

## Does Gender Sensitive Joint Forest Management Programme Increase Women's Contribution on Household's Income? Evidence from West Bengal in Indian context

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### Abstract

*[This study tries to examine as to whether gender sensitive planning under participatory forest management programme increases women's contribution on household's income by augmenting women's physical involvement in forest works based on an empirical study in such an Indian state-West Bengal- which acts as key-precursor of the implementation of participatory forest management programme in general and gender sensitive participatory forest management programme in particular. Most important finding of this study is that under female-organised forest management unit (called female FPC) women are the major contributors to their family income, which they only receive from forest source, after JFM programme. However more worrying is that despite women's major share of households income from female FPC villages in particular, male control over household's income implying that this might undermine women's empowerment and equity principle of people's centered forest management programme.]*

**Keywords:** Joint Forest Management Programme, Female Forest Protection Committee, Joint Forest Protection Committee Physical and Financial Dependence on Forest, Non-Jfm Village, Women's Contribution of Forest Income.

### Introduction

As the major stakeholder, women's interaction with the forest is based on their day-to-day dependence on forest for subsistence needs. Women, who live close to the forest areas, are primarily responsible for collection and processing of NTFPs (non-timber forest products) and spend more time in the forest. According to the typical gender-based division of

roles and responsibilities in Indian forest belts, they are the primary collectors of a wide range of NTFPs for both subsistence and income. It is said that men are responsible for processing timber for house construction and agricultural implements while women procure firewood for household needs by the traditional gender-based roles (Kumar 2005, p.100). Thus women's multiple tradition of knowledge of forest resource for the nature of women's work which makes them closer to nature than men can be useful for the effective management of forest (Locke 1999, p.235; Tinker 1994, p.367; etc.). Many recent studies indicate that gender balance in decision-making authorities for collective action (like community-based forest management) has both equity and efficiency implications (Adhikari & Lovett 2006; Agarwal 2001; Kabeer 1994; etc.). During the recent years within various policy-making circles, the concern for 'women-in-development' has also become a continuous humming noise. But under the existing socio-economic context where masculine images conjure up any development effort, such references are highly ambiguous and do not ensure the genuine involvement of women. Consequently, woman, who by her nature of work and on the basis of her spiritual context is very 'close to nature', lose an important opportunity to participate actively under the formal institutional framework in community-based forest management movement. There are instances that where women are involved in decision-making about forest, they tend to take account of the needs of food, fodder, fuelwood and other non-timber forest products which are otherwise ignored by men sitting on forest protection on similar community-level committees (Fuquan & Yuhua 2003; Kelkar & Nathan 2003; Sarker & Das 2002; Vasundhara 2000; etc.). This study thus tries

to examine as to whether gender sensitive planning under participatory forest management programme increases women's contribution on household's income by augmenting women's physical involvement in forest works based on an empirical study in West Bengal, which acts as key-precursor of the implementation of participatory forest management programme in general and gender sensitive participatory forest management programme in particular in Indian context. The underlying assumption is that if women are empowered in their own management system on forest resource under participatory programme (called joint forest management, JFM) establishing their own management unit (like female-organised forest protection committee or female FPC) separated from general forest management unit (joint FPC) women's income will increase in the former FPC with their greater physical involvement in forest works.

The paper is organized as follows. The next section presents the importance of this study in West Bengal. It tries to highlight as to how West Bengal acts as key-precursor of the implementation of participatory forest management programme in general and gender sensitive participatory forest management programme in particular in Indian context. The data set and methodology appears in Section III. The key results are outlined in Section IV. Section V concludes.

### Importance of Study

Three issues seem to be important in exploring the importance of this study. What is the relevance of JFM programme in Indian context in general and West Bengal in particular? Why was such pro-people initiative programme in India in the protection, management and development of forest resource primarily initiated in greater Mednapore district in West Bengal-now south West Bengal? What are the implications of gender sensitive JFM programme of this study?

