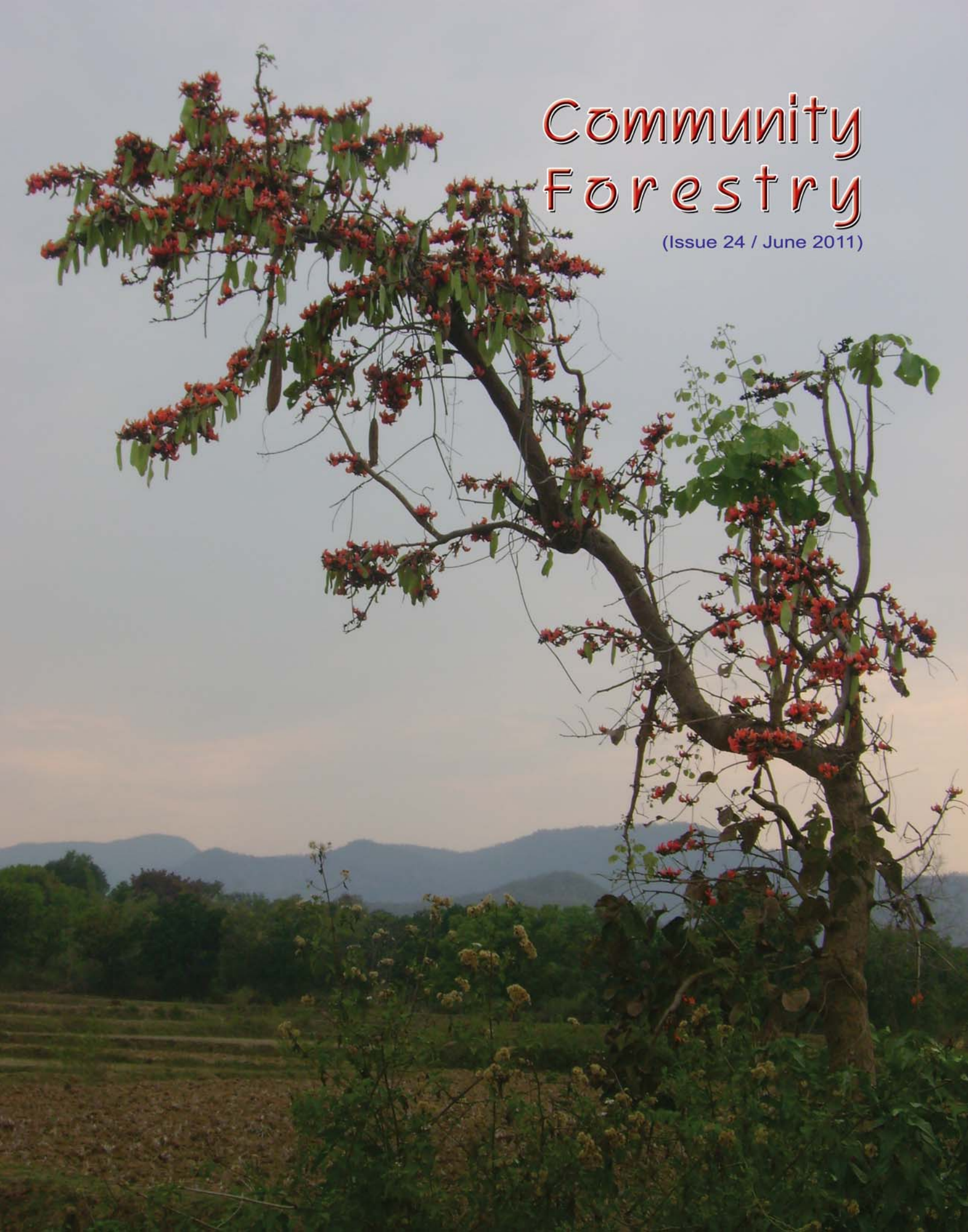

Community Forestry

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Note to Contributors...

Community Forestry invites contributions from readers. The write-ups should be on issues concerning community forestry on any forestry related concerning conservation, management and livelihood. Of particular interest to us is the plight of the community, which has protected forests and environment out of its own volition for ages but is losing out to commercial interests aided and abetted by a State apathetic to its concerns. The articles could be based on experiences from the field or well-argued critiques on various aspects of community forestry.

We prefer contributions in English; however, we can provide translation for papers in Oriya and Hindi. The paper shall include: authors' names and their brief introduction. Ideal length of a paper is between 2500 – 3000 words. However, comments, analysis, book reviews or news item could be smaller than this. The articles should not be too technical and should be written in a manner that can be understood by an average reader having interest in forestry.

The paper should be ideally submitted in the soft version. Those who are not comfortable with computers or do not have access to the same can send their handwritten draft. Photographs are encouraged. Please give the photographers' credit and a few words describing the photograph. We require hard copy of the photographs for the kind of printing that we adopt. Authors can send in a copy of their books to be reviewed.

Articles are acknowledged on receipt and the authors are informed of its status within a month.

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Cover photo: *Regional Centre for Development Cooperation.*

Editorial

It is a great pleasure to present this edition in celebration of 2011 as the International Year of Forests as declared by the United Nations. It is an indisputable fact that forests are indispensable for the survival of mankind and other living creatures. As per the estimates of World Bank, more than 1.6 billion people directly depend on forests for their livelihoods while some 300 million live in them. The figures speak volumes for the significance of forests in our life. Besides, the forest products industry is an important source of economic growth and employment. The volume of global forest products trade is estimated at $327 billion. Likewise, forests of India are estimated to contribute over 1.7% to the country's GDP, besides providing priceless ecosystem services which cannot be estimated or interpreted precisely in economic terms.

It is obvious that forests contribute significantly to human livelihoods and welfare. Similarly, forests are also a cradle to the magnificent and precious wildlife. It is an irony that this cradle of life is in danger. The UN's Food and Agriculture Organization (FAO) estimates that every year 130,000 km² of the world's forests are lost due to deforestation.

Mercifully, all is not lost yet. There is still hope. Nations of the world are now coming up with progressive forest and wildlife protection and conservation laws and policies, If framed and implemented properly, these measures can help tide over the problem of deforestation and loss of wildlife.

As an environmentalist, I have been fascinated with the diversity of life which exists in forests and the diverse roles forest plays in nature. As the editor for this edition, I was equally excited to see the wonderful articles contributed by the authors, so diverse yet so similar, despite many of them working in isolation both in time and space. What is dissimilar about their work are the issues they have studied and what is similar is the source of those issues "Forest and Biodiversity".

Whether it is the issue of policies, conservation, NTFP markets and livelihoods, development projects, or gender and equity, as an editor I have found that the one theme permeating all these articles is biodiversity and its cradle, "the forest". If one could find a link among these articles, I am sure one could clearly see how this cradle of life, with its priceless diverse resources, is meeting our diverse needs, interests, demands etc. I am convinced about the pivotal role played by forests in our lives and it is evident from these articles that there is a need for better conservation efforts not only to safeguard dwindling forest resources, but also to provide livelihood to millions of people whose survival is directly dependent on these resources.

Kanna K. Siripurapu

Redefining Community Forestry: For a better Approach and a better World

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Community forestry has been commonly defined as involvement of local communities in the protection and/or management of public forests. Such a perception doesn't distinguish between community forestry, participatory forestry and other such related terminologies and therefore ignores the legal, social and other aspects of the actual relationship. We need to realize that such ignorance may sometimes do injustice to the people who endeavour to save the precious forest resources with a spirit so close to their heart and who demand no external interference in their relationship with their beloved forest patch. As per Revington's definition, quoted hereinafter, one of the essential parameters of community forestry should be clearly and legally defined boundaries. But if the Court of Law exclusively relies on this definition, then most of the indigenous communities in India would lose their rights because in their system, the boundary is often defined by traditional access, and not by revenue/land records though there are exceptions. In fact, there are instances in which the legal boundaries recognized by the authorities significantly reduce the area under actual protection, a move which is not acceptable to the concerned community.

There has been differential evolution of people's involvement in forest protection and management across the world because local factors differed from place to place and time to time. The level of maturity of the community to take up the responsibility also varied simultaneously. It has been generally found that the authorized agency (Forest Department) failed to protect the forest patch or otherwise found it more viable to involve local communities, which is why/how the communities took over the job. If they decided to accept this responsibility, then it was chiefly because they realized the complications resulting out of forest degradation.

While community involvement has been often successful in its objective, there is no dearth of exceptions. In the author's home state of Odisha in India, there has been the curious phenomenon of the same village community adopting different approaches for two different forest patches under their responsibility. While they carefully conserve the one that they protect out of their own volition, they did not bother much for the one in which the Forest Department (FD) involved them in protection and management under the Joint Forest Management programme. This is chiefly because they do not consider the patch under JFM to be their 'own', and know that the Forest Department may decide to cut the forest anytime for one or other reasons.

Defining 'Community forestry' properly is necessary to promote public forest governance, particularly decentralized forest governance. It is also important because it is high time we solved all concerned issues so that the precious forest ecosystem and biodiversity is conserved for the sustenance of the human civilization.

As per the definition given by Martel & Whyte (quoted hereinafter) community forestry is a village level activity. Whereas this has been the case more often than not, it would be unwise to confine community forestry only to the village level because the potential of communities has to be utilized in urban areas too, wherever feasible.

Accordingly, we can define Community Forestry as a system wherein the symbiotic relationship of people with the forest makes them the managers and saviors of the forest, helping sustain this relationship with or without direct commercial benefits. An essential element of this system is that it is nurtured under or itself nurtures a sense of actual or virtual ownership over the forest under protection. If the legal ownership rests with any body else, it is only secondary. This sense of ownership sometimes leads to conflicts to assert the rights, particularly when some external group/individual/agency (it may be the Forest Department also) attempts to use the same forest without the consent of the community that actually protects and conserves it.

Usually, community forestry is concerned with public forests. But in some cases, it may have reasons to relate itself to private forests too, particularly

when a patch under protection and public access is put under private ownership without taking the dependent/ protecting community into confidence.

Citizen forestry is a system wherein citizens accept the responsibility for protecting/developing local plantations or natural forest patches for environmental and ecological reasons without sharing a rich and diversified symbiotic relationship with the same. This refers particularly to community forestry in urban areas in some developed countries. But the community's feelings and commitment in such cases is decidedly less intense compared to areas where it enjoys a symbiotic relationship with forests. An essential difference between community forestry and citizen forestry is that the former doesn't initiate protection with a sense of citizen's duty to national/public assets. However, some people have used the term citizen forestry to mean community forestry. It is good if community forestry also develops this sense of duty towards national/public assets and is not motivated by its own dependence on the forest alone.

Participatory forestry is a concept or system which, without recognizing community ownership over forest, wants them to collaborate in forest protection and management in lieu of certain benefits. Normally such an initiative lacks the vigor and the spirit of community forestry though there could be cases where a community may consider it to be an honor to collaborate with the FD and hence may put in sincere efforts to discharge its responsibilities. This system of collaborative forest management has a potential to involve private forests also. Further, participatory forestry may evolve itself into community forestry, if provided a scope.

