PEOPLE AND PROTECTED AREA: IMPLICATIONS ON LIVELIHOOD

C.S. Shylajan[1]

This paper examines the livelihood of people in a Protected Area and the factors influencing the extent of their dependence on forest. The study uses direct participatory observation method to analyze the forest dependence model. The analysis reveals that, in the absence of alternative income sources, the forest dwellers tend to depend more on various available forest products and often it leads to unsustainable extraction of resources. Forest dependent communities contribute for forest protection in various ways and they need to be compensated for their services. The estimated values of foregone benefits of biodiversity conservation from non-wood forest products would serve as good indicator of minimum compensation to be made to the local community, if they are to be relocated for the purpose of biodiversity conservation. Providing such compensation would be beneficial for maintaining the ecological stability in the long run.

[1] Faculty, Icfai Business School (IBS) Hyderabad, India, Email: shylajan@gmail.com

1. INTRODUCTION

The interaction between forest and forest dwelling communities has received increasing attention from social scientists and policy makers due to its significance from the view point of community welfare and sustainable forest management. This is particularly true in the case of benefits from non-timber forest products (NTFPs). Hence sustainable management of NTFP is of crucial importance for sustaining the livelihood of rural poor. The role of non-timber forest products (NTFP) in the economic development of local communities and sustainable forest management has been documented by many researchers (Arnold and Perez, 2001; Panayotou and Ashton 1992). Eighty per cent of the populations of the developing world depend on NTFP for their primary and nutritional needs. The global monetary value of plant-based pharmaceuticals in OECD countries is estimated to be 500 billion US dollars. Some 50 million tribal people in India depend on NTFP for meeting their subsistence consumption and income needs.

National Forest Policies between 1950 and 1970 were mainly timber oriented. Concerned with the increasing depletion of forest biodiversity, the subsequent policies, Wild Life (Protection) Act of 1972, Forest Conservation Act of 1980 and National Forest Policy of 1988 have reoriented the objectives by treating forest as environmental and social resource rather than as a mere revenue earning resource. To overcome depletion of biodiversity, a network of 'protected areas' comprising 504 sanctuaries and 89 national parks encompassing 4.8% of the country's total area constituting all major ecosystem was established. The 1988 Forest Policy also recognized forests as a source of goods for use by the local population. Management of forest for NTFPs started receiving attention, thanks to a seminal paper by Peters *et al*., (1989), which demonstrated that the potential long-term benefits of managing forest for NTFPs far exceed the benefits from timber or from conversion to agriculture.

2. FOCUS AND OBJECTIVES OF THE STUDY

For designing an incentive based mechanism for the conservation of forest, it is crucial to know the benefits that accrue to the local people from the extraction of NWFPs. For most of the products there are no proper markets for transaction, and hence economic valuation becomes difficult. In India, over 65 per cent of the protected areas were characterized by human settlement and resource use. Attempts to protect PAs from human intervention by coercion have often led to hostile attitude of local people towards wildlife management and sometimes to open conflict (Nadkarni, 2001). The National Forest Policy of India, 1988 declared that local communities were to be involved in natural resource conservation. The Joint Forest Management (JFM) approach in India seeks to develop partnership between state forest departments as owners and local community as co-managers for sustainable forest management. In this context, it is important to know to what extent the local people depend on forests and what factors determine the dependence on forest.

In this backdrop, the present study attempts a) to impute income generated from NWFP (b) to examine the extent and nature of dependence on forest by various local communities in a protected area and factors influencing the dependence using household data (c) to compute the present value of foregone benefits to the local community due to loss of access to the forest and finally d) to draw inferences for sustainable management of forest.

The rest of the paper is organized as follows. The third section surveys the relevant past studies. Methods and data are discussed in section 4. This is followed by empirical analysis of income generated from NWFPs and the community dependence on forest. The sixth section discusses the participatory framework and its failure in resolving the conflicts between local community and the forest officials. This section presents some alternative mechanism which could be considered for success of the program. The last section presents policy implications.

3. INFERENCES FROM THE PAST STUDIES

There are various studies which estimated income generated from NTFP using household data. Overall the income derived from NTFP ranges between 20% and 40% of the total income of the household. Various approaches such as direct method and indirect method have been used to value the resources. In what follows, few relevant studies have been discussed.

