civil society organizations, and other stakeholders, who will be trained by the FSI and FD on technological, methodological, policy, and financial aspects of MRV processes and procedures. For measuring the forest carbon stock, the FSI can empanel organizations for carrying out monitoring activities at the state level and validation of this information can be done by the FSI. For other ecosystem services, a set of indicators can be developed that can be monitored to adequately address the issue of safeguards. The MoEF may designate centres of excellence to support both national as well as state REDD+ Cells. These centres of excellence will provide capacity-building support and perform other facilitating functions as may be required. Involvement of grass roots or civil society organizations will also help raise awareness on the issue among forest-dependent communities.

Strengthening the Local-level Institutions

Local institutions play an enormously significant role in forest conservation and its sustainable utilization of forest resources. They also have the local acceptance that is essential for policy uptake. The institutions dealing with forests at the local level are JFMCs (known by different names in different States), Van Panchayats (Uttarakhand), traditional village-level institutions or Village Councils (Schedule VI area); and Biodiversity Management Committees, Forest Committees set up under Rule 4 of the Forest Rights Act, etc. In addition, Self Help Groups (SHGs) or Common Interest Groups (CIGs) have also been set up at the village level to promote forest-based livelihood activities. Since JFMCs have certain limitations such as tenurial insecurity, inadequate silvicultural development, restricted harvesting, lack of legal back up and market access, therefore they need to work in coordination with the Gram Sabhas or Panchayati Raj Institutions (PRIs). The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, empowers Gram Sabhas with the ownership of Minor Forest Produce and the responsibility to set up institutions to see that the individual and community forest rights are strengthened.

Village-level institutions for protection and management of forests with technical guidance from the FD need to be set up by the Gram Sabhas. This would not only help in strengthening the Gram Sabha, but would also help in necessary convergence of resources and integrated planning for implementing REDD+ at the village level that would surely benefit all stakeholders. Leadership provided by the committees of the Gram Sabhaand the SHGs would contribute to strengthening of the Gram Sabha.

REDD+ has to be implemented without undermining the needs of the local forest-dependent communities, however, this has be based on the principles of sustainability. Livelihood activities and enterprises as well as protection of forests have often been effectively addressed at the cluster/sub-landscape level, led by product-based federations of SHGs and CIGs working as livelihood promotion groups, which need to be encouraged and facilitated along with village-level committees including JFMCs/Van Panchayats/ Biodiversity Management Committees for forest protection, conservation, and livelihood activities in forest fringe areas. Therefore, the JFMC, as a committee of the Gram Sabha, needs to be strengthened and appropriately empowered to protect and manage forests as well as act as the primary agency for implementing REDD+. This will necessitate a review of the structure and role of the Forest Development Agencies (FDA) to make them Forest Division level institutions, contribute to decentralized forest governance, and provide valuable services for forest conservation and improving livelihoods of people living in and around the forests. This would further help achieve poverty eradication objectives while enhancing carbon sequestration potential. The function of the FDA will be to facilitate demand-based and inclusive (participatory) planning and implementation of forest conservation and community development activities by the local bodies mandated by Gram Sabha. It will need to create partnerships with local NGOs/CBOs, academia, PRIs, research and training organizations, people's representatives, media, and government line agencies to carry out its function and to strengthen forest governance. In order to carry out the above functions on ground, the FDA,as an institution would need to be strengthened with appropriate capacity building through a well thought out institutional arrangement, and adequate infrastructural support.

The FD in collaboration with other line departments, like Tribal Welfare, Panchayati Raj, Social Welfare, Rural Development, Education, and Electricity should take up programmes for capacity building of the local community institutions as a long-term measure to help them effectively implement REDD+ and commence forest-based livelihood enterprises.

SFM will require good skills and knowledge in inventorization, adaptive silvicultural practices, and sustainable NTFP harvesting and monitoring of impacts. Traditional knowledge, forestry science, and Information and Communication Technology will promote capacity-building initiatives. The State FDs would act as an 'enabler' in addition to its statutory role in protection and management of forests and to ensure compliance with technical prescriptions of REDD+ with the active role of local communities. The State FDs have to prepare themselves for a new role which is more inclusive, facilitative, development centric, educative and supportive to local communities in enhancing forest resources, with a proactive role of the MoEF, Government of India. The engagement of community institutions in facilitating field actions will require sensitization of the FD officials and frontline staff. Capacity building of frontline staff, on a regular basis, to carry out the emerging role will have to be given high priority. Teams of subject-matter specialists at the level of revamped FDAs could bring in new knowledge and skills.

Conclusion

In addition to the institutional mechanism being negotiated at the international level, implementing REDD+ at the ground level needs to be backed by strong institutional support at the national, state, and local level. The entities that will be implementing REDD+ activities at different levels need to function in a well-coordinated manner in order to take decisions and incentivize actions that are in alignment with the national policies and internationally agreed objectives. Achieving the desired results requires adequate capacity support in terms of dedicated professional staff, technical base as well as provision of adequate financial resources.

Frequent and focused trainings can be organized for local institutions on cross-cutting issues and resource management highlighting their role as facilitating agencies. Orientation programmes on REDD+ could be made mandatory for in-service candidates, officials from various sectors and community foresters. A mechanism by means of which regular technical guidance can be provided to officials of the FD and local-level institutions needs to be established by MoEF.

National-level institutions that have been working in the forestry sector and which can support REDD+ activities need to be identified and strengthened. These can play an important role in providing the required technical inputs and undertaking capacity-building exercises on issues such as MRV, safeguards, assessment of carbon stock among others.

An inter-departmental coordinated approach is required to address the various drivers of deforestation and forest degradation that lie outside the forestry sector as well as cater to the concerns of different stakeholder groups. This demands coordinated efforts by all sectors to align their policies and activities by means of mandates, procedures and capacity to meet such accountabilities. This will also ensure that the actions under existing policies and programmes of various departments that have linkages and overlaps are suitably modified/strengthened for realization of goals under SFM. The local forest dependent communities would be central to the implementation of REDD+. It is a

statutory requirement under the FRA to have Gram Sabha based forest governance. Also, the Green India Mission document states that committees set up by the Gram Sabha under FRA will be centrally engaged for implementation of Mission. Similarly, the Gram Sabha will be the overarching village-level institution to oversee and implement REDD+. The FD along with the local-level forest governance units will play a key role in sensitization and capacity building of the local people so they can reap maximum benefits from forest conservation activities in their area. The Gram Sabha and JFMCs with technical support from the FD are principal agencies in decentralized management of forests. These institutions need to be strengthened for effective decision making and planning to be inclusive and responsive to the needs of the local communities for the design of the REDD+ architecture.

The FD at the district level will provide the Gram Sabha with technical, monitoring, and legal support. The State REDD+ Cell will function as a link between the district-level authority and the National REDD+ Cell to incentivize measurable action at the field level. The National REDD+ Cell will engage at the international level to ensure that the REDD+ activities undertaken at the national level are in accordance with the principles agreed under the Framework Convention on Climate Change and are eligible for international support.

While in the REDD+ readiness phase, fund-based mechanism for REDD+ projects is recommended for supporting REDD+ activities, but later possibilities of a market-based mechanism could also be explored. The Green India Mission may present an opportunity to have a fund-based mechanism for financing REDD+ projects. Financial assistance may be provided to communities for preparing the baseline and later their efforts in forest conservation can be compensated on the basis of assessment of carbon stock and implementation of SFM.

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CHAPTER 5

Livelihood of Forest-dependent Communities and Sustainable Forest Management

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Introduction

India's current forest and tree cover, constituting 23.81 per cent of the geographical area of the country, is estimated to be 78.29 million hectare (Mha) (Forest Survey of India 2011). Forest cover alone amounts to 69.20 Mha, against the recorded forest area of 76.95 Mha. Of the total forest cover, 12.06 per cent is very dense forest (more than 70 per cent crown density), 46.35 per cent is moderately dense forest (40 per cent to 70 per cent crown density), and the remaining 41.59 per cent is open forest (10 per cent to 40 per cent crown density). According to the India State of the Forest Report (ISFR) (2011), forest cover has declined by 367 sq km compared to the forest cover in the preceding ISFR in 2009. The tree cover outside forest areas is assessed to be at 9.7 Mha, and has recorded an increase over the last few assessments, indicating a rise in green cover in non-forest land in the country.

According to ISFR 2011, there are many states and Union territories that have shown an increase in their forest cover. This may be attributed to reasons such as management interventions like harvesting of short rotation crops followed by new regeneration/ plantations, shelter belt plantations in tsunami affected areas, effective protection by village forest protection committees, and regeneration of forest areas. On the other hand, there are some states that have shown a decrease in the forest cover mainly due to illicit felling, encroachments in insurgency affected areas, shortening of shifting cultivation cycle, and biotic pressure. Forest cover in the country has more or less stabilized since the 1980s. According to the estimates of the Forest Survey of India, forest cover has increased from 64.08 Mha in 1987 to 96.2 Mha in 2011. The enactment of proactive forest conservation policies and changes in management approaches from 'timber' to 'forest' ecosystem during the last few decades have curbed deforestation, and promoted conservation and sustainable management of forests. The enforcement of the Forest Conservation Act, 1980 enabled the regulation of widespread diversions of forestland for non-forest uses, and hence put a check on deforestation.

However, forest degradation is quite evident from the low level of growing stock in Indian forests and declining trend of dense forests in the country. The growing stock per hectare of forest area according to both the 2009 and 2011 ISFRs is estimated to be around 58.46m3/ ha of forest area. This is far below the global average of 130.7 m3/ha and the South and Southeast Asian average of 98.6m3/ha for the corresponding period (FAO 2010). More

than 40 per cent of the forests in country are degraded and under-stocked (Aggarwal et al. 2009; Bahuguna et al. 2004). The National Forest Commission Report 2006 indicated that around 41 per cent of the total forest in the country is already degraded, 70 per cent of the forests have no natural regeneration, and 55 per cent of the forests are prone to fire (MoEF 2006). As far as the trend of change in dense forests is concerned, it has remained very moderate as compared to changes in open forest (see Table 5.1). For some assessment years, the change has been negative to the preceding assessment too. For instance, the moderately dense forest has declined by 936 sq.km from 2005 to 2007. However, the forest cover assessment exercise hardly reflects the extent of forest degradation and the data often are not comparable due to differential methodologies in different assessment years (Davidar et al. 2010).