Social forestry, unlike other forms of community-centric forestry that evolved around natural forest ecosystems, involved communities to protect and manage plantations of non-indigenous species like Eucalyptus in village wood lots and in areas other than forest lands. Although many would like to see it as a form of community forestry, the motivations and implications are different in the two. Despite huge investments, most of such plantations have failed to survive. Further, dominated as they are by non-indigenous species, social forestry has not really established itself in conformity with the local natural forest ecosystem. Hence, there were neither bee hives nor bird's nests in such forests. Undergrowth diversity was also absent. In short, we can say that the community did not feel a sense of belonging to such forestry, though there may be exceptions.

Let's now examine some of the definitions given by various researchers and analysts.

Alistare Sarre quotes some of these definitions in a note 'What is Community Forestry?' (http://www.rainforestinfo.org.au/good_wood/comm_fy.htm) as under:
"Community forestry is a village-level forestry activity, decided on collectively and implemented on communal land, where local populations participate in the planning, establishing, managing and harvesting of forest crops, and so receive a major proportion of the socio-economic and ecological benefits from the forest."

Martel & Whyte, 1992

"Successful community forestry requires... genuine popular participation in decision-making... Experience has proven time and again that participation is more than a development cliche; it is an absolute necessity if goals are to be met. But working with people rather than policing them is a new role for many foresters."

Eckholm et al, 1984

"Community forestry has the following characteristics: the local community controls a clearly and legally defined area of forest; the local community is free from governmental and other outside pressure concerning the utilisation of that forest; if the forestry involves commercial sale of timber or other products, then the community is free from economic exploitation of markets or other pressure from outside forces; the community has long-term security of tenure over the forest and sees its future as being tied to the forest"

J. Revington, Rainforest Information Centre, 1992

"Community forestry, social forestry and rural development forestry are more or less equivalent and reflect Abraham Lincoln's view of democracy - government of the people, by the people, for the people."

J. Burley, Oxford Forestry Institute

"The political dimension of community forestry makes it a venue for people's struggle against domination and exploitation of the community's resources by 'outsiders'.

Ecology, equity and social justice are part of this struggle."

Rao, 1991

Whereas the definitions proffered by Rao and Eckholm et al are actually explanations rather than proper definitions, Martel & Whyte certainly attempt to define the concept. Revington's definition clearly has more substance in it. However, despite its apparently loose constitution, the statement of Burley holds the key to forest governance.

A FAO webpage on Community Forestry provides us with the following definition:

Community forestry was initially defined, by FAO, as "any situation which intimately involves local people in a forestry activity. It embraces a spectrum of situations ranging from woodlots in areas which are short of wood and other forest products for local needs, through the growing of trees at the farm level to provide cash crops and the processing of forest products at the household, artisan or small industry level to generate income, to the activities of forest dwelling communities" (FAO 1978). Thus, community forestry was perceived as encompassing activities by individual households, women and men farmers and other people, as well as those involving a community as a whole (http://www.fao.org/docrep/u5610e/u5610e04.htm).

This definition emphasises the differential dynamics of the evolution of community forestry, but uses a key word 'intimately' that has a lot of significance. It is this intimacy that is hurt when somebody else asserts rights over the resource. And it is also this intimacy that has implications for gender and equity since in the rural scenario of developing and underdeveloped countries, rural women share a more intimate and delicate relationship with the forest because of their day-to-day activities and requirements than men. Similarly, tribals and other disadvantageous groups/individuals are more critically dependent on forests than others. However, critical dependency doesn't necessarily mean a spontaneous support for forest conservation because conservation and protection activities may require a reduction of this dependency which people may not find easy to accept. Several conflicts with their genesis in precisely this reason have been documented. There are cases where forest protecting communities have provided for special concessions to such groups/individuals so as to avoid the risk of conflicts and also to strengthen unity among the community.

In a recent attempt, Carter(2010) has 'broadly' defined community forestry as "an approach to forest management that actively promotes the rights of the people living in and around the forest to both participate in forest management decisions and to benefit (financially and in kind) from the results of the management"(see 'Introduction' by Jane Carter in 'How Communities Manage Forests', available at http://www.indiaenvironmentportal.org.in/files/How%20communities%20manage%20forests.pdf). This definition appears to have balanced many relevant things and points to the evolving nature of community forestry. However, true community forestry asserts the rights of the people rather than the sense of ownership. A sense of ownership may be the motivating factor, particularly in case of communities which have not been able to get their rights recognized despite making valuable contribution to conservation efforts; but it is secondary. Carter's definition therefore corresponds to a more desirable version of participatory forestry.

Community involvement in natural resource management has interesting dynamics and a great potential. It is high time that we understood this dynamics properly and made optimum use of this potential for facing challenges like climate change.

Civil Society Response to Wildlife Amendment Bill, 2010

As facilitated by Regional Centre for Development Cooperation, Bhubaneswar
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The following recommendations are made by the Regional Centre for Development Cooperation (RCDC) on the basis of its own understanding as well as extensive consultation with the civil society, for amendment of the principal Act, the Wildlife (Protection) Amendment Act, 2002, as also the Wildlife (Protection) Amendment Bill 2010:

Revision of Section 2, sub-section 12 (B): "forest produce" shall have the same meaning as in sub-clause (2) of Section 2 of the Indian Forest Act, 1927 or under any other Act for the time being in force in a State, provided that 'minor forest produce' or 'non-timber forest produce' shall have the same meaning as defined in section 2 (i) of The Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (hereinafter called Forest Rights Act).

Insertion of new sub-section 24 (B) in Section 2: 'Protected Unit' means any area, either on government or private land, where wildlife is protected & conserved in a natural environment, but which lacks feasibility to be declared as a Protected Area.

Revision of Section 2(37): 'Wildlife' implies any life form growing wild in nature and includes animals, bees, butterflies, crustacean, fish, and moths; and aquatic or land vegetation which forms part of any habitat.

Insertion of new sub-section 10(A): "Critical species' means any species implied to under section 51 of this Act.

Insertion of new sub-section 2(A) under Section 11

11-2(A): Provided further that relationship with any wild animal in captivity that doesn't cause any significant trauma to the animal or doesn't otherwise threaten its life or health, but essentially displays a mutually faithful and socially inspiring relationship, shall not be an offence.

Revision of Section 32: No person shall use in a sanctuary or its periphery (to be determined in consultation with the Gram Sabha after a technical assessment) chemicals, explosives or any other substances which may cause injury to, or endanger, any wildlife in such sanctuary.

Provided further that the Chief Wildlife Warden shall make adequate compensatory arrangements for farmers affected by ban on chemical farming in such areas, and also undertake promotional arrangements for organic farming, along with protection arrangements for the crops thus raised.

Insertion of section 37(A): Declaration of Protected Units

(1) The State Government may, in consultation with the Gram Sabha and by notification, declare any area as Protected Unit without adversely affecting the local forest/wildlife management/governance system of the communities (if any), for rendering special protection and support to such areas for wildlife conservation and protection.

(2) Such areas may have an honorary wildlife officer in each Unit, preferably the chief functionary of the concerned community-based institution that renders protection to the forest and/or wildlife.

(3) Provided further that Protected Units shall be entitled to financial as well as technical support from the government for sustenance and development of their protection & conservation efforts.

(4) Provided further that no permission will be granted for any use of such a Unit on government land or community land, for purposes that significantly threaten the wildlife & their habitat protected therein.

Insertion of new section 38K in Chapter IVA: Animals and birds that are susceptible to fatal illness under the controlled conditions of the zoo are not allowed to be kept in captivity except for research or treatment or temporary breeding, unless an environment to counter this susceptibility is ensured.

Insertion of new section 38L in Chapter IVA: A citizens' monitoring every three months is required for every zoo so as to get their feedback on the safety arrangements, hygienic conditions, and healthy environment for animals/ birds.

Revision of Section 44, sub-section (1): Provided further that nothing in this sub-section shall apply to individuals or registered institutions using tail feathers of peacock and articles made therefrom for religious purpose, therapeutic application, research, and any such household purpose that use an insignificant number of these feathers.

Insertion of new clause 8 in section 51(as per the Amendment Bill 2010): (8) In case the offence is challenged by the accused on the basis of Forest Rights Act, 2006 with due compliance with the duties & responsibilities specified therein, evidence provided by the Gram Sabha will be considered with due importance.

Insertions under Section 62

(a) Provided further that the Chief Wildlife Warden may exercise a special power to declare a wild animal vermin even if specified in Sch. I and Part II of Sch. II, if his/her enquiry approves of an application to this effect from the local Gram Sabha or Gram Panchayat or an equivalent local body in urban areas, in case translocation (that would not endanger human life or livestock in the translocated area) of the same animal is not possible.

(b) Provided also that the Chief Wildlife Warden would, in due time, take appropriate safeguarding measures, in case the population of a wild animal under Sch. I and Part II of Sch. II is found saturated in the area of its protection/ conservation, considering the ecological capacity and size of the concerned area of conservation, in order to avoid human-animal conflicts. The saturation shall be immediately informed to the appropriate authorities at Central- and State level for necessary action within 30 days of such intimation.

Insertion of new section 65(A): Conformity with the Forest Rights Act, 2006

(1) Exercising the power under section 24(c), the Collector shall, in due consultation with the Chief Wildlife Warden, the Forest Rights Committee(s) as well as the Gram Sabha of the concerned area(s), work out on a priority basis those individual families or communities (entitled under the Forest Rights Act, 2006) residing in the area of the proposed/existing Protected Area who would prefer continuation of their permanent stay in the area of their present habitation, instead of a relocation, on the condition of a modified right(s).

(2) The modification, through a legal agreement with the concerned party, shall be in conformity with the technical requirements of the wildlife protection & conservation applicable specifically to the concerned area, and may consist of acquisition of private land used for cultivation or other such non-forestry purpose (except homestead land and the gardens/orchard attached to it), restriction on the use of otherwise disturbing vehicles, use of chemical fertilizer or pesticides, and use of exotic species (etc.).

(3) One or more competent persons of the families thus agreeing to the modification of their rights would be offered recruitment, within two months of his/her/their agreement to this effect, for serving in the concerned Protected Area authority for wildlife protection & conservation under a 'special forest service cadre' that would be applicable only in case of such individuals whose rights are to be modified in the proposed or existing Protected Area so as to avoid displacement.

(4) Basic amenities like primary education & health, etc. are to be ensured for such families/communities, within three months of modification and/or acquisition of their rights.