As regards the first issue is concerned, essentially, in the context of Indian forestry, several strands have gone to the present emphasis on community involvement in forest conservation. JFM programme emerges as the latest in a long history of policy changes, attempting to create a new relationship between 'state'

and 'community'. Such an evidence of community forest management regime in India was found earlier in Kautilya's *Arthashastra* (BC 321) which refers to 'forests' being managed as "state reserves for revenue" and for 'public use' (Sarmah & Rai 2001, p.209). But, since then, no rulers in India did execute this policy in the management of forest resource before 1988. The forest policy of 1988 constitutes a significant departure from earlier forest management practice, which emphasized on production of commercial wood and disregard for local need, because of the fact that the former emphasizes on: (i) obtaining the active participation of local people in forest conservation and development programme on local forest lands and (ii) the benefit sharing arrangements, which is intended to provide village communities living near the forests a stake in the protection and development on the degraded forests. The new policy lays emphasis on meeting the local needs in particular of the tribal and rural poor living near the forest and in safeguarding their traditional rights and concessions subject to the carrying capacity of the forests.

Regarding West Bengal's role in India's JFM programme, it is said that India's JFM, implemented through a Ministry of Environment and Forests, Government of India Circular in 1988, is to a large extent based upon the successful experience of joint management of forest in Arabari under Midnapore district of West Bengal, wherein government and forest fringe community were economically benefited by this programme. This programme has demonstrated beyond doubt that local communities can protect forest patches near their villages and the forest department also can work with the people if it wants. The key precursor to JFM, from a managerial perspective, was a local-level initiative, dating from the early 1970s, in Arabari (Sarker & Das 2006, p.272). A forest officer worked outside the official rules. He discovered that by offering to share the benefits of regrowth of trees, Government's own interests in protection could be met (Sundar & Jeffery 1999, p.28). Without any legal punishment by law, traditional cooperative management system based on self-enforcing social norms and customs – each person knows that if they cheat, the other will as well, and to their supply of forest products in years to come will be jeopardized

– were enough to restrain people from removing trees from forest and the prevailing conditions ensures that the forest dependent households did not suffer from a scarcity of forest resource on which they were so dependent. About 618 families living in 11 villages lying in the fringe voluntarily protected these forests when in return they were assured provision of fuelwood and fodder from the regenerated forest and employment in forestry activities. In 1987 these villagers were also declared as beneficiaries for these rejuvenated forests and granted 25 per cent share from the revenue earned from final harvest. This project made both government and community benefited (SFR, 2000: 47).

As to the second issue is concerned, the emergence of this new forest management system in West Bengal, especially in southern part where the pioneer attempt on community-based regime in India was taken place, is grounded historically in tribal and peasant resistance movements (Poffenberger 1995, pp.342-50; Sarmah & Rai 2001, p.213). Against the custodian forest management system, which emphasized on production of commercial wood and disregard for local need, the local forest fringe communities – *Santal*, *Bhumij* and *Mahato* tribal, and some low caste Hindus – in south West Bengal mobilized repeatedly against *Mughal* and *British* rulers to protect their traditional rights on forestland from long past. *Chur Rebellion* (1767-1805), *Naik Revolt* (1806-1816) and *Hul Rebellion* (1855) are the glaring examples of the history in south West Bengal (Poffenberger 1995, pp.342-49). It is said that during *Hul Rebellion* (on July 16, 1855) some ten thousand tribal, under the messianic leadership of four Santal brothers stood their ground firmly and fought with bows and a kind of battle-axe in a battle near *Pirpaiti* (Dutta 1940, p.26). Although, the revolt collapsed eventually after half their members were reportedly killed, its effects were far-reaching.

Although from a managerial perspective, West Bengal was the key precursor to JFM in India, JFM movement in West Bengal gathered momentum when in 1989 a programme of resuscitation and reestablishment of *moribund sal* and other hardwood forests in the districts of Midnapore, Bankura, Purulia, Burdwan and Birbhum in south Bengal was initiated by

the government with the active participation and involvement of the local people. Forest report of West Bengal reveals that the overexploitation of trees for timber was so severe that thousand and thousand hectares of forest lands in the south West Bengal except *Sundarban* were almost treated as bare plain land, when the JFM was established; but such lands are almost secured after JFM programme (SFR 2000, p.47). Government revenue from the degraded forest was almost nil when the JFM was established, but it has significantly increased after JFM (Das & Sarker 2008, p.91).

