Livelihood of local communities and forest degradation in India: issues for REDD+

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Livelihood of local communities and forest degradation in India: issues for REDD+

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Introduction

India's current forest and tree cover is estimated to be 78.29 million ha, constituting 23.81 per cent of the geographical area of the country (ISFR, 2011). Forest cover alone amounts to 69.20 million ha, against the recorded forest area of 76.95 million ha. Of the total forest cover, 12.06 per cent is very dense forest (more than 70% crown density), 46.35 per cent is moderately dense forest (40% to 70% crown density), and the remaining 41.59 per cent is open forest (10% to 40% crown density). As per 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. Tree cover outside forest areas is assessed to be 9.7 million ha, and is experiencing an increase over the last few assessments, indicating a rise in green cover in non-forest land in the country.

Forest cover in the country has more or less stabilized since the 1980s. As per the estimates of the Forest Survey of India, forest cover has increased marginally from 64.08 million ha in 1987 to 96.2 million ha in 2011.

Forest cover in the country has more or less stabilized since the 1980s. As per the estimates of the Forest Survey of India, forest cover has increased marginally from 64.08 million ha in 1987 to 96.2 million ha 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 forest. 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. The changing priorities of the forest department from revenue generation to conservation-oriented forestry and the practice of doing away with clear felling of tress has resulted in a significant decline of formal pressure of deforestation and degradation on forest ecosystem. However, forest degradation of natural forest due to several factors remains a major concern of forest management.

Forest degradation in India

The forest degradation is quite evident from low level of growing stock in India forest and declining trend of dense forest in the country. The growing stock per ha of forest area as per both in 2009 and 2011 ISFR is estimated to be around 58.46 m^3 per ha of forest area. This is far below the global average of 130.7 m^3/ha and the south and Southeast Asian average of 98.6 m^3/ha for the corresponding period (FAO, 2010). More than 40 per cent of the forest 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 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 the trend of change in dense forest is concerned, it has remained very moderate as compared to changes in open forest (see Table 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 it is often difficult to compare the data in this regard due to lack of standardized methodologies (Davidar *et al,* 2010).

Table 1: Change in forest cover 1991-2011

State of the 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	385008 (60.64)	249930 (39.36)	634938
2001	395169 (60.43)	258729 (39.57)	653898
2011	404207 (58.41)	287820 (41.59)	692027
Change from 1991 to 2011	19199	37890	57089

Note: Figure in parenthesis are the percentage to total forest cover
Source: Various issues of State of the Forest Report

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.

The factors affecting forest degradation in India are:

i. Critical livelihood–forest linkage of a huge forest dependent population (FSI, 2011; Davidar *et al*, 2010)
ii. Demand and supply gap of forest products, resulting in exploitation beyond its carrying capacity (Aggarwal *et al*, 2009)
iii. Forest fires, over–grazing, illegal felling, and diversion of forest land (both permitted and illegal for non-forest uses due to competing land use demand for developmental and other uses (FSI, 2011; Davidar *et al*, 2010; Aggarwal *et al*, 2009; MoEF, 2009; MoEF, 2006).

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 the forest for a variety of forest products for food, fodder, agriculture, housing, and an array of marketable minor forest produces which can potentially degrade forest if harvested unsustainably. Field based studies assessing the pattern of collection of these forest products and its impact on local forest found that local livelihood dependence results in degradation (Davidar *et al*, 2010; Mishra *et al*, 2008; Arjunan *et al*, 2005; Sagar and Singh, 2004; Maikhuri *et al*, 2001; Silori and Mishra, 2001). Hence, the livelihood concerns of the millions of poor people living in and around forest contribute to forest degradation along with other factors.