(5) Collection of such non-timber forest products, on which there is no primary/significant dependency of the local wild fauna, and no primary/significant ecological dependency of local wild flora, can be allowed by the Chief Wildlife Warden only to those entitled under the Forest Rights Act, 2006 provided that commercial collection of the same will be allowed only on condition of sale to some public sector agency or women's SHGs or self-help cooperatives of the local residents as authorized by the government, and also only after the Chief Wildlife Warden is technically satisfied that such collection would have no significant impact on the wildlife of the area.

(6) The local management plan shall essentially be designed, after consultation with the concerned

Gram Sabha, with due consideration of the important anthropological elements or trends of the local communities (eligible under the Forest Rights Act, 2006) that help their sustenance or development.

Insertion of new section 67 in Chapter VII: Recognition & promotion of skills in interest of wildlife conservation

(1) The Chief Wildlife Warden, shall take a special initiative to recognize & utilize with due remuneration and in the interest of wildlife protection & conservation, the traditional or exceptional skills & knowledge systems (and persons possessing such skills/knowledge) for handling wildlife for their control, peaceful coexistence with humans and other living beings, therapeutic treatment, and capacity development.

(2) Well-disciplined & technically abiding skill-holder groups like a certified 'Circus party' shall be especially encouraged, through exemptions/concessions on taxes or other such duties/levies so as to demonstrate the developed skills of wild animals/birds, unless threatening their health/life, in order to bring intimacy between the human society and wildlife, as per the protocol issued by the Chief Wildlife Warden.

(3) The Chief Wildlife Warden may employ such skill-holder groups/ individuals in the awareness building and/or capacity building programmes.

Insertion of section 68 in Chapter VII: Facilitation of participatory wildlife protection & conservation

(1) Campaigns and awareness building programmes are to be carried out, along with capacity building programmes wherever necessary, by the Chief Wildlife Warden, for development of understanding of the local communities, and civil society organizations on the natural habits, sustenance requirements, corridors, and other such important aspects of the locally important wildlife in order to bring about a behavioral change among the general people and civil society organizations in particular, towards the protection & conservation of wildlife.

(2) The Chief Wildlife Warden is to establish, within two months from the promulgation of this provision, a toll-free helpline to help people register their grievances/ reports regarding attacks on or by wild animals, compensation, or for any other thing that relates to wildlife conservation.

(3) The Chief Wildlife Warden is to consider or forward/recommend to appropriate authorities/agencies, applications received from individuals/groups/communities protecting & conserving wildlife on their own and outside Protected Areas other than community reserves, for necessary financial & technical support that could help sustain their conservation efforts and make them more effective.

(4) It is further provided that the Chief Wildlife Warden or his authorized local representative (not below the rank of ACF) would also consider & settle grievance applications from the local Gram Sabha or Gram Panchayat or equivalent local body at urban level requesting immediate & adequate compensation (amount to be determined according to the legal status of the wild animal as per the schedules provided herein) to the victims of wildlife attacks (including the owners of livestock injured or killed by wildlife), within forty-five days of receiving such applications. The compensation would also include, in deserving cases and in addition to compensation in cash, disability certificate, recommendations for additional quota in schemes like PDS, and any other measure that would help the victim or his/ her family for a sustainable livelihood.

(5) It is also provided that the Chief Wildlife Warden may declare any wild animal 'vermin' within 15 days of receiving an application to this effect from the Gram Sabha or Gram Panchayat or equivalent local body at urban level and on the basis of an enquiry.

Non Timber Forest Products Marketing Interventions for Augmenting Livelihoods of Forest-dependent Communities

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Abstract

Non Timber Forest Products (NTFPs) play a vital role in sustaining rural communities, particularly those living adjacent to forest areas. Globally, more than two billion people are dwelling in forests, depending on NTFPs for subsistence, income and livelihood security. In India, it is estimated that over 50 million people are dependent on NTFPs for their subsistence and derive their earnings from these products after consuming about 60 % of NTFPs. Despite the high dependence on NTFPs among forest users, there are still many barriers restricting the generation of greater benefits from these resources. These barriers include issues of security of tenure, lack of processing skills and limited market access. Augmenting the livelihoods of the forest dependent communities requires some focused intervention on NTFPs. NTFP based interventions should be designed keeping in view the (i) community involvement; (ii) sustainable harvesting and conservation practices for NTFPs and (iii) setting up of NTFP based micro enterprises for facilitating primary processing, value addition and marketing of NTFPs. Researchers and policy makers must collaborate in community-based forest management initiatives which are socially and economically viable.

Keywords

Marketing interventions, sustainable harvesting, primary processing, value addition, NTFP marketing

Introduction

Non-Timber Forest Products (NTFPs) are biological products and services, except timber, sourced mainly from forests and similar land uses such as wastelands, grasslands, agro/farm forests and marginal lands. Fuel wood is generally excluded from the purview of NTFPs as it is assumed that its market systems are already well understood and do not require the same degree of analysis as common NTFPs such as medicinal plants, aromatic plants, bamboo, wild foods etc. NTFPs, especially products meant for household consumption and/or sale in the market, have a comparative advantage in addressing the needs of the local communities and enhancing family incomes. NTFPs provide the major share of income for rural households, particularly to meet seasonal requirements and other periodic needs.

At the global level, more than two billion people are dwelling in forest, depending on NTFPs for subsistence, income and livelihood security (Gauraha, 1992; Chopra, 1993; Mallik, 2000;Vantomme, 2003; FAO, 1995). In general, forest fringe communities and rural people are more dependent on NTFPs for: a) earning cash income; b) satisfying household needs such as fodder, medicine, shelter, and other household goods; 3) sourcing traditional agricultural inputs such as leaf litter, wild plants, small tools and water; and 4) obtaining supplementary foods such as roots, tubers, vegetables, fruits and grains for the family. Due to their physical remoteness from the outside world and the traditional linkage between the local community and forestry, they are economically and ecologically inseparable from each other. Their dependency on the forest resources is both historical and cultural so much so that they constitute an in-

tegral component of the forest ecosystem. These communities (tribals) inhabit wide ecological and geo-climatic conditions in different concentrations throughout the country. Tribal livelihood systems vary considerably between different regions as also among the various ethnic groups, depending on ecological, historical and cultural factors. These tribal communities have occupied the forest regions since time immemorial, living in isolation from the mainstream life, maintaining harmony and a symbiotic relation with nature.

The collection of NTFPs by communities is primarily for meeting their subsistence needs (Prasad, 1985; Hegde et al. 1996) and it varies from state to state ranging from 5.4 to 55%. In Manipur, nearly 90% of the population depends on forest products as a major source and some 2,50,000 women are employed in collecting forest products (FAO, 1992). In Bastar district of Chhattisgarh, about 75 % of forest dependent people supplement their food by tubers, flowers and fruits all the year round (Khare, 1998). NTFPs provide as much as 50% of the income to about 30% of the rural people. It is estimated that 275 million poor rural people in India-27 percent of the total population- depend on NTFPs for at least part of their subsistence and cash income. This dependency is particularly intense for half of India's 89 million tribal people, the most disadvantaged section of society, who live in forest fringe areas (World Bank, 2006).

According to Government of India (2000), at least 35 million man-days of employment is generated in the NTFPs trade, which includes collection and processing of economically valuable NTFPs species. NTFPs also serve as a vital livelihood safety net in times of hardship. Furthermore, NTFP extraction has multiplier effects in the economy by generating employment and income in downstream processing and trading activities (Nepstad et al. 1992). An important feature of the dependence is that almost all NTFPs are harvested from natural forests. Despite the high dependence on NTFPs among forest users, there is still scope for maximizing the benefits from these resources. The factors impeding such maximization include issues of tenure security, lack of processing and value addition skills, lack of knowledge, organizational education and credit necessary for market entry leading to limited market access.

Trade in NTFPs can act as an incentive for forest conservation by providing a source of income from resources that might otherwise appear to have little financial value (Cottray et al., 2003). It is believed that the sustainable use of NTFPs could lead to a win-win situation (FAO 1995; Shiva and Verma 2002; Golam et al. 2008). This is due to the increasing recognition that NTFPs can contribute significantly to the livelihoods of forest dependent communities (Belcher et al. 2005; Marshall et al. 2005; Ros-Tonen and Wiersum 2005; FAO 2006); household food security and nutrition (FAO 1995; Falconer 1994; Sunderland et. al. 1999); generate additional employment and income (Peters 1996; Marshall et al. 2005); and offer opportunities for NTFP based enterprises (Shackleton and Shackleton 2004; Subedi 2006). Moreover, NTFPs are more accessible to the poor (Saxena 2003); contribute to foreign exchange earnings (Shiva and Verma 2002) and support biodiversity and other conservation objectives (FAO 1995; Marshall et al. 2006).

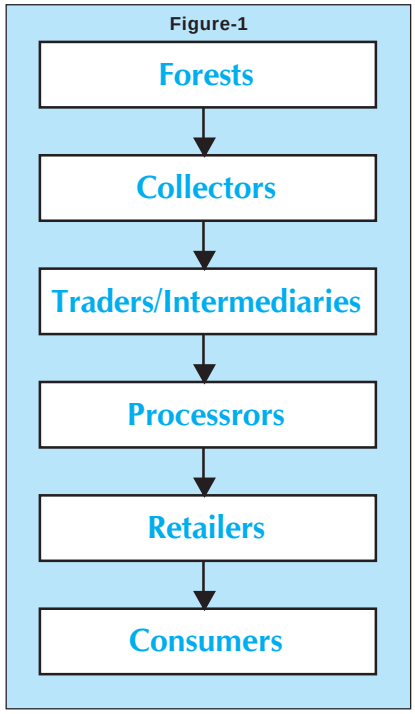
Two important issues need to be addressed with respect to improving community livelihoods through NTFPs market systems. First, as communities gain experience and capacity in forestry, they will require more oppurtunities to engage in direct marketing. This is currently hampered by weak community capacity, lack of enabling structures and institutions to provide effective market intelligence, and poor access to marketing channels within and outside the state. Second, the legal framework restricts potential sale and movement of nationalized/listed products.

Current marketing system

The market of NTFP is extremely imperfect and unstructured. At present, forest dwellers collect NTFPs and sell it to local traders who in turn sell it to the urban centres from where it finally reaches the consumers. The distribution channel from forest collector to urban wholesaler consists of 3 to 5 middlemen. These men are known as kutchias (middlemen), the agents of the traders. The kutchias speak the language of the tribals and in many cases shell out money as advance payment for NTFP. They hustle the tribals, cheating them on weights and rates as tribals mostly count in traditional scales and are unfamiliar with the metric system of measure. The tribals have to sell their material as they need the money to buy weekly supplies. In most places inhabited by them, the barter system is prevalent and people usually exchange NTFPs (Mahua flowers, Tamarind, Chironjee kernels, Bhilwa

nuts) for common salt and other provisions. Villagers also resort to door step bartering and selling (at a very low price) to intermediaries in exchange for food items and clothes. Often, these middlemen also take NTFPs on credit and pay later, further discounting the return to villagers. In case a villager has taken any advance from the local trader (which is also a common practice), the trader fixes the price which is often much lower than prevailing market price. A typical marketing channel of NTFPs is represented in Figure 1.

