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Sustainable Forest Management Practices and the Recent Experience of Birbhum District, West Bengal: Some Critical Observations

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Sustainable forest management refers to both the expansion of forest area and the conservation of biodiversity. The incorporation of forest-user groups into forest management practices under the social forestry scheme has led to an improvement of the canopy cover over the years but the protection of biodiversity has been at stake. To understand the reason behind this dilemma, an in-depth study of such user groups was conducted in a few selected forest patches of the Birbhum district of West Bengal. The study reveals that while the incentive package designed for forest protection is encouraging monoculture plantation, a gradual transition of culture as well as livelihood practices of the forest-dependent people has adversely affected their motivation for conservation of forest biodiversity. Therefore, need arises to design new strategic intervention policies that can incentivise forest protection without compromising biodiversity conservation.

Key Words: Joint Forest Management (JFM), Livelihood protection, Biodiversity conservation, NTFP, Birbhum

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1. Introduction

Sustainable Forest Management, as defined by the General Assembly of the United Nations, adopted in December 2007, is a dynamic and evolving concept which aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations. However, environmental management demands an impeccable and accurate knowledge base of the physical interactions in nature and a constant effort to reach acceptable and tenable trade-offs between what is essential now (short-term benefits) and what is needed to secure the future (long-term benefits) (Aggarwal, 1992). In developing countries like India, where hunger and poverty are still the order of the day, the purpose of environmental management is more to secure the present. The challenge is, therefore, on how to use the environment at increasing levels of productivity and in a sustainable manner (Aggarwal, 1992). This requires balancing the demand for natural resources with the protection of ecosystems that also contribute goods and services necessary for economic growth. This, in turn, depends upon the effective and systematic integration of economic development with social equity and environmental protection (Figure 1).

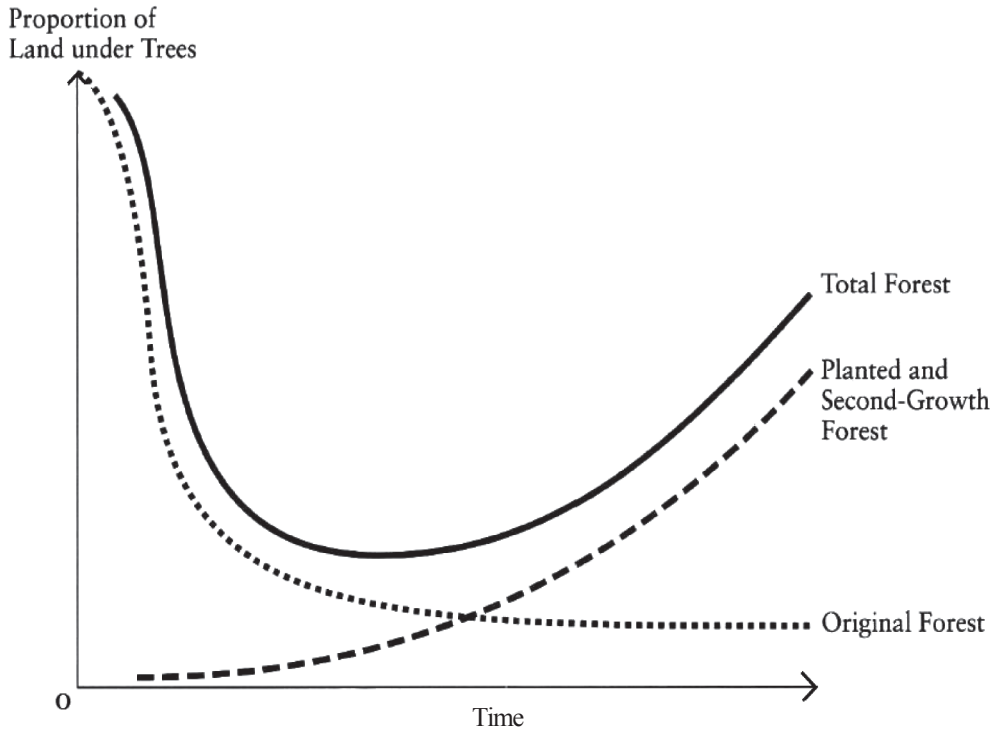
Figure 1: Three Goals of Sustainable Forest Management

Source: Adapted from Condrea and Boston (2008).

From time immemorial the aboriginal people were the original forest inhabitants whose livelihoods were based on hunting and gathering for the supply of food, fodder, fuel-wood and even cosmetics (wild gems) from the woods (Ghosal, 2011). Their living and livelihood were so intricately woven with the forest and its product variety through customs and culture that it acted as the niche for them, who not only extracted forest resources but tried to maintain its ecological balance through different rituals and practices (De, 2012). Tagore (1915) pointed out, "in India it was in the forests that our civilization had its birth". Vedic literature also indicates that forests were held in high esteem and *ashrams* (hermitages) of the sages existed within these forests. Thus there was an integrated and harmonious coexistence of man and nature, indicating a strong connection between the social and ecological aspects of sustainable forest management.