Table 5.1: Change in Forest Cover 1991–2011

State of Forest report (year)	Dense (40% and above crown cover) forest (in sq. km)	Open (10% to 40% crown cover) forest (in sq. km)	Total forest cover (in sq. km)
1991	385,008 (60.64)	249,930 (39.36)	634,938
2001	395,169 (60.43)	258,729 (39.57)	653,898
2011	404,207 (58.41)	287,820 (41.59)	692,027
Change from 1991 to 2011	19119	37890	57,089

Note: Figures in parenthesis are percentage to total forest cover
Source: Various issues (1991, 2001 &2011) of India State of the Forest Report

The factors affecting forest degradation in India include the following:

- Critical livelihood–forest linkage of a huge forest-dependent population (FSI 2011; Davidar et al. 2010);
- Demand and supply gap of forest products resulting in exploitation beyond the forest's carrying capacity (Aggarwal et al. 2009);
- Forest fires, over-grazing, illegal felling, and diversion of forest land—both permitted and illegal for non-forest uses due to competing land demand for developmental and other purposes (FSI 2011; Davidar et al. 2010; Aggarwal et al. 2009; MoEF 2009; IIASA, 2009; MoEF 2006, Bahuguna and Upadhaya, 2002).
- Unsustainable harvest of fodder, fuelwood and minor forest produce.

In the forested landscapes of India, the livelihoods of the people living close to forest and within the forests are inextricably linked to the forest ecosystem. People depend on a variety of forest products for food, fodder, agriculture, housing, and an array of marketable minor forest produces which can potentially degrade forests if harvested unsustainably. Field-based studies assessing the pattern of collection of these forest products and its impact on local forest have found that local livelihood dependence on the forest results in degradation (Davidar et al. 2010; Mishra et al. 2008; Puyravaud et al. 2005; Arjunanet al. 2006;Arjunan et al, 2005; Sagar and Singh 2004; Maikhuriet al. 2001; Silori and Mishra 2001). Hence, along with other factors, the livelihood concerns of the millions of poor people living in and around forest can potentially result in more forest degradation.

Livelihood of Forest-dependent Communities and Its Impact on Forest Carbon Stock

India has a huge population living close to the forests with their livelihoods critically linked to the forest ecosystem. There are around 1.73 lakh villages located in and around forests (MoEF 2006). Though there are no official census figures for the forest-dependent population in the country, different estimates put the figure as ranging from 275 million (World Bank 2006) to 350–400 million (MoEF 2009). People living in these forest-fringe villages depend upon the forests for a variety of goods and services. These include collection of edible fruits, flowers, tubers, roots and leaves for food and medicines; fuelwood for cooking (some also sell wood in the market); materials for agricultural implements, house construction, and fencing; fodder (grass and leaves) for livestock and grazing of livestock in forest; and collection of a range of marketable non-timber forest products. Therefore, with such a huge population and an extensive dependence pattern, any over-exploitation and unsustainable harvest practice can potentially degrade forests substantially. Moreover, a significant percentage of the country's underprivileged population lives in its forested regions (Saha and Guru 2003). It has been estimated that more than 40 per cent of the poor of the country are living in these forest-fringe villages (MoEF 2006). Apart from this, a significant percentage of India's tribal population lives in these regions. Several field-based studies have documented the adverse impact of such a dependence pattern on the forest quality.

The forest-fringe communities not just collect these forest products for their own consumption, but also for commercial sale, which fetch them some income. The income from the sale of forest products for households living in and around forests constitutes 40 to 60 per cent of their total income (Bharath Kumar et al. 2011; Sadashivappa et al. 2006; Mahapatra and Kant 2005; Sills et al. 2003; Bahuguna 2000). A study by Saha and Sundriyal (2012) on the extent of NTFP use in North–east India suggests that tribal communities use 343 NTFPs for diverse purposes like medicinal (163 species), edible fruits (75 species), and vegetables (65 species). The study also found that all the households in the study area depend on local forest for fuelwood and house construction materials and NTFPs contribute 19 to 32 per cent of total household income (Saha and Sundriyal 2012). Forests are not only a source of subsistence income for millions of poor households, but also provide employment to the poor in these hinterlands. This makes forests an important contributor to the rural economy in the forested landscapes of the country. Widespread poverty and lack of other income generating opportunities often make these people resort to over-exploitation of forest resources.

The collection of fuelwood for sale in the market, though illegal, is also extensive in many parts of the forested regions in the country and constitutes the source of livelihood for a significant proportion per cent of the population (IPCC 2007). However, many other forest products have been sustainably harvested by local communities for many years, and are a constant source of household income. Agriculture and livestock are two other major sources of livelihoods in the forest-fringe villages. These in turn depend extensively on the forest for various inputs. People rear both bovine and ruminant livestock, and forests and other local common land are the major source of grass and tree fodder. Open grazing in the forest is the conventional rearing practices for forest-fringe communities and this has an adverse impact on growing stock as well

as the regeneration capacity of forest when there is over-grazing. The estimates of the Indian Council for Forestry Research and Education (ICFRE) (2001) suggest that India's forests support 270 million cattle for grazing against its carrying capacity of 30 million. The incidence of grazing is estimated to be affecting 78 per cent of India's forests, of which 18 per cent are highly affected with the remaining 31 and 29 per cent, medium and low, respectively (World Bank 2006; MoEF 2006). The large livestock population also results in a huge collection of tree fodder, which affects the forest quality adversely. The annual requirement of dry and green fodder is estimated to be 569 metric tonnes and 1025 metric tonnes, respectively against the availability of 385 metric tonnes and 356 metric tonnes (Roy and Singh 2008). This explains the pressure on India's forest from the livestock sector and its contribution to the state of degradation of forests in human dominated landscapes of the country. Agricultural systems in the forested regions also inextricably relate to the forest ecosystem. Farmers collect small timber, poles, and other materials from forest for agricultural implements and house construction, branches for fencing agricultural fields, leaf litter for manure, herbs, and medicinal plants to deal with pests, and so on. The agriculture in this region is predominantly subsistence, and crop production is highly vulnerable to weather conditions and wildlife attack. All such dependence does not affect the forests as long as these resources are extracted sustainably and well within the regeneration or carrying capacity of the forests.

Shifting cultivation that is still being practised in some regions of the country contributes to forest degradation. With increased crop cycles and declining fallow period in shifting cultivation practices in recent decades, the impact of traditional agricultural practice is more severe. Different estimates for the area under shifting cultivation ranges from 5 Mha to 11.6 Mha involving 3 to 26 million people in 16 different states of the country (MoEF 2006). The practice is more prominent in the north-eastern states of the country.

REDD+ and Livelihood of the Forest-dependent Communities

REDD+ is a financial instrument to incentivize conservation and sustainable management of forest and thereby reduce GHG emissions from deforestation and forest degradation. It aims at compensating forest owners in developing countries for conserving their forests by putting a value on the forest carbon stocks—one of the ecosystem services that forests provide. REDD+ aims at compensating the countries conserving forests as they forgo the economic gain of harvesting them as well as the benefits from alternative land use. This apart, conservation and sustainable management of forest imposes enormous costs - both direct and indirect, for its strong livelihood linkages in many forest-rich countries. REDD+ also aims at facilitating a process where other countries share the costs involved as forests provide a range of offsite ecosystem services that benefits all. The idea of REDD+ is based on the premise that any financial mechanism to compensate some of these costs by developed countries would encourage sustainable management of forest in developing countries. Decentralized forest management through devolution of power to local communities is one of the important components of sustainable management of forests under the REDD+ regime. Besides this, REDD+ will also improve the livelihoods of forest-dependent communities by adding value to the collected forest produce that would enhance income and employment opportunities for the local people. Assigning monetary value to the enhanced carbon stocks in the forest could incentivize forest conservation

and management. Since 75 per cent of forest-based income is from NTFPs (MoEF 2009), NTFP enterprises can contribute significantly to livelihood enhancement in forested areas. The two main barriers recognized in NTFP management are lack of sustainable harvesting practices and problems of NTFP productivity. To resolve these issues, the Government of India would support technology for value addition, certification, and improved marketing of NTFP. Further, sustainable management of forest safeguards the forests for the future generation. Unsustainable harvest of NTFP is key factor for forest degradation. Many pilot studies indicate that the unsustainable harvest of forest produce in quantity and the use of unsustainable techniques are the major reason for forest degradation.

Addressing Forest Degradation

Globally, there is no standard definition of forest degradation. It is a complex process and has several drivers, which pose a great challenge to checking the problem of degradation. The IPCC Special Report on 'Methodological Options to Inventory Emissions from Direct Human Induced Degradation of Forests and De-vegetation of Other Forest Types' defines degradation as a 'direct human induced long-term loss of at least Y % of forest carbon stocks since time T and not qualifying as deforestation'. Given the widespread dependence of a huge population on forests for subsistence, arresting forest degradation involves designing and implementing strategies that create alternative livelihood opportunities and reduce their dependence on forest-based activities. The livelihood requirement of the people fully and partially dependent on forest varies, and this needs to be taken into consideration while designing strategies. Unsustainable harvesting and extraction of fuelwood should be substituted by promoting alternative energy sources like biogas, solar energy (solar lanterns and solar street lighting), and improved cookstoves. The expansion of provisions for cleaner cooking fuels such as LPG in rural areas will help to reduce pressure on forests for fuelwood and enhance carbon stocks. The Government of India has proposed to provide 10 million households (in 0.1 million villages in forest conservation areas) with improved stoves (over 30 per cent wood saving). This would lead to a saving of 2 million tonnes of fuelwood every year amounting to a reduction of 3.6 Mt of CO_2 emissions per year.

Filling the Gap of Demand and Supply of Forest Products

India's huge population contributes to the large demand base of forest products. With limited forest cover, the supply of forest products does not match the demand, and hence there is a substantial gap (Tables 5.2 and 5.3). This gap often drives the over-exploitation of forests. There has been different estimates of the demand and supply of major forest products. The estimates by TERI (Aggarwal et al. 2009) put the demand–supply gap for fuelwood, fodder, and timber at 100, 853, and 14 MT respectively (see Table 5.2).