Forest survey of India (FSI) also made a comprehensive assessment of the production and consumption of forests in India and this has been discussed in detail in recently published IFSR 2011. The low productivity of forest coupled with ever-increasing demand for forest products due to India's huge and increasing population contributes to the degradation of forest (Gulati and Sharma, 2000). The development concerns in general and the rapidly growing economy has implications on forest cover and the land use pattern of the country (IIASA, 2009; MoEF, 2009). The forests are also subject to several other anthropogenic pressures like over grazing, shifting cultivation, and vulnerabilities to forest fire and so on (World Bank, 2006; Bahuguna *et al,* 2002). A host of these drivers are directly linked to the livelihood of the forest dependent communities.

Livelihood of the forest dependent communities and its impact on forest carbon stock

India has a huge population living close to the forest with their livelihoods critically linked to the forest ecosystem. People living in these forest fringe villages depend upon forest for a variety of goods and services.

India has a huge population living close to the forest with their livelihoods critically linked to the forest ecosystem. There are around 1.73 lakh villages[1] located in and around forests (MoEF, 2006). Though there is no official census figures for the forest dependent population in the country, different estimates put the figures from 275 million (World Bank, 2006) to 350-400 million (MoEF, 2009). People living in these forest fringe villages depend upon forest for a variety of goods and services. These includes collection of edible fruits, flowers, tubers, roots and leaves for food and medicines; firewood for cooking (some also sale in the market); materials for agricultural implements, house construction and fencing; fodder (grass and leave) 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 extensive dependence pattern, any over exploitation and unsustainable harvest practice can potentially degrade forest. Moreover, a significant percentage of the country's underprivileged population happened to be living 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 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 sale of the forest products for households living in and around forest constitutes 40 to 60 per cent of their total income (Bharath Kumar *et al,* 2010; Sadashivappa *et al,* 2006; Mahapatra and Kant, 2005; Sills *et al,* 2003; Bahuguna, 2000). A study (Saha and Sundriyal, 2012) on the extent of NTFP use in north east India suggest that the tribal communities use 343 NTFPs for diverse purposes like medicinal (163 species), edible fruits (75 species) and vegetables (65 species). The dependence for firewood and house construction material is 100 and NTFPs contributed 19–32%

1 There are 6.41 lakh villages in India as per the 2011 census

of total household income for the communities under study (Saha and Sundriyal, 2012). Forests are not only a source of subsistence income for millions of poor households but also provide employment to poor in these hinterlands. This makes forests an important contributor to the rural economy in the forested landscapes in the country. The widespread poverty and lack of other income generating opportunities often make these people resort to over-exploitation of forest resources. The collection of firewood for sale in the market, though it is illegal, is also extensive in many parts of the forested regions in the country and constitutes the source of livelihood for 11 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, which 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 adverse impact on growing stock as well as regeneration capacity of forest when there is over grazing due to more livestock. ICFRE (2001) estimates suggest that India's forest 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 the India's forests of which 18 per cent are highly affected with remaining 31 per cent and 29 per cent medium and low respectively (World bank 2006; MoEF, 2006). The large livestock population also results in huge collection of tree fodder, which affects the forest quality adversely. The annual requirement of dry and green fodder is estimated to be 569 MT and 1025 MT respectively against the availability of 385 MT and 356 MT (Roy and Singh, 2008). This explains the pressure on India's forest from 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 related to the forest ecosystem. Farmers collect small timber, poles, and other materials from forest for agricultural implements and fencing the 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 highly vulnerable weather conditions and wildlife attack. Crop failure in any specific year has All such dependence does not affect as long as these resources are extracted sustainably and well within the regeneration or carrying capacity of the forests.

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Shifting cultivation that is still being practiced in some regions of the country contributes to the 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 area under shifting cultivation ranges from 5 million ha to 11.6 million ha involving 3 to 26 million people in 16 different states in the country (MoEF, 2006). The practice is more prominent in north-eastern states.