This traditional symbiotic relationship between the users and the resource base of the forest was one of the stimuli to the introduction of the participatory approach in 1988, popularly known as the Joint Forest Management (JFM). It was since then that the active involvement of the user group known as the Forest Protection Committee (FPC) was observed in managing forest resources along with the government forest officials. However time has flown through several histories from Vedic times to 1988 and as Robson and Nayak (2010) have mentioned that it cannot be denied that certain demographic, cultural and environmental changes have altered the configuration of institutions and values that characterized traditional resource-dependent communities and, in turn, reduced their willingness for forest conservation. The livelihood needs have changed through centuries from ecological to economic. This change in need was appropriately taken care of while designing the incentive schemes for participation in FPC such as the offer of 25 per cent share of the harvest proceeds. This incentive design has provoked all the forest managers for monoculture plantation of trees like *eucalyptus* and *acacia* species in deforested lands because of their relatively faster maturity period with higher market demand coming from the pharmaceutical, artificial fabric and paper industries. Though their alkaline property destroys the ecological quality of forest floors, not much heed was paid to that biodiversity degrading aspect. Thus, altogether, the present forest management practice is focussing more on the economic and social aspects of sustainable forest management; the ecological diversity is certainly getting compromised. If the proportion of natural forest in the total forest area is taken as an indicator of biodiversity, the conflict between the expansion of area under forest cover and the conservation of biodiversity reserve can be depicted as an ever widening gap between the area under total forest and that under natural forest (Figure 2).

Figure 2: **Deforestation-Afforestation and Nature of Tree Cover**



Source: Adapted from Harris (2006).

In fact, there exists a conflict between the pattern of demand on forest and forest produce created by the livelihood-related activities and the conservation of biodiversity. Consequently there is neither *de jure* security rights defined for the forest fringe communities participating in the JFM programme, nor there is any *de facto* livelihood opportunities provided to make them feel fully protected (Sarkar, 2009). These crises faced by the nature and the society need to be addressed in conjunction. A conceptual framework is required for analysing the linkage between livelihoods and conservation.

Since all these issues deserve in-depth investigation, a micro-level study is appropriate here as it provides opportunity to have ground-level interactions with the people concerned. To collect fair and detailed information from indigenous local people through such interactions, the interviewer must be an insider in terms of ethnicity, community or locality. Also the possibility of

interview at grass-root level is easy if it is conducted in vernacular. So this paper is basically the interpretation of a primary survey conducted with local forest-dependent people in the Birbhum Forest Division of West Bengal (WB), India. Information was collected from households in the vicinity of forest and the data generated is composed of biodiversity documentation, nature dependent livelihood pattern, personal details of household members, conditions prevailing in the nearby forest-area, general awareness regarding forest variety, FPC-related facts, traditional knowledge flow and perception of local people on nature conservation strategies over time, space and cultural practices. Collating these data and the experience gathered from the field, an attempt has been made to indicate the design of new intervention strategies where incentives will be explicitly given to both livelihood protection and biodiversity conservation simultaneously and the nature of instrument(s) that would be acceptable to all stakeholders from their present economic locations.

The rest of the paper will be organized as follows: section 2 will discuss the present scenario of the forest management practices in West Bengal including the emergence of JFM policy and its loopholes, section 3 will describe the features of our field area and will talk about the survey design and questionnaire, section 4 will present the primary data and some exploratory analysis and finally section 5 will conclude the paper by providing an overall assessment.

2. Forest Management Practices: The Present Scenario

2.1 Emergence of Joint Forest Management (JFM) Policy

Though continuous deforestation and forest degradation leading to a decline in forest cover have long been sources of concern for policy makers in India, historically, Indian forest policies have alienated people from the forests, which resulted in tightening of control over forest lands through restricted access to forests and forest products (Yadama, Pragada & Pragada, 1997). Before the introduction of the British colonial rule, the people living near or inside forests in India were assumed to have customary rights of residence, cultivating, grazing, hunting and gathering forest produce (Banerjee, Ghosh, & Springate-Baginski, 2010). During the regime of the East India Company (1757-1857), these Indian forests were used as an important source of revenue with no policy or plan to protect the natural resources (Ghosal, 2011). After the transfer of power from the Company to the British Government in 1857, however, realization came on the strategic importance of timber supply and the threatening destabilizing effect that might be produced through rampant commercial exploitation by the timber merchants. Consequently, forests and grazing 'wastelands' were brought under

direct state control for their 'orderly exploitation' (Banerjee et al., 2010). However, emphasis was still not on protection and regeneration but on gaining maximum revenue from the forests. Since then, Indian forest policies have alienated people from the forests and this trend continued even after Independence (Yadama, et al., 1997). This resulted in an expansion of agricultural production, meeting of the industrial demand for raw materials, and the tightening of control of forest lands through restricted access to forests and forest products (Yadama, et al., 1997). The outcome led to an increasingly indifferent attitude amongst local people towards the forests and the Forest Department, thus bringing about a shift in traditional symbiotic relationships between the users and the resource-base of the forest, which culminated into rapid forest degradation. In this backdrop the participatory approach started with the realization that active involvement of the user group in managing forest resources and sharing the benefit generated there from would help the forest communities to identify themselves with the development and protection of forests. JFM was thus introduced in different states as a result of systematic attention to socio-psychological dimensions of work.

2.2 Effects of JFM: A Critical View

More than two decades have passed since the issue of the JFM circular by the central government, pursuant to which there had been 84632 JFM Committees covering 28 States in India (Basu, 2010). West Bengal has more than half of its forest area under such committees (Basu, 2010) and as on March 2011, there are 4,300 FPCs in the state, involving total number of 44,93,538 members, protecting the total forest area over 5,82,160.60 hectare (State Forest Report, 2010-11). This increase in the number of JFM committees could mean a positive trend towards decentralized, community-managed forest practices (Bose, Arts, & Dijk, 2010). However, the present scenario is far from satisfactory as the present model fails to recognise the specific needs and unique characteristics of forestd wellers, including the tribals. This inadequacy has encouraged having a fresh look at the whole approach. Some critical issues have been identified as detrimental to the project's thrust and, hence, needed to be highlighted in this context.