Regarding gender sensitive JFM programme (the third issue) is concerned, the 1988 National Forest Policy in India asserted that one of the basic objectives was ‘creating a massive people’s involvement with the involvement of women’ (Ministry of Environment and Forest – MOEF -1988). The JFM resolutions in India (Table 1) suggest that the joint FPC failed women’s involvement in the joint forest protection committee where both men and women should jointly participate in the same committee. Significantly, understanding that women are being deprived of their equal constitutional rights to benefit accruing from the forest, efforts have been made during 1990s by the Forest Department, Government of West Bengal to establish a new management system of female FPC in West Bengal, where all members of each committee are exclusively women. To this end, 17 female FPC (Forest Protection Committee) have been established, primarily, in Bankura district in West Bengal. It has been extended to all the forest divisions of the Bankura district, although over 90 per cent forest protection committee of the said district are Joint FPC (Sarker and Das, 2002). So, this study seems to be relevant in West Bengal in general because West Bengal acts as key-precursor of the implementation of participatory forest management programme in India, and Bankura in particular, because gender sensitive JFM exclusively guided by female members primarily started in Bankura district in Indian context under government incentive, and despite the fact that the proportion of female FPC is insignificant as compared with joint FPC in Bankura district, both the types have been working there side by side.

## Data Set and Methodology

As the paper is a part of intensive research study on gender sensitive JFM programme, data set for the study has been collected through an intensive field enquiry from Bankura district of Bengal. Although female FPC is core area of this study, for comparison, we consider two types of control groups – joint FPCs under JFM programme (first control group) and villages without JFM programme (second control group). For the selection of female FPC / core group, random sampling technique (SRSWOR) is used. First district-Bankura, and then all forest divisions of Bankura district- Bankura (North), Bankura (South) and Panchayet (Soil Conservation - were selected purposively. But the selection of one female FPC from each division is randomly selected. Thus total number of female FPC considered for field survey works out to three. As regards the selection of FPC under control group is concerned, we take three joint FPCs and two non-JFM villages based on the criterion of close proximity (nearest distance in km) to each sample female FPC. More importantly, two non-JFM villages are considered, one each from Bankura (North) and Bankura (South) forest divisions, because there is no any forest fringe village under Panchayet (Soil Conservation) forest division without JFM programme.

As regards the selection of FPC members' households are concerned, for field survey we cover all members from six JFM villages – three sample female FPCs (core group) and three joint FPCs (first control group) – and two non-JFM villages (second control group) for all forest divisions in the district – Bankura (North), Bankura (South) and Panchayet (Soil Conservation). However, the distribution of total number of households selected for field survey is 431: female FPCs ( 120 households), joint FPCs( 182 households) and non-JFM villages( 129 households). Worthwhile to mention that each FPC under this study was formed in the respective village; so, FPC/village is synonymous in this study.

The field survey is conducted during the year 2005-06. In addition to the comparison on current data of after situation of JFM programme, data during before situation of JFM are also collected from all the households during the year 2005-06 through the *reflexive comparison method* where 'after' and 'before' scena-

rios are compared for the participating households (Ravallion, 2001; Reddy et al., 2004; Reddy, and Sousan, 2004). But the period of data for 'before situation' was not same to all FPCs. 'Before situation' for each FPC is considered for the preceding one-year period from the starting of JFM programme in the respective FPCs. Before situation of all FPCs lies between 1991 and 1996. However, a single 'before situation' is selected by the simple arithmetic mean of FPCs under study<sup>1</sup>. Data were collected from all individual members of the respective JFM and non-JFM villages through the scheduled questionnaire.

In order to study the different aspects of the stated objective simple tabular analysis, which presents absolute numerical values, percentage change, simple proportion, descriptive statistics and test of significance<sup>2</sup>, is used here. Income in monetary units (in INR.) is assessed by estimating net real earnings<sup>3</sup> (revenue minus cost in real term) from both forest and non-forest sources during both after situation and before situation (Das 2008, p.54; Sarker & Das 2008, pp.26-31).

## Findings

At the very outset, we portray some observed characteristics of the villages under study. More than 80 percent members of almost all JFM villages (both female and joint FPC-villages) and non-JFM villages are either schedule caste (SC) or schedule tribe (ST); more that 75 percent households in each sample FPC village live below poverty line<sup>4</sup>; major part of income for all categories of households in all FPC/JFM villages and non-JFM villages is yielded from forest source during both before and after situations of JFM. All these might lead to low economic and social status of forest fringe communities in rural Indian society.

