

A critical evaluation on forest dependence and forest outcomes in West Bengal in the context of joint forest management programme- a case study of Bankura District

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Abstract

Objectives: The present study based on a field survey in Bankura district, West Bengal tries to find out that to what extent, the member households under the JFM program depend on the concerned forests for their subsistence and to what extent the program has benefited them in terms of forest outcomes.

Methods: The study mainly involves descriptive analysis based on a field survey in the district of Bankura, West Bengal across four Forest Protection Committees (FPCs) using multi-stage stratified sampling technique. The survey covers a total of 155 households. The data collected throughout the survey have been put into tabular form after doing some basic calculations.

Findings: The study finds that after the implementation of the program, the households, especially those from Female FPC village and those of the landless have been benefited a lot in accessing free bio-mass fuel from the concerned forest areas. Apart from head loading, the households earn a certain sum of money from usufructs share and forestry works. However, on average, a major portion of forest income for all the households (irrespective of village category or land holding status) comes from biomass fuel (along with few NTFPs). It seems that, JFM's role in terms of tangible economic outcomes is not sufficient, as a major portion of the outcomes is limited in bio-mass fuel. It could hamper the very motive behind sustainable forest management in the coming years, since it is clearly evident that, forest protection is highly linked to people's willingness and participation, which in turn depends on forest outcomes. In this regard the study suggests yielding of some quick growing NTFPs, like bamboos, cashew nuts along with honey and some medicinal plants that can give the people an additional option for generating extra income to some extent. Besides, increasing forestry working days can also give the people some extra money.

Applications/Improvements: JFM has provided the member households with little legitimate access to forest outcomes. However, since forest protection is highly linked to forest outcomes, the concerned forest departments should adopt some initiatives to make them financially available.

Keywords: Joint Forest Management, Forest Protection Committee, Bio-mass fuel, Head loading, Female Forest Protection Committee.

1. Introduction

Forests are crucial to the well-being of a developing country like India, which has a predominantly agriculture-based rural economy. It has been seen that, forest-grown bio-mass fuel meets around 40% (more than 80% in the rural sector) of the energy needs of the country, while an estimated 100 million people of the country earn income directly through the collection and marketing of non-timber forest products, like-bamboo, canes, fodder, leaves, gums, waxes, dyes, resins and many forms of food including nuts, wild fruits, honey, etc. However, due to growing demand of forest products from the people (residing in or on the periphery of forests) and rapid urbanization, the pressure on forest resources has been immense in the country. Presently, the country occupies only 1.85% of the world's forest area against 17% of the world's population and 18% of livestock population, while the contribution of forestry sector to the national economy is little over 1% of GDP. In this context, it is imperative for the country to manage its existing forest resources in a sustainable, efficient and equitable manner [1-5].

A growing body of experiences from Indian context shows that local people's participation in protection and management of forests had been effective in regeneration of degraded forest lands. The 'Arabari experiment', in this regard, deserves a special mention. The experiment was applied in early 70's at Arabari forest range, Medinipur district, South West Bengal with the motive to find out whether local villagers could participate in regeneration and management of degraded forest lands. Accordingly, 618 families of 11 villages from the range were motivated to rejuvenate 1186 ha of degraded 'Sal' forests, while, they were assured to have some economic benefits in lieu of their active participation. The experiment proved successful and opened up the avenue to participatory forest management throughout the state. Almost two decades after the experiment, following the objectives of 1988 national forest policy, the ministry of environment & forests, Government of India, came up with a circular supporting the involvement of village communities and NGOs in the regeneration, management and protection of forests. Thus, a new forest management regime called joint forest management was born in the country [6-10].

The initiative of joint forest management in India has represented a major effort over the last few decades to make policy work for both forests and people. Hill and Shields (1998) has defined JFM as a process of "sharing of products, responsibilities control and decision making authority over forest lands between forest departments and local user groups, based on a formal agreement." Thus, the primary objective of JFM is to give the forest-users a stake in the forest benefits and a role in planning and management for sustainable development of the forests, while the second objective of the program is to provide an equitable distribution of forest products. The activity of JFM has left positive impacts in many Indian states, especially, in West Bengal, which has been pioneering in the country in implementing the program. After years of protection by the villagers, the coppice forests of the state have regenerated; canopy cover and crop height have improved; biodiversity has enhanced; the flow of NTFPs has increased to a considerable extent; along with these, in many places, JFM practices have been able to diminish the age-old conflict between the forest department and the local villagers. In [6,9,11] the present study thus tries to find out that to what extent, the member households under the JFM program depend on the concerned forests for their subsistence and to what extent the program has benefited the member households, in terms of forest outcomes. The study comprises of total 5 sections. Following introduction the 2nd section of the study depicts about the sources of data and methodologies we have used throughout our study. The 3rd section highlights on basic profile of specific FPC -villages and member households. The 4th section follows the findings of the study and the 5th section, the conclusion.