Firstly, it is difficult to compute the benefits of FPC as there is no existence of any clear starting point with transparent bookkeeping at the departmental level. Secondly, forest communities are primary collectors with only a passive role in the collection and marketing which is mainly done by the Forest Department (Sarkar, 2009). Thirdly, a share in final produce (obtained after several years of waiting) may not be sufficient in itself to motivate a community to embark on protection, as they need seasonal incomes. In the long run, it is the lure of obtaining livelihood products which attracts people to forests (Saxena, 1992).

Fourth issue relates to the design of incentives for forest protection to a FPC, i.e. enhancing the plantation of *eucalyptus, acacia,* and similar fast growing trees may be perceived as a direct influence of the promise of 25 per cent share of the harvest proceeds. Moreover, the forest officials still claim a monopoly of scientific expertise, refusing to entertain villagers' own ideas on species' choice, spacing, or harvesting techniques (Guha, 2001). Finally, there are also some socio-economic and political problems regarding this participatory forest management which even lead to failure of such practices in certain forest regions (Mukherjee, 1995).

Evaluation of the West Bengal Forestry Project conducted by the World Bank in 1995 have also found that though the project had exceeded appraisal estimates in rehabilitating large areas of degraded forests with peoples' participation, forest productivity did not increase to the expectation with only 50 per cent survival rates in plantations (Banerjee, 2004). Moreover, Sudha et al. (2004) have shown that in West Bengal, there has been an increase in the density of *acacia*, *eucalyptus* and *tectona* species with the decrease in regeneration of native species (Sudha et al., 2004). In a study on the jungles of south-west Bengal, Ghosh, Dutta, Yasmin, and Roy (2007) have come across with similar findings of monoculture domination in the new plantations raised by JFM during the last decade, and plantations raised by West Bengal Forest Development Corporation since 1999-2000 had less than 10 per cent of their areas under non-timber forest products (NTFPs) and miscellaneous evergreen species. However, Vinod Kumar Yadav, Conservator of Forests, Western Range, Government of West Bengal, has strongly claimed that the resolution for formation of FPCs has stressed on successful implementation of the programme for regeneration, maintenance and protection of only the degraded forests/plantations of the state as a whole for converting the areas into productive forests in south-West Bengal (Yadav, 2009). All these evaluative studies contain both positive and negative sides of the impact of JFM in West Bengal. However, there are hardly any such studies concentrated in the district of Birbhum, where due to large areas of forest degradation, afforestation has been practiced rigorously under the jurisdiction of the Forest Department over the past 10-15 years. JFM policies have been implemented and almost all villages in the vicinity of forest have members of Forest Protection Committees (FPC). A micro-level study on Birbhum district regarding the effectiveness of JFM would fill an important research gap.

3. Survey Design

3.1 Description of the Survey Area

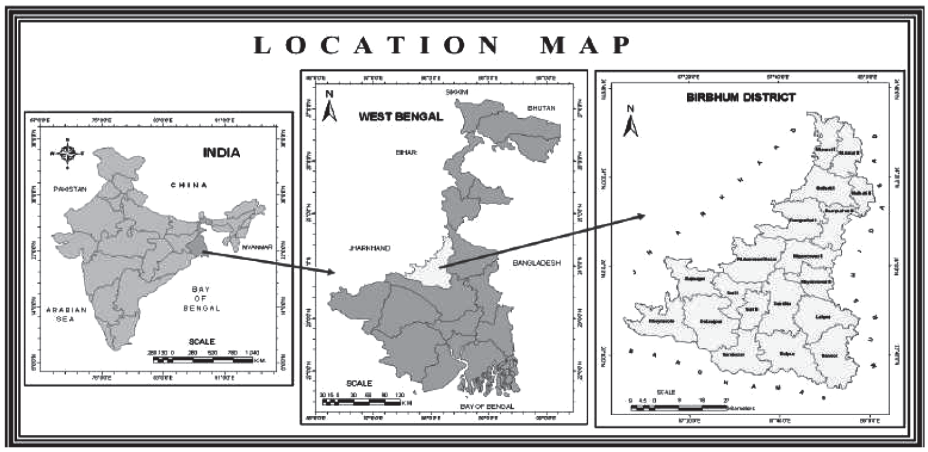
Birbhum is bounded on the north and west by the Santhal Parganas of Jharkhand

state and the district of Murshidabad and on the south by Burdwan, from which it is separated by the river, Ajoy (Figure 3). This district is eventually noted for its undulating topography and its cultural heritage which is unique and is somewhat different from that of the other districts of the state. In fact, in the native language of the region, the meaning of the term 'bir' is forest, and so, Birbhum is basically a land of forest. At present the district is predominantly agricultural and 3.51 per cent of total land area of the district is reckoned as forest land (Human Development Report, 2009). In fact, forestry is one of the main economic activity in this district. Among 425 small and micro enterprises and artisan units present over here, 145 depend on forest products like timber and wood pulp. There are 13 wood and wood-based furniture units and 132 paper and paper-product units existing in this district (Directorate of M & SSE., 2013).