Figure-1



Merely gathering NTFPs rarely generates enough revenue to sustain the people harvesting them. National Forest Commission (MoEF, 2006), quoting studies, also agrees that the financial return to those involved in NTFP collection and primary processing is often very low, leading only the poorest to be involved in collection of NTFPs. Communities are still largely insulated from market signals that should influence quality and volume. They are not yet fully empowered to manage the financial affairs of the societies.

To sell NTFPs at fair prices, communities need access to an open and efficient market. Developing an efficient NTFP market chain will require investing in other areas such as access to credit, transport and training in sustainable forest management, including the collection, processing and trade of NTFPs. An efficient marketing chain with processing and value addition intervention is presented in Fig. 2.

Such a market generates higher revenues and offers a strong incentive for communities to take on increasing responsibility for forest management and promote more efficient forest utilization. A number of factors currently restrict more open marketing by communities. These include the highly bureaucratic process of issuing transit permits for many species, a legal requirement to sell certain species only to state marketing monopolies and a lack of information about markets channels and prices.

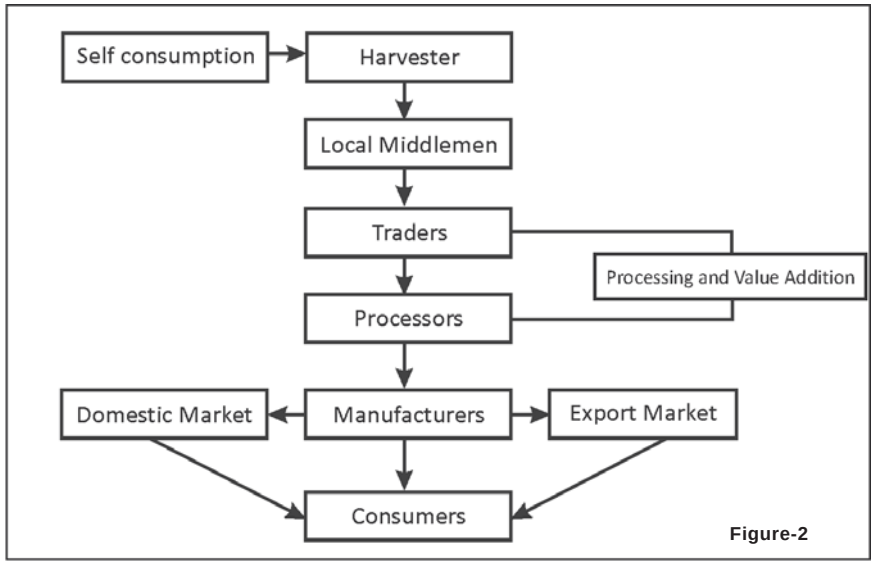


Figure-2

Marketing efficiency constraints affecting the livelihoods of communities

A market is said to be efficient when the gatherer's share is high and involves less marketing costs. But in case of NTFPs, it has been observed that the producer's share is low while the margin of intermediaries and marketing costs are high. In other words, it is a less than efficient market. The following are the constraints:

1. Absence of direct contact with the consumer

The forest dependent communities have no organized mechanisms to establish direct contact with the consumers. The time at their disposal and their poor financial background do not permit them to concentrate on marketing activities. Another important factor that prevents them from direct contact with the consumer is the mode of consumption of the produce. There are a number of NTFPs that cannot be used as they are and need to be processed to prepare the final product. Communities are not in

a position to establish processing units. So, they are solely dependent on the traders and wholesalers to get their produce marketed.

2. Less holding capacity

Most NTFP collectors are poor farmers and landless labourers (predominantly tribals), who are always short of money. They generally have no choice but to dispose of their produce shortly after the collection to meet their immediate consumption needs.

3. Malpractices performed by the middlemen

The traders in the market operate through commission agents (middlemen), who are given the definite rate at which the products are to be purchased and are also given advance money. The commission agents travel to the village and move from door to door to purchase the product at a price which is much below the market price. However, the price charged to the consumer is much higher than the price at which the producer sells the stuff to the middlemen. There is thus a wide margin between the prices paid by the ultimate consumer and the procurement prices, which goes to the middlemen.

4. Uneven quality and perishable products

The quality of NTFPs is highly variable, leading to obstacles in processing and marketing. Immature collection, poor storage and processing facilities are the main reasons for variations in the quality of the produce. Products such as Aonla (Phyllanthus emblica), Bamboo shoots and Mushrooms follow a different marketing path, mainly because of their limited availability and perishable nature. The collectors do not have the facility to store and transport the produce, which often leads to distress selling.

5. Lack of processing, storage and grading facilities

NTFP collectors do not have storage, processing and grading facilities. Moreover, there is no standard method to grade the raw NTFPs. Primary processing and some value addition is done at the trader's level, who sell graded products at a better price.

6. Lack of bargaining capacity

The communities engaged in the collection of NTFPs are mostly illiterate and poor. The middlemen/traders mislead them by foul means. The price they offer is readily accepted by them as they are always in need of money. No wonder distress sale takes place due to the low bargaining power of collectors and their poor access to transport facilities.

7. Imperfection in flow of market information

The forest dependent communities are not aware about market information as they are illiterate and living in remote areas. There is also absence of market regulations, marketing channels etc.

8. Monitoring and rules of NTFP trading

Most of the collectors are not aware about the rules and regulations pertaining to harvest and management of NTFPs. The monitoring and enforcement of laws vary considerably across central India. There is also a lack of clarity as to who is responsible for monitoring and enforcing rules on harvesting and marketing of NTFPs.

NTFP based interventions

Before taking up any NTFP based intervention, it is always important to thoroughly understand the linkage between the forest and people. The following aspects should always be considered:

1. Communities' access to resources, decision making and benefits

The formation of Community Forestry User Groups helps forest dependent communities to increase their bargaining power in price negotiations with traders, resulting in increased incomes. Increased access to decision-making processes and sharing of benefits allows disadvantaged families to invest in NTFP trade and processing groups and increase their income in the process.

2. Community involvement right from the beginning

Tribal people have a great potential for organizing themselves to improve their livelihoods. However, they require proper guidance, infrastructure facilities and capacity building. In any NTFP based intervention, the communities must be involved right from the beginning to build their capacities. Therefore, establishing community owned and managed institutions are a sine qua non to enhance their livelihoods.

3. Sustainable harvesting and resource management

Traditional harvesting practices are unscientific and destructive in nature. Communities need sus-

tainable harvesting and forest management systems to maintain the resources. They should be made aware of sustainable harvesting practices through various extension activities in partnership with the state forest departments (SFDs).

4. Focus on conservation aspects

Resource assessment of the region along with imbibing indigenous knowledge and understanding existing practices of the people is essential. Several factors such as unsustainable harvesting, pressure of population, expanding markets for NTFP are threatening the survival of some species and reducing the quality of many others. Hence, it is necessary to take up conservation measures for making forest based livelihoods more sustainable.

5. Product diversification

Product diversification and processing methods of NTFPs provide better terms of trade and bargaining power to the communities. Keystone Foundation in Nilgiri Biosphere Reserves, Tamil Nadu has introduced diversified products through usage of honey and beeswax to make spiced honey, bee wax balms, bee wax soaps, etc.

Strategies for implementing the interventions

1. Establishment NTFP based Micro Enterprises

Processing of locally gathered NTFPs adds value and contributes to poverty alleviation and the sustainability of NTFPs. The simplest form of value addition i.e. storage, drying, cleaning, sorting and grading are simple activities usually carried out by traders who derive a significant benefit from these services. Establishment of NTFP based micro enterprises with primary processing and value addition facilities at the village level involving the local community will greatly improve the livelihoods of the people. In Sheopur Kala and Balaghat, Madhya Pradesh; Bilaspur and Dhamtari, Chattisgarh, a wide range of primary processing activities have been successfully taken up at village/range level (for example incense stick production, medicinal plant processing and bottling honey). Success of NTFP based enterprises depends upon the degree to which the policy environment facilitates the development of entrepreneurship, market access, appropriate technology and business services.

2. Developing an efficient market information system

Different types of information such as price, value addition options and sustainable harvesting techniques are required by comunities to increase their bargaining power and receive higher prices for their products. A social-networking forum must be developed for sharing of market information among various stakeholders. Systematic collection and reporting of market information will be greatly facilitated by the use of specific special reports ensuring that all the relevant information is systematically collected and reported. The following types of reports should be prepared.

NTFP availability status report: The objective of this report must be to provide information on the estimated availability and production of selected NTFPs.

NTFP primary/local market arrival and price trend report: The objective of this report must be to provide information on the market arrival, origin, prices, and price trend for selected NTFPs in primary/local markets (Local centre).

NTFP secondary market price trend report: The objective of this report must be to provide an assessment of the origin, prices, price trends, and destinations of selected NTFPs in secondary markets (urban centres).

NTFP final/major market price trend report: The objective of this report must be to provide an assessment of the origin, prices, price trends, and destinations of selected NTFPs in final markets (National/ International Market).

3. Market Strengthening

To sell NTFPs at fair prices, forest dependent communities need access to an open and efficient market. Creating such a market would generate higher revenues and offer a strong incentive for forest dependent communities to take on increasing responsibility for forest management and promote more efficient forest utilization.

4. Collective marketing

Collective marketing approach as an NTFP based intervention can support communities with knowledge, confidence and processes to operate as a non-exploitative

channel for the marketing of products. It has to be a streamlined effort where the community, in order to get better prices for the produce, works on the entire value chain i.e. on the pre-production, collection, harvesting and marketing aspects of the produce. The objective of Collective Marketing should be to maximize the leadership and managerial abilities that pre-exist within the community and not to construct external institutions to serve the poor.

5. Formation of village based co-operatives

Village based cooperatives are better options to provide mutual benefits to both primary collectors and local traders of NTFPs. Forest dependent communities can sell economically valuable NTFPs species directly to the village-based cooperative and traders of NTFPs can get involved as a trade promoter of the NTFPs species under the village-based cooperative. This way, both actors of economically valuable NTFPs trading - primary collectors and local traders - will be in a 'win-win' situation. These village-based cooperatives would collect economically valuable NTFPs species from every primary collector and store them in a warehouse. Later on, the cooperatives can fix the price of every NTFP species on the basis of last year's price and the current year's market demand.

Expected outcomes

The outcomes of these interventions can be grouped into two broad categories, one at the sector level and the other at the level of the livelihoods of forest dependent communities.

- At the sector level, the expected outcome will be:
- Increased conservation perspectives in development interventions, which are sensitive towards ecological cycles governing natural resources
- Indigenous people being in a position to participate in dialogue with decision-makers on matters affecting their lives in an effective manner and getting their due space in advocacy and policy related issues.
- Sustaining traditional and cultural practices.
- The expected outcome at the community level will be:
- Increasing the availability of viable natural resource-based livelihood options for indigenous people and providing sustainable livelihoods leading to greater self-reliance
- Enhancing the economic status of indigenous people
- Village groups and institutions to take greater responsibility in managing resources.