2. Data set and Methodology

The study we have taken mainly involves primary data sources. For the purpose of collection of the data, we have carried out an intensive field survey in between December' 2016 and February' 2017, across four FPC-villages of Bankura district, West Bengal, covering 155 members/households from these. A multi-stage stratified sampling technique has been applied for the selection of four specific FPCs under our study. We have purposively chosen Bankura South forest division out of three forest divisions of Bankura district based on its majority in total number of FPCs. Then, from this particular division, two forest ranges, namely- Hirbandh and Khatra have been chosen (out of twelve forest ranges). This selection has also been done on the basis of majority in total number of FPCs. From each of two forest ranges, two FPC-villages have been chosen, one of them are Female FPC village and another being joint FPC village. Finally, a total 155 households have been chosen from these villages on random basis (Table 1). As regards to the objective of our study, the villages (under our study area) have been categorized into two groups: Female FPC village and Joint FPC village. Again, within each group of village, the households, on the basis of their (agricultural) land-holding status, have been categorized into two groups: landless and landed. The extent of dependency on forest for each category of household within each village group have been assessed on the basis of households' total days employed (in a year) in collection of forest produce (mainly, bio-mass fuel, here). To find out the outcomes from forest for each category of households within each village group, we have first considered three forest income sources: bio-mass fuel along with other NTFPs, usufructs share and forestry works and then combining the incomes from all of these three sources, we have shown the contribution of forest income to total annual household income including three income sources: farm, non-farm and forestry. In the following, the methods of computing each type of income (forest as well as non-forest) have been depicted.

Table 1. Sampling design of the study

Forest range	Name of FPC-village	Village category	Population size	Sample size
Hirbandh	Amjhuri	Female FPC	100	50
	Meridhara	Joint FPC	75	35
Khatra	Dedua	Female FPC	96	45
	Salbani	Joint FPC	50	25
Total sample size				155

Source: Field survey'2016-17

2.1. Income from farming

Farming (cultivation and live stocks) is a significant source of income to many households, we have found in our study area. This type of income generally includes self-consumption valuation as well as income from sale.

Table 2. Crop-wise productivity and market price in the study area

Crop types	Productivity (in qtl.)/bigha*	Price (in ₹)/qtl.
Paddy	3-5	1000-1250
Mustard seed	0.5-2	3000
Potato	8-15	500
Onion	2-5	3000
Maize	6	600
Pulses	4	5000

Source: Field survey'2016-17

1. Cultivation

To the agricultural households, cultivation is an important source of subsistence. They mainly cultivate paddy, mustard seed, potato, onion etc. with mix of some maize, pulses and vegetables. The volume of production of each crop depends on land size and varies according to places (Table 2). Thus, if one has information about the household's land holding size and type of crops cultivated, then it will be easy to compute the household's annual income from cultivation.

2. Live stocks

In our study area, each household, on average, domesticate 1-8 live stocks. Among the live stocks, cow, goat and duck/hen are common. Cows are generally domesticated for getting of milk. A cow, in a day, can give 2-5 litres of milk (for around 6 months). 1 litre of milk costs ₹35/- to ₹40/- in village area. Goats are generally used for getting meat, a medium sized goat costs ₹2000/ to ₹2500/-. Ducks/hens are used for getting egg as well as meat. However, to avoid double counting we prefer to consider only its meat value. Generally, 2-3 kg of meats is produced from one piece of duck/hen; 1 kg of meat costs ₹100/- to ₹120/-. Thus, if one has the information regarding number and type of lives tocks domesticated by a household; it will be easy to calculate the household's annual income from live stocks.

2.2. Non-farm income

This type of income generally considers the occupational sources of income of the households. Throughout our study, we have found four types of occupation: daily wage labour, household industry, service and business.