3.2 Sampling Strategy

From the administrative perspective, this district is divided into 7 ranges (Bolpur, Md. Bazar, Rajnagar, Rampurhat, Sainthia, Dubrajpur and Suri) containing 19 beat offices. Among them, 6 beats under 5 ranges (Map 1) were randomly selected for the present study to cover 10 locales with the presence of active FPCs (Table 1), keeping in mind the variations in topographical properties, cultural heritage as well as nature of forest biodiversity. Ranges with limited forest cover were excluded from the sample.

Figure 3: Location of the Study Area



Source: Debnath and Mondal (2014).

Table 1: Surveyed Forest Areas in Birbhum

Name of the FPCs	Mouza	Beat	Range
Kheledangaadibasi	Kheledanga	Bolpur	Bolpur
Lohagodd	Benuria	Bolpur	Bolpur
Jamboni	Murgaboni	Illambazar	Bolpur
Bonvilla	Ramnagar	Illambazar	Bolpur
Laxmipur	Laxmipur	Illambazar	Bolpur
Bonsuli	Usardihi	Illambazar	Bolpur
Pachiara	Chandrapur-Srichandrapur-Bodaguri	Hetampur	Dubrajpur
Sultanpur	Sultanpur	L.N.Pur	Rampurhat
Asna-Sundarkhele	Asna, Sundarkhele	Aligarh	Rajnagar
Jethia-Rampur	Jethia	Mallarpur	Md. Bazar

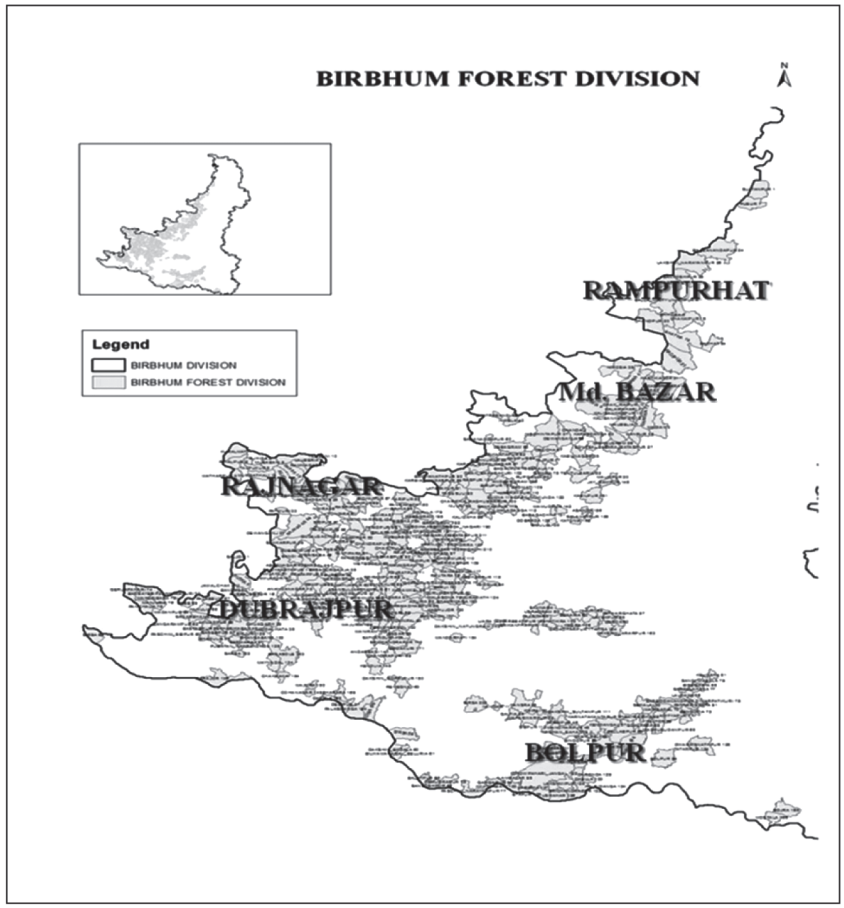
Source: DFO, Birbhum.

From each of the locations, ten households were randomly selected containing at least one family person as FPC member and to isolate the impact of FPC participation on forest-dependent livelihood, conservation of traditional knowledge and sustainable forest management, similar information was collected from ten households not containing any FPC member. Typical randomized household sample survey was conducted and information was collected from personal interviews made to a total of 204 households.

3.3 Questionnaire Design

The household survey questionnaires were designed in two types – one, for households containing at least one FPC member and the other, for the households having no FPC representation. Each of the questionnaires is divided into five sections pertaining to personal details of household members, condition of the nearby forest area, general awareness regarding the role of forest, role of FPC and the flow of traditional knowledge. The personal details comprising questions related to ethnicity/caste, occupational pattern, household structure and assets and forest dependence were collected. If the households were found to depend on forest then they were asked the questions related to their perception about the change in the forest condition over time. This section was designed to get the pattern of household dependence on forest – types of forest resources used,

Map 1: Surveyed Ranges of Birbhum Forest Division



Source: Aranya Bhawan, Government of West Bengal, 2012.

whether the resources meet up to their financial needs, etc. The general awareness section was basically designed to know whether the household is having the awareness of the importance of forest, the type of nearby forest area and the performance standard of the present practice of forest management. The last question was included only in the questionnaire designed for the non-FPC households. The section regarding information about FPC was deliberately made different for the two questionnaires. For the FPC households, questions were asked to know the motive behind taking up such membership and attempt was made to assess FPC performance in that area. For non-FPC members, questions like - do you think the forest cover has been protected since FPC formation; being a non-member, do you face any problem in collecting NTFPs;

why haven't you become a member still now, etc. - were asked to see whether the formation of FPC is taking care of the forest-dependent society as a whole or are creating a group of dissidents. The section related to traditional knowledge flow was common to both the questionnaires and was designed to check whether traditional knowledge has been conserved or not. These questions were asked to understand whether the knowledge of the forest-resource usage or its importance has passed from one generation to the next, whether currently there has been application of any such knowledge and to what extent. To facilitate the ease of data collection, the questionnaires have been developed in a bilingual mode. Finally, the data collected were interpreted and analysed by utilizing the direct, first-hand experience gathered from the field.