In an interesting study, Gunatilake *et al* (1993) estimated the composition of income in the peripheral communities, particularly from the extraction of non-timber forest products from the National Wilderness Area of Knuckles in Sri Lanka through household survey. NTFP formed 16.2 per cent of the total income of the family. The study shows that the share of NTFP declines as income increases. In another study, Chopra, (1994) discussed user valuation of different NTFPs and evaluated marketing channels from the viewpoint of efficiency. Primary data from surveys conducted in the Raipur district of Mahdya Pradesh has been used to understand the role of the market and of different marketing channels in the local economy. It has been found that collection and sale of NTFPs is an important source of secondary income for rural households in the region. On an average, 40 percent of household income is contributed by the NTFPs. The study also shows that nationalized channels or institutionalized arrangements do not give the gatherer a better deal. According to the study, moving towards more integration with markets is the preferable policy option. The author has examined the concepts of value from various perspectives focusing on preservation value[1].

The vast difference between the price paid to the gatherer or local producer and the retail price has also been noted by a few researchers. It has been reported that for several items of non-wood forest products the local producer receives only a negligible portion of the final consumer price (Chandrasekharan 1996).

There are a few studies, which attempted examining the factors determining community dependence on forest. Gunatilake (1998) has examined the community dependence in the tropical rain forest in Sri Lanka. The case studies were conducted at two sites, *viz.* Knuckles and Sinharaja forests. The study highlighted the merits of

rural development approach in the conservation of rain forests. This approach explores alternative income generating opportunities for the local people so that the dependence on forest resources will be minimized. The results of the analysis in both sites indicate that the opportunities of income generation from non-agricultural and non-forestry activities reduce forest dependence, even though some of the variables such as distance to the forest and debt level produce different results between the two sites. From the analysis of Hegde and Enters (2000), level of education was also found to be an important variable in reducing the forest dependence. The study by FAO (1996) has highlighted the role of women in the protection and management of forests.

From the survey of past studies, it is evident that there were wide variations in the level of dependence on NTFP either on a per household basis or based on per unit of area depending on the various socioeconomic factors and the status of the forest. In the Indian context, none of the studies considered the 'net value' realized by the households which is attempted in the present study. The importance of foregone benefits of forest conservation or the opportunity cost of loss of access to the forest has not received the needed attention in the literature except for a couple of studies. There are still a few methodological issues in the valuation of NTFPs. It has greater policy relevance because government may have to consider compensation when relocating the local people to outside-protected area. This study intends to fill some of these gaps.

4. DATA AND METHODOLOGY

4.1 Study area

A typical forest area from Wayanad district was selected to conduct the household survey. Wayanad is a hilly district of Kerala lying in the sub-region of the Western Ghats in north Kerala. It is one of the 'hot spots' in India having a rich biological diversity. There is a large number of species providing various NTFPs. The major tribal communities in the enclosures are Kuruman, Paniyan, Kurichian, Kattinaikkan, Adiyan, and Urali. Kattunaikkan (KN) community is considered as descendants of a nomadic primitive hunter-gatherer group who were roaming on the hilltops and caves. Traditionally they are honey collectors, food gatherers and hunters. The Paniyan (PN) is a numerically dominant tribal community. They occupy small plots

of land and cultivate paddy, ginger etc. They form a major proportion of the agricultural laborers of the study area. Kuruman (KR) is another major group of tribal community. Compared to other two tribal communities, Kurumans are comparatively better in socio-economic status. Apart from the tribal, the ethnic groups living inside the protected area also depend on forest for various purposes such as fuel-wood, grazing etc.

There are more restrictions and regulations on extraction of NTFPs in protected area. Dependence of local people is less in the non-protected area because of other income earning opportunities like plantations and farming. Secondary data from 'Federation' and 'Tribal Service Co-operative Societies' on marketing aspects have also been used for the study.

4.2 Sampling procedure for household survey

To examine the extent and nature of dependence on forest, a household survey was carried out (Shylajan, 2001). For conducting primary household survey, one village Panchayat has been selected from the main portion of the protected area (PA). The Panchayat has been divided into ten village wards for administrative purpose. Out of ten village wards, two from interior forest area and two from periphery were considered. From the Panchayat records, it was found that 41 per cent of the households are tribal community and the remaining non-tribal groups. 'Stratified random sampling method' was used for selection of households. Out of total residential households, eight percent of the households, i.e.; 194 households constitute the total sample, of which tribal households form 80 and non-tribals, 114[2]. The demographic details of the sample households classified by the community are given in Table 1. The tribals belong to three different communities, viz. Kattunaikan (KN), Paniyan (PN) and Kuruman (KR). From land ownership details we observe that KN and PN community possess very little land with ownership entitlements. Both KN and PN largely depend on forest for their livelihood. They collect NWFP for both subsistence and for sale. The dependence of KR community for these two purposes are meager and they depend on forest mainly for the collection of grass and bamboo. The pharmaceutical companies (Ayurvedic) are main consumers of majority of the products collected from the area. Gooseberry (Philanthus emplica) is one of the major food items collected in large quantity from the forests[3].