### Dependence on Forest (Physical):

As may be seen in Table 2, representing Household's involvement (sex-wise) in various NTFFPs collection, processing & production and marketing during after and before situations of JFM programme, there exists almost exclusive domination of women (male-female differences are statistically significant) for all economic activities on NTFFPs except marketing for all categories of households in all types of villages during both after and before situations of JFM. Categorically, it is higher for lower econo-

mic status (landless and marginal landholding households) for all types of villages for both situations. Domination of female also persists in female-male ratio (number of female for one male) for all economic activities on NTFPs except marketing. Women's major role in the task of NTFPs' collection also appear in the other studies (Kumar 2005; Vasundhara 2000). But, interestingly, the comparative outlooks between JFM and non-JFM villages of this study reveal that as compared with before JFM situation, the percentage of women's annual man-days employment of total family labour in the task of NTFPs' collection has considerably decreased for all categories of households in the JFM villages during after JFM situation, whereas it has increased during the same period in non-JFM villages. It may be judged by the fact that due to non-execution of JFM, women of non-JFM villages have to spend more time in the forest for the collection of NTFPs. Similarly, for the non-execution of JFM, women of non-JFM villages are not involved in the production of NTFPs-based enterprise (like sal-leaves plate) which is more existent among female members in JFM villages. Worthwhile to mention that the capital of such enterprises is mainly provided by forest department to households under JFM villages and necessary training in this regard is also given to those households (with the help of NGOs). But during before situation, women's contribution of family labour in the activity of production of NTFPs-based enterprise is hardly observed for both JFM and non-JFM villages.

Table 2 also shows that although male's involvement in the collection, processing & production of NTFPs are significantly lower, for marketing of NTFPs the former has exclusive dominance over the latter for all categories in all types of villages during both the situations. It implies that with marginal participation compared with women in NTFPs' collection and production & processing, men has a free hand access in NTFPs' sale income. This might undermine women's empowerment of the poor forest fringe communities under our study. However, after JFM, the percentage of women's annual man-days employment of total family labour has increased in the task of NTFPs' sale in the female FPC villages, whereas it has decreased in the joint FPC villages and non-JFM villages during the same period. Not unexpectedly, the gender sensitive JFM has made some positive changes for women's involvement in the task of NTFPs' sale. More relevant, some NGOs in India are playing very posi-

tive roles in safeguarding the interest of tribal women who collect NTFPs as the main source of livelihood. For example, Adivasi Harijan Kalyan Samity, a NGO in Bastar district in Madhya Pradesh, has formed a rule according to which money is given only to women, who are entitled to hold a card in exchange of their NTFPs. The NGO is of view that if the money goes to the hand of women, it will be properly utilized. This experiment proved as a milestone in empowering women. Considering the merits of this policy, the forest department of Jagdalpur division has now issued a government order that only women would be entitled to hold a card to receive the cash of all NTFPs transactions (Kumar 2005, p. 101).

### **Dependence on Forest (Monetary):**

Table 3 presents per capita annual net real income of various categories of households from forest source, non-forest source along with the change of income between two time periods (before and after situations). A common feature that emerges from the table is that annual income from forest source accounts for major share of total income for all categories of households under both JFM and non-JFM villages during both the situations. It also shows that per capita income for all categories of households increases during after situation for all villages. But such an increase is higher for all categories of JFM households than that of among non-JFM villages after JFM. Categorically, the increase of forest income is higher for landless and marginal landholding households under JFM villages compared with same categories of households under non-JFM villages. The higher increase in income for landless and marginal categories households under JFM villages has been made possible only due to substantial increase in income from forest source after JFM. It seems to be relevant to mention that during before situation the share of income from forest source out of total income from all sources for all households under our study (combining both JFM and non-JFM villages together) ranges between 63.56 and 70.58 percentage points indicating that forest was major source of income for all categories of households before JFM. During after situation, the share of income from forest source for households under JFM, combining both types of FPCs together, works out between 67.96 and 87.45 percentage points. For non-JFM villages, the share of forest income out of total income ranges between 60.29 and 64.09 percentage points during before situation, whereas after JFM it

lies between 55.26 and 64.59 percentage points. Table 3 also shows that forest income for all households under JFM villages has considerably increased after JFM; but the incidence of increase is much lower for the households belonging to the better economic position according to land-based economic status.