1. Daily wage earning

Daily wage labour is the main source of earning for most of the households, we have found in our study area. Those, who are daily wage earners by occupation, are engaged in different activities (Table 3). Thus, if one has information regarding the number of working members from a household engaged in daily wage labour along with the types of work they do then it will be easy to compute the household's annual income from daily wage earning.

2. Household industry

We have found a few numbers of workers, involved in household industry in our study area. These workers mainly remain engaged making of handicrafts (mainly basket) from bamboo and sell them to local market for cash income. Depending on size, one hand-made bamboo basket costs ₹10/- to ₹30/- in local market. Thus, if one has information regarding the number of baskets sold/day by a household annually, then it will be easy to compute the household's annual income from it.

Table 3. Days employed in different works on daily wage basis along with wage rate in the study area

Types of work	Days employed/year	Rate per head & per day
Local agriculture work	15-30 days	₹120/-
Migratory agricultural work	100-150 days	₹150/-+ 1 kg rice
NREGA work	20-25 days	₹170/-
Raj mistri related work	Depends	₹250/-
Brick field work	100-125 days	₹500/- per 1000 bricks

Source: Field survey'2016-17

3. Service

It is comparatively easy to compute the annual income of those who are engaged in service sectors on fixed monthly salary basis. In our study area, we have found a little number of such service holders. Among them there are clerk (school), peon (block office), D group worker (hospital), ISDS worker etc.

4. Business

We have found only two people in our study to be engaged in business, who are from same family and jointly run a grocery shop. Like service-holders, they also earn a fixed monthly income.

2.3. Income from forest

In forest-fringe rural areas, forests are the significant source of income to many people and most of this income comes from NTFPs. However, in our studied villages, due to specific type of trees species (mainly quick growing) the scope of getting NTFPs is very little. People mainly collect biomass fuel (eg. dried twigs, leaves, cow dung etc.) along with some food (mushroom) and medicinal (kalmegh) items from forests to meet their self-consumption, and who hold live stocks, use the forest areas for grazing of the cattle. We have found mainly three sources of forest income in the study area: bio-mass fuel along with some NTFPs, usufructs share and forestry works. In the following, the computation method of income from each of these three sources has been given:

1. Biomass fuel and other NTFPs

Dried twigs and leaves are the main source of bio-mass fuel for most of the villagers in our study area. Almost the entire year the villagers remain involved in collecting these from the forest areas. One bag full of dried twigs and leaves is called 'head load ('bojha' in local language). The collection of head loads depends on the households' consumption needs. Generally, if a household has 5 member's then one head load meets up consumption demand of the household for 2-3 days. Sometimes, especially during the lean period, villagers also sell head loads to earn cash income. The local price of each head load ranges between ₹30/- to ₹35/-. Thus, if one has the information regarding the volume of collection of head loads by a household (in a year) it will be easy to compute the total annual value obtained from head loading for that household. Apart from bio-mass fuel, there are found some mushrooms (locally, known as 'astamirchhatu') in the forest areas for some specific months (July-October) in the year.

The collection of mushrooms also depends on households' consumption needs. Generally, if a household has 4 members, then 250-300 grams of mushrooms meet up consumption demand of the family for 1 day. 1 kg of mushrooms costs ₹200/- to ₹250/- in local market. Thus if one has the information regarding the volume of collection of mushrooms by a household (in a year), it will be easy to compute the total annual value obtained from mushrooms collection for that household.

2. Usufructs share

JFM gives a sustained income to the involved FPC households in terms of usufructs sharing. In [1] as per West Bengal JFM resolution 2008, one fourth of the net sale proceeds (of timber, pole etc.) at every final harvesting of the concerned plantation/forests are distributed among the FPC members. In case of cashew seeds (where available), also, 25% of the net sale proceeds goes to the FPC members. In [12] our study area, we have found three villages out of four, where the member households have received certain sum of money through 25% share of timber and pole at final harvesting and 25% share of cashew nuts (available in two villages out of three) at final auction. The harvesting/auction periods, are however, not same for all of the three villages. Since the enforcement of JFM, as we have been, the villagers have received the shares in between 2006-2015. Under this circumstance, to compute the annual share per household, we have first divided the total shares for each village by its' total number of households and then again the amount has been divided by the number of years (2006-2016).