4.3 Marketing mechanism for the sale of NTFP

There are number of institutions involved in the management of NTFPs in Kerala. Important among them are 1) Minor Forests Product Committee, (2) Forest Department (3) The Kerala State Scheduled Caste Scheduled Tribe Development Co-operative Federation Limited and (4) Tribal Service Co-operative Societies.

In 1970, the Government of Kerala granted the right of NTFP extraction from public forest to the tribal people. In 1978, a number of Tribal Service Co-operative Societies (Sicieties) were started with membership reserved only for the tribals. These societies have monopoly right to procure the forest products, which are extracted by the tribal. In 1981, the Government of Kerala established an apex body of tribal societies viz, The Kerala State Scheduled Caste Scheduled Tribe Development Co-operative Federation Limited (Federation) and it was entrusted with the right of monopoly marketing of all NTFPs collected by the Societies.

The tribal people are legally permitted to collect various NTFP, which have been notified by the state government. Tribals formed co-operative societies in different localities to organize collection. The Societies procure NWFP from the tribals for a price fixed by the Federation. The executive committee of each co-operative society has full freedom to re-fix the MFP price, fixed by the MFP Committee. As per the norms, eighty percent of the sales price is given to the gatherers as Collection Price[4]. The remaining twenty per cent is shared between Society and Federation to meet their expenses.

The NTFPs are marketed through different channels depending upon a variety of factors such as nature of the product, demand, distance of the market *etc*. In the first channel, the products are marketed through the 'Federation'. The next channel is through private traders. In some part of the State, Forest Department also practices marketing of some products. The primary collectors of the products also sell the products to retail shops. They are mostly owners of small provision stores in the locality.

The co existence of co-operative societies and privately managed channels in the marketing of NTFP is due to the fact that, not all the products are procured by the Federation. Highly imperfect NTFP market with the intermediaries' presence[5] has

been cited as the major reason for poor management of NTFP in Kerala. Other problems are: (1) higher illegal collection in the less protected area (2) absence of proper pricing policy for NTFP and (3) competition from private traders.

4.4 Calculation of price spread

An analysis of price spread has been carried out to understand the share of final price going to the primary gatherers. Price spread is the difference between the price paid by the ultimate consumer and price received by the producer (harvester/gatherer/primary collector in the case of NTFP). It includes the costs and margins of different agencies. The marketing costs comprise the costs of transportation, storage, grading and handling. The margins include the returns to the intermediaries for their functions. Analysis of price spread is significant from the policy point of view if the objective is to protect the interests of producers and consumers. The aim is to ensure that the services of intermediaries are made available at reasonable costs. Table 2 gives price spread estimated for some of the NTFP collected by the tribal people from the study area and marketed through the 'Federation'. It is seen that more than 50% of the final consumer price is captured by various marketing agencies for certain products. Since Federation has monopoly power over marketing, gatherers are not allowed to market their products as per their choice. Some of the products have alternative market in the nearby town. So the society tries to give more share of the sales price to the gatherers to prevent the leakage of these products to private parties. The percentage of collection price to sales price is higher for these products.

4.5 Methodology for computation of income from NTFP

In the present analysis, only 'non-wood forest products' (NWFPs)[6] are considered for NTFPs. As per FAO's (1995) definition, *'Non-wood forest products include all goods of biological origin, as well as services, derived from forest or any land under similar use, and exclude wood in all its forms'*. In this, timber, poles, small wood, fuel-wood and charcoal are excluded. Even though FAO definition includes forest services such as grazing, viewing wilderness, hunting of wild life etc, we have excluded these

services from economic valuation. Hunting of wildlife is excluded from the calculation of value since it is legally banned inside the protected area.

For the present study, products consumed at home are valued at their retail purchasing price in the village town. Wherever the market price was not available, prices of substitutes have been used. The gross and net returns from non-wood forest products obtained by a household are estimated as

P_{ki} = The forest-gate price of the product i marketed through k^{th} marketing channel. k = 1 and 2 indicating private market and the

$$GR = \sum_i \sum_j \sum_k P_{ki} Q_{kij}$$

$$NR = GR - \sum_j C_j$$

society.

Q_{kij} = The quantity of non-wood forest product i collected by the j^{th} member of the household and marketed through k^{th} channel during the season

C_j = Combined cost of extraction of all types of NWFPs by the jth member of the household.