The IFSR 2011 made a comprehensive estimation of consumption of woods by commercial and household sectors for various purposes. It also estimated the production potential of woods from forest sources as well as from trees outside forests (see Table 5.3).

The total annual consumption of wood for construction and furniture—both in commercial and the household sectors are estimated to be 48 million m3 in Round Wood Equivalent (RWE). However, the total production of timber stands at 45.95 million m3, showing a gap of 2.05 million m3 annually (Forest Survey of India 2011). Of the total production

Table 5.2: Demand and Supply Gap in Various Forest Products

Forest products	Demand	Sustainable supply (in million tonnes)	Gap/Unsustainable harvest (in million tonnes)
Fuelwood	228	128	100
Fodder (green and dry)	1594	741	853
Timber	55	41	14

Source: Aggarwal et al. 2009

Table 5.3 Consumption and Production of Forest Products

Forest products	Consumption	Production
Wood (RWE in m cum)	48	45.95
Fuelwood from forests (million tonnes)	58.47 (27.14)*	19.254#
Livestock dependent on forest (in million)	199.58 (38.49)**	

Source: Forest Survey of India (2011)
Note: Percentage of the total fuelwood consumed,*
*** Percentage of the total livestock in the country, Annual availability of fuelwood from trees outside forests (TOF)*

of 45.95 million cum, the production of timber from forests are estimated to be 3.175 million cum, whereas the annual potential production of timber from trees outside forests (TOF) is estimated to be 42.774 m3. Fuelwood constitutes the major source of cooking energy in India and more than 853 million people use fuelwood for cooking (FSI 2011). According to the 2011 Census, 49 per cent of the households in the country use fuelwood for cooking. In some states, it is as high as 80 per cent. Forest rich states have higher incidence of fuelwood use for cooking. This trend is evident from Table 5.4, which shows the forest cover of the states with higher incidences of fuelwood use. As far as the total annual volume of fuel wood use is concerned, it is estimated to be 216.421 MT, of which 58.747 MT (27.14 per cent) are sourced from forests (see Table 5.3). There have been no estimates for the volume of fuelwood availability from forests and the annual availability of fuelwood from TOF is estimated to be 19.25 MT.(FSI, 2011).

India's total fodder consuming livestock population according to the 2007 Livestock Census is estimated to be 518.6 million. Of these, 199.6 millions of livestock depend, partially or fully, on forest for fodder (Forest Survey of India 2011).

Creating Alternative Livelihood Opportunities through Poverty Alleviation Programmes

The government implements a series of rural development activities to generate employment for the rural poor in general which covers the forested regions as well to

Table 5.4: Forest Cover and Dependence on Fuelwood

Name of state	Percentage of house-holds using fuelwood for cooking*	Percentage of total geographical area of the state under forest cover#
Chhattisgarh	80.8	41.18
Tripura	80.5	76.07
Meghalaya	79	77.02
Nagaland	77.9	80.33
Assam	72.1	35.28
Arunachal Pradesh	68.7	80.5
Madhya Pradesh	66.4	25.21
Manipur	65.7	76.54
Odisha	65	31.41
Kerala	61.9	44.52
Jharkhand	57.6	28.82

*Sources: *Census of India (2011); # Forest Survey of India (2011)*

alleviate poverty. The Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), which ensures 100 days of employment to all poor adult population in the country, is a significant step in this regard. The effective implementation of these programmes among forest-dependent communities would reduce their dependence on forests. The 11th Five Year Plan gives a special impetus to several programmes aimed at building rural and urban infrastructure and providing basic services with the objective of increasing inclusiveness and reducing poverty. Some of these programmes are new, while others have augmented the existing initiatives. Many of these programmes can be clubbed under the umbrella of the FD or dovetailed with FD programme in remote areas. These include Indira Awas Yojana (IAY), National Social Assistance Programme (NSAP), Pradhan Mantri Gram Sadak Yogna (PMGDY), National Rural Health Mission (NRHM), Integrated Child Development Services (ICDS), Mid Day Meal (MDM), Sarva Shikhsha Abhiyan, Accelerated Irrigation Benefit Programme, Rajiv Gandhi Gramin Vidhyuti Karan Yogana (RGGVKY), Rajiv Gandhi Drinking Water Mission and Total Sanitation Campaign (TSC), and Rashtriya Krishi Vikas Yojana. The state Forest Departments, can play an important role in effective implementation of such programmes , design strategies in making these programmes work towards creating alternative livelihood opportunities and help reduce dependence on forests. Provision of better educational facilities and other skill development trainings to youth enable these forest-dependent populations to diversify their livelihood options and look beyond forests as their source of income. Providing infrastructure and support for improved agricultural practices as well as other natural resource-based activities like apiculture would ensure better income to these poor households.

Forests provide a range of marketable NTFPs like fruits, flowers, berries, tubers, resins, honey, leaves, creepers, etc., that have great nutritional, medicinal, and other values.

The NTFP sector with an annual growth rate between 5 to 15 per cent contributes to approximately 75 per cent of the forest sector income (MoEF, 2006). NTFPs also constitute 68 per cent of the total forestry sector export (Planning Commission, 2011). However, although NTFPs and NTFP-based products fetch a good price in markets, the collectors (the forest dependents) sell these to the intermediaries at abysmally low prices. This sector has immense potential in creating livelihood opportunities for the marginalized communities living close to the forest. Support for marketing and value addition by creating processing facilities would not only enhance the income but also the employment opportunities in these hinterlands.

This sector also needs significant institutional interventions and innovations. In spite of the economic importance of NTFPs for such a huge forest dependent community, there is no national policy for NTFPs and the state level policies governing NTFP collection and sale found to be inadequate in addressing the livelihood concerns. Some of the policy concerns in this sector as raised by experts are 'inadequate/insecure right of collectors, incompatible access regulation systems, inadequate benefit sharing mechanism, incompatible tax structure, and absence of commodity specific and region specific solutions' (Planning Commission, 2011, p. 5). However, there have been several innovative interventions at state level and local level by the government as well as NGOs. Some of them have emerged as success stories and these can potentially be replicated in other parts of the countries. Creation of 'Jari Buti Mandi' by Uttarakhand Forest Development Corporation, establishment of Girijan Cooperative Society by Andhra Pradesh Forest Department, decentralized NTFP management through Gram Panchayats in Odisha, and the MFP federation model in Madhya Pradesh and Chhattisgarh are some of the examples. In Chhattisgarh, the Chhattisgarh State Minor Forest Produce (Trading and Development) Cooperative Federation Limited (CGMFP Federation) is the apex body of approximately two million forest produce gatherers comprising almost 913 primary cooperative societies and 32 district unions. The actual pluckers are the members of this body. The state has also initiated appropriate measures through the CGMFP Federation for sustainable utilization and long-term conservation of all minor forest produce found within the forests of the state. This ensures increased wages to the members, i.e., the minor forest produce gatherers in the interior areas where there are no employment opportunities otherwise. Such innovative institutional interventions can substantially enhance the well-being of the poor forest dwellers. The expert panel of the planning committee has suggested a host of measures that includes provision of minimum support prices for NTFPs, developing sustainable harvest protocols and national level NTFP policies among others for the sustainable management of NTFPs (Planning Commission, 2011). The implementation some of these measures has great potential in improving the forest livelihood opportunities and halting forest degradation.

Community-level Forest Management

Greater involvement of the local communities in the management of forests and devolution of power through access and ownership rights ensures greater tenurial security and improved forest management and conservation. In recent years, devolution of forest resource management and access of rights to local communities have become important policy tools for many developing countries. Over the last two decades, a profound change has been witnessed in the area of forest resource management, with

countries at least partially devolving rights and responsibilities over their forests to the users. Community-based management institutions are often considered critical preconditions for equitable, efficient, and effective implementation of REDD+ (Springate-Baginski and Wollenberg 2010). India has also made significant efforts in involving the local community to manage forests through Joint Forest Management (JFM) institutions since the early 1990s. However, these JFM institutions need to be further strengthened by empowering the local communities with adequate power and responsibilities (Lele 2011). The recent decision to integrate JFM with the Gram Sabha of the PRIs aims at strengthening decentralized forest governance. This would encourage association of committees or groups such as JFMCs,, as well as livelihood promotion groups like SHGs to plan for forest protection, conservation, and enhancement of livelihood-based activities. Livelihood activities are best addressed at cluster level/sub-landscape level/federation of SHGss. The government has also proposed to provide legal back-up to JFMCs to effectively protect, regenerate and manage forests. Community-driven innovative management practices have great potential in halting degradation of forest ecosystems.

Conclusion

According to several estimates, India has traditionally been characterized as a low forest cover–low deforestation (LFLD) country exposed to significant direct human induced deforestation and degradation in the past few decades (Forest Survey of India 2011; Ravindranath et al. 2012). India's forests harness a large potential for livelihood-based activities for forest-dependent communities, thus, bridging the gap between the poor and the forest-based market. With such a huge population depending on forests for subsistence and livelihood, the strategies for controlling forest degradation need to be focused on reducing this dependence by creating alternative livelihood opportunities, providing alternative technologies to reduce the gap in demand and supply of forest products, and making the community adopt sustainable harvesting practices. This provides unhindered opportunities for the poor to utilize traditional knowledge in sustainable management of forests with the help of the FD and the Government of India. Linking the two, REDD+ and alternative livelihood improvement activities will ultimately reduce pressure on forests, causing an increase in forest cover in the future. Moreover, international negotiations on REDD+ under the UNFCCC from Bali to Doha, point towards performance-based systems in countries undertaking REDD+ readiness activities like India, where communities will be benefited through conservation of forest ecosystems, in turn improving their livelihood and simultaneously increasing the forest cover of the country. AlthoughIndia is partially ready for implementing the REDD+ mechanism, a benefit sharing mechanism still needs to be framed in order to overcome the livelihood issues in REDD+ and to conserve the degrading forest cover.