Conclusion

Augmenting livelihoods of the forest dependent communities requires some focused intervention on NTFPs. Communities should be empowered with information about the market, policy and products to enable them to strategize and access better returns from NTFPs. NTFP based interventions should be designed keeping in view three broad factors. Firstly, the community should be involved at all the stages of the intervention as it will increase their stake in the intervention and inculcate in them a sense of ownership. Secondly, attention must be paid for sustainable harvesting of NTFPs and conservation of the forest environment. This will make the intervention long lasting. Lastly, an enterprise model is required to organize the process and to run the intervention profitably. Marketing of NTFPs is an important conservation and development strategy. It can add economic value to forested areas without cutting trees while providing local people with a sustainable and productive livelihood option. Researchers and policy makers must collaborate to launch community-based forest management initiatives which are socially and economically viable.

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Forest Management for Biodiversity Conservation and Climate Adaptation: The Bangladesh Initiatives and Experiences

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Introduction

Bangladesh has 2.53 million hectares of forest land, which constitutes 1.40 million hectares of tropical evergreen and semi-evergreen forests present in the hilly regions of the east and south-east of the country (Hill forests), 0.74 million hectares of mangrove and coastal forests in the coastal belt of the south, 0.12 million hectares of moist deciduous Shorea robusta (Sal) forests in the central and northern regions and 0.27 million hectares of village (homestead) forests scattered throughout the country. All the mangrove forests, all the Sal forests and 0.67 million hectares of hill forests are managed by Bangladesh Forest Department (FD), while another 0.73 million hectares of hill forests in the Chittagong Hill Tract (CHT), called un-classed state forests (USF), are managed by the district civil administration while the homestead forests are owned by private individuals (Roy, 2005).

Being a part of the bio-diversity rich Indo-Burma region, Bangladesh is endowed with rich floral and faunal biodiversity. Its flora includes 5,700 species of angiosperms, including 68 woody legume species, 130 fire-yielding species, 3 species of gymnosperms and 1700 pteridophytes. Its fauna includes 113 species of mammals, 628 species of birds, 126 species of reptiles, 22 species of amphibians and 708 marine and freshwater fishes (Mukul et al. 2008). But due to high population pressure (0.017 hectares of per capita forest land), there has been a high rate of deforestation and forest degradation resulting in a continuous loss of biodiversity. The recent (2005-2007) National Forest and Tree Resources Assessment recoded only 1.442 million hectares of land i.e., 10% of the country's total surface area under forest cover (Altrell et al., 2007).

Due to the deforestation and degradation of forests, 10% of native species of plants of Bangladesh are already extinct and 167 species are vulnerable or endangered (Mukul, 2008). For the same reason, the country has lost 13 vertebrate fauna species (10 mammals, 2 birds, 1 reptile), while another 147 species are vulnerable to extinction, of which 52 species are critically endangered (Mukul et al. 2008).

In the above backdrop, the Government of Bangladesh and other concerned organizations have undertaken several initiatives to conserve the remaining biodiversity resources of the Bangladesh forests.

Bangladesh is one of the worst affected victims of climate change. The Intergovernmental Panel on Climate Change (IPCC) has predicted that by 2050, the water level of the Bay of Bengal might rise by 15 - 50 cm, inundating about 1,20,000 square kilometer area of the country. Due to the accelerated rate of melting of the ice cover of the Himalayan mountains and increased monsoon rainfall, about 4,000 km2 area in the northeast and 1400 km2 area in the southeast of the country might experience more frequent flash floods. On the other hand, the frequency of droughts in the dry season, especially in the northwest region of the country, might increase. In fact, the impact of such climate change is already being felt in Bangladesh. Land inundation and salinity intrusion have already been spreading to more and more areas in the coastal belt every year affecting the biodiversity of the region and compelling people to replace rice cultivation with shrimp farming. The frequency of cyclones and storm surges in the coastal region of Bangladesh have increased manifold. While only three major cyclones occurred every 50 years from 1785 to 1896 and 13 major cyclones during 1897 - 1947, the number dramatically increased to 51 during 1948 - 1980 (Falguni, 2011). The frequency of major floods in the floodplain areas and that of early flash flood in the haor (basin) areas in the northeast of the country have also increased.

The climate-change-induced natural hazards have been affecting every sector, including forestry. For example, the two devastating cyclones, Sidr in 2007 and Aila in 2009, not only killed thousands of people and damaged their houses, but have also caused extensive and severe damage to the mangrove stands in the Sundarbans and killed hundreds of spotted deer and other wildlife. Thus the increased fre-

quency of strong cyclones is also becoming a threat to the sustainability of the forest stands and the wildlife resources of the Sundarbans. Due to increased salinity (and silting up of the forest floor) the survival and growth of some of the important tree species of the Sundarbans are being affected.

To deal with the impacts of climate change, Bangladesh has undertaken various programs and projects in different sectors based on its own resources as well as support from international donor agencies. In consideration of its vulnerability to climate change impacts, Bangladesh is treated as a priority country for adaptation support by the international communities - both under the United Nations Framework Convention on Climate Change (UNFCCC) and bilateral aid programs of donor countries.

As one of the least developed countries with a negligible contribution to the global green house gas emission (only 0.14%), Bangladesh does not have the international obligation as yet to undertake emission reduction measures. Nevertheless, it has undertaken certain initiatives to reduce its emissions as a voluntary measure and to exploit the opportunity of earning revenue by selling carbon credits to developed countries under the Clean Development Mechanism (CDM) and the Reducing Emissions from Deforestation and Forest Degradation (REDD) programs of the UNFCCC.

This paper describes Bangladesh's contemporary forest management policies and programs aimed at biodiversity conservation and climate change adaptation and mitigation.

Forest Biodiversity Conservation Initiatives

Regulatory measures to prevent loss of biodiversity have been embedded in the Forest Act of 1927 that has governed forest management in Bangladesh for more than a century now. After the independence of Bangladesh, biodiversity conservation efforts began in the year 1973 through promulgation of the Bangladesh Wildlife (Preservation) Act 1973, which entitled the Forest Department (FD) to establish National Parks, Wildlife Sanctuaries and Game Reserves (i.e., Protected Areas) and to regulate hunting, farming and trading of wildlife. In 1976, a 'Wildlife Circle' was created in the FD in order to implement wildlife conservation activities. It was abolished in 1983 due to shortage of funds but re-established in 1994 under a development project and subsequently revamped and named as 'Wildlife Management and Nature Conservation Circle (WMNCC) under the revenue budget of the FD. As of now, 28 Protected Forest Areas (PFAs), which include 15 National Parks and 13 Wildlife Sanctuaries, have been established in Bangladesh. The total area of the 28 PFAs is 268,961 hectares, which is 10.67% of the total forestland and 1.82 % of the country's total area (Forest Department, 2010a).

Bangladesh Government signed the United Nations' Convention on Biological Diversity (CBD) in 1992 (ratified in 1994) and subsequently developed and adopted the National Biodiversity Strategy and Action Plan (NBSAP) in 2004. The NBSAP outlined short-term (up to 3 years), medium-term (4-7 years) and long-term (8-10 years) interventions towards conservation, restoration, protection and sustainable use of the ecosystems, species and genetic pool of Bangladesh and conceived the institutional arrangements and procedures for implementation and monitoring of the proposed interventions. It recommended a co-management approach for the management of the PFAs.

In 2003, the FD undertook a pilot project with financial support from the United States Agency for International Development (USAID) called 'Nishorgo Support Project (NSP: www.nishorgo.org)' which tested a collaborative management system (co-management) in five PFAs. In the co-management model, the management of a PFA is vested with the local Co-management Council composed of representatives of local communities, relevant government line agencies and local government bodies, including the local Member of Parliament (MP) and the Divisional Forest Officer (DFO) as advisors. The FD officer in charge of the respective forest area acts as the Member Secretary of the executive committee of the Co-management Council, called Co-management Committee (CMC). The CMC and the technical experts of the FD jointly develop a development and management plan for the PFA and its surrounding landscape, keeping in mind the issues of forest protection, biodiversity conservation and social forestry activities in the buffer zone. Community Patrol Groups (CPG), manned by poor forest dependent people, are established for patrolling the forests jointly with the Forest Guards of the FD. The Government has created a legal provision by which the CMC can retain 50% of the entry fee collected from visitors to the PA for local development activities. The NSP provided training and input

support on alternative income generating (AIG) activities to the poor forest dependent people.

Based on the encouraging results of the NSP, the co-management approach is now being adopted in all the 28 notified national parks and wildlife sanctuaries (i.e., PFAs) of Bangladesh by the FD under a subsequent USAID-supported project called Integrated Protected Area Co-management Project (IPAC). The IPAC project (2008 - 2013) activities include establishment and capacity development of the co-management organizations, training of forest dependent people on AIG activities, promotion of value chain of the products produced by the forest dependent communities, and promotion of ecotourism. IPAC has also been measuring carbon stock in the protected areas with a plan to develop Reducing Emissions from Deforestation and Forest Degradation (REDD) projects. It has also arranged training on developing proposals for REDD projects for the FD staff.

In 2003, the Governments of Bangladesh and United States of America jointly established the Bangladesh Tropical Forest Conservation Foundation, called Arannayk Foundation (based on the provisions of the United States Tropical Forest Conservation Act, 1998) as an independent institution to provide financial and technical support to the NGOs, community based organizations, forestry research and academic institutions as well as relevant government agencies for important forest and biodiversity conservation activities in Bangladesh.

Arannayk Foundation (AF) supports forest and biodiversity conservation projects on PFAs as well as in community conserved forests in the CHT and homestead forests in different regions of the country. In PFAs as well as in reserve forests, it supports establishment of co-management systems following the same model as IPAC and promotes AIG activities through training, creation of market linkage and access to capital.

The AF sponsored projects follow a unique approach to provide access to capital for the poor project participants. It provides a grant to organized groups of the project participants to use as a revolving fund for AIG activities. The group members apply for loans (BDT 3000 - 10,000) to the executive committee of their organization along with their business plans. The executive committee assesses the feasibility of the business plans in order to approve the loan. The loan is generally interest free but the incumbents are required to plant 3-5 saplings of endangered native tree species in their homestead or farm lands at their own cost as a condition of the loan. Some of the community based organizations (CBO), however, levy a low rate of interest, determined in a democratic manner, on the revolving loan considering the time value of money. The repayment schedule is based on the enterprise concerned.