The major part of the cost is labour time involved in extraction. Cost of transporting the products to market, if any, is also included. The two main activities in the forest village are agriculture and collection of NWFPs. In the off-season, the NWFP gatherers work as agricultural laborers. Hence, the wage rate at the time of survey is used as opportunity wage to compute cost of labour time involved for collection of NWFPs. For those products, which are extracted during nights, the time spent during the night has been included to calculate opportunity cost of labour.

Present worth of the NWFP was calculated for those products that are extracted for commercial use. The estimation was done for two major forest dependent communities; Kattunaikka and Paniya. Based on single year income, the present income was calculated on the assumption of constant annual income. Alternative discount rates have been used for calculation. Following formula has been used for estimating present worth.

$$PV = \frac{AV}{r}\left[1-\left(\frac{1}{1+r}\right)^{t}\right]$$ for a finite time horizon t

$$PV = \frac{AV}{r}$$ for infinite period

Where

AV = annual income from NWFP per household

r = discount rate

t = time horizon

4.6 Estimation technique for analyzing dependence on NWFP

It is hypothesized that the dependence of the locals on forest varies according to the socio-economic status and legal right to collect forest products. Average annual gross income of the household from the sale of non-wood forest products has been used as a proxy for measuring 'dependence'. The analysis is conducted for those households who have legal or customary right to collect various NWFPs from the protected area.

The factors influencing the households dependence on NWFP for commercial purpose could be explained by the following variables: (a) cost of collection (based on distance to the source of forest products) (b) alternative income generating options, (c) overall economic status of the household in terms of total land area under cultivation (d) availability of labor force (e) education etc. The equation and the variables are as follows:

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \delta D_1 + \gamma D_2 + \mu$$

where Y =Annual Household Income from the sale of Non-Wood Forest Products

X_1 = Annual Household Income from daily wage i.e. occupational income

X_2 = Annual Household Income from Cultivation of own land

X_3 = Area under Paddy Cultivation

X_4 = Total area under Cultivation

X_5 = Number of Adult men in the household as a proxy for labor force (people in the group of 14-65)

X_6 = Number of Educated Adults in the age group of 14-65 who can read and write.

D_1 = Location Dummy

= 1 for interior forest area
= 0 otherwise

D_2 = Community Dummy

= 1 for Kattunaikkan and Paniyan Households
= 0 otherwise

The equation is estimated using Censored Regression *viz.* Tobit Model. In a Censored sample, some observations on the dependent variable, corresponding to known values of the independent variables, are not observable. *i.e.* We do not observe the dependent variable over the entire range. For instance, suppose the regression model is

$$Y = \beta_x + u$$

We observe Y only if $Y > 0$. Thus our model is

$$Y = \beta_x + u \quad \text{if } \beta_x + u > 0$$
$$= 0 \quad \text{otherwise}$$

In this case one cannot rely on only the observation for which $y > 0$ to estimate the regression equation by ordinary least squares (OLS) because the residuals do not satisfy the condition $E(u) = 0$ if we consider only those cases where Y>0

In the present study, income from NTFP is not observed for those households who chose not to collect forest products for commercial purpose. In this case Ordinary Least Square (OLS) estimation by omitting the limit observations (zero income observations) will cause bias in the estimators. Including the limit observations and conducting OLS will result in inconsistency. In order to overcome this problem, the estimation technique of 'Tobit' is used.

5. LOCAL COMMUNITY AND FOREST DEPENDENCE- AN EMPIRICAL ANALYSIS

Forest product, besides providing food and other basic needs to the rural population, is a source of inputs into the agricultural system. However, these values are specific to a site and probably vary widely. This section focuses on estimating income from

NWFP at the household level and analysing the extent of dependence on NWFP by the local community. Preliminary analysis was done to understand the relation between various characteristics of the sample.

5.1 Location

Location of the households in the protected area is one of the important factors that influence the extent of dependence. Out of 71 sample households in the interior area, 36 percent of the households collect NTFPs (vide Table 3). On the other hand, in peripheral area, percentage share of households who go for extraction is less (22 percent). It is due to the following: (1) In the interior area, the major activity of the households is collection of NWFP. In the peripheral area, relatively more alternative source of livelihood is available. Income from occupation and cultivation is more for people living in the peripheral area. Secondly, the percentage of households who consume various forest products as food is also higher in the interior forest area. For instance, 46 percent of the households in the interior area collect various NWFP of plant origin as food items.

5.2 Income derived from NWFP

The major group of NWFP is edible products, which include honey, gooseberry and medicinal plants. Gross income per household derived from the sale of edible products was computed as Rs.2673 and for medicinal plants Rs.604 . Since edible products, such as honey and gooseberry have private market in the nearby town, the intensity of extraction of these products is much higher compared to other products.