### **Women's Contribution of Income from Forest:**

We now turn to have an insight on women's contribution in total family income from forest source under our study (Tables 4a and 4b). Despite the fact that both before and after situations forest is the major source of earning for all categories in all types of villages, women's contribution in FPC-villages has significantly increased during after situation compared with before situation. More importantly, after JFM women in the female FPC villages are the only major contributors of their family income (on an average about 54 percent), which they only receive from forest source, whereas such contribution was around 21 percent in the same villages during before situation, and around 37 percent in the joint FPC-villages after situation. It might imply that JFM has economically benefited to a large extent to the women under JFM villages in general and female FPC-villages in particular from forest resource, whereas income from forest source decreases for women of non-JFM villages after JFM. Evidently, it might be an indication that women of non-JFM villages fail to receive the economic benefit from forest resource due to non-execution of JFM. Categorically, however, the households belonging to lower economic status receive higher economic benefit from JFM. It also suggests that compared with joint FPC-villages, JFM conducted by female FPC-villages has made greater income security, particularly, to members of landless and marginal categories of households.

### **Conclusions**

This study lends credence to the fact that women of forest fringe areas are primarily responsible for NTFP's collection, processing and production based enterprises of NTFPs, and spends almost all their labour time in performing forest related works. However, JFM has greatly benefited presently to households under this programme not only in terms of reducing their labour time for collection of NTFPs but also in terms of increasing higher forest income in relation to the before JFM. Women in the female FPC villages are the only major contributors to their family income (on an average 54 percent), which they

only receive from forest source, whereas such contribution was much lower during before situation. A comparative study between joint FPC-villages and female FPC-villages under JFM reveals that women's contribution of their household's income in the female FPC-villages after JFM is much higher than either by women's contribution of their household's income in the joint FPC-villages or by men's contribution of their household's income in the female FPC-villages (own villages) during the same period. Categorically, households belonging to lower land-based economic status (landless and marginal categories of households) in JFM villages in general and female FPC-villages in particular receive higher benefits from forest income than small categories of households.

But despite women's higher share of households income from NTFP's source in both the JFM and non-JFM villages (including women's major contribution to their family income, which they only receive from forest source, after JFM programme) through women's higher involvement in labour time in almost all types of forest works compared with male, male control over household's income through male's higher involvement in labour time and higher male-female ratio in the NTFP's sale only. This might undermine women's empowerment and their equity principle of people's centered forest management programme. However, after JFM, women's involvement in the task of NTFP's sale in the female FPC-villages has increased, whereas it has decreased in the joint FPC-villages and non-JFM villages.

This study might suggest that gender sensitive planning for JFM has made some positive roles for institutionalizing poor women's efficiency and equity. So, in some areas of West Bengal, the setting up of female FPCs, which have motivated women function as an important control group in their own FPCs along with their own management system separated from joint FPCs, has helped women augment higher share of their household's income influencing thereby to contribute to better economic condition for their households after JFM situation in relation to their before situation. Hence an important task at this hour is to establish more gender-sensitive planning for JFM by establishing new female FPCs in other areas of India to increase household's income which may ensure some voice and space for this marginalized group within society. An enhancement of women's active agency/NGO is also necessary for women's empo-

werment and for fighting against inequality of every kind. Gender involvement of empowerment strategy like education, establishment of self-help group, etc. are also necessary for generating the perception of high sense of worth of women members within and outside households.

## Notes

1. A common before situation (single period) is measured on the basis of Consumer Price Index for Agricultural Labourer [General].
2. The problem here is to examine whether there is any significant difference between two mean values – mean values of two variables (after situation and before situation) for a given population, say, household related to collected quantity of NTFPs, etc. We want here to find if JFM is really effective to change households' collected quantity of NTFPs, man days of employment in forest sector and so on. One may apply *paired t-test* for this purpose.
3. Real earning (in INR) is determined after deflating the money income by Consumer Price Index for Agricultural Laborers (General) by applying the base transformation procedure (*splicing*). The procedures of estimation of cost, revenue and net money income during both before and after JFM situations are evaluated directly from our earlier study (Sarker and Das, 2008). It is worthwhile to mention that to estimate the income for forest fringe households under our study we use the household production framework (Pattanayak & Sills 2001) where total revenue and total cost of rural forest fringe households are estimated on two sources – forest (NTFPs, forestry wage and TFPs) and non-forest (farm, non-forest wage and others).
4. As per NSS of 56th round (1999-00), poverty line income in rural West Bengal on the basis of PCME (per capita monthly expenditure) is INR 350.17. In order to estimate the *poverty line income*, we consider NSS 56th round as the base year. By simple algebraic calculation with the consumer price index for agricultural labourers (CPIAL) we calculate poverty line income during the survey year (2005-06)- the current year (INR 394.08)- and also during the reference period of 'before JFM' situation. Such estimates are also used by Das (2008, p.98) and Das and Sarker (2008, p.89).