Based on the local context, a wide range of AIG activities are undertaken by the project participants using the revolving fund. The most common ones include vegetable cultivation on homesteads, leasing of land for cultivation of cash crops, cattle (cow or goat) rearing, poultry, beef fattening, handicrafts making, value addition to crops through primary processing, grocery shop and other petty businesses. The project participants also contribute to increasing their revolving fund through contributions from their monthly savings. The results of the revolving fund schemes have been very encouraging and have contributed significantly to the development of group cohesion and sense of ownership among the participants (Arannayk Foundation, 2010). Recently AF and IPAC initiated a collaborative program to extend the Arannayk revolving fund support to the forest dependent groups of the IPAC-supported co-managed protected forest areas.

In each of the AF-sponsored project, the baseline biodiversity profile of the project area has been prepared through field surveys with the help of professional experts (botanists and wildlife biologists).

Through an AF grant, the Institute of Forestry and Environmental Sciences, Chittagong University (IFESCU) has undertaken a program of restoring and conserving critically endangered native tree species of Bangladesh forests by identifying the remaining (mother) trees, developing propagation technique, establishing seed orchards and planting them in forests and conservation sites.

From December 2010, a joint team of Wildlife scientists from Jahangirnagar University and Botanists from Dhaka University has initiated a project of surveying and documenting the floral and faunal biodiversity of the PFAs under the jurisdiction of the FD as well as that of the community conserved

forests in the CHT. This project will establish a national database of biodiversity resources found in the forests of Bangladesh.

Climate Change Adaptation Initiatives

The Government of Bangladesh signed the UNFCC in 1992 and ratified the same in 1994, enabling the country to benefit from the UNFCCC sponsored initiatives on climate change mitigation and adaptation programs.

In 2005, the Government of Bangladesh launched the National Adaptation Plan of Action (NAPA), which identified 15 priority activities, to combat the impacts of climate change in Bangladesh, including general awareness raising, technical capacity building and implementation of projects in vulnerable areas. The Bangladesh NAPA included priority action for all relevant sectors: agriculture, fisheries, forestry, water development, health, infrastructure development, communication, food security and disaster management. The planned forestry sector activity included reducing climate change hazards through coastal afforestation with community participation (MoEF, 2005).

In 2009, the Bangladesh Government prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP). The BCCSAP is a 10-year program to build capacity and resilience within the country to meet climate change challenges over the next 20-25 years in 6 thematic areas, namely (a) food security, social protection and health, (b) comprehensive disaster management, (c) infrastructure development, (d) research and knowledge management, (e) mitigation and low carbon development, and (f) capacity building and institutional strengthening (MoEF, 2009).

Based on NAPA and BCCSAP, concerned agencies of the Government have undertaken various programs and projects on climate change adaptation. The adaptation activities include establishing/strengthening systems for dissemination of early warning information among vulnerable communities, establishment of multi-purpose flood/cyclone shelters in vulnerable areas, raising homesteads in char areas, strengthening of research and extension program on developing saline, flash flood, drought crop varieties and cropping systems. Besides the government agencies, NGOs are also involved in such activities that are supported by a number of donor agencies.

In 2009, Bangladesh established a Tk 7.0 billion Climate Change Trust Fund from its own sources for the implementation of the BCCSAP. The Trust Fund is managed by the Ministry of Environment and Forests (MoEF).

In June 2010, the Government of Bangladesh established a multi-donor trust fund, called 'Bangladesh Climate Change Resilience Fund' with an initial amount of $ 110.2 million contributed by the United Kingdom ($86.7 M), Sweden ($11.5 M), EU (10.4 M) and Denmark (1.6 M). The Fund will support implementation of the BCCSAP by assisting vulnerable communities in adapting to climate uncertainty and changing agricultural conditions with technical support to be provided by the World Bank. The latter has pledged to provide approximately $ 800 million in the next four years for Bangladesh's Climate Change Strategy and Action Plan, especially for investments in water resource management (embankments, river conservation, etc), agricultural adaptation, emissions reduction, and disaster preparedness. The World Bank has already made a number of large scale investments in climate change-related operations owned and implemented by the government of Bangladesh like the Emergency Cyclone Recovery Project (establishment of embankments, cyclone shelters and warning systems) and National Agriculture Technology Project, which is focused on agricultural adaptation (The Daily Ittefaq: 2 June, 2010).

In the forestry sector, FD undertook its first climate change adaptation project under the NAPA in 2009. The project titled, 'Community based adaptation to climate change through coastal afforestation', funded by UNDP-Global Environment Facility (GEF), seeks to reduce vulnerability of coastal communities to the impacts of climate induced risks in 4 pilot sites (sub-districts) in the coastal districts of Barguna, Bhola, Noakhali and Chittagong. The project, being implemented by the FD in partnership with local NGOs, has plans to establish 7,000 hectares of mangrove and non-mangrove plantations, which will sequester 6,10,000 tons of carbon and will diversify livelihood of about 85,000 people through cash-for-work and training on nursery and plantation work.

In fact, the FD has been establishing coastal plantations with the objective of saving lives and properties from tidal surges and cyclones in the costal

frontline of Bangladesh since the 1960's. By 2007, the FD completed a total of 151,000 hectares of coastal plantations (under different projects) along the 610 km coastline, of which 45,000 ha were surviving in 2007 (FAO, 2007).

Climate Change Mitigation and Carbon Forestry Initiatives

Bangladesh has undertaken a series of mitigation measures to contain emissions though it is under no international obligation to do so given its negligible share in the global GHG emissions (only 0,14%). Some of these are aimed at exploiting the carbon trading opportunities provided by the UNFCC initiatives, namely the Clean Development Mechanism (CDM) and Reducing Emissions through Deforestation and Forest Degradation (REDD).

Since 2004, the Designated National Authority (DNA) for CDM projects in Bangladesh has approved eight projects, of which only two have got CDM registration. The two registered CDM projects (each with an eight-year duration) are on organic composting of municipal wastes, implemented by the Waste Concern of Bangladesh and financed by the Worldwide Recycling (WWR) of the Netherlands. The projects in pipeline are on landfill gas recovery, promotion of solar home systems (SHS), promotion of energy-efficient compact fluorescent lamps, and reducing electric energy consumption in industries (http://cdmbangladesh.net; Enayetullah & Sinha, 2010).

Despite having a vibrant afforestation program, Bangladesh unfortunately does not have any afforestation-based CDM project as yet. However, it is registered for the UN-REDD program and the Forest Department (under IPAC project) is currently developing three forest carbon investment projects aiming to access the REDD facilities (IPAC, 2011). The projects are: (a) the Sundarbans REDD+ Project, (b) the Chunati Wildlife Sanctuary Reforestation Project; and (c) an innovative forest carbon sequestration initiative that bundles efforts in seven PFAs into a single project.

The Sundarbans REDD+ project involves conservation of 4,12,000 hectares of natural mangrove forests with an emission reduction target of 52 million tons of carbon.

The Chunati Wildlife Sanctuary has an area of 9000 hectares and the project will involve restoration of degraded areas of the forest through participatory afforestation, establishment of a sustainable management plan for the forest, promotion of AIG activities among the communities living around the PFAs and carbon trading under the REDD facility (Forest Department, 2011). The project seeks to increase the carbon stock of the forest by about 43,000 tons per year.

The project on carbon sequestration in seven co-managed PFAs (Dudpukuria-Dhopachari Wildlife Sanctuary, Fasiakhali WS, Teknaf WS, Rema-Kalenga WS, Inanai National Park, Medhakachapia NP and Sitakunda Botanical Garden & Eco-park) involves a bundle of activities including reforestation, livelihood improvement trough community participation in forestry activities and conservation of flora and fauna through various measures including habitat improvement.

Presently, the Chunati Project is co-financed by the German Development Cooperation Agency, GIZ and the USAID-funded IPAC project, while the other two projects are funded by the IPAC project.

In 2010, the FD undertook seven projects, worth Tk 778.5 million (USD 11.12 million), using the Climate Change Trust Fund of the Bangladesh Government. The projects include: (a) production of planting material for afforestation and reforestation activities, (b) buffer zone plantation in the protected forest areas in the central zone, (c) restoration of degraded forests through participatory reforestation, (d) embankment and charland plantation in coastal areas, (e) conservation of Sundarbans and promotion of its ecotourism demand, (f) establishment of a forest information generation and networking system and (g) establishment of a Botanical Garden (in Chittagong) for carbon sequestration.

Integrated Resource Management Approach

With necessary technical support mobilized under the IPAC project, the FD has developed a draft 'Integrated resources management plans for Sundarbans'. This plan covers the entire Sundarbans, including three PFAs, the remaining parts of the reserved forests and the buffer landscape zone (a 10-km strip bordering the PFAs and reserved forests). It includes aspects of biodiversity conservation as well as sustainable harvest of timber and non-timber forest products, enhanced protection measures and capacity development of the FD. Considering the live-

lihood requirements of the nearly one million poor people who are directly dependent on the Sundarbans for their livelihood, the integrated resources management plan includes social forestry and fisheries activities in the landscape zone as well as various social safety-net programs (VGD, VGF, Food for Work, etc.) that the government has been implementing for the extreme poor and distressed people of vulnerable areas. The management plan prescribes Annual Allowable Cut, silvicultural system, length of rotation, minimum diameter size of harvestable trees and the number of seed trees to be left per hectare for different mangrove species and for the mixed stands. The management plan has also recoded the carbon stock in the Sundarban in 1997 (31.4 million tons of Carbon or 115 million tons of CO2 equivalent) and 2010 (31.4 million tons of Carbon or 115 million tons of CO2 equivalent) for potential use in developing a REDD+ project (FD, 2010b).

Gaps and Bottlenecks in Current Initiatives

All the policies and plans made by the Government in order to better conserve the forest biodiversity resources look very good on paper. But there has been very little positive impact in the field due to lack of proper implementation of the policies and plans. In most of the state owned forests, including the protected areas, illicit extraction of timber, bamboo and other minor forest products, and incidence of forest fire have remained high. Constraints of the FD such as inadequate staff and logistics facilities are recognized as the main causes of such failure in forest protection. There are also other systemic causes which are not generally taken into consideration. The most important gap in the problem analysis and development planning is the failure to give due consideration to the demand and market factors that contribute to illicit extraction of forest products.

A case in point is the Chittagong and Cox's Bazar forest divisions, where country bean and betel leaf are cultivated extensively. Both require huge quantities of bamboo or wood sticks providing a vibrant market for such materials. There are thousands of poor people living near the forest who collect such materials from the forests and sell them in the local market on a daily basis. Due to heavy competition, they harvest immature culms of bamboos, which leads to permanent loss of the groves and requires people to travel deeper and deeper into the forest in search of the remaining groves. They also cut saplings of naturally regenerating trees as well as those in young plantations of the FD for the same reason. Moreover, the booming brick manufacturing industry of this region provides a big market for fuelwood, which allures poor people to extract fuelwood from the forests, often destroying planted and naturally regenerating saplings. No wonder afforestation and forest conservation efforts hardly succeed in this region. Participatory forest conservation and social forestry activities generally create alternative livelihood opportunities for a very limited number of households and the non-participants continue to rely on their illicit forest product extraction activities for their livelihood based on the unmet demands of the market.