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CHAPTER 6

Methodological Issues for Assessing Carbon Stock for REDD+ Project in India

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Introduction

India's submissions to the United Nations Framework Convention on Climate Change (UNFCCC) have consistently reiterated its position to get recognition and encouragement for conservation, sustainable management of forests, and increase in forest cover as potential policy approaches under REDD+. It has maintained that all countries engaged in efforts to maintain and increase forest carbon stocks in their broader national policy framework of conservation and sustainable management of forests should be rewarded. The REDD+ approach incorporates important benefits for improving livelihoods, biodiversity conservation, and food security services. Carbon accounting in a forest is one of the most crucial steps for successful implementation of REDD+ projects. The process needs to meet international standards in a cost-effective manner within the local context. Recently, India submitted a methodological guidance for a REDD+ project to the UNFCCC, where it stated that stratification of forest areas, Trees outside Forest (ToF), crown density classes, sampling design, precision of estimates, protocols for collecting sample data, and models and equations used in computing forest carbon stocks will form an essential part of accounting in a REDD+ project. All equations, growth, and biomass yield models used in the computation of forest carbon stocks will be based on published records, and will be freely and readily accessible to all for evaluation. The Intergovernmental Panel on Climate Change (IPCC) has defined five important carbon pools to be monitored for deforestation and degradation. These include: (i) aboveground biomass, (ii) belowground biomass, (iii) litter, (iv) dead wood, and (v) soil organic carbon. Developing countries have the option to choose all or any of the pools of forest carbon stocks (Murdiyarso et al. 2008).

This chapter examines the key methodological issues such as the project scale, baseline reference level, leakages and monitoring of a REDD+ project. The chapter also highlights the key steps for measuring organic carbon stored in all the five carbon pools, constraints and gaps in implementing the proposed methodology, and suggests recommendations in the Indian context. The proposed methodology should be simple, precise, accurate, reliable and user-friendly, so that local communities, civil society, and other interested entities are fully involved and informed about the technological, policy, and financial aspects of the measuring, reporting, and verification processes and procedures that are adapted to India's specificities for the REDD+ project. The methodological guidelines are expected to meet international standards as defined by the IPCC and Voluntary Carbon Standard (VCS).

Methodological Issues

Project Scale

Scale is one of the most critical policy issues of a REDD+ project in the country since other important parameters such as baseline reference level, permanence, leakages, monitoring, and investment depend on it. While implementing a REDD+ project, a key question that arises is at what scale (or level) should the project be implemented in the country? Should it be at the national level, or sub-national level (project level) or be a mix of both (nested or hybrid approach)? There are various arguments in favour and against these options. At the national level, the key argument in favour is that it allows a broad set of policies and creates country ownership (Aggarwal 2010).

However, there are various constraints in the implementation of the REDD+ project at the national level, especially when there is a lack of a system that permits nationwide implementation of a uniform policy. In large countries like India, this would need the involvement of large numbers of skilled professionals, and transaction costs would be typically high due to complex bureaucratic processes.

In case of a sub-national approach, which is more suitable for a large country like India, communities, NGOs, civil society, private companies, and local governments can implement REDD+ activities in a defined geographical area or at a project scale. Smaller projects can help in building capacity at the grassroots level, and spread knowledge and awareness. They can clearly define project stakeholders and distribute the benefits more efficiently, and there are good possibilities of attracting private investors due to relatively simple processes and well-defined stakeholders. But at the same time the small scale projects may not assure the fulfilment of the national emission reduction targets and the cost of monitoring them would be relatively higher than a large scale project.

It might be possible to sub-divide one national project into a number of smaller projects, and then implement them with the participation of local communities and private entities. However, a more feasible scale for the country would be at sub-national level, keeping in view the various positive points of the project level approach. Initially, some activities could be started at the project level, in order to build the capacities of various stakeholders including the forest staff at the grassroots level and then implement them in the defined geographical area. In the Indian context, village forests, community forest resources (CFRs), forest areas assigned to Joint Forest Management (JFM) and other areas of a similar nature may be considered as a unit for implementing a REDD+ project. Since there is no mechanism to transfer the money generated from carbon trading to the community, it would be appropriate to have smaller project areas so that the fund would reach the community smoothly and efficiently.

Baseline Reference Level

Baseline refers to the forest cover of an area at a certain period against which progress of the REDD+ project interventions can be measured. Baseline reference level is a key parameter for implementing a REDD+ project, and assessing its overall impact in terms of reduced GHGs and tradable carbon credits. There are various arguments in setting up the baseline reference level for the REDD+ project. If a baseline was to be established based on data from recent years only, it would discourage countries who have already made efforts towards checking deforestation rates. Such a baseline will not yield any

significant credits for them, and in fact, would demotivate them to participate in the process. India favours a baseline reference level of 1990, while countries such as Brazil favour an average of a historical 10-year period. The baseline reference level should depend upon the availability of data. India favours the 1990 baseline due to the availability of geographic information system (GIS), remote sensing (RS), and forestry data for the entire country from that year onwards. India has one of the most advanced forest mapping programmes in the world; the Forest Survey of India (FSI) conducts a biennial cycle of forest and tree cover assessments throughout the nation. In addition, activities under the gamut of SFM started in a large scale within the country during the 1990s.

Monitoring

Regular monitoring of the carbon stock is very important for a REDD+ project. However, there are various issues in monitoring and verifying the REDD+ project. For example, there is no uniform definition of various terms like 'forests', 'deforestation', and 'degradation', across the globe. There is a lack of uniformly agreed density classification, which makes it difficult to monitor the progress and effectiveness of REDD+ projects across the nations. There is also a lack of historical data, technical skills for field measurements, carbon stock calculations, and interpretation of satellite imageries in most of the world's developing and under-developed nations. Besides, monitoring and verification involves huge expenditure. In India, there is an urgent need to organize capacity-building programmes of local communities and forest staff at the project level on methodologies for assessing carbon in order to ensure minimal transaction cost for the preparation of REDD+ projects.

India has established a REDD+ cell in the Ministry of Environment and Forests (MoEF) to coordinate and guide REDD+ related activities at the national level. One of the major aims of the cell is to collaborate with the State Forest Departments (SFDs) to collect, process, and manage all relevant information and data relating to forest carbon accounting. The National REDD+ Cell also helps in formulating, funding, implementing, and undertaking MRV of REDD+ activities within the states of the country. The cell also assists MoEF, Government of India, in developing and implementing appropriate policies relating to REDD+ within the country.

Leakages

Leakages are defined as changes in GHG emissions outside the project boundary due to project interventions. They can reduce the impact of the project significantly, hence leakages should be addressed properly while implementing a REDD+ project. In India, the primary sources of leakages from forests are fuelwood, fodder, and timber extraction. Fuelwood leakages can be reduced by deploying energy efficient mechanisms, such as renewable energy sources, especially solar energy sources and providing alternative employment to the people who are dependent on fuelwood extraction for their livelihood. Fuelwood requirements can be tackled through the installation of improved cooking stoves, biogas plants, LPG, and various other means at the village level. Leakages in the form of fuelwood and fodder can be managed by implementing the management prescriptions provided in the Working Plans and various other forestry documents, and cultivating nutritive grass species such as Berseem and Napier grasses at private farms. Tree species of fodder grass such as Bhimal, Oak, Neem,

and Bauhinia should be encouraged. Leakage of timber can be managed through the proper implementation of silviculture and the management techniques provided in the Working Plans of the respective forest divisions. In addition, conservation practices and sustainable harvesting should be encouraged.

Carbon Stock Assessment

India has more than 70 million hectare (Mha) under forest cover and has added around 3 Mha of forest cover and ToF over the last decade. It has a good historical data of its forest area and thus, has proposed a methodology for assessment, which is based on field measurements followed by the use of RS and GIS techniques. The benchmark year may be taken as 1990 or 1991 depending upon the availability of satellite imageries and other forestry datasets. Forest cover map of 1990 and 2012 (project year) may be prepared using Landsat satellite data. The area would be divided into homogenous strata based on forest types (or species composition) and canopy density through interpretation of satellite imageries.

It is proposed to classify the satellite images into three density classes, viz., 'D 1' with a tree canopy density between 10 to 40 per cent, 'D 2' with a tree canopy density between 40 to 70 per cent, and 'D 3' with a tree canopy density of more than 70 per cent. Degraded forest lands having density less than 10 per cent are categorized as scrub. Species composition, if not discernible from satellite data, can be determined by field measurements. Field measurement data would be collected using an appropriate sampling design. A combination of systematic and stratified random sampling may be adopted based on the methodology of the FSI (FSI 2011). In case the project-based approach, where average project size area is small (approximately 100 to 1000 ha), is used, the entire project area may be divided into grids of 100 m × 100 m (1 ha). Each grid can be assigned a unique ID and classified according to the stratum it represents. Sampling intensity and sample plot size would be determined according to standard statistical tools. Field data such as project area, legal status of the project area, rights and concessions, topographical details, soil types and quality, site quality, status, forest types, species composition, number of stems of each species, girth, height, number of stems in each diameter class, and soil carbon data would need to be collected. Above-ground carbon stock would be calculated by taking the local volume equations available in the Working Plan document of the area or those published by the FSI (FSI 1996). Below-ground carbon and carbon in the branches would be estimated using default values provided by the Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidelines (Chauhan and Saxsena, 2012).

The field data collection should be carried out by demarcating the project boundaries to provide accurate measurements, monitoring, accounting and verification of the project. There are various tools available for identifying and delineating the project boundaries such as satellite images, aerial photographs and topographic maps etc. To demarcate the project area, co-ordinates should be taken from the boundaries of the project area through Digital Global Positioning System (DGPS) and a base map should be prepared. The project area can vary in size and it may be one contiguous block or many small blocks of land spread over a wide area. Major eligible carbon pools from the forest area are Above Ground Biomass (AGB), Below Ground Biomass (BGB), Woody Litter (WL), Deadwood (DW) and Soil Organic Carbon (SOC). The project area should be stratified based on various parameters such as land use (forest,

plantation, agro forestry, cropland, etc.), vegetation species, slope types (steep and flat), drainage (flooded and dry) and age of the vegetation. Sampling should be based on a stratified random sampling or stratified systematic sampling approach. In stratified random sampling, sample plots should be laid out and distributed randomly covering all the stratums using standard sampling methods while in stratified systematic sampling, sample plots should be laid out and distributed systematically across all stratums of the project area. Estimation of the number of sample plots and their size is another key step. If the project area is large, the number of sample plots should be statistically significant. Pearson et al in 2005 has developed a statistical tool through which one can estimate the required number of sample plots which is statistically significant (Pearson et al, 2005).The number of estimated sample plots depends upon various factors such as size and number of stratums, carbon density and its standard deviation, etc., in the project area. The sample plots should be either permanent or temporary. Permanent sample plots are statistically more efficient in estimating changes in forest carbon stocks, but since their locations are known they could be treated differently than the rest of the project area. Locations of the temporary sample plots are unknown, so there is less chance of it being treated differently. These sample plots are statistically less efficient in estimating changes in forest carbon stocks.