3. Forestry works

Working as wage labour in forestry department for various development activities (mainly, plantations) is another source of forest income, we have found in three villages out of four. The number of working days (as wage labour under forest department) is fixed for each village. The days vary from 8-20 days per year, across the FPCs, depending on the scope of forestry operation in those committees. Generally, one person from each household gets the opportunity of this work. The wage rate for such works is fixed at ₹180/- per day and per head. Thus, based on the number of days, a household remains involved for forestry-related works; it is easy to compute the household's income from forest wage labour.

3. Basic profile of specific FPC -villages and member households

Four FPC-villages under our study area, Amjhuri and Dedua fall under Female FPC category, while the other two viz. Meridhara and Salbani fall under Joint FPC (apparently male-dominated) category. All of the four FPCs in the respective villages have been registered in between 2000-2008. All of the villages are located within a short range of one to two kilometers from the assigned forests. The per capita forest area ranges from the lowest of 0.21 ha (in Dedua) to the highest of 0.73 ha (in Salbani). The forests are mainly plantation forests, covered with some quick growing tree species like Akashmani, Eucalyptus, Sissoo, Segun, Gamharetc (Table 4). Average household size for all the villages lies between 4 and 5. In terms of sex-distribution, the majority of the population is female in all the villages, except Amjhuri. Caste-wise distribution of population shows preponderance of tribal in Meridhara and Salbani villages, while in other two villages the majority are others (mostly other backward castes).

Table 4. Basic profile of the specific FPCs

Name of FPC	AmjhuriMahilla Ban Sangrakshan committee	Meidhara Ban Sangrakshan committee	DeduaMahilla Ban Sangrakshan committee	Salbani Ban Sangrakshan committee
Village, Beat	Amjhuri, Hirbandh 2	Meidhara, Hirbandh 2	Dedua, Khatra 1	Sabani, Khatra 1
Range, Division	Hirbandh, Bankura South	Hirbandh, Bankura South	Khatra, Bankura South	Khatra, Bankura South
Registration year	21/03/2006	08/04/2008	06/08/2002	28/01/2000
No. of members/ households	50	35	45	25
Total forest area, forest area per member/household	33.28 ha, 0.33 ha	40.00 ha, 0.53 ha	19.83 ha, 0.21 ha	36.52 ha, 0.73 ha
Distance between forest and FPC	1.5 km	2 km	1km	2km
Forest type	Planting	Planting	Planting	Planting
Main tree species	Akashmani, Sissoo, Segun, Gamhar etc.	Akashmani, Eucalyptus, Manjadi etc.	Akashmani, Eucalyptus, Cashew etc.	Akashmani, Eucalyptus, Cashew etc.

Source: Field survey'2016-17

The literacy is above 60% in all the villages, except Meridhara (with 55%). In terms of female literacy, the percentage lies between 55%-60% in all the villages, except Amjhuri (with below 50%). A significant portion (above 60%) of total population in all the four villages is aged between 18-65 years. With respect to this group of population, Meridhara and Dedua villages show higher work participation rate (more than 80%) compared to that of Amjhuri and Sabani (with 73%). The female work participation rate is also higher (70%-80%) in former

two villages compared to that in latter two (53%-56%) (Table 5). A significant number of households are landless in all of the four villages. The number is highest in Amjhuri (38%) and least in Salbani (12%). Among the landed, however, there are only marginal land holders. Daily wage labour is the main occupation for most of the landless households, while among the landed, majority are involved in daily wage labour, along with cultivation.

Table 5. Demographic characteristics of FPC-households

Name of FPC	Amjhuri	Meridhara	Dedua	Salbani
No. of households	50	35	45	25
Total population	247	151	237	112
HH size	4.9	4.3	5.3	4.5
Male population	51.10%	49.50%	48.60%	46.43%
Female population	49.90%	50.50%	51.40%	53.57%
SC population	8%	-	-	-
ST population	30%	77.00%	26%	100%
Others population	62%	23.00%	74%	-
Literacy rate	60.50%	54.78%	65.92%	60.71%
Female literacy rate	49.3%	58.26%	58.70%	55.00%
Population in age group 18-65	68.50%	68.51%	67.60%	63.39%
Work participation rate w.r.t population in age group 18-65	73.20%	82.35%	80.17%	73.24%
Female work participation rate	53.27%	78.07%	69.70%	55.56%

Table 6. Land-holding status of households

Name of village	No. of households	Landless (%)	Landed (%)
Amjhuri	50	38	62
Meridhara	35	31	69
Dedua	45	24	76
Salbani	25	12	88
Total	155	28	72