It is realized that until effective alternative materials or technologies are available to the country bean and betel leaf farmers and brick kiln owners, it would be very difficult to restore and conserve the forests of the Chittagong and Cox's Bazar regions. Agricultural research and extension interventions are needed in order to identify and promote alternative cropping systems (which should be more profitable than the existing cropping practices). Alternatively, application of preservative treatment to the bamboo and wooden sticks used by the country bean and betel leaf farmers should be vigorously promoted in the said region. This technology is already available with the Bangladesh Forest Research Institute. Similarly, manufacturing of concrete building blocks may be promoted in the region in order to replace the demands for bricks so as to reduce the demand for fuel wood. Such solutions involve decision making at the highest level of the government and inter-agency collaboration and coordination at the implementation level.

In case of the planning initiatives for REDD projects, the efforts are limited to PFAs. On the other hand, the village forests (homestead forests and trees on cultivated lands) hold much more amount of carbon (277 million tons) than the state forests (139 million tons) (FAO, 2007). The National Forest Assessment Process may provide the basis for planning the REDD project on village forests as it would provide periodic data on the carbon stock in different types of forests, including village forests.

Conclusion

The CDM and REDD programs provide the opportunity to earn foreign currency through selling of carbon credits. But the processes are quite

complicated and involve high transaction costs due to the requirement of engaging designated specialized organizations (independent operational entities) for the validation of project proposals and verification of project implementation processes and outputs. Therefore the financial viability of REDD projects is yet to be ascertained. Nonetheless, the remaining forests of Bangladesh need to be conserved for sustaining the various ecosystem services and the livelihood support the forests provide to the local communities and to the nation at large. Accordingly, sustainable multiple use and biodiversity conservation should be the main objective of forest management plans although carbon trading opportunities should also be explored for added benefit.

The integrated resource management plan developed by the Bangladesh Forest Department for the Sundarban forests might be a good model of sustainable multiple-use forest management. However, the success of the plan will depend on a number of factors such as necessary capacity development (staff, logistics) of the Forest Department, collaboration of other agencies and peoples' representatives and, above all, political will of the government to provide good governance and an enabling environment.

The co-management system being tried in Bangladesh would hopefully be effective in sustainable management of the protected areas as it involves local communities as well as administrative, law enforcement, technical support agencies and market actors in the forest management activities and also focuses on developing alternative livelihood opportunities for the forest dependent people. The creation of community's 'Revolving Fund', as done by the Arannayk Foundation, is an effective strategy of motivating and enabling the forest dependent people to support forest conservation. However, more financial resources are needed for this purpose.

Moreover, the government and other concerned development organizations should undertake/strengthen a number of other initiatives in order to ensure long-term sustainability of the forest biodiversity resources of the country. Some of them are:

- Strengthening research, monitoring and documentation activities on biodiversity resources of the Bangladesh forests;
- Strengthening habitat restoration programs for the endangered wildlife species of Bangladesh;
- Joint planning, technical collaboration and coordinated program implementation with neighboring countries (India, Myanmar) for the conservation of tiger, elephant and other wildlife species having trans-boundary habitat;
- Promulgation of laws providing perpetual right to the concerned indigenous communities of the CHT to conserve the community conserved forests;
- Promoting use of metals (steel, aluminum) and plastic in building construction and furniture making;
- Promoting manufacturing and marketing of concrete blocks, in addition to stricter control of brick manufacturing, in the forest zones;
- Extension of appropriate technologies such as preservative treatment of bamboo and wood and alternative crops and cultivation technologies in order to reduce use of bamboo and wood (poles, sticks) in agricultural activities in the forest zones; and
- Extending education and family planning programs among the communities living in and around the forests in order to reduce extraction pressure on the forests in the long run.

Last but not the least, the carbon forestry initiatives should include exploring the possibilities of developing a REDD project on the village forests, which constitute the biggest repository of carbon (65% of total stock) in Bangladesh and are managed in a sustainable manner by the owner households.

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Criticality of Commons - Role of Forest as Food Resource

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Introduction

It is important to understand the strong linkage that exists between food security, forest and resource conservation. Studies conducted over a decade in India clearly point to the fact that a majority of people in this country survive within a biomass based subsistence economy (Agarwal, A & Narain, S, 1991). Forests form a major source of food for many communities residing in rural areas across the country. Communities residing on the forests fringes are the most dependent on it. Years of close association with forests not only define the cultural heritage of the local communities but also provide their livelihood needs. This case of Godipokhari village in central Odisha, (India) is a perfect example of a community's dependency on the forest resources.

A study was undertaken in order to assess the extent of dependency for livelihood and survival of these communities on the forest. The study primarily examines forest produces collected by the local communities, which meets their food requirements and supports them during periods of stress as agriculture provides them food for only three to four months a year. The study was conducted through focused group discussions and participatory observations. Discussions were also conducted separately for men and women across different seasons to collect as much of information as possible.

Godipokhari is a small tribal village in Kamakhyanagar block of Dhenkanal district in central Odisha. It has a total of 35 households with a small population of around 200 individuals belonging to the Juang community, one of the primitive tribes of this region. The village is situated on the periphery of "Maula Bhanaja" reserve forest range, where the local community has been protecting around 200 hectare of forest for the past twelve years. Along with the reserve forest, they are also protecting a 34-hectare patch of Gramya jungle (village forest).

The local community has led a nomadic life living in and around the forest and migrating from one place to the other. However, with changing times, the dwindling forest base and restrictions on access to forestland for practicing shifting cultivation compelled them to settle down and take up permanent small scale agriculture. Most households in the village are either landless or marginal land holders having rights over a very small patch of agriculture land, which cannot sustain them for the whole year. Therefore, they earn their living mainly from the forests and wage labour. They depend largely on the forest to meet their livelihood needs. It was found that the community collects a wide range of products from the forest which includes mushrooms, leafy vegetables, fruits and nuts, roots, tubers and insects which they consume mostly during lean season and stress periods.

Out of the total 60 items they collect from the forest, only five are sold in the market; the rest are used for domestic consumption. The villagers collect around 18 varieties of wild mushrooms from the forest, which supplements their vegetable requirements for four to six months. If the wild mushrooms collected from the forest by the entire village were sold at the local market price, it would amount to INR 33,005/- per annum. Besides mushrooms, they also collect 16 varieties of leafy vegetables during different seasons of the year, which amounts to INR 12,651/- per annum. They also collect from the forest under their protection 15 varieties of fruits and nuts worth INR 34,410/- per annum and 6 varieties of tubers and 2 species of insects worth INR 14,803/- per annum purely for domestic consumption. The total value of the forest products collected by the local community, if calculated as per prices prevailing in the local market, thus amounts to INR 94,869/- per annum which means that the per-household consumption value of the forest products amounts to INR 2,710/- per annum.

Non Timber Forest Products (NTFPs) like Sal leaves (Shorea robusta), Tendu leaves (Diospyros melanoxylon), Kankoda and Mahua seeds (Madhuca indica) are also collected by the local community for sale in the local market. They earn about INR 1,17,600/- from the sale, which contributes significantly to their cash income. Per

Details of Mushroom Collected

Sl. No.	Name of the mushroom	People involved in collection			No. of days of collection	Amount of collection per day (Kg)	Month of collection	Cost in the local market	Total cost
		Men	Women	No. of HH					
1	Jamu	6	-	4	5	2	June 1st half	5	300
2	Anthu	10	22	35	15	0.5	June 1st half	4	960
3	Rootuka	27	35	35	15	1	June 2nd half	4	3720
4	Rakan	27	33	35	15	0.5	June 2nd half	4	1800
5	Haladiapicha	22	32	35	7	1	July 1st half	5	1890
6	Bali	12	35	35	10	0.25	July	10	1175
7	Bhanu	30	30	35	12	1	July 2nd half	5	3600
8	Budhabudhi	22	18	35	2	0.2	July 2nd half	4	64
9	Sinduria	32	35	35	8	1	Aug 1st half	4	2144
10	Gener	22	48	35	2	0.2	Aug	4	112
11	Budamulia	35	35	35	6	1	Aug	4	1680
12	Hunka	35	35	35	6	1	Aug 2nd half	10	4200
13	Khuda	35	35	35	4	0.25	Aug 2nd half	10	700
14	Paturia	35	35	35	11	1	Sept 1st half	4	3080
15	Bahalia lia	28	35	35	5	1.5	Sept 2nd half	4	1890
16	Aswina mela	15	25	35	10	1	Oct 1st half	5	2000
17	Samardama	28	32	35	9	1	Oct 1st half	6	3240
18	Khunta	28	2	30	5	0.5	Oct 2nd half	6	450
									33005

household cash income from the sale of such products is about INR 3,360/- per annum. When a household study was conducted to understand the income-expenditure pattern of a typical household in the village, the average household income (including the income from NTFP sale) was found to be around INR 16,000/- per annum and the expenditure was found to be around INR 18,000/- per annum. The expenditure incurred by the local communities thus exceeds their income. But for the availability of various forest products for consumption and sale, which significantly reduces the vulnerability of the local communities to stress during lean seasons, things could have been much harder for them. It would have put an additional burden of INR 2,710/- per annum on each household. In a worst case scenario, the entire community could be deprived of their livelihood and survival. In this setting, natural resources such as forest and water from within the physical and natural environment plays a crucial role in sustaining their subsistence livelihoods.

Conclusion

Forests not only provide the local communities their basic needs but also sustain and secure their lives. It significantly supplements their incomes while contributing to their food security. The growing trend towards domestication of some of the tubers can be seen as a positive step in diversification of the food source so as to meet the growing demand and also to maintain the fragile web of life. However, to ensure forest based services over a long period of time even while balancing the competing interests from within and outside the community, it is imperative to work on other complementary resources such as agriculture, water, livestock, horticulture etc. This case study clearly points to the need for holistic planning of resources and diversification options in a way that different components of ecosystems are made productive and address the varied needs of the community.