After estimating the number of sample plots, the next step is laying out of the sample plots. Researchers and foresters have developed various layouts of the sample plots in which the nested sample plot is very common. Normally, the size of plot is 20m x 25m and radius of circular plot is 12.62 m, but can vary depending upon various factors such as site topology, forest types, slope, vegetation species, etc. Measurements are recorded for all the trees lying within the sample plot, starting from the north direction. The dbh of the tree should be taken at 1.37 m height. If the tree is on the slope then it should be measured from the uphill side. If the tree is forked at below the dbh, then it should be measured just below the fork point. If it is not possible to measure below the fork it should be measured as two separate trees. Height of the tree could be measured directly by various instruments such as Ravi multi meter, and Haga altimeter. Before taking the height, slope correction should be taken into account. Smaller sub plots should be plotted randomly inside the tree plot for studying saplings, dead wood and litter. For deadwood sampling, at least three sub plots of 2m x 2m within the rectangular sampled plot of tree species or three sub plot of 2.82 m radius within the circular sampled plot of tree species should be drawn All dead wood vegetation from the sub plots should be weighed. To get the dry weight, the samples should be placed in the oven at 85°C degree for 48 hours, if oven capacity is limited, samples could be sun dried. For leaf litter sampling, at least three sub plot of 1m x 1m or 0.5m x 0.5m within the rectangular sampled plot of tree species or at least three sub plots of 0.56 m radius within the circular sampled plot of tree species should be drawn. Samples of all leaf and woody litter, undecomposed or semi-decomposed plant material should be taken. Subsequently, the fine litter in the organic layer (0-5 cm) may be collected and the roots and partly decomposed dark litter and should be weighed. For soil carbon measurements, the soil surface of the litter and small plants should be cleaned, the auger should be turned clockwise until its base penetrates the soil to 15 cm depth, then the auger should be gently pulled out by slightly turning it counter clockwise. The samples should be taken at various layers, mixed and sent for carbon concentration analysis.

To assess Above Ground Biomass, species specific allometric equation or biomass value from the biomass table based on the allometric equations should be applied. This will provide the volume of tree bole for each species. This volume is to be multiplied with basic wood density for each species to convert the volume into dry mass. Multiplying the dry mass with Biomass Expansion Factor (BEFs) of each species will provide the AGB. BEFs are dimensionless since they convert between units of weight. The BGB could be calculated by multiplying AGB with a default value of 0.27, provided by IPCC, Good Practices Guidelines, 2006. Also, there are various regression models developed for different forest types to calculate the Below Ground Biomass. Deadwood and woody litter biomass could be calculated through physical weighing and converting the fresh weight into dry mass. Multiplying the dry mass weight by 0.45 will provide the weight of carbon. The soil organic carbon should be calculated by taking soil bulk density of the site and carbon percentage in the soil.

Carbon stock in each grid would be determined based on field data. Simultaneously, carbon stock per hectare would be estimated for each stratum. This would help in estimating carbon stock in the site for the benchmark year. The grids where an increase in canopy density is observed with respect to the benchmark year will indicate additionality due to SFM initiatives or other effective management practices. Similarly, a decrease in density over the years would indicate loss of carbon from the area due to unsustainable management practices and/or anthropogenic pressures. The present interpretation scale of 1:50,000 along with improved spatial resolution have made it possible to capture forest cover patches up to 1 ha area. Carbon estimation from soil, woody litter, and decomposed material would be estimated based on the present data, and it can be further compared with future projects of the same area. Socio-economic data including dependency on forest produce (fuelwood, small timber, etc.) from the adjoining villages should be collected through household surveys and group discussions. Such data would help in understanding anthropogenic demands and help design interventions for SFM.

RS and GIS based methodology will help in estimating carbon stock of the benchmark year as well as in estimating future stock at periodic intervals. The output generated would help in understanding the impact of on going management practices, suggesting improved practices, and supporting decision-making processes. Annual increment data of dominant species from secondary sources (like the Working Plan Documents) can be used to refine the estimate, particularly in grids where there is no change in the density class over the past few years. While RS data may not show any increase in grids where there is no change in canopy density, there would certainly be an increase in carbon stock because of annual increments in the above-ground woody volume of the tree.

Constraints and Challenges

Although REDD+ is in the negotiation stage, there is a lack of established approved methodology and technical skills in assessing carbon stock. Inadequate documentation (as micro plans at the village level for example), a general unwillingness to release information/data, transfer of key field forest officials are other constraints in REDD+ project development.

Previous carbon forestry projects including AR CDM faced many challenges and obstacles. The risks were mainly due to non-permanence, biodiversity loss, and negative

impacts on local livelihoods of the local communities. Compared to regular carbon credits, the market for temporary credits from the forestry sector is very low. One of the major issues in this is the EU's decision to exclude forestry credits from the EU Emissions Trading Scheme, which currently holds a major share of the overall carbon market (Commission of the European Communities 2003).

An important issue relates to transaction costs, investments and risks associated with carbon forestry projects. Carbon forestry projects require long-term investment, high transaction costs, and yield less return. The investment may vary with varying local factors, complexity of the project, and costs of services.

Another major challenge in forestry projects is complex methodologies and procedures. To develop a new methodology, it takes time and effort, and only highly skilled forestry professionals with some background in bio-statistics can develop a new methodology which is approved by the UNFCCC. In already approved methodologies as used in the AR CDM project, designing the project and preparing the Project Design Document (PDD), require hiring technically-skilled forestry professionals as consultants, which might be very expensive. Sometimes the DNAs (Designated National Authorities) involved in the validation process take a lot of time to validate the project due to lack of expertise and technical knowledge of the project and methodologies applied within the project. Sometimes, project developers do not understand the guidelines for carbon accounting and are unaware of the changes brought about in the rules from time to time by the UNFCCC. Securing eligible land for the project is a very difficult task and the proofs that need to be provided for eligibility of land can be expensive. Social and legal issues add another dimension to the problems faced by forestry projects. The project land is often under the control of local communities and their participation is crucial for the successful implementation of the project. Sometimes, there is a conflict of interest among the communities, which requires legal intervention to resolve conflicts of rights and other social issues.

Evidently, the design of a REDD+ project needs to account for these challenges and constraints so that it becomes possible for carbon benefits to accrue at the community level without a high transaction cost. The need for a simple, accurate and flexible methodology for REDD+ project has therefore been emphasized in this chapter. For example, the need to hire highly skilled consultants at a high cost could be obviated by the use of simple techniques of carbon assessment which could be used by local communities and a programme of capacity-building for this purpose targeted to members of the Forest Protection Committee.

Conclusion

The established methodology for a REDD+ project should be as simple as possible involving the local communities, the state forest department, scientific organizations and civil society. Forest Survey of India (FSI) should be appointed as an apex body for monitoring, reporting and verification (MRV) of the REDD+ projects in India. The REDD+ project should be developed on a small-scale pilot basis, so that the benefits can be easily transferred to communities. Village forests, CFRs, forest areas assigned to JFM and areas of similar nature may be considered as a unit for implementing the project under REDD+. The REDD+ approach should incorporate benefits like livelihood improvements, biodiversity conservation, and ecological security, besides carbon

benefits. The Government of India should take the initiative to build the capacity of state forest departments with respect to MRV, assessment of carbon, and other ecosystem services. The scale of the project should be first at the project level and can then be extended to the state or national level for smooth and effective implementation and coordination of the project. Baseline reference level should be 1990, as within the country, large scale activities under the gamut of SFM started during the 1990s. The MRV process should be as simple as possible, so that the project owner/s can develop and monitor the project by themselves. Definition of 'forests', 'deforestation' and 'degradation' across the globe should be uniform and India should clearly define these terms in context to REDD+ and submit the definitions to UNFCCC. Carbon should be assessed by adding above-ground, below-ground, and level of soil carbon. Above, as well as below-ground carbon should be calculated according to the IPCC guidelines. There is a need to organize capacity-building programmes for forest staff, local communities, and all the project stakeholders on MRV and assessment of carbon along with other ecosystem services at national, sub-national/state level, to ensure minimal transaction cost for the preparation of REDD+ projects. Each state government should establish a REDD+ cell at the state level, which will function under the National REDD+ Cell. Local communities shall develop the project under the guidance of the State REDD+ Cell. Institutes of excellence working on forest-related issues will be identified to provide technical and methodological guidance and policy support to the National REDD+ Cell, State REDD+ Cell, and also to the local communities.

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CHAPTER 7

Biodiversity and Ecosystem Services in the Context of REDD+ in India

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Introduction

REDD+ as a financing mechanism for the carbon functions of forests provides an opportunity to enhance the entire gamut of ecosystem services, if designed suitably. The three elements of the '+' aspect, namely, the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks needs to be understood in this context. A purely carbon-centric approach could potentially compromise biodiversity functions and undermine local community rights, whereas an explicit recognition of the associated co-benefits of carbon-based financing could result in the simultaneous enhancement of non-carbon ecosystem services, including biodiversity. It is a well-recognized fact that a high level of biodiversity confers resilience to forest ecosystems at various scales and could secure long-term stability of the carbon stock (UN-REDD, undated).