REDD+ and livelihood of the forest dependent communities

REDD+ is a financial instrument to incentivize conservation and sustainable management of forest and thereby reducing GHG emissions from deforestation and forest degradation. It aims at compensating the forest owners in developing countries for conserving the forests by putting a value on the forest carbon stocks, one of the ecosystem services that forests provide. The idea of REDD+ is based on two basic premises. Firstly, the countries conserving forests forgo the economic gain of harvesting them as well as the benefits from alternative land use and hence need to be compensated for the same. Secondly, costs involved in conservation and sustainable management of forests needs to be shared by other countries too as the 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 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 the sustainable management of forest under REDD+ regime. Besides this, REDD+ will also improve the livelihoods of forest-dependent communities by adding value to the collected forest produce through a Public Private Partnership Model that would enhance income and employment opportunities for the local people. Assigning monetary value to the enhanced carbon stocks in the forest that could incentivize forest conservation and management. Since, 75% of forest-based income is from NTFPs (MoEF, 2009) the NTFP enterprises can contribute significantly, to livelihood enhancement in forested areas. In addition, the two main barriers recognized in NTFP management are lack of sustainable harvesting practices and problems of NTFP productivity. To resolve this issue, the GoI would support technology for value addition, certification, and improved marketing of NTFP. Further, sustainable management of forest safeguards the forests for the future generation.

The proposed REDD+ regime provides an opportunity for sub-national actors, like States, to address the delicate issue of poverty in resource-rich regions such as forested and tribal dominated States.

Addressing forest degradation

Globally, there is no standard definition of forest degradation. It is a complex process and has several drivers, which pose a greater challenge to check 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 "direct-human induced long term loss of at leastY % of forest carbon stocks since time T and not qualifying as deforestation". Given the widespread dependence of such a huge population on forest for subsistence livelihood, arresting forest degradation involves designing and implementing strategies that creates alternative livelihood opportunities and reduce their dependence on forest-based activities. The livelihood requirement of the people fully dependent and partially on forest varies and these need to be taken into consideration while designing the strategies. Unsustainable harvesting and extraction of fuel wood will be substituted by promoting alternative livelihood and energy

sources like biogas, solar energy (solar lanterns and solar street lighting), and improved cook stoves. The expansion of provisions for cleaner cooking fuels such as LPG in rural areas will help to reduce pressure on forests and enhance carbon stocks. This would save fuel wood and reduce pressure on the forests. The GoI has proposed to target 10 million households (in 0.1 million villages in forest conservation areas) for improved stoves (over 30% wood saving). Simultaneously, this would lead to saving of 2 million tons of fuel wood every year amounting to reduction of 3.6 Mt of CO_2 emissions per year. Some other measures could be:

1. Filling the gap of demand and supply of forest products

India's huge population contributes to the large demand base of the forest products. With limited forest cover, the supply of forest products does not match the demand and hence there is a substantial gap (see Table 2 and 3). This gap often drives the over-exploitation of the forest. 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 fuel wood, fodder and timber at 100, 853 and 14 million tonnes respectively (see Table 2)

Fuel wood requirements could be tackled through the installation of improved cooking stoves, biogas plants, LPG, and various other means at the village level.

Table 2: Demand and supply gap of various forest products

Forest Products	Demand (MT)	Sustainable Supply (MT)	Gap/Unsustainable Harvest (MT)
Firewood	228	128	100
Fodder (green and dry)	1594	741	853
Timber	55	41	14

Source: Aggarwal *et al*, 2009

The IFSR 2011 made a compressive estimation of consumption of woods by commercial and household sectors for various purposes and production potential of woods from forest sources as well as from tress outside forest (Table 3).

Table 3: Consumption and production of forest products

Forest Products	Consumption	Production
Wood (RWE in m cum)	48.0	45.95
Firewood from Forests (million tonnes)	58.47 (27.14)*	19.254#
Livestock dependent on forest (in million)	199.58 (38.49)**	

Note: * Percentage of the total firewood consumed, ** Percentage of the total livestock in the country, # Annual availability of firewood from trees outside forest (TOF)

Source: India State of Forest Report (IFSR) 2011, Forest Survey of India

The total annual consumption of wood in constructions and furniture – both in commercial and household sector – as well as for agricultural implements are estimated to be 48.0 million cubic meters in Round Wood Equivalent (RWE). However, the total production of timber stands at 45.95 million cubic meters, showing a gap of 2.05 million cubic meters annually (FSI, 2011). Of the total production of 45.95 m cum, the production of timber from forests are estimated to be 3.175 m cum whereas the annual potential production of timber from trees outside forest (TOF) is estimated to be 42.774 m^3.