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Details of leafy vegetables

Sl. No.	Name of the leafy vegetables	No of days of collection		No of days of collection	Amount of collection per day (kg)	Month of collection	Cost in the local market per kg	Total Cost
		Men	Women					
1	Bhadabhadalia	-	35	15	0.2	Apri 1st half	10/-	1050
2	Uruguna	-	28	13	0.25	March	8/-	728
3	Phandi	-	30	5	0.5	June2ndhalf	12/-	900
4	Mamuri	-	35	12	0.2	May & June	8/-	672
5	Barada	-	12	6	0.5	Feb 2nd half	15/-	540
6	Giliri	-	15	2	0.25	March	10/-	75
7	Chapata	-	8	3	0.1	Dec2nd half	20/-	48
8	Sukhua	-	15	12	0.25	Oct 2nd	8/-	360
9	Kenasuri	-	35	30	1	Jun & July	2/-	2100
10	Lahanga	-	35	30	0.5	July	2/-	1050
11	Bhuin Chakunda	-	30	30	0.5	July	4/-	1800
12	Puni	-	28	25	1	July	0.5/-	350
13	Lutuni	-	2	1	1	Aug	4/-	8
14	Sunusunia	-	30	20	0.1	November	15/-	900
15	Rangabati	-	32	30	0.5	August	3/-	1440
16	Yogiyogiani	-	35	12	0.25	Sept2nd half	6/-	630
							Total	**12651**

Details of tubers and insects

Sl. No.	Name of the tubers	No of people involved in collecting		No of days of collection	Amount of collection per day (kg)	Month of collection	Cost in the local market per kg	Total Cost
		Men	Women					
1	Pitalu	28	30	15	2	September	4/-	6960
2	Pani alu	24	30	12	2	January	4/-	5184
3	Gadaba	6	0	1	3	August	3/-	54
4	Tunga	3	3	1	2	October	4/-	48
5	Kanta alu	12	0	5	2	Sept	5/-	600
6	Sutalu	4	1	1	1	September	6/-	30
	Name of the insect							
1	Red Ant	12	18	12	.75	May	6/-	1620
2	Carpenter Ant	15	17	4	.20	July	12/-	307
							Total	**14803**

Details of Fruits & nuts

Sl. No.	Name of the fruit	People involved in collection			No. of days of collection	Amount of collection per day (Kg)	Month of collection	Cost in the local market	Total cost
		Men	Women	No. of HH					
1	Mamuri	8	22	35	10	0.1	August	5/-	150
2	Char	10	35	35	8	0.25	April	4/-	360
3	Kendu	15	12	35	5	2	April	2/-	540

The winged visitors of Rugudipali

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Introduction

Government of India and Orissa has established many national parks and sanctuaries for the conservation of forests and wildlife. Many national level Acts, rules and policies have been enacted for the conservation of forests and wildlife in India, ironically these gazette acts and rules have proved abortive to a large extent. On the other hand simple verbal rules of the local villagers/communities have proved to be more effective for the protection and regeneration of vast areas of forest as well as wildlife. Orissa has the unique glory of having more than 10000 local village/communities involved in protection of 2 million hectares of forest area (RCDC, 2009).

Besides conservation of forests people of Orissa have been involved in the protection of some unique and endangered wildlife for their own interest or for the environmental sustainability. It was found that some local communities protect wildlife for spiritual and cultural reasons as local communities of Orissa are known to have strong inclination towards spiritual values (Gouda A. et al, 2010). As a result of which Orissa is known to have many sacred groves and interesting instances of wildlife protection by the local communities. The conservation or the protection areas usually includes the forest or private lands. There are many examples of people voluntarily giving away their private lands to create a new or regenerate the degraded forest.

Community Based Conservation at Rugudipalli Village

Rugudipalli is one of the Community based conserved areas of Orissa where the arrival of Asian Open Bill Storks is believed to coincide exactly with the advent of monsoon season in Orissa.

Some important Community based Conservation areas (CBCA) of Orissa

Name of the village/CBCA	District	Species conserved
Rugudipalli	Bolangir	Asian open billed stork (Anastomus oscitans)
Budhikhamari	Mayurbhanja	Peafowl (Pavo cristatus), Rhesus macaque (Macaca mulatta)
Kalahandi	Kalahandi	Rhesus macaque (Macaca mulatta), Spotted deer (Axis axis)
Vetanai, Cheramaria, Polosara, Pakidi	Ganjam	Black buck (Antelope cervicapra), Peafowl (Pavo cristatus), wild boar (Sus scrofa)
Mangalajodi, Chilika lake	Khurda	Migratory birds
Kedndujhar	Kendujhar	Pangolin (Mamalia Pholidota)
Humma	Sambalpur	Soft shelled turtle (Asperadetus gangeticus), Mahashir Fish (Tor mahanadicus)
Kodbahal	Sundargarh	Spotted deer (Axis axis)
Dhanamandal	Dhenkanal	Asian open billed stork (Anastomus oscitans)
Rusikulya river mouth	Ganjam	Olive ridley (Lepidochelys olivacea)

Ref: Subudhi D, 2011; Yenderpati G R et al, (undated)

The Asian Open Bill Storks are considered as the harbingers of monsoon season. It is a belief among the local villagers for the past 20 years which was based on their experience. When they see an Asian Open Bill Stork hovering over their village, they guess immediately that monsoon is on its way and jump start cultivation activities. This is the common mindset of every resident of Rugudipali, a remote village located about 25 kilometers away from Balangir town in western Orissa.

Rugudipalli has now become a laboratory for researchers studying wildlife and bird watchers who take great pleasure watching these magnificent winged visitors. Every villager takes pride that their village is one of the best known examples of co-existence between humans and wildlife.

The arrival of birds and the belief of villagers

The year was 1990, when no signs of monsoon were observed even at the end of June, farmers of the village panicked fearing an impending drought. "What will happen if there are no rains?", "villagers were afraid how they will survive?" But all their apprehensions and gripping anxieties vanished when a flock of Asian Open Bill storks suddenly appeared hovering over their village for 2/3 days. In the next 5-6 days, another flock of Asian Open Bill Storks were seen perched on a huge 'Aswatha' tree on the village outskirts close to the forest. Villagers were amazed to see these huge birds which were never seen before. Miraculously, the monsoon arrived within two days of the arrival of winged visitors. Since then, the villagers have come to believe that the advent of Asian Open Bill Storks brings rain to their village.

This did not happen once but several times which further cemented their faith and belief. When locals are convinced it becomes a local culture. This is what happened at Rugudipalli. This belief was further reinforced among the farmers when there was a bumper harvest that season. During their stay at village, the Asian Open Bill Storks lay eggs, reared their chicks and left for their summer destination.

The next year, the villagers got apprehensive again when the "Kakda" (local name for the Asian Open Bill stork) did not appear till June. But they were proved wrong when the Asian Open Bill Storks were seen hovering in the sky. The storks arrived at the village in the month of June and stayed there till 'Kartika Purnima' in the month of October that year. The villagers observed a slight increase in the number of the birds which arrived the following year. The phenomenon continued and the number of birds arriving there kept increasing year after year. Villagers say that only one tree was sufficient for them for nesting when they arrived here initially. But now, they are occupying more than 10-11 trees.

Protection Mechanism

The arrival of Asian Open Bill Storks to the village has prompted the members of the forest protection committee constituted in the village to spring into action. The committee members have been protecting the whole forest through 'Thengapali' (patrolling the forest with a baton made of Bamboo). Every day 'thengapalias' (usually a small group of two/three individuals) patrol the forest on a rotation basis to guard and protect the forest against fire, illegal theft and timber mafia. The 'Palias' patrol the forest even during rains. Interestingly, forest protection and the protection of the Asian Open Bill Storks go hand in hand. The villagers of Rugudupalli believes that "wild animals and birds are an integral part of the forest; hence, they have been protecting them as a whole. The villagers keep a hawk eye on the nesting trees in the village.

No one, including children of the village, hunts, hurts or disturbs these birds. The most interesting part is that the local farmers do not use chemical fertilizers and pesticides in their agricultural lands which could harm these birds. According to the villagers, "Asian Open Bill Storks are very clever and sensitive birds; if they sense any threat to their habitat, they may leave the village and move on. Besides, it is also very difficult to catch them using a net." If any trespasser or an outsider tries to hunt these birds, the locals nab them and impound the catch, besides penalizing the perpetrators with a fine of INR 1500/- for each bird killed. The community has banned the possession of guns, catapults in and around the nesting area and cutting of trees or kindling fire in the nearby forest.

The villagers regularly organize village meetings to discuss the issues of forest conservation and wildlife protection. If anybody was found to have violated the rules and regulations framed by the forest protection committee, they are penalized during these meetings. With the support of Gram Panchayat (GP), the neighboring villages of Bhimdungri, Khalbandh, Bandhpali, Upparjhar and Mukundpur were also sensitized on the above issues by the locals. Through "Dengura" (traditional way of calling an assembly by beating drums), the GP has created awareness among the

people of the surrounding villages about the need to conserve the Asian Open Bill Storks and their natural environment. It is a conscious effort made by the GP because these birds fly for 15-20 kilometers in search of food and the surrounding villages fall within this radius.

Instance of Co-existence

The wildlife and the forest departments and some of the researchers are of the opinion that there is hardly any possibility of co-existence between humans and wildlife. But Rugudipali village repudiates their opinion. The villagers have proved the Forest Department wrong. Communities in Orissa have proved that they can protect and manage their forests in a better way than the forest department. The community-based wildlife conservation at places like Rugudipalli is a good example of the same. The local community here has been protecting the endangered Asian Open Bill Stork for the last 20 years very effectively and efficiently.

According to the villagers, the birds roost and lay eggs on a tree that stands adjacent to an agricultural field. The birds are neither afraid nor disturbed even when the villagers plough their agricultural lands! The villagers even go close to the tree to count the number of nests. The birds don't get panicky at the approaching local villagers and nor do they take to flight. But what is remarkable is that the moment they see outsiders closing in on the nesting trees, they take to sky immediately! The villagers proudly say; "The Asian Open Bill Storks are very familiar with us and are acquainted with our voices." The birds and the villagers share a strange yet interesting camaraderie between them. The noisy hubbubs of 'Gendalia' (local name for Asian Open Bill Stork) flocks disturb the tranquility of the village and the stench of their guano makes it difficult for the residents to pass by these trees. But the villagers don't mind these minor irritants. Can there be a better example of human-wildlife co-existence than this?

Bird Counting

The villagers have never been trained in scientific techniques of bird enumeration. But they are still efficient to count the number of birds through their own traditional method. It is well nigh impossible to count the exact number of nesting birds, but the villagers have developed their own, ingenious method of arriving at an approximate figure. They count the number of nests with the assumption that two Asian Open Bill Storks reside in a nest (one male and a female). According to the villagers, the female lays a clutch of 5-8 eggs in the nest. The villagers count the chicks and add them to the number of existing breeding pairs. For 16 years now, the villagers have been counting the birds through this method. In the year 1990, when the Asian Open Bill Storks arrived at the village for the first time, they occupied only one tree. But now, they are nesting on 10-11 trees. The number of birds visiting the village has also increased correspondingly and now stands at about 15,000. It is nothing short of phenomenal!

Conclusion

For 20 years since the first arrival of the birds, the village has transformed itself into a community based bird sanctuary. But still, the local forest department does not show any interest to foster the efforts of the locals. Though locals use their own techniques of bird enumeration, they still feel the need and support of the forest department to hone their bird enumeration and wildlife management skills. Scientific research will no doubt go a long way in generating more information and knowledge about nurturing the birds. Local villagers thank the neighboring villages for their unstinted cooperation. They realize that it is almost impossible to create a community bird sanctuary without their assistance and cooperation.

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