The design and implementation of REDD+ projects need to account for its impacts on other (non-carbon) ecosystem services. There could be synergies or trade-offs among these, and local communities may be positively or negatively impacted. It is important, therefore, that the co-benefits of the REDD+ activity be identified and mainstreamed into the project design. In this context, it is important to understand the nature of ecosystem services associated with forests. Several of these, such as carbon sequestration, are global in nature, and others such as watershed services are regional. Services like biodiversity have significance at various scales, ranging from local to global. In this chapter, we will review these services as they apply to the design of a REDD+

The International Guidance on Potential Risks

Potential risks to biodiversity caused by poorly designed REDD+ efforts include the following (UNEP/CBD/WS-REDD/1/3):

1. The conversion of natural forests to plantations and other land uses of low biodiversity value and the introduction of biofuel crops;
2. The displacement of deforestation and forest degradation to areas of lower carbon and biodiversity value;
3. Increased pressure on non-forest ecosystems with high biodiversity value; and
4. Afforestation in areas of high biodiversity value.

Specific risks of REDD+ to indigenous people and local communities include (UNEP/CBD/WS-REDD/1/3)

1. Loss of traditional territories and restriction of land and natural resource rights;
2. Lack of tangible livelihood benefits and lack of equitable benefit sharing;
3. Exclusion from designing and implementation of policies and measures; and
4. Loss of traditional ecological knowledge.

These risks can be mitigated (i) through appropriate implementation and monitoring of the application of safeguards as outlined in the UNFCCC COP decision 1/CP.16, including ensuring that conversion of natural forests is avoided, and by ensuring full and effective participation of indigenous peoples, and local communities based on the United Nations Declaration on the Rights of Indigenous Peoples; (ii) by ensuring that REDD+ follows a comprehensive approach to forest-based carbon storage; (iii) by setting appropriate baselines and reference scenarios; and (iv) by monitoring biodiversity impacts of REDD+ efforts, for example, in the context of reporting under the Convention on Biological Diversity (CBD).

project and analyse the current policy climate in the national context. We will also specifically identify the issues that pertain to biodiversity in the light of various national and international processes.

National Level Policy and Legislation

In the Indian context, the principal aim of the National Forest Policy, 1988 is to ensure environmental stability and the maintenance of ecological balance. The derivation of direct economic benefits is to be subordinated to this aim. The policy understandably does not make a distinction among carbon and non-carbon services, given the state of international deliberation at that point of time. However, the spirit of the policy is in line with the need to value forests for the ecosystem services they provide.

The Biological Diversity Act, 2002 of India defines the term 'biological diversity' or 'biodiversity' as 'the variability among living organisms from all sources and the ecological complexes of which they are part and includes diversity within species or between species and of ecosystems'.

The legislation defines 'sustainable use' as 'the use of the components of biological diversity in such manner and at such rate that does not lead to the long-term decline of the biological diversity thereby maintaining its potential to meet the needs and aspirations of present and future generations'. It is evident that at the national level, biodiversity is treated as a bundled service with clear recognition of its potential to enhance ecosystem functions as a whole.

Conservation of various elements of biodiversity—genes, species, and ecosystems as defined by the Biological Diversity Act, 2002—is governed by a variety of legislations in a sectoral manner. In this, there has been a very distinct separation of wild and domesticated biodiversity, in terms of management. Most wild biodiversity, mainly in the form of trees, are regulated through prevalent central/ state forest legislations such as the Indian Forest Act, 1927. In the overall management of forests and biodiversity, other than through the Working Plans, there is no information gathered at the sub-national level to assess the

health of forests, or to generate understanding about the functioning of an ecosystem. The conservation of habitats, corridors, and threatened and endangered species is largely governed by the provisions of the Wildlife (Protection) Act, 1972.

The largest system for the conservation of wild biodiversity in the country is a network of more than 668 protected areas. National parks are managed with a perspective of ecosystems and habitats, whereas wildlife sanctuaries are managed with a species-specific perspective. A management plan is developed and backed by government-sponsored financial mechanisms for every protected area. Apart from this network of protected areas, there are softer forms of conservation measures such as biosphere reserves, UNESCO heritage sites, and Ramsar sites, identified on the basis of international priorities. Ecologically sensitive areas and biodiversity heritage sites, as defined by national legislations, as well as a variety of community conservation efforts in the form of community forests and sacred forests form the main source of enhancement of carbon stocks.

Many of these measures provide opportunities for strengthening documentation and data collection; empowering local communities by recognizing their responsibilities, ownerships, rights, and concessions; and creating suitable institutions. The mandates of the National Forest Policy, 1988 and the National Environment Policy, 2006 recognize the need to address conservation of areas of biodiversity importance, increasing forest productivity, and restoring degraded areas, which are also anticipated as part of the REDD+ policy regime. The current legislative/policy provisions are listed below:

- Indian Forest Act, 1927 (defines concessions, village forests, protected forests, transit of forest produce)
- Wildlife (Protection) Act, 1972 (management of national parks and wildlife sanctuaries, protection to Scheduled species, community and conservation reserves)
- Environment Protection Act, 1986 (restoration of degraded lands, management of watersheds, wetland management, and identification of ecologically sensitive areas)
- Biological Diversity Act, 2002 (guidance on sustainable use of biodiversity, access and benefit sharing of biodiversity for commercial use, identification of species of conservation importance, documentation of biodiversity through People's Biodiversity Registers (PBRs), declaration of biodiversity heritage sites, local institutional mechanism in the form of biodiversity management committees, and financial mechanism in the form of national–state–local biodiversity fund)
- Protection of Plant Varieties and Farmers' Rights Act, 2001 (mandate of conservation of plant genetic resources, financial mechanism in the form of national–state–local gene fund)
- The Scheduled Tribes and Other Traditional Forest Dwellers Act, also referred to as Forest Rights Act, 2006 (defines community forest resources, critical wildlife habitats, provides ownership of minor forest produce to the local communities, and provides tenurial security for forest-dwelling communities; the functioning of the provisions is also linked with performance of the ecosystems in terms of delivering the ecosystem services for livelihoods)
- State-level legislations such as the United Khasi–Jaintia Hills Autonomous District (Management and Control of Forests) Act, 1958 and the Garo Hills Autonomous District (Management and Control of Forests) Act, 1961 recognize traditional forest land-use systems such as Law Lyngdoh, Law Kyntang, and Law Niam, and could be important mechanisms for the maintenance of ecosystem services at the local level.

- The guidelines and orders issued by the Ministry of Environment and Forests (MoEF), and other central ministries, on joint forest management (JFM) and best practices for extraction of medicinal plants are important from the point of view of implementation of the broader policy directives.
- The Green India Mission has been launched where 10 million hectare (Mha) of land are targeted for improving qualitatively and quantitatively through village level institutions.

These provisions are interconnected in many ways. For example, the provision of People's Biodiversity Register documentation in the Biological Diversity Act, 2002 is of importance not only in the context of documentation of traditional knowledge, but also in the preparation of JFM micro-plans, and a number of requirements under the Forest Rights Act.

The REDD+ regime will need to recognize these legislative and policy provisions. The Green India Mission, indeed, proposes a fundamental shift from the traditional focus of increasing the quantity of forest cover towards increasing its quality and improving the provision of ecosystem goods and services. The mission takes a holistic view towards greening, not merely focussing on carbon sequestration targets but also on enhancing biodiversity, ecosystems and habitat diversity (MoEF, undated)

Ecosystem Services and their Notional Recognition

Ecosystem services are 'benefits of nature to households, communities and economies'. The term is increasingly gaining currency because it conveys the idea that ecosystems are of social value in ways that may not be immediately intuited (Daly 1997). Ecosystem services have been classified into supporting, provisioning, regulating, and cultural services in the Millennium Ecosystem Assessment (MEA) exercise. These three categories are further classified in terms of tangible and intangible services. Climate regulation is identified as one of the regulating services in the MEA framework. In the context of forests, carbon sequestration serves as the mechanism for climate regulation. The Food and Agricultural Organization (FAO) provides the following categorization of the climate change roles of forests:

"Forests have four major roles in climate change: they currently contribute about one-sixth of global carbon emissions when cleared, overused or degraded; they react sensitively to a changing climate; when managed sustainably, they produce wood fuels as a benign alternative to fossil fuels; and finally, they have the potential to absorb about one-tenth of global carbon emissions projected for the first half of this century into their biomass, soils and products and store them—in principle in perpetuity."

A typology of intangible ecosystem services (in extremely broad terms) is as provided below:

- Watershed conservation/hydrological benefits: Regional/site-specific, rarely marketed
- Carbon sequestration: Global, conditionally marketed
- Biological diversity: Local to global, partly marketed
- Storm protection: Local, not marketed
- Recreation and aesthetics: Local to global, partly marketed
- Existence: Global, non-marketed

An elaborate discussion on the hydrological benefits of tropical forests is beyond the scope of this chapter. However, the possible hydrological impacts of land use changes could include increased sediment delivery, erosion, increased/decreased water yield, water table changes in the micro-climate, etc. (Chomitz and Kumari). The typical impacts include siltation of reservoirs, damage to fisheries, loss of agricultural productivity, and flood damage. Biological diversity results in benefits at multiple scales, both in terms of use and non-use values. At the local level, the key benefits accrue in terms of meeting subsistence and livelihood needs; while at higher levels, the ecosystem functions associated with biodiversity assume relatively higher importance. For example, the loss of globally significant species of flora and fauna is a global concern that impinges on the well-being of humans across the world.

Recreational and aesthetic services are often captured in the market place through the avenue of eco-tourism. However, the economic gains from these services capture only a fraction of the total value of these services, since by their very nature, the derivation of these benefits is the result of a bundled service that includes public infrastructure such as transport networks.

The mechanisms for payments for these services have not evolved fully. There are several examples of PES (payments for ecosystem services) schemes in developed countries like USA and some developing countries like Costa Rica. The application of these schemes in the Indian context remains a major challenge. However, a number of policy moves indicate an in-principle recognition to compensate for the preservation of ecosystem services other than carbon.