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**Table 1. Scope of Women's Participation in Joint Forest Management (JFM) Resolutions of Participating States / Union Territories in India**

Sl. no.	Participating states	Name of JFM unit	Membership in JFM unit	Size of EC or MC	Size of women in EC / MC*
1	Andhra Pradesh	Vana Samrakshana Samithi	Two adult male and female from hamlets/villages/cluster	15-20	Not specified
2	Arunachal Pradesh	Village Forest Management Committee	One adult from each family (30 % women in total)	11	Not specified
3	Assam	Forest Protection and Regeneration Committee	Economically backward forest fringe family	7 or less	Not specified
4	Bihar	Village Forest Management and Protection Society	One adult resident from each household	15-18	Should be 3-5
5	Gujarat	Village Organisations	Any person interested in forest conservation	Not specified	At least 2
6	Haryana	Hill Resource Management Societies	Hamlet/village/gram panchayat	Not specified	Not specified
7	Himachal Pradesh	Village Forest Development Committee	One adult male/female from each household	9-12	50 % from elected <i>tikka</i>
8	Jammu & Kashmir	Village Committee	One adult male/female from each household	11	At least 2
9	Karnataka	Village Forest Committee	Any person interested in village	14	2
10	Kerala	Vana Samrakshana Samithi	Two adult male and female from selected ward/hamlet/user-group	13	At least 3
11	Madhya Pradesh	Village Forest Committee	One person from each household	9 or more	At least 2
12	Maha-rashtra	Forest Protection Committee	All families in and around forest area	11	2
13	Nagaland	Community Forest Committee	Land-owing community	Not specified	Not specified
14	Orissa	Vana Samrakshana Samiti	Two adult male and female from a household in village/cluster	10-15	At least 3
15	Punjab	Forest Protection Committee	Sarpanch, member of panchayat, local forest guard, village level worker & 3 selected person of village	Not specified	Not specified
16	Rajasthan	Village Forest Protection and Management Committee	One adult from every family	7	Not specified
17	Tamil Nadu	Village Forest Council	Two adult male and female from each willing household in village	5-15	At least 3
18	Tripura	Forest Protection and Regeneration Committee	Poor households with at least one wage earner	6 or less	Not specified
19	Uttar Pradesh	Village Forest Committee/ Forest Panchayat	Member constituted under United Provinces Panchayat Raj Act, 1947	Not specified	Not specified
20	West Bengal	Forest Protection Committee	Husband/wife from economically backward household	9 or less	Not specified

Source: Society for Promotion of Wastelands Development, India (1998).

Note: Although the SoFR (1999) of Forest Survey of India mentions that some other states/union territories in India (Delhi, Goa, Jharkhand, Manipur, Meghalaya, Mizoram and Sikkim) also implemented the JFM programme, JFM resolutions of such states/union territories have not been included in the latest report 'JFM Updated (1998)' of Society for Promotion of Wastelands Development, India.\*EC(Executive committee),MC(Managing Committee).

**Table 2. Household's involvement (sex-wise) in various NTFPS collection, processing & production and marketing during after and before situations of JFM programme**