Source: Field survey'2016-17

Thus, on average, about 95% of the total working population from all the four villages is daily wage labourers. Among the wage labourers, agriculture is the main occupation we have found in all the villages. Almost all of them (either land-less or landed) remain involved in agricultural sector for about 4-6 months in a year. However, due to scarcity of local agricultural jobs, seasonal migration is common among them; they migrate to Burwan or Hoogly town for certain months (around 3-5months, on average), every year. To the landed households, cultivation is another important source of subsistence, apart from wage labour. The major crops cultivated by them are paddy, mustard seed, potato, onion etc. along with some pulses, maize, seasonal vegetables etc. Apart from this, some households (mostly landed) domesticate live stocks (mainly, cow, goat and duck/hen etc.) for subsistence. A majority of the household's monthly per capita income lies below ₹2000/- (Table 6-9).

Table 8. Seasonal migration among the wage labourers

Name of village	No. of wage labourers	No. of seasonal migrants(agriculture)	% of migrants
Amjhuri	106	87	82.14
Meridhara	83	67	80.72
Dedua	128	105	82.29
Sabani	52	49	94.23
Total	369	308	83.58

Source: Field survey'2016-17

4. Findings

With an attempt to forge partnership between forest departments and local communities, JFM has now been widely accepted as a promising approach to forest management in order to regenerate degraded forest lands. However, there is quite difference between the forest department and village communities, in seeing JFM. Most of the forest officials see JFM primarily as a means to ensure rehabilitation of degraded forests.

Village communities, on the other hand, see JFM as a way to avail the supply of biomass, a means to secure daily requirements of forest products and/ or a way to augment supplementary income. Thus, the success of JFM has a direct relation to the increased flow of forest products– the very incentive for the communities to protect the forest. In [9,12-14] as per West Bengal forest department's JFM resolution of 2008, the FPC members are entitled to collect some items, like-fallen twigs, leaves, grass, fruits, flowers, mushroom seeds etc., free of royalty without causing any damage to forest/plantations. Along with this, one fourth of the net sale proceeds (of timber, pole etc.) at every final harvesting of the concerned plantation/forests are distributed among the FPC members. In case of cashew seeds (where available), also, 25% of the net sale proceeds goes to the FPC members. In case of salseeds, the entire collection shall have to be deposited with the West Bengal Tribal Development Cooperative Corporation Ltd., through the local LAMPS (where LAMPS are functioning) and LAMPS will pay the members, in approved tariff, against their individual collection. In addition to these, the members are provided some development works (mainly, plantations works) on daily wage basis from the concerned forestry departments. In [13] now, so far our studied FPCs are concerned; the scope of availability of NTFPs (which are considered to be significant source of forest income in India as well as in West Bengal) is very little, since the forests under these FPCs are plantation forests. People mainly use the forest areas for getting bio mass fuel (dry wood, leaves, cow dung) and grazing the cattle. Among the NTFPS, cashew nuts are available in two of the four FPC-forests (Dedua and Salbani). However, due to restrictions from the forestry department, they are not able to collect those. Along with this, some local mushroom (*astamirchhatu*) and medicinal plants (*kalmegh*) are grown in the forests, but their availability and extraction, both are limited. In this background, we have defined mainly three sources of forest income for the member households: bio-mass fuel (along with some free accessible NTFPs, as mentioned earlier), usufructs share (25% of the net income from felling of timber and auction of cashew nuts, where available) and forestry works.

Table 9. Status of households in terms of monthly per capita income

PCI (in ₹)	No. of households (%)				
	Amjhuri	Meridhara	Dedua	Salbani	Total
Below 1000	2.8	0.0	8.8	0.0	3.5
1000-1999	61.1	54.5	76.5	36.0	60.0
2000-2999	16.7	36.4	8.8	40.0	22.6
3000-3999	8.3	9.1	5.9	16.0	9.0
4000-4999	2.8	0.0	0.0	4.0	1.5
5000 & above	8.3	0.0	0.0	4.0	3.3