Net Present Value (NPV) for Forest Land Diversion

The Expert Committee on NPV (2006) recommended the determination of NPV estimates based on seven goods/services, and further stated that this site-specific NPV

The Storm Protection Function of Forests

Mangrove forests play an important role in protecting coasts, acting as a natural barrier against severe storms, reducing death, property damage, and crop and livestock loss. Due to lack of information and awareness of this service, large stretches of mangroves have been lost to degradation, coastal development, and shrimp farming. It is estimated that mangrove forests prevented damage worth Rs 18 lakh/ha in Kendrapada district of Odisha during the 1999 super cyclone (SANDEE 2008). In the Sundarbans, Forest Protection Committee (FPC) members have been protecting large areas of forest land, restricting the collection of fuel wood and guarding against illegal felling. It is interesting to note that FPC members provide anecdotal evidence to indicate that the damages caused by Aila, the tropical cyclone that struck the region in 2009 were perceptibly less in areas where strong forest protection measures were taken by communities. While the monetary value of this benefit could be potentially calculated based on the damages averted, these could be seen as important co-benefits of REDD+ approaches.

along with ground rent for the land would constitute full payment for the diversion of forest land (other than protected areas). The graded payment system recommended by the Central Empowered Committee is in line with the broad arguments of the Expert Committee (the CEC recommends a payment between Rs 6.99 and Rs 10.43 lakh/ha based on eco-class and density). In short, the funds collected as NPV payments are payments for the ecosystem services lost on account of diversion of forest land.

Fiscal Transfers

At another level, there was a long-standing demand from hill states that they be compensated for the ecosystem services of forests flowing downstream. According to the National Forest Policy 1988, these states are mandated to maintain 66 per cent of their area under forest cover as opposed to 33 per cent for the country as a whole. The hill states constitute about one-fifth of the geographical area and have forest cover well above the national average. Most of the hill states have higher poverty rates as compared to the national average, and development of infrastructure is significantly costlier in these states. It is, thus, argued that fiscal arrangements should recognize this fact and there should be a mechanism to pay the hill states for the national service they provide on this count. The Thirteenth Finance Commission recommends a Rs 5,000

NPV Committee

The NPV issue received added attention due to the 2005 Supreme Court judgement No. 826 (in I.A. No. 566), saying that NPV should be worked out on 'economic principles'. The Supreme Court also appointed an expert committee known as the Kanchan Chopra Committee, comprising leading environmental economists to determine, among other things, the basis of NPV. The Committee recommended that payment on account of NPV along with ground rent represents full payment for loss of forest goods and services, and there is no need for any further payment on account of compensatory afforestation or any other rental. In a sense, therefore, the Committee takes the stand that the current regime is fraught with issues of double/multiple counting, and that the NPV route can do away with such multiple payments. In addition, the Committee also recommends that unlike the present arrangement where all forest-related payments are put in a centralized fund—the Compensatory Afforestation Fund Management and Planning Authority (CAMPA)—the payments now to be collected are to be split among a local forest fund, a state forest fund, and a national forest fund. The payments for each of these funds are to be based on the nature of forest good/service being accounted for. Thus, payments for fuel wood and NTFPs accrue to the local fund, whereas payments for carbon values go to the national fund. The Committee, therefore, envisages a regime shift for payments on account of diverted land on two counts: (a) shift from multiple payments to a single payment and (b) shift from centralized management of payments to (a scheme of) distribution of NPV at three levels, with due recognition of local stakeholders.

crore forest grant, and the entitlement of states are based on three factors—the total forest area of the country falling in the state; the share of forested area of the state as a proportion of its total area, compared with the national average; and the quality of forest cover, measured by density.

Getting Back to the REDD+ Context

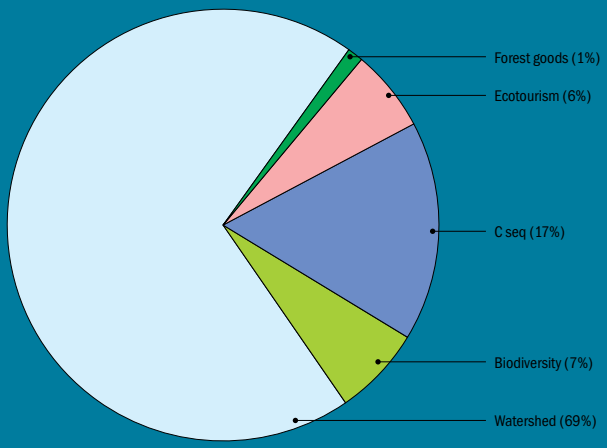
In the context of REDD+, we thus need to develop means and mechanisms to compensate local communities for not just the carbon benefits but also the several

The Valuation Challenge

There exists a debate on the necessity to value each of the ecosystem services using a consistent methodology and collapse these into a total economic value (TEV) estimate. For the total biosphere (not just forests), this value is estimated at USD 16–54 trillion per year, that compares with a global GNP of USD 18 trillion per year (Costanza 1997). In practice, such an estimate serves a rhetorical purpose, capturing 17 ecosystem services, and drawing attention to the volume of these services vis-à-vis conventionally defined income measures. In the Indian context, the total annuity value of three ecosystem services of forests (nutrient loss, water recharge, flood benefits) is estimated at Rs 5,637 billion (Kumar et al. 2006). For the state of Himachal Pradesh, the per hectare present value is estimated at USD 33,077 (20 years @ 5 per cent discount) (Verma 2008).

However, more important than these aggregate values is the composition of the values. As the figure below shows, the watershed values account for an overwhelmingly large share of benefits (based on Verma 2002). There seems to a fair degree of convergence on this issue: the monetary value of watershed services is the largest among all non-marketed values.

The point of concern is how these large monetary values can be captured in the real market place if they are not to remain notional and how a REDD+ scheme can be dovetailed with such possibilities.



co-benefits in the form of intangible services such as watershed services and storm protection services. As of now, the fiscal measures do not operate at the local level nor is there any international mechanism for such compensation—though there exists a range of policy and legal provisions that recognizes the need to maintain and enhance ecosystem services.

We propose several mechanisms and incentive measures to address this gap.

Direct Compensatory Mechanisms

An understanding of the dominant ecosystem services in the project area is critical at the outset. This could be watershed services in mountainous regions or storm protection services in a coastal area. It may not always be an absolute necessity to value these services in quantitative terms but a notional understanding of people's dependence on these services would be important. For example, if the storm protection function of mangrove forests is recognized even notionally, there could be much greater local motivation to maintain these forests. However, it is strongly recommended that appropriate site-specific valuation methods be developed and monetary values be assigned to at least the dominant ecosystem services. As mentioned earlier, the avoided damages to agricultural land, for example, could be a useful proxy measure for the storm protection functions of coastal forests. If these estimates are available, the local communities could be rewarded appropriately for maintaining these services. It could be possible to apportion the potential carbon-based financial inflows in relation to these non-carbon services. In other ways, communities who take great effort to preserve these services (and accept short-term losses) could be given an incentive amount out of available funds.

A broader issue is how to develop mechanisms of payments for the non-carbon services at the local level. As mentioned earlier, the payments for diversion of forest land (NPV) and the Finance Commission recommendations are important recognitions of the need for such payments. However, examples of such measures operating at the local level at a sufficiently large scale are rare in the Indian context. Isolated examples include the case of the Kuhan–Ooch arrangement in the Kangra district of Himachal Pradesh where a village located downstream decided to pay a village located upstream to cease grazing that was causing erosion and accumulation of silt (Agarwal, pers comm).

Linking Conservation Effort with Carbon Stock Enhancement

The protected areas dominated by terrestrial ecosystems such as forests are the major contributors who play a part towards enhancement of carbon stocks. However, the protected areas and other associated habitats important for biodiversity conservation (such as corridors, isolated populations of endangered species) are vulnerable due to the heavy dependence of local communities. Menon and Tiwari et al. (2005) have identified 88 elephant corridors currently used in the country and have suggested an individual corridor level Conservation Action Plan. Settlements and the resulting biotic pressure in corridors are serious issues in about 77 per cent of the 88 corridors. The conservation plans for the corridors are primarily intended to strengthen elephant habitats and reduce human–animal conflicts but also enhance carbon stocks, an example of the bundling of a local and global benefit.

Integrating with Broader Development Effort

The broader development effort in the current context including watershed programmes, catchment plans, and similar activities are increasingly focusing on maintaining the flow of ecosystem services. It is important that REDD+ projects be suitably integrated with such programmes to realize the highest benefits. For example, conservation activities in upstream areas could enhance water availability for agricultural crops downstream, which could in turn induce a change in agricultural practice that is supported by a watershed programme. Likewise, the reduction of fuel wood extraction could be dovetailed with programmes of promoting alternative fuels that could enhance carbon stocks while reducing drudgery and to improve the quality of life.

Developing a Baseline for Biodiversity

One approach of developing the baseline would be to refer to documents such as the Working Plans of the State Forest Department for knowing the availability of species in the given region. But this information would not necessarily match with the scale of the site for which the REDD+ project is getting prepared. Also this process will not provide much understanding about the extent of ecosystem services. Hence, it is suggested that there should be an inventory of the species at least for a set of prioritized Landscape or Waterscape Elements. (Landscape or Waterscape Elements can be defined as ecosystem patches recognized by the local people as distinct from one another from the point of use practices or management systems.) If individual elements are at least 550m^2 in size then the particular element can be recognized in remote sensing data available free of cost for landscape level analysis.

Such a baseline can provide a a basis for tracking changes in biodiversity status at a scale consistent with that of carbon stock assessment. Depending on the local context, a historical baseline could also be created, using the recall method, to see if a carbon-

Ecosystem Services	LSE 1	LSE 2	WSE1
Fuelwood			
Timber			
Small timber			
Medicinal plants			
Food			
Fodder			
Water			
Honey			
Spices-Condiments			
Fish			
Economically important NTFPs			
Prevention of Soil Erosion			

*(A * in a cell would indicate the association of an LSE/ WSE with an ecosystem good or service.)*

enhancing management practice has led to any significant improvement or decline in biodiversity status.

A matrix linking each LSE/WSE with the locally relevant ecosystem goods/ services can then be prepared (See below).

Likewise, the species present in each prioritised LSE / WSE could be recorded and tagged with an attribute (Abundant, Common, Occasional, Rare, Threatened etc).