Type of village	Category of households	Collection			Processing & production			Marketing			
		Annual man-days employment of total family labour (%)		No. of female for one male	Annual man-days employment of total family labour (%)		No. of female for one male	Annual man-days employment of total family labour (%)		No. of female for one male	
		Male*	Female		Male*	Female		Male*	Female		
JFM village	Female FPC/ Core group	Landless	22.52 (28.73)	58.20 (66.52)	2.77 (2.52)	3.32 (2.02)	23.32 (14.02)	10.94 (6.50)	16.32 (7.16)	6.32 (5.16)	0.17 (0.14)
		Marginal	19.37 (27.87)	54.23 (67.04)	2.89 (2.71)	2.38 (1.78)	22.38 (12.12)	12.71 (9.04)	15.27 (6.09)	6.27 (4.75)	0.15 (0.13)
		Small	12.43 (16.69)	46.81 (56.79)	2.94 (2.87)	1.12 (0.96)	19.12 (10.39)	15.47 (12.39)	10.76 (4.70)	4.76 (3.27)	0.12 (0.11)
		<i>Total</i>	19.62 (27.25)	54.73 (65.86)	2.85 (2.63)	2.57 (1.82)	22.29 (12.85)	12.40 (8.16)	15.04 (6.46)	6.08 (4.81)	0.15 (0.13)
	Joint FPC/ First control group	Landless	23.83 (28.45)	59.79 (67.05)	2.62 (2.41)	2.96 (2.17)	22.96 (12.77)	9.60 (7.18)	14.33 (6.48)	4.33 (4.88)	0.15 (0.14)
		Marginal	19.61 (27.64)	55.93 (66.66)	2.83 (2.68)	2.18 (2.03)	22.18 (12.03)	11.73 (10.05)	12.70 (5.02)	2.70 (4.02)	0.14 (0.12)
		Small	12.06 (18.21)	48.04 (58.43)	2.91 (2.86)	1.06 (1.02)	19.06 (10.52)	13.53 (12.60)	9.19 (3.86)	2.19 (2.36)	0.11 (0.11)
		<i>Total</i>	20.13 (27.00)	56.24 (65.95)	2.76 (2.56)	2.32 (1.99)	22.00 (12.23)	11.15 (8.90)	12.80 (5.62)	3.28 (4.27)	0.14 (0.13)
Non-JFM village/Second control group	Landless	27.48 (27.19)	68.32 (65.85)	2.56 (2.48)	4.02 (2.82)	14.72 (12.82)	7.79 (7.04)	7.13 (5.89)	3.43 (4.89)	0.14 (0.13)	
	Marginal	26.46 (25.36)	64.91 (62.96)	2.79 (2.72)	3.44 (2.03)	14.04 (12.40)	10.70 (9.82)	3.33 (3.89)	2.73 (3.62)	0.14 (0.13)	
	Small	21.54 (21.23)	60.15 (58.17)	2.86 (2.82)	1.35 (0.83)	12.35 (11.23)	13.82 (13.00)	2.98 (1.88)	1.98 (2.38)	0.11 (0.10)	
	<i>Total</i>	26.18 (25.66)	65.79 (63.87)	2.74 (2.66)	3.31 (2.18)	14.10 (12.49)	10.30 (9.28)	4.63 (4.40)	2.87 (3.96)	0.13 (0.13)	
<i>Grand total</i>		21.79 (26.67)	58.66 (65.31)	2.78 (2.61)	2.68 (2.00)	19.73 (12.48)	11.25 (8.81)	10.99 (5.49)	3.94 (4.33)	0.14 (0.13)	

Source: Field survey

Notes: i) \*Male-female differences are statistically significant at 5 per cent level; and

ii) Figures within ( ) indicate values during before situation of JFM programme.

**Table 3. Household's Earning (Annual Per Capita Net Real Income in INR) on Different Sources of Income During After and Before Situations of JFM**