The major items collected for self-consumption are honey, gooseberry, various types of tuberous roots and mushrooms. The value derived from the products for consumption accounted for Rs.49 per household. Gross income per household worked out for the two communities, Kattunaikan and Paniyan, are Rs.9542 and Rs.1936 respectively. If we deduct (labour) cost of collection and transportation, the net incomes are derived as Rs.4265 and Rs.325 per household respectively. The cost of labour time spent in collection of NWFP is imputed from the opportunity wage rate prevailing in the village. Further, if we adjust for cost of labour time spent in collection during night, net income per household is reduced to Rs.3544 for Kattunaikan community who are traditionally honey collectors; *viz.* a 17% decrease in value.

Present worth of NWFP

One of the major objectives of the Management Working Plan of Protected Area of Wayanad is to conserve forest biodiversity by rehabilitating forest dependent community from interior part of the PA to the outside protected area. In this context, it is important to know the foregone benefits of extraction of NWFP due to complete protection of the sanctuary. Table 4 describes the present worth of gross annual income from NWFP per household calculated for different time horizons and at different discount rates. This is done for two major tribal communities *viz.* Kattunaikkan (KN) and Paniyan (PN). The present worth of gross income per household for Kattunaikan community is Rs.64030 at 8 percent discount rate for a time horizon of 10 years. The gross income projected for the population of this particular community is Rs.17.74 million. On the other hand, for Paniyan Community, the present worth of gross income per household is Rs.12996 at the same rate of discount and time period. The value projected for the population is around Rs.4.60 million, which is comparatively low compared to the other community. In a recent study, Ninan *et al* (2000) have estimated that total value of non-timber forest products per household was around Rs. 6287 per annum. The study found that the foregone benefits of biodiversity conservation from NTFP in terms of present value was Rs. 67123 at 8 per cent discount rate assuming a time horizon of 25 years.

Net present worth (NPW) of non-wood forest products per household and projected for population is reported in Table 5. It is derived after deducting cost of labour time spent for collection of various forest products and cost of transportation. The calculation is done on the assumption that NWFP extractors have positive opportunity cost of labour. Net present worth projected for population of KN community for infinite time horizon at 10 per cent discount rate is Rs.11.81 million while for Paniyan community it is Rs. 1.16 million. The values could be interpreted as the foregone benefits of biodiversity conservation from NWFP. These values would serve as good indicators of minimum compensation to be made to the local community if they are to be relocated for the purpose of forest / biodiversity conservation. Needless to say, employment generation through alternative activities is equally important for the people who are relocated in order to sustain their livelihood in the long run.

5.4 Estimates of Forest Dependence Model

In this section, the estimated results of the extent of influence of various factors on forest dependency are presented. The specific technique of Censored Regression Model (Tobit Model) is used to estimate the parameters for reasons discussed in the earlier section. The sample is restricted to tribal communities who are legally permitted to collect various forest products. The dependent variable is gross annual household income from non-wood forest products. It is expected that variables such as income derived from other sources either from occupation or cultivation and ownership of land would be negatively associated with dependence on NTFP. Number of adult men in a family is expected to be positively correlated with extraction of NWFP. However, more the number of educated adults in a family, less would be the dependence. The distance to be traveled to the source of product origin is another important factor which influences the household decision to extract forest products. People residing near the source of forest products are expected to extract the products more intensively. To see if there is any such significant relationship, a dummy variable for location is used.

The estimated results given in Table 6 show that except for two variables, all the others have expected signs. There is a significant negative relationship between the dependent variable and annual household income from cultivation. It shows that for a unit increase in income from cultivation of land, there will be a 50 percent reduction in the collection of NWFP. The coefficient of the dummy variable for location has expected sign but not statistically significant at 5 percent level. On an average a household living in the interior forest area derives an additional income of Rs.1464 per annum from NWFP compared to households living in the periphery. “Community” dummy variable’s coefficient reveals, on an average a household belonging to either Kattunaikkan or Paniya Community derive an additional income of Rs.10370 per annum as compared to the Kuruman community. The coefficient is statistically significant.