Source: Field survey'2016-17

4.1. Bio-mass fuel and NTFPs

In West Bengal, a major portion of rural households depends on bio-mass fuel like fuel wood, cow dung cake, crop residue etc. for energy. As per census report'2011, in Bankura district overall 74% households use bio mass fuel for cooking while in rural areas, alone, the number is 78%.In [15] the villages under our sample frame, most of the households solely depend on traditional *chulah* for cooking and other domestic purposes (making of rice from paddy etc.) while around 12% of the total households have the access to LPG, along with *chulah*. Among the *chulah* users, the tendency of using bio-mass fuel is high in all the villages. They collect fuel wood, cow dung, dry leaves on daily basis to meet their energy needs. Some households, who have own agricultural farm, also use crop residue as fuel. However, above all, fuel wood and dry leaves are of high use among the households, which in a large scale, are extracted from protected forest areas. These collection activities (generally known as 'head loading') are particularly done depending on the households' (subsistence) needs. Sometimes, especially, when the villagers (mostly, who live on daily wage earning) suffer from job scarcity, earn cash income from selling head loads. Thus, on an average, the households are involved for monthly 15 days or annually 6 months in head loading activities.

An FPC member from Dedua village (who is also a member of the concerned executive committee) has expressed their satisfaction regarding easy access of biomass fuel after implementation of the program. In her words, I quote: Before the committee was formed, we had to walk for long hours to collect each head load. Many times, during collection, we got assaulted and even attacked by other villagers. After forming up of the committee, we have now own forest area, within a short distance from our village. We are now free to collect dried twigs/leaves for fueling according to our needs without any harassment.

According to another FPC member from Amjhuri village, the reason behind forming up of their committee was scarcity of fuel, which has been considerably reduced to a certain extent after the formation of committee. As she stated: It has been a long time that, majority of forest area within or nearby our locality has been managed by the FPCs. Before we had our own committee, we used to collect fuels from those areas and often got restrained by concerned FPC members. This resulted in to growing scarcity of fuels for us. To curb this scarcity, we decided to form our own committee and with support from other villagers, we went to our beat officer for approval of forming the committee. After getting approval from the forestry department, we formed our own committee and started to plant trees. Now, we have sufficient access to dried twigs/leaves/cow dung, which we collect from our forest area for fueling. The story is more or less similar for all of the four villages. JFM has been fruitful to many villagers for easy access of biomass fuel, which is the main and for many, the sole source of energy and for many, and a way to earn income. However, throughout our study, we have noticed that, the dependency on forests (for head-loading) is higher among the households from Female FPC villages, compared to those from Joint FPC villages. As one of the member households from Joint FPC village (Meridhara) told: Many households in our village have now home-grown sources of fueling with few of them having the LPG connection. They use forest-grown fuel, in most of the times, for making rice, molasses etc. Table 10 shows that, the average number of days for head loading is 223.45 days annually or 18.6 days monthly for the households belonging from Female FPC village category, while the same for those belonging from Joint FPC village category is 147.61 days annually or 12.3 days monthly. Disparity is found within the villages, also. In both types of villages, as we can see from the table, the average number of days for head loading is higher among landless households (17-20 days monthly) compared to the same among landed households (11-14 days monthly). This indicates that, those who belong to lower economic status, are more dependent on forests for subsistence. Table 11 shows that, average value obtained from head loading is ₹7495/-, annually for the households belonging from Female FPC village category, while the same for those belonging from Joint FPC villages is ₹6241/-, annually. Again, within villages, the value for landless households ranges from ₹6793/- to ₹8,384/-, while the same for landed households ranges from ₹5690/- to ₹6606/-.

Table 10. Households' involvement in head-loading (in terms of days*/year)

Village category	Name of village	Land-less		Landed		Total (Landless+Landed)	
		No. of households	Average employment days	No. of households	Average employment days	No. of households	Average employment days
Female FPC	Amjhuri	19	243.56	31	192.89	50	218.22
	Dedua	11	240	34	217.33	45	228.67
	Total	30	241.78	65	205.11	95	223.45
Joint FPC	Meridhara	11	122.67	24	87.33	35	105
	Salbani	3	205.33	22	175.11	25	190.22
	Total	14	164	46	131.22	60	147.61
44			202.89	111	168.17	155	185.53

*Here, 1 day=2.25 hours

Apart from bio-mass fuel, people collect some local mushroom from the protected forest area. These mushrooms, locally known as '*astamirchhatu*' are available for some specific months (July-October) in a year. People collect these mainly for self-consumption. Along with this, some medicinal plants (*kalmegh*) are available in the area, which people collect according to their needs.