4. Data Analysis

4.1 Salient Features of the Sample

Nearly 63 per cent of the sampled households belonged to the scheduled tribe with around 49 per cent illiterate household head and 50 per cent holding the below-poverty-line (BPL) card. They are mostly engaged in traditional vocations with 56 per cent directly engaged in forestry- and agriculture-based activities.

4.2 Is the Present Policy Adequate?

Historically the forests of Birbhum remain covered with sal trees[2]. However, our survey found dominant presence of *eucalyptus* and *sonajhuri* with sal trees mainly present in *jahirsthan*[3]. Though the alien species have made the land patch a greener one, there were hardly any green undergrowth like grasses and bushes noticed in the ground area. The forest officers claimed that it is easy to plant these trees in barren lands as they are fast growing, tough and due to their allelopathic[4] nature they are not eaten up by cattle even in sapling stage. Also the timber value of these species adds up to the revenue generation of the Department. However, the views of the local villagers (both FPC members and non-members) were widely divergent, depending upon their culture, educational status, occupational pattern, etc. In general, it is observed that FPCs with greater

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[2]The forest areas that remained dense at the time of JFM emergence generally have not lost their density till now. However, the less dense or scarce forest patches are afforested with the monoculture plantation of non-native species.

[3]*Jahirsthan* is a sacred place of worship in traditional tribal culture; the tribals worship trees like sal.

[4]Allelopathy is a biological phenomenon by which an organism produces one or more bio-chemicals that influence the growth, survival, and reproduction of other organisms.

percentage of tribal population and high dependency on forest are more concerned with this trade-off between enhanced canopy cover and loss of biodiversity.

Due to a long tenure of deforested state followed by the monoculture plantation of alien species, forest resources have turn out to be inadequate to guarantee sustainable livelihood. Hence it is observed in FPCs like Jethia-Rampur and Sultanpur, that the once forest-dependent villagers have reduced the extent of forest dependence in their day-to-day living. Branches of sal trees, which are auspicious augury for tribal marriages and cremation ceremony, are available nowadays in markets to meet such demand. Local people have failed to recall the names of the extinct species as they have been lost long. Biodiversity documentation relating to present conditions in the surveyed forest area is reported in Table 2. Thus, there are push factors from inside the system which, in turn, is increasing the dependence of local people on external monetized economy. This transformation dampens their involvement and commitment towards forest protection irrespective of their level of awareness regarding the long-term consequences.

Table 2: Present Biodiversity Status at Birbhum

Species Break up					
	Birds	**Mammals**	**Fish**	**Insects**	**Other**
Fauna	Spotted dove, wild turkey, *balihans, saral, maurhen*, owl, *gurul*, bulbul, tailor bird, *dauk*, wild hen, *finge*, woodpecker, cuckoo, blue jay, kingfisher, parrot, moina, gundri	Rabbit, squirrel, jackal, *pansberal*, mongoose, *herol, khotash*, bat, wild pig	Rohu, mrigel, silver-cup, nylontica, hybrid *magur, bata*, tilapia	Honey-bee, termite, *laljieta, polu*, caterpillar, *bitichi, sonapoka, tassarguti*, scorpion, spider, dung beetles, *bichhe*, big bee, *patoicha*, chameleon, many types of ants, wasp, dans, leech, grasshopper	Snakes like *ajagar, khorish, hele, chandrabora, chiti, laudoga, keus, dhor, holhole, ras, suyorchande, dhemna*; frog
	Fruit	**Algae**	**Fungi**	**Medicinal**	**Timber**
	Mahua, piyal, date, cashew, *koromcha,*	Green algae	Varied types of mushroom	*Kalmegh, sarpogandha, khoyer, aamloki,*	Eucalyptus, *sonajhuri, bon-neem, sal,*

Flora	*horitoki, bohora, aamloki, kurut jam, kendu, kul, bel*			*bohora, horitoki, satmul, got, vela, bon-tulsi, anantamul, pitkiri, tejumala, bandorkola, bichhuti, rahim, iswarmul*	*mahua, piyal, murga, gamar, polash, arjun, bot, jarun, sishu, kodom, segun, chhatim*, soyabean, ailanthus

Source: Primary Survey, 2012.