Another important variable that determines the extent of dependency is level of education. The inverse relationship between income from NWFP and number of educated adults in the household indicates that more the educational level more will be the exposure to the employment opportunities outside PA. The coefficient of total

land area is significant but it does not have expected sign. This may be due to the fact that mere possession of land may not generate revenue flows unless it is put to use. If the households could not cultivate due to cash constraint or fear of crop damage from wild animals, then they have to depend more on forest as a major source of income. Similarly, due to fear of relocation of the households from the protected area to outside, people may hesitate to grow cash crops, which give yield in later years. Another important factor, the coefficient of which produced a sign against the hypothesis, is the number of adult men in the household. However, the result is not statistically significant. The reason may be that women also actively participate in extraction activities. The negative relationship between annual household occupational income and forest dependence is as expected.

6. ISSUES IN SUSTAINABLE MANAGEMENT OF FOREST

6.1 Issues in participatory framework

One of the policy issues in the rural livelihood of forest depending community is how to manage the products sustainably, so that it provides continuous flow of resources. Since the commercial value of the NTFPs have been increasing steadily, state realized that it would be difficult to protect and regenerate the forests without the cooperation of the local people who depend on forest for their livelihood. The 1988 Forest Policy facilitated implementation of Joint Forest Management (JFM). Government of India provided guidelines to all the states for the “involvement of village communities and voluntary agencies in the regeneration of degraded forests” in 1990.

In the period after nineties, a new set of policies gave way for more participation of the private sector. There was a move to reduce state’s role and give more power for the user group and beneficiary group in the day to day management. In this period Panchayati Raj as local governance was provided more power and responsibilities. Even though JFM agree upon sharing the responsibility and power with the local user groups, ultimate procedures are greatly influenced by state and related departments’ decisions. Even with the conducive environment for community involvement, number of problems arise in making the institutional arrangement sustainable. Deserving of mention are: (1) absence of legal rights to community and (2) Large share of benefits being appropriated by the forest departments. Substantial

power still vests with Forest Departments to suspend and dissolve JFM committees. One of the noted criticism is that very poor and marginals have little say in the management process and often locally powerful groups in coordination with forest department highly influence the final outcome in deciding who should claim rights over a particular forest area.

There are certain political factors held responsible for the poor performance of JFM. Based on various studies, Damodaran *et al*.(2003) concluded that the whole JFM process can be understood as "a battle between Centre and State governments to operationalise their respective policy and property right perceptions on forests". Indeed the 1990 guidelines clearly laid down that, local village communities should have access to forestlands and usufruct benefits. This had the effect of setting in motion a new system of rights and concessions in reserved and protected forest areas of the country. There are other sources of conflicts between the Center and State Governments on JFM. Many states were not in favor of changing the existing forest working plans in JFM areas. Most of the States did not believe in empowering Forest Protection Committees with executive and financial responsibilities. The states were not willing to relegate powers due to the personal gain such power provides. Linking conservation with livelihood, Shah (2004) highlighted the need for an appropriate combination of public private partnership such that public sector retains the regulatory role leaving other functions to private initiative through development of markets and institutions**.**

While many studies engage themselves more on how the participatory framework can result in sustainable management of resources and offer benefits to the local community as a whole, some gave a thought to the implications of this mechanism for distribution of benefits among the members. Some studies have highlighted the adverse intra community distribution of benefits from participatory approach. In an interesting study Adhikari (2003) described distributional implications of Common Property Resource Management. This is especially a concern when the community consists of socio economically heterogeneous groups and the benefits are derived jointly. There are some startling evidences that the formalized system of community property rights may result in gradual exclusion of poor. The point is, differential

returns to different groups within a resource using community must be given adequate emphasize to derive the successful management options.

Ghate (2004) has also examined distributional implications of benefits' sharing among the communities under 'Joint forest Management' regime. It has been emphasized that equitable distribution of benefits is a pre condition for sustaining the collective action type of participatory approach to management. Another neglected factor in the discussion is acknowledgement of women's special values, knowledge and use of forest produce (Locke, 1999). Gender dimensions are never studied in JFM management. Added to this is the insensitivity of JFM to the intra-community variations regarding forest dependence. While the JFM agreement mention about the way of sharing benefits from timber, it never specified anything for sharing NTFP benefits.

6.2 How to sustain participatory approach to management?

Even though forests provide adequate physical resource flow to the community, there are problems in transforming it into a reasonable revenue flow. One of the major contention in JFM approach is that the gatherers get a very low share for the products extracted whereas the final value added fetches very high returns. This is especially the case when the products enter the pharmaceuticals with final product fetching high value. One way to tackle with this is to bring together the traditional knowledge of the villager and the commercial ventures making the final product. There were discussions on how to effectively devise incentive based schemes in the system where communities and pharmaceuticals enter into an agreement to develop traditional knowledge based innovations (eg. Aparna, 2005). The interesting question is "what factors should be taken into account in sharing the benefits arising from commercial use of traditional knowledge?"