Firewood constitutes the major source of cooking energy in India and more than 853 million people use firewood for cooking in India (FSI, 2011). As per the 2011 census, 49 per cent[2] of the households in the country use firewood for cooking. In some states, it is as high as 80 per cent. The forest rich states have higher incidence of firewood use for cooking. This trend is evident from Table 4, which shows the forest cover of the states with higher incidences of firewood use. As the total annual volume of firewood use is concerned, it is estimated to be 216.421 million tonnes and of which 58.747 million tonnes (27.14 per cent) are sourced from forests (see Table 3). There have been no estimates for the volume of firewood availability from forests and the annual availability of firewood from TOF is estimated to be 19.25 million tonnes.

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Table 4: Forest cover and dependence on firewood

Name of the State	Percentage of Households using Firewood 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	80.50
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; # India State of Forest Report 2011

India's total fodder consuming livestock population as per 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 (IFSR, 2011).

2 Of the 246.693 million households in the country as per 2011 census

2. Creating alternative livelihood opportunities through poverty alleviation programmes

The governments implement a series of rural development activities to generate employment for the rural poor in these forested regions and alleviate poverty. 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 will reduce the dependence of the local communities on forests.

Provision of education to the children and other skill development trainings to youth enables these forest dependent populations to diversify their livelihood options and look beyond forest as their source of income.

Provision of 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 has great nutritional, medicinal, and other use values. However, many of these products fetches a good price in cities and markets but the collectors (the forest dependent) sale these to the intermediaries at abysmally lower prices. The support for marketing and value addition by creating processing facilities would not only enhance the income but also the employment opportunities in these hinterlands. Approximately, NTFP sector with annual growth rate between 5-15% also contributes to 75% of forest sector income.

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2. Community level forest management

Greater involvement of the local communities in the management of forest 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 rights to local communities has become an important policy tool 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 often considered as a critical precondition for equitable, efficient and effective implementation of REDD+ (Springate-Baginski and Wollenberg, 2010). India has also made significant effort in involving the local community for management of forest through Joint Forest Management (JFM) institutions since 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 Panchayati Raj Institutions aims at strengthening decentralized forest governance objective. This would encourage association of committees or groups such as JFMCs/CFM/VPs, etc. as well as livelihood promotion groups like SHGs/ CIGs to plan for forest protection, conservation and enhancing livelihood based activities. Livelihood activities are best addressed at cluster level/sub-landscape level/federation of SHGs/CIGs. The government also proposed

to provide legal back up to JFMCs, build capacity of local institutions to effectively protect, regenerate and manage forests. Community driven innovative management practices can further check Forest degradation.

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 past few decades (ISFR 2011; Ravindranath *et al* 2012). Consequently, India's forests harness a large potential for livelihood based activities for the forest dependent communities, thus bridging the gap between the poor and forest based market. With such a huge population depending on forest for subsistence livelihood, the strategies for controlling forest degradation need to be focused on reducing the dependence by creating alternative livelihood opportunities for the forest dependent communities, 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 the traditional knowledge in sustainable management of forest with the help of the forest department and the Government of India. Linking the two, REDD+, and alternative livelihood improvement activities will ultimately reduce pressure on forests producing an increase in forest cover in future. Moreover the international negotiations on REDD+ under the UNFCCC from Bali to Durban, provided a nested approach for REDD+ implementation leading to performance based system in countries undertaking REDD+ readiness activities like India, where communities will be benefited through conservation of forest ecosystem, in turn improving their livelihood and simultaneously increasing the forest cover of the country. Although, India is partially ready for implementing REDD+ mechanism, but still the benefit sharing mechanism needs to be framed properly, in order to overcome the livelihood issues in REDD+ and to conserve the degrading forest cover.

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