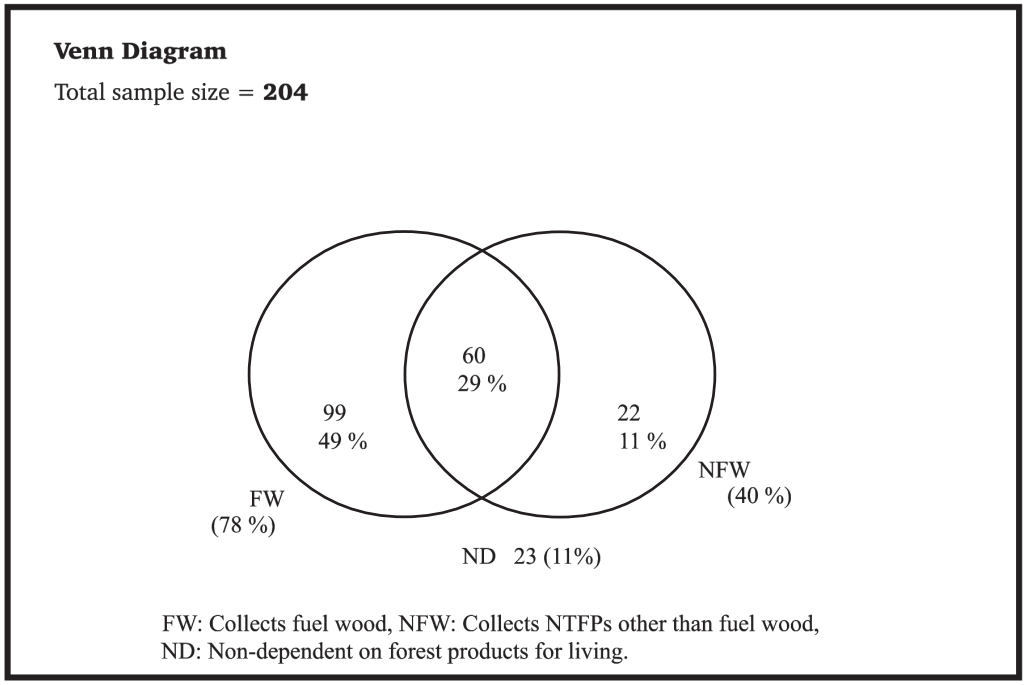
Again, as the exposure to outside world increases, a conflict between formal knowledge and traditional knowledge is experienced leading to a *cultural migration*. The tribals now take money as the only compensation to do any work instead of once practised barter system. Getting education from mainstream institutions, they have now socialized outside their own communities and mould themselves for a better career in the outside world. Money and jewellery have also entered as dowry in their marriage system in place of country liquor and chicken/pig/goat and all legal issues are settled in courts or at police station instead of through the intervention of *morol*[5] of a community. This cultural transition gains momentum through the targeted socio-economic programmes on education/health/poverty alleviation to create a pull towards the world outside. The reliance on traditional *kabiraji*[6] medicines (herbal treatment) has gone down further with the enhanced health awareness among local people. It is noticed that though 89 per cent of the sampled households depend on forest for their daily needs, only 4 per cent of them collect medicinal plants from it.

Bit and Banerjee (2015) has studied the household dependence of people and identified various socio-economic determinants of livelihood dependence on forest. Logit regression has been applied to assess the influence of different 'cause factors' to enhance the probability of conservation of traditional knowledge within the forest community. The results have shown similar cultural transition among the local people who were once used to self-sustained forest-dependent livelihood, but due to forest degradation and non-availability of necessary resources/ services got depended on the market economy of the outer world. They gradually started participation in general economic activities. Bit and Banerjee (2015) has shown that participation in such activities (like 100-

[5]*Morol* is the head of a village/community, who has a final say on any judgment decisions.
[6]*Kabiraji* is a traditional practice of Ayurveda in India.

days work in Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), etc.) has become a significant factor in the livelihood of forest dependent people. The economic use of forest dominates the newly afforested areas as against the concern for protecting their biodiversity leading to comprehensive ecological balance. Thus the inclusion of forest-dependent people alone is insufficient to understand the importance of ecological diversity in the present forest management practices.

Figure 4: Pattern of Usage of NTFPs



Source: Primary Survey, 2012.

Nearly 45 per cent of the forest-dependent villagers still depend on non-timber forest products (NTFPs) for meeting their daily needs, other than fuelwood (Figure 4). They consume fruits of *mahua* and *piyal*, use mushroom, *bon-alu* as vegetables, stitch plates with the leaves of sal and make brooms with palm leaves and *kuchi* grass as shown in Table 3. Sal-plates and mushrooms are even locally marketed. Because of these livelihood dependencies, most of the forest-dependent villagers held their wish for plantation of mixed species. The traditional species mixed with new ones will help generating grasses, shrubs and bushes to yield fuel-wood and fodder in the shortest possible time. Thus forest dependency can

be increased, but that may then lay thrust on forest biodiversity protection. However, if money becomes an incentive for such protection[7], then monoculture plantation of revenue-generating trees is hard to be stalled.

Table 3: Nature of Biodiversity-linked Livelihood Practices at Birbhum

Sl. No.	Type of Livelihood Practices	% of Local People Involved	Pattern of Usage	Depended Species
1	Using as fuel wood	77.94	Personal consumption	Dry leaves and twigs of any plants
2	Making of sal plates	31.37	Stitching plates from leaves of sal trees for domestic use and also for sale	Sal trees (*Shorearobusta*)
3	Consumption of vegetables	20.10	For personal consumption and also for sale	Varieties of mushroom (35), *bon-alu* (2), *kapu-alu* (1), *mahua* flower (3)
4	Consumption of fruits	14.22	Personal consumption	*Mahua* (22), *piyal* (5), *khejur* (1), mango (3), jamun (3), jackfruit (1)
5	Using as medicines	3.92	Personal consumption	*Joripat* (4), *horitokic* (14), *kalmegh* (45), *satmul* (19), *got* (7), *kundri* (1), *boincha* (2), *mugar dal* (3), *bohora* (2), *vela* (10), *wild garlic* (1), *rahimchhal* (5), *arjunchhal* (2), *thankuni* (3), *ananta-mul* (3), *barangay* (1), *horekkolai* (2), *kana-klata* (2), *chirchira* (1), *chorbori* (1), etc.
6	Other (making broom, *talai*, *chatai*, etc.)	5.39	Personal consumption	*Sarpata* (2), *kuchi* grass (3), *khejurpata* (8)

Note : The figures within parentheses represent the number of respondents using such species of NTFPs in their daily life.