Practical difficulties need to be sorted out before working out a viable participatory framework. In European and North American countries where there is a reasonable degree of transparency and rationality in forest governance, the issues are settled through open public debates. JFM has the potential to generate diversified livelihood in rural communities and local empowerment as well as improved management through local participation. However the success very much depends on the nature of power sharing and benefit sharing (Castren, 2005). The state has to be free from

undue rent seeking qualities. Case and Context specific strategy is needed for sustaining the JFM regime. One finds gap in the literature about complete stake holder participation in forest management.

6.3 Direct payment mechanism

Sustaining community involved forest management very much depends on the benefits to the community in such regime to sustain the interest of the community. However in degraded forests where the benefits to the community are meager, it is difficult to sustain their interest. Community contribution to forest protection and management provide number of off site environmental benefits. The community has to be compensated for providing such services. If the value of the variety of functions is accounted for, then providing compensation for the local people for their effort in maintaining the ecological stability would result in a win-win situation for both the beneficiaries of conservation and the local people who undertake the major task of conservation[7]. In soil and water conservation programs, people who participate enjoy direct benefits such as subsidies for inputs or technologies to continue with the program. But such concept is not extended to forest conservation. Direct payments approach has been working successfully in other countries (e.g. Brazil, Costa Rica, Guyana and Kenya). For instance, in Costa Rica, the National Forestry Financial Fund generate money from international donors, fuel taxes, hydroelectronic companies and other sources and make payment to the community directly involved in forest conservation. According to the Government of India, 1990 guidelines, JFM strategy is meant for regeneration of degraded forests. Less forest productivity and the absence of adequate resource flow to the community has been cited as one of the major reasons for failure of this strategy. Conservation provides external benefits such as climate regulation, water shed protection and variety of environmental services. However the notion of compensating local people for providing such benefits rarely finds mention in the conservation strategy. There are strong empirical evidences to show that direct payment approach is more cost efficient than any indirect approach (Conrad *et al.*, 2001). Potential obstacles to direct payment approach in developing economies are (i) insecurity of land tenure (ii) inadequate enforcement of legal contracts and (iii) limited opportunities for non-agricultural investment. Designing a requisite institutional arrangement is crucial for the success of direct payment mechanism. One problem in direct payment of compensation is the

measurement of off site benefits. Context specific analysis is needed to value the services to make the program sustainable.

7. POLICY IMPLICATIONS

The present study imputed value of non-timber of forest products and examined the factors determining the extent of community dependence on NTFPs. The net present value of infinite stream of benefits from NTFP in the region varied from Rupees 1 million to 15 million depending on the rate of discount and the community type. The household analysis on overall dependence on forest shows that income from other sources like cultivation is inversely related to extraction of NWFP. Hence providing alternate source of income for the livelihood either through employment opportunities or by a secured source of income from cultivation would help forest conservation in the long run.

The existing institutional mechanism for collection and marketing of NWFP in the study area faces many weaknesses. In the present marketing system by the Federation, there are many intermediaries between marketing agency and final consumer. Higher marketing margin by these middlemen results in higher consumer prices and low collection price received by the gatherers. An analysis of price spread in the present study has revealed that the percentage of the difference between final consumer price and the collection price was more than 50% for certain products. Hence, eliminating cost of intermediaries will improve the community benefits from the collection of NWFPs. This would also serve as an incentive for the gatherers to cooperate willingly in conservation activities.

Viable mechanism for operationalising the participatory type needs to be worked out. In the degraded areas, which do not provide sufficient resource flow to the communities, it is difficult to obtain willingness of the locals to protect the forests sustainably. Hence offsite benefits must be accounted for in valuing the service of the community and a direct payment mechanism by the beneficiaries of the conservation may be a better option as compared to JFM strategy.

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Table 1. Demographic particulars of sample households

Particulars	Tribal Communities				Non-Tribe	Total
	KN	PN	KR	Total Tribe		
No. of sample households	22	29	29	80	114	194
Total Population of the sample	93	142	140	375	509	884
% of Male Population	52.69	50.70	55.00	52.80	49.71	51.02
Average Family Size	4.23	4.89	4.83	4.68	4.46	4.56
Sex Ratio[$]	897	972	818	894	1011	960

Note: KN = Kattunaikkan, PN = Paniyan, KR = Kuruman

[$] Number of females per 1000 males.

Table 2 Estimation of Price Spread of some NTFP marketed through Federation - 1999-2000* (Rs. per Kg.)