Table 11. Value obtained by households from head loading/year (in ₹)

Village category	Name of village	Total value obtained		Average value obtained		Average value obtained Total (Landless+Landed)
		Landless	Landed	Landless	Landed	
Female FPC	Amjhuri	182210	235445	9590	7595	8593
	Dedua	69300	193970	6300	5705	6003
	Total	251510	429415	8384	6606	7495
Joint FPC	Meridhara	70840	110040	6440	4585	5513
	Salbani	24255	151690	8085	6895	7490
	Total	95095	261730	6793	5690	6241
Grand total		346605	691145	7877	4459	6168

Source: Field survey'2016-17

4.2. Usufructs share

JFM gives a sustained income to the involved FPC households in terms of usufructs sharing. In [6] according to West Bengal State forest report 2011-12, Timely sharing of usufructs both from the intermediate and final yield particularly in South West Bengal has established creditability of the State Government in pursuing with the desired zeal and mission of the policy of JFM in managing natural resources- of the state. The report shows that, during 2011-12, an amount of ₹1713.28 lakh has been distributed as usufructs share among 1,14,398 beneficiaries in South West Bengal while during 2013-14, an amount of ₹7,72,22,936/- has been distributed among 14,970 beneficiaries, in Bankura district, alone. In [11] however, one thing in this regard should be mentioned that, this type of income is received at irregular annual intervals and usually does not meet immediate survival needs. Among the member households from four villages under our study area, every household have received a certain amount of usufructs share, except those from Amjhuri village. According to the members from Amjhuri, there are few months left for the final yielding of their forest area. However, as regard other three villages are concerned; the per capita usufructs share is dissimilar across the FPCs. The main reason behind this dissimilarity is: the felling/auction period are not the same for all FPCs. Besides, there is inequality in terms of the total forest area, number of households, forest products and quality across the FPCs. Table 12 shows that the enforcement of JFM program, the member households from Salbani FPC has received a highest usufructs share amounting to ₹3,550/- , followed by those of Meridhara FPC (₹2500/-) and Dedua FPC (₹450/-). Thus, on average, per capita annual usufructs share of the households belonging from Female FPC village is ₹26/-, while the same for those belonging from Joint FPC village is ₹326/-.

Table 12. Usufructs share received by the FPC households since the enforcement of JFM (in ₹)

Village category	Name of village	Total FPC share	FPC share per capita	FPC share per capita/year*
Female FPC	Amjhuri	0	0	0
	Dedua	22500	450	50
	Total	22500	237	26
Joint FPC	Meridhara	87500	2500	278
	Salbani	88750	3550	394
	Total	176250	2938	326
Grand total		198750	1282	142

Source: Field survey'2016-17

4.3. Forestry works

Working as wage labour in forestry department for various development activities (mainly, plantations) is another source of forest income, we have found in all the studied villages, except Dedua. As stated by the members from Dedua village, at the very beginning of the formation of their committee, they were employed in forestry sector for plantation activities; afterwards, no more plantations rose in the area and they did not get any work from the department. However, as regard the other three villages are concerned, the number of working days (as wage labour under forest department) is fixed for each FPC. The days vary from 8-20 days, across the FPCs, depending on the scope of forestry operation in those committees. Generally, one person from each household gets the opportunity of forest work per year and irrespective of land-holding status, every household remain employed in this sector. Table 13 shows that, the annual income received by the households from forestry work is highest in Amjhuri FPC with ₹3600/-, followed by that in Salbani FPC with ₹2700/- and Meridhara FPC with ₹1440/-. Thus, on average, per capita annual income from forestry sector for the households belonging from Female FPC village is ₹1895/-, while the same for those belonging from Joint FPC village is ₹1965/-. Thus, forestry wage labour constitutes a small source of income for the member households.

Table 13. Annual income received by member households from forestry works (in ₹)

Village category	Name of village	Total amount spent on forestry works	Income/household/year
Female FPC	Amjhuri	180000	3600
	Dedua	0	0
	Total	180000	1895
Joint FPC	Meridhara	50400	1440
	Salbani	67500	2700
	Total	117900	1965
Grand total		297900	1922

Source: Field survey'2016-17

Finally, combining all of the above three forest income sources into the tabular form, we can see that, the contribution of forest income to total annual household income (including farm, non-farm and forestry sources) for the Female FPC village and Joint FPC village is 9.64% and 7.9%, respectively. Again within the villages, the contribution of forest income to total annual household income for the landless households is 8.53%-10.68%, while the same for landed households is 7.3%-8.6% (Table 14).