Source: Primary Survey, 2012.

[7]It may, however, be noted that the National Forest Policy, 1988 mentions that forest should not be utilised for revenue-earning purposes.

Using the information collected on the nature of day-to-day dependence on forest biodiversity, an estimation of average dependence is done in terms of the types of dependence. The households depending on forest for at most one factor is identified as low-dependent ones and those with dependence on at least 5 types or more are marked as highly dependent. Those in-between are moderately dependent. Table 4 presents the results. It is apparent that majority surveyed are low dependent (65.69 per cent) and the relative shares of the FPC-member households are higher at both the extremes. On an average only 7.35 per cent are revealing high dependence on forest produces. Since 77.94 per cent of those who depend on biodiversity are using fuel-wood (Table 3), so a further distinction is made between fuel-wood use and other uses for both FPC-member and non-member households.

Table 4: Extent of Biodiversity Dependence

Category	Number of Usage of NTFPs		
	Low	Moderate	High
FPC	69.09	21.82	9.09
Non-FPC	61.70	32.98	5.32
Total	65.69	26.96	7.35

Source: Primary Survey, 2012.

The figures presented in Table 4 show that 11 per cent does not use any forest produce and out of the remaining 89 per cent who are somewhat biodiversity dependent, 49 per cent uses only fuel-wood, 11 per cent uses only non-fuel wood-related products and only 29 per cent uses both. It is also found that FPC members are more inclined to use fuelwood (60 per cent) and the non-FPC members are showing higher overall dependence (48 per cent depend on only fuel wood and 52 per cent depend on forest products other than fuel wood). So, logically it can be said that non-FPC members should have more urge for forest biodiversity protection. Thus creation of FPC does not seem to be significantly important for forest biodiversity protection though it may play great role in protecting forest canopy cover as this has reduced illegal logging to a large extent.

4.3 Institutional Implications

The survey shows that FPC formation is somewhat non-transparent which

creates division not only between member and non-member villagers but also between active and passive members. The non-transparency mostly deals with lack of complete information regarding FPC formation among local villagers. While non-members generally complain of residual access to the non-timber forest produces, the passive members are unsure about the trust placed on the active members. A few of those dissident classes believe that though they have some very concrete and useful suggestions to offer,[8] they do not have effective access to any decision making body to make them come true. Even those who got that access claimed that their appeal never came into consideration of the forest department. They are also not given any power of decision making though the participatory forest management's objective was to give equal importance to all the primary stake holders. So, in most of the FPCs covered, it is noticed that even the active members are not very enthusiastic about the prospect of forest protection and concentration through JFM. Apprehension is consequently originating among the forest-dependent villagers which act as a hindrance in taking collective action against Common Property Resource Management. Also, because of the formal rigidity of official directives, only the patches with a minimum size can be brought under forest regeneration leaving a large number of barren but small plots all over the place.

5. Conclusion: Need for a Comprehensive Policy

This paper has pointed out the gradual withdrawal of forest dependence for the erstwhile forest-dependent population due to their enhanced access to the outside economy and society. This lack of dependence is leading to some apathy on their part to conserve biodiversity, which is essential for the sustainable maintenance of forest. It has also been shown that the incentive schemes developed through the JFM practices are purely economic in nature

[8]They think that (a) inundation of ponds and waterbodies inside the forest may help in enhancing and preserving faunal diversity; (b) instead of making the minimum required size of forest to be protected as 10 hectares if it can be lowered to a minimum required size of 2 hectares, then more active forest protection would be feasible; (c) instead of monoculture plantation, varied types of traditional trees may improve their living. For example, better livelihood can be achieved if social forestry is done by changing species selection from teak, eucalyptus and pines to usufruct-based trees, such as neem (*Azadirachtaindica*), mahua (*Madhucaindica*), and sal (*Shorearobusta*).

and, therefore, inadequate to create awareness among the stakeholders about the critical importance of protecting a diverse forest. To save the system from the lopsidedness of this existing policy-induced biases, some supplementary policies need to be designed. If the traditional uses of forest resources can be brought back, at least partially, by documenting traditional wisdom and knowledge in this regard still available among the senior members of forest-dependent tribes, institutions can be established to understand the connection between these traditional practices and the modern intervention methods, training can be imparted among the local people to use the traditional knowledge base in some commercially viable way, then some incentive will be generated even at the local level for biodiversity conservation and sustainable forest management. In fact, to bring back the practice of sustainable forest management through wise use of forest products, expert training should be arranged bythe government with the help of NGOs and others to regenerate and spread the once prevalent traditional knowledge.