NTFP items	Collection price at forest gate	Sales price of the Federation	Final consumer price	Price spread	% of collection to final price
Honey	119	133	200	81	59.5
Honeywax	80	135	203	123	39.4
Kalpasam	51	85	128	77	39.8
Cheevakkai	9	11	16	7	56.3
Nellikkai[a]	5	5	8	3	62.5
Kakkumkai	5	7	10	5	50.0
Atthithippali	10	16	24	14	41.7
Kunthirikkam	30	39	58	28	51.7
Kudampuli	74	110	165	91	44.8
Pachottitholi	11	13	19	8	57.9

Source: Mythili and Shylajan, 2002

[a] refers to Gooseberry

* for non-medicinal plants. The computation was not possible for medicinal plants because there is a wide gap between the collection price and sales price. It is so because the society procures the medicinal plants , as a fresh biomass and so the price is less. The Federation sells these products as a dry biomass (value addition just by making it dry) . In dry form, biomass quantity is less but the price is more (almost 6 times more than the fresh biomass)

Table 3. Location wise distribution of percentage of sample households depending on forest

Particulars	Location		
	Periphery (n= 123)	Interior (n=71)	Total (n=194)
Collection of Non-Wood Forest Products for Sale	28 (22.76)	26 (36.62)	54 (27.83)
Collection of Food Items for subsistence use	26 (21.14)	33 (46.48)	59 (30.41)
Fishing for subsistence use	29 (23.58)	23 (32.39)	52 (26.80)
Animal Food for subsistence use	7 (5.69)	3 (4.22)	10 (5.15)
Collection of Grass and Bamboo	50 (40.65)	45 (63.38)	95 (48.96)
Material for Agricultural purpose	14 (11.38)	8 (11.27)	22 (11.34)

Note: Figures in parentheses are percentages to total number of sample households in the respective locations.

Table 4: Present worth of NWFP (gross) extracted for commercial use per household (in 1000 Rs.)

Discount Rate (%)	10 Years		20 Years		Infinite Stream	
	KN	PN	KN	PN	KN	PN
8	64.03	13.00	93.70	19.01	119.28	24.21
10	58.63	11.90	81.24	16.49	95.43	19.37
12	53.92	10.94	71.27	14.47	79.52	16.14

Table 5: Net present value of NWFP for infinite stream

Discount Rate (%)	KN		PN	
	NPW per household (in 1000 Rs.)	Projected for population (in million Rs.)	NPW per household (in 1000 Rs.)	Projected for population (in million Rs)
8	53.317	14.77	4.063	1.45
10	42.653	11.81	3.251	1.16
12	35.544	9.85	2.709	0.97

Table 6: Estimates of Factors determining Forest Dependence

Variable:	Coefficient	Standard Error	t
Annual income from Occupation (Rs.)	-0.0388	0.0720	-0.54
Annual income from cultivation (Rs.)	-0.5042	0.2306	-2.19*
Number of adult men in the age group 14-65	-233.97	886.36	-0.26
Paddy area (cents)	-98.32	47.31	-2.08*
Total area (cents)	111.07	40.68	2.73*
Location dummy	1464.21	1444.83	1.01
Community dummy	10370.62	3179.78	3.26*
Educated adults in the age group 14-65	-1345.03	725.76	-1.85
Constant	-4900.13	3521.10	-1.39

* Significant at 5% level.

Number of Observations = 80
LR Chi^2 (8) = 64.17
Pseudo R^2 = 0.0630
Log Likelihood = - 477.275
Left – censored observations at P < = 0 =33
Uncensored Observations = 47

Notes

[1] This is defined as the opportunity cost of reducing present use to sustainable levels.

[2] The field survey was conducted during April 2000 to November 2000. 'Participant observation method' was used to gather details on types of NTFP collected, season of availability of various NTFP, method of extraction of various products, labour time involved and distance traveled for collection. Informal discussions were conducted with officials of the co-operative societies, forest range officers, tribal chiefs and other key informants in the study area before preparing the questionnaire for household survey.

[3] It is used as a food item and also for preparation of medicines. Since it is highly perishable, it is mainly sold within the state.

[4] The collection price paid to the collectors (tribes) by the societies theoretically must cover at least the cost of labour involved in the collection of NTFP .

[5] Governments' delay in paying the gatherers is also cited as a reason for the growth of intermediaries and contractors who operated on higher margins.

[6] NTFPs and NWFPs are interchangeably used in the study, though we have considered only NWFPs for the analysis.

[7] If many beneficiaries are involved, direct payment mechanism may entail sizable transaction cost. In such instances, fiscal instruments such as taxes and subsidies may have to be followed.