Species / Attribute	Abundant	Common	Occassional	Rare	Threatened
Shorea robusta	Yes				
Asparagus racemosus			Yes		
Helicteres isora			Yes		
Lantana camara	Yes				

Conclusion

In conclusion, REDD+ offers a modality to develop an ecosystem approach to the management of natural resources where the global goals of reducing greenhouse gas emissions gets meshed with the local goals of enhancing a gamut of ecosystem services and associated livelihoods. While monetary valuation of these services remains a challenge, there is a need to develop appropriate monitoring mechanisms for interventions, targeting both carbon and non carbon services. . Local databases such as People's Biodiversity Registers (PBRs) and national-level monitoring systems need to be developed or strengthened for this purpose.

In this context, it may be useful to identify a few ecosystem services that are locally relevant and amenable to monitoring at the community level. Biodiversity is indeed one of them since the direct use values of biodiversity make it relatively easier for communities to show a keen interest in observing and reporting changes. Much in the same way, changes in water availability for domestic or agricultural purposes could be monitored easily at the community level as they relate directly both to domestic uses and changes in agricultural production. Soil conservation or reduction of soil erosion also gets reflected in agricultural yield and in possibilities of bringing additional land under cultivation.

Thus, it would be desirable to use a set of locally relevant indicators to assess changes in ecosystem services rather than rely on complex scientific techniques that could be cost prohibitive and act as a barrier for accrual of benefits at the community level. Over the long run, such mechanisms could of course be integrated with a more rigorous monitoring effort – process that would clearly have wider benefits, beyond the REDD+ mandate.

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CHAPTER 8

The Way Forward

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Forests are a national resource of global concern. The Forest Principles agreed upon at the Earth Summit in 1992 mandate sustainable development of all types of forests, and also recognises the right of member countries of the United Nations to use their forest resource according to their priorities and needs, including social and economic development needs. Forests are important globally, nationally, and locally. Biodiversity conservation and carbon sequestration are concerns of the global community while several other ecosystem services, wood and non-wood products and livelihoods are the concern of national, sub-national, and local communities. However, there is a general lack of political commitment and means of implementing sustainable forest management in developing countries, including India. The optimal realisation of biodiversity conservation and carbon sequestration services is possible when forests are managed sustainably. In the current global situation, it is the responsibility of developed nations to take care not only of the payment mechanism for carbon sequestration service, but also for the implementation of sustainable forest management. Developing countries are raising issues relating to the gaps in the means of implementing sustainable forest management at the global level. India has gone ahead to empower communities for sustainable forest management but capacity of the community has to be built up so that they can take up this responsibility, which is perhaps even more important than the need for financial resources for sustainable forest management.

Reducing Emissions from Deforestation and Forest Degradation (REDD) is a global endeavour to incentivize developing countries to protect, sustainably manage, conserve and develop their forest resources and thereby contribute to the global fight against climate change. REDD+ goes beyond merely checking deforestation and forest degradation, and includes incentives for ecosystem services, biodiversity conservation, sustainable forest management, and enhancement of carbon stocks. It has specifically opened up possibilities for countries like India, to expect compensation for its pro-conservation approach and sustainable forest management.

India is expecting an annual enhancement of carbon stock to the extent of 50–60 million tonnes CO_2 by 2020 and an addition of more than one billion tonnes of CO_2 over the next three decades. 275 to 400 million people depend on forests for their sustenance and livelihood; they are also involved in the management, conservation, and protection of forests with benefit-sharing mechanisms on the principle of 'care and share'. REDD+ is an opportunity for the community to take advantage of this incentive mechanism to conserve their forests. India stands committed to pass on the financial incentives under REDD+ to the community which would in turn motivate the community towards conservation of forests. It already has an institutional mechanism in the form of Joint Forest Management (JFM) to do so but the exact mechanism to transfer the incentives to the communities has to be worked out. India should ideally adopt the small project strategy under REDD+ rather than taking up big projects at national

level at the first instance to facilitate the flow of funds to the communities for their conservation efforts.

India has an adequate legal, policy, and institutional framework to implement REDD+.

The National Forest Policy, 1988 envisages the involvement of people for sustainable forest management with an edge given to ecological security, and towards ensuring sustenance and livelihood security. The national government has the responsibility of policy and planning while the responsibility of implementation is with State Governments. The enactment of the Forest Rights Act, 2006 strengthens the involvement of people in forest governance through the Gram Sabha, and also provides opportunities for enhancing livelihoods. The Ministry of Environment and Forests has taken a policy decision to put JFM Committees under the respective Gram Sabhas. It has also been decided that the Gram Sabha will be the core body for the implementation of Green India Mission, one of the eight missions under the National Action Plan under Climate Change (NAPCC). The appropriate forest governance should be such that the Gram Sabha implements the actions and activities for sustainable forest management along with the benefit-sharing mechanism on the principle of sustainable harvest while the Forest Department is expected to provide regulatory, monitoring and technical support to the Gram Sabha for the implementation of sustainable forest management.The ownership of minor forest produce under PESA 1996 and Forest Rights Act, 2006 is with the people or the community. The JFM institution gives communities access to these produce on the principle of 'care and share'. However, there is an apparent overlap of ownership and benefit-sharing between JFMC and the Gram Sabha which needs to be clarified unambiguously. Similarly, there is a need to clarify the contentious issues relating to the definition and ownership of MFPs existing due to various provisions under IFA, 1927, PESA 1996, and FRA 2006.

Another important aspect that has to be understood and appreciated is that the forests of India alone cannot bear the burden of providing livelihood to 275 to 400 million people. People are harvesting forest resources unsustainably, thereby causing forest degradation, loss of biodiversity, and reduction in ecosystem services including carbon sequestration. There is an urgent need to ensure the reach of various development programmes to the interior forest fringe areas through a well thought out convergence strategy whereby thee forest fringe dwellers get adequate livelihood opportunities available under these programmes and are able to meet their basic human needs (health, drinking water, sanitation, primary education, sanitation) . resulting in reduced dependence on forest for sustenance.

One of the critical issues for REDD+ implementation is monitoring, reporting and verification (MRV). Since India has strengthened its efforts for implementation of SFM since 1990, the reference baseline could be 1990 for the assessment of carbon to generate financial incentives. There is a need to have a monitoring mechanism to assess sustainability of forests. India has developed criteria and indicators for the assessment of sustainability of forests but additional effort is needed to institutionalize these. The Forest Survey of India may be designated as the national-level coordinating agency to monitor the sustainability of forests. Since it will be difficult for FSI alone to do this huge task, there is a need to identify many more agencies from government and non-government sectors for MRV, particularly for carbon assessment. It is suggested to adopt the path of small projects at the level of JFMC/CFMC under REDD+ to facilitate the flow of financial incentives generated through trading of enhanced carbon to the community.

An institution is needed to regulate the implementation of REDD+. A REDD authority may be established in the MoEF to frame policies, strategies, and guidelines for the implementation of REDD+ in the country. State governments through state-level REDD+ Cells need to facilitate project formulation at the JFMC/CFMC level. A JFMC/CFMC will formulate the REDD+ project with the technical assistance of FD. Monitoring may be done by the Central government through the Forest Survey of India, while verification may be done by an independent body identified by Forest Survey of India.

A dedicated and regulated market under the umbrella of the UNFCCC is needed to compensate the efforts of the community towards conservation of forests. Institutes of excellence working on forest related issues have to be identified to provide technical and methodological guidance and policy support to the National REDD Cell, State REDD Cell, and JFMC/CFMCs including building their capacity. The mechanism for the financing under REDD+ are under negotiation. The fund-based mechanism may be appropriate till the mechanism for financing under REDD+ is decided. The Green India Mission is an opportunity for India to implement the REDD+ concept for enhancing biomass, improving quality of forests, and also sustaining livelihood of the people living in and around forests along with biodiversity conservation and sustenance of ecosystem services. The funding under Green India Mission may compensate the conservation efforts of the community on the basis of their performance.

India should also make efforts to define forests, forest degradation, deforestation, conservation, and sustainable management of forests in the context of REDD+. Efforts are needed to devise mechanisms for sustainable harvest of forest produce, particularly for minor forest produce. This will help addressing the issues of leakages.

Communities are to be involved in the maintenance of ecosystem services. Carbon sequestration being a global common may be compensated by the global community but compensation to the community for other ecosystem services is also needed, especially when there is a significant input of labour-time by the community in the conservation of forest resources and maintenance of other ecosystem services. There is a need to develop indicators and a methodology for monitoring biodiversity conservation and maintenance of ecosystem services.

The capacity-building of all stakeholders including community and Forest Department officials is needed with respect to REDD+ readiness and preparedness. Financial resources are available with the Forest Carbon Partnership Facility (FCPF) at an international level and under the Green India Mission at the national level. India may join with the FCPF to generate financial resources for capacity-building, readiness, and preparedness of REDD+. The MoEF may use the ongoing externally aided projects, the National Afforestation Programme and the Green India Mission for capacity-building, pilot studies, and organizing workshops to generate awareness of REDD+ in the country.

REDD+ presents opportunities to address the varied needs and interests of a wide range of stakeholders. As mentioned before, it helps developed countries to reduce their emission targets on the one hand, and on the other hand, it contributes towards SFM. REDD+ has a pro-conservation approach and is sensitive towards the needs of forest-dependent communities. The maintenance of balance between conservation and dependence on forests is critical in the REDD+ context.

At the level of practice India needs to take several initiatives for REDD+ implementation. These include

- reinforcing community-based forest governance as elaborated in Chapter 2
- building capacity of the community as well as Forest Department officials
- raising funds at national level to finance the community for their conservation efforts
- becoming a member of FCPC to generate funds for capacity-building and preparedness of REDD+
- establishing a simple and flexible methodology for assessment of carbon and leakages
- developing guidelines for benefit-sharing with communities (convergence of employment programmes with forest-related activities, particularly for forest-dependent communities

Finally, India has the potential to be a thought leader in international negotiations on REDD+, given its significant successes in the area of sustainable forest management and forest governance. India needs to improve forest governance, sustainable harvest, forest degradation and reduce dependence on forests to the extent of sustainable limit. At national level, India needs to set target for emission reduction and implement it through forestry sector with the use of CSR funds. Compensation of conservation efforts of the community must be implemented through CSR funds and National Level Schemes with assistance of strong monitoring mechanism and capacity building programme.