Unequal position with respect to the decision-making power among FPC members and the government officials has been discussed in the survey findings. This aspect needs to be taken care of and a more fair institutional arrangement needs to be developed so that in decision making each group would have equal say. This is especially important in deciding on the types of plantation needed for the local forests. These changes may inculcate a genuine interest in the whole development process among the forest-dependent people and the initiative will then come from within the village itself. If the local stakeholders are given more opportunities to benefit from biodiversity, then they will have sufficient incentive to resist external threats leading to rapid depletion of forests. So, livelihood itself can promote conservation through use of best practices. As already observed from field survey (Table 3), making of salplates, consumption of a variety of vegetables, usage of traditional medicines are some of the forest-dependent livelihood practices that would be threatened if the local forest biodiversity gets further disrupted, while encouragement to continue such dependence can indirectly lead to forest protection. This is because those who will depend on sal trees or shrubs or herbs for their livelihood will surely encourage protection and plantation of such species which has traditionally increased forest's biological diversity. These linkages are important to be recognized and when utilized

with the conservation of traditional knowledge (TK),[9] they are expected to bring in forest protection and biodiversity conservation at one go. Many studieslike Folke (2004), Beamer (2009) and Johannes (1993) have shown several innovative ways to incorporate TK into modern practices of ecosystem management. Some studies have solely focused on the integration of TK into forest management. Rist, Shaanker, Gulland and Ghazoul (2010) has discussed the merit of combining TK with scientific data to achieve improvement in forest management in BRT Wildlife Sanctuary of South India where such an application helped managing the mistletoe infection in *amla* tree (with serious biodiversity and livelihood impacts) more efficiently. Butler (2010) also discussed how the tribes in Suriname, Brazil and Columbia are combining their traditional knowledge of the rainforest with western technology to conserve forests and maintain ties to their history and cultural traditions, which include profound knowledge of the forest ecosystem and medicinal plants. Thakali and Lesko (1998) has described some important contributions that several American Indian tribes have recently made, applying their traditional knowledge to the management of forest resources in the United States. Furthermore, Charnley, Fischer and Jones (2008) has paid attention to the ecological knowledge of three local groups who inhabit in the Pacific Northwest region and have pointed out that integration of traditional and local ecological knowledge into forest biodiversity conservation is most likely to be successful if the knowledge holders are directly engaged with forest managers and western scientists in on-the-ground projects in which interaction and knowledge sharing would be facilitated.

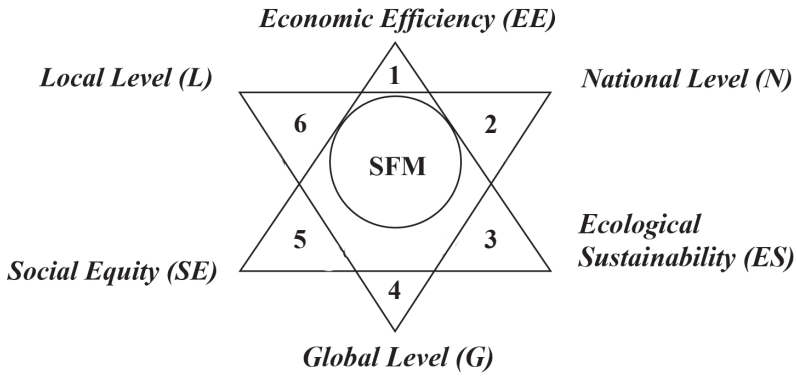
Forest protection should also be envisaged as a global concern. Banerjee and Bit (2014) has strongly advocated that a clear scheme of responsibility should be developed among trading countries regarding sharing of the protection of foresthealth around the globe. The National Forest Policy, 1988 has focused on meeting national needs, protecting forest at the national level with consideration for local livelihood protection. However, there is no emphasis given to any global linkage, for example, to reduce import of finished wood products or export of raw timber from outside. However, this

[9]This is the knowledge base acquired by indigenous and local people over hundreds of years through direct experience and contact with the environment. This knowledge is mostly about local biodiversity and how it can be used for a range of purposes.They have helped in preserving, maintaining and increasing biodiversity over centuries (www.cbd.int/abs).

is the latest forest policies which India has for managing her forests and still no official amendment has been issued in terms of such global concern.

The forest management in India is solely under the control of the forest department, both at the national and the state level[10] . Even the local people's participation is in command of the foresters. Historically these foresters have always given hard core importance to economic benefits derived from timber and have also designed the local-level participatory incentive in terms of monetary gains. So they concentrated on increase in forest canopy cover by any means and since plantations of *eucalyptus* and *acacia* species are easily manageable, as they are not eaten up by animals due to their allelopathic nature and can grow up even in arid zones, monoculture plantations of such species became the most popular strategy for enhancing forest coverage. However, in this single-specie domination, forests lost their ecological diversity and turned into 'green deserts'. Therefore, it is required to integrate the forest management policies at the local (*L*), national (*N*) and global (*G*) level with a comprehensive framework by including the three aspects – economic efficiency (*EE*), social equity (*SE*) and ecological sustainability (*ES*) – to ensure sustainable management of forests. Such integration can be clearly depicted in terms of Figure 5. Forest management will be sustainable when it incorporates all these six dimensions simultaneously, i.e., all three aspects (*EE*, *SE*, *ES*) and all at three levels (*L*, *N*, *G*) (Banerjee and Bit, 2015).

Figure 5: Dimensions of Sustainable Forest Management



Source: Banerjee and Bit (2015).

[10] Initially the Forest Department was clubbed with the Department of Agriculture and later it became a part of the Environment Department.

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