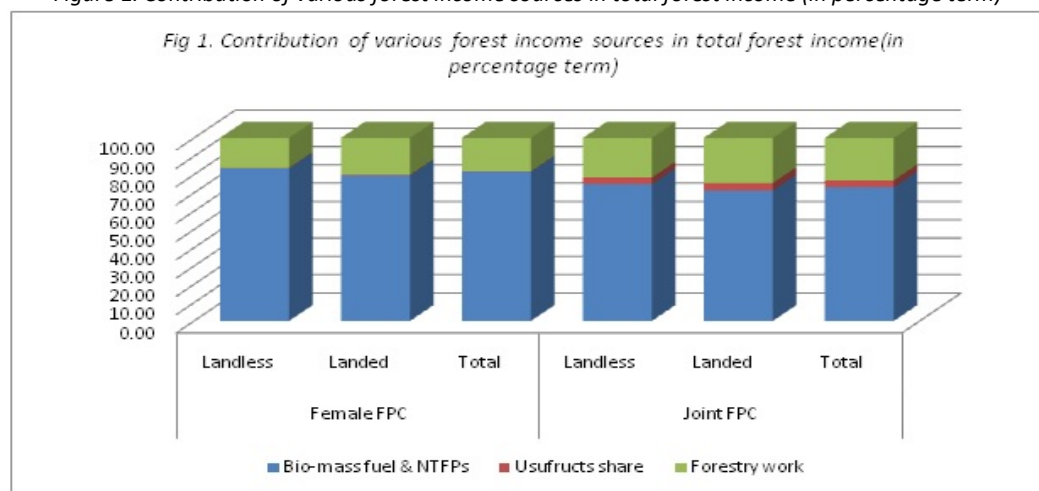
Table 14. Share of forest income to total (annual) household income(in percentage term)

Village category	Household category	Sources of income		
		Farm*	Non-farm**	Forestry
Female FPC	Landless	8.1	81.22	10.68
	Landed	7.1	84.29	8.6
	Total	7.6	82.755	9.64
Joint FPC	Landless	0.09	91.37	8.53
	Landed	19.7	72.98	7.32
	Total	9.90	82.18	7.93
Grand total		8.75	82.47	8.78

Source: Field survey'2016-17*Here, farm income includes the income from cultivation and live stocks.

**Here non-farm income includes income from wage labour, service, business and others

Figure 1. Contribution of various forest income sources in total forest income (in percentage term)



As we can see from Figure 1 for the households belonging to Female FPC village, a little over 80% of their total forest income comes from bio-mass fuel (along with few NTFPs). The percentage is, however, lower (73%) in case of those belonging to Joint FPC village. This, in turn indicates that, the contribution of other forest income sources (usufructs share & forestry works) in total forest income, is comparatively higher for the households from Joint FPC-village (27%) than those from Female FPC-village (19%). Similar thing can be found within villages, also. The contribution of bio-mass fuel (along with few NTFPs) in total forest income is always higher for the landless compared to the landed.

5. Conclusion

In summing up, we can say that, JFM has provided the member households with legitimate access (though little) to economic outcomes. In respective of village categories, the access is, however, higher for the households belonging to Female FPC village compared to those from Joint FPC village. Again within villages, the access is comparatively higher for the landless households than the landed households. Well, this difference (across villages or within villages) exists mainly due to different pattern of forest products (bio-mass fuel along with few NTFPs) extraction. It has been found that, the Female FPC villagers' dependency on (and thus extraction of) forest products are comparatively higher than the Joint FPC villagers. Again within villages, the extraction of forest products is higher among the landless than the landed. Overall, forest products (more specifically, biomass fuel) contribute the major portion of forest outcomes for all of the households (irrespective of village type or land-holding status). In terms of other forest income sources, however, the contribution remains at the periphery.

It could hamper the very motive behind sustainable forest management in the coming years, since it is clearly evident that, forest protection is highly linked to people's willingness and participation, which in turn depends on forest outcomes. In this regard the study suggests yielding of some quick growing NTFPs, like bamboos, cashew nuts along with honey and some medicinal plants that can give the people an additional option for generating extra income to some extent. Besides, increasing forestry working days can also give the people some extra money.

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