Type of village	Category of household	After JFM situation			Before JFM situation			Percentage change			
		Forest source	Non-forest source	All source	Forest source	Non-forest source	All source	Forest source	Non-forest source	All source	
JFM village	Female FPC/ Core group	Landless	1131.26 (87.45)	162.35 (12.55)	1293.61 (100.00)	528.94 (64.46)	291.63 (35.54)	820.57 (100.00)	113.87	- 44.33	57.65
		Marginal	1155.16 (85.20)	200.66 (14.80)	1355.82 (100.00)	677.94 (65.65)	354.72 (34.35)	1032.70 (100.00)	70.39	- 43.43	31.29
		Small	1275.71 (78.83)	342.60 (21.17)	1618.31 (100.00)	1108.70 (70.58)	462.15 (29.42)	1570.90 (100.00)	15.06	- 25.87	3.02
		<i>Total</i>	1165.79 (85.18)	202.85 (14.82)	1368.64 (100.00)	644.34 (65.55)	338.69 (34.45)	983.02 (100.00)	80.93	- 40.11	39.23
	Joint FPC/ First control group	Landless	1116.40 (85.64)	187.20 (14.36)	1303.60 (100.00)	601.12 (63.56)	344.63 (36.44)	945.75 (100.00)	85.72	- 45.68	37.84
		Marginal	1061.05 (78.19)	295.97 (21.81)	1357.02 (100.00)	773.42 (64.77)	420.68 (35.23)	1194.10 (100.00)	37.19	- 29.65	13.64
		Small	1075.24 (67.96)	506.93 (32.04)	1582.17 (100.00)	1001.30 (65.02)	538.68 (34.98)	1540.00 (100.00)	7.38	- 5.89	2.74
		<i>Total</i>	1091.31 (79.59)	279.87 (20.41)	1371.18 (100.00)	711.21 (64.19)	396.72 (35.81)	1107.90 (100.00)	53.44	- 29.45	23.76
Non-JFM village/Second control group	Landless	768.29 (64.53)	422.31 (35.47)	1190.60 (100.00)	629.27 (62.06)	384.70 (37.94)	1014.00 (100.00)	22.09	9.78	17.42	
	Marginal	783.31 (59.87)	525.04 (40.13)	1308.35 (100.00)	739.43 (60.29)	487.02 (39.71)	1226.50 (100.00)	5.93	7.81	6.68	
	Small	843.76 (55.26)	683.13 (44.74)	1526.89 (100.00)	976.22 (64.04)	548.17 (35.96)	1524.40 (100.00)	- 13.57	24.62	0.16	
	<i>Total</i>	794.47 (60.93)	509.44 (39.07)	1303.91 (100.00)	730.13 (61.54)	456.30 (38.46)	1186.40 (100.00)	8.81	11.64	9.90	
<i>Grand total</i>		1023.73 (75.59)	326.71 (24.40)	1350.45 (100.00)	698.18 (63.78)	398.26 (36.22)	1096.42 (100.00)	47.83	- 20.19	23.95	

Source: Field survey.

Note: Figures within ( ) indicate percentages out of annual per capita net real income from all sources

**Table 4a. Household's Dependence (Sex-Wise) on Forest Source of Income During After and Before Situations (Share in Percentage Out of Annual Per Capita Net Real Income from All Sources)**

Type of village	Category of households	NTFPs		Forestry wage		TFPs*		Forest (aggregate)		
		Male	Female	Male	Female	Male	Female	Male	Female	
JFM village	Female FPC/ Core group	Landless	14.17 (8.00)	39.52 (18.68)	6.66 (5.31)	9.61 (3.31)	5.61 (29.16)	8.01 (0.00)	26.44 (42.47)	57.14 (21.99)
		Marginal	14.04 (9.08)	38.94 (18.56)	7.33 (6.06)	8.20 (2.78)	4.95 (29.17)	7.64 (0.00)	26.32 (44.31)	54.78 (21.34)
		Small	12.74 (9.78)	30.88 (15.61)	7.48 (4.97)	3.57 (1.27)	7.76 (38.95)	6.40 (0.00)	27.98 (53.70)	40.85 (16.88)
		<i>Total</i>	13.91 (8.64)	38.02 (18.34)	7.09 (5.61)	8.10 (2.89)	5.51 (30.55)	7.61 (0.00)	26.51 (44.80)	53.73 (21.23)
	Joint FPC/ First control group	Landless	12.93 (8.06)	32.89 (16.28)	7.98 (3.90)	7.77 (3.06)	28.07 (38.94)	0.00 (0.00)	48.98 (50.90)	40.66 (19.34)
		Marginal	12.63 (8.92)	30.05 (15.50)	7.89 (3.93)	5.60 (2.79)	23.82 (38.75)	0.00 (0.00)	44.34 (51.60)	35.65 (18.29)
		Small	8.71 (7.10)	28.27 (15.79)	4.71 (2.89)	2.18 (1.81)	22.09 (39.43)	0.00 (0.00)	35.51 (49.42)	30.45 (17.60)
		<i>Total</i>	12.13 (8.29)	30.92 (15.92)	7.42 (3.80)	5.94 (2.82)	25.75 (38.94)	0.00 (0.00)	45.30 (51.03)	36.86 (18.74)
Non-JFM village/Second control group	Landless	5.89 (7.13)	17.56 (17.89)	5.71 (4.84)	2.99 (2.73)	43.72 (40.47)	0.00 (0.00)	55.32 (52.44)	20.55 (20.62)	
	Marginal	5.05 (7.15)	16.43 (17.91)	4.92 (4.51)	2.58 (2.39)	38.29 (38.28)	0.00 (0.00)	48.26 (49.94)	19.01 (20.30)	
	Small	4.17 (8.04)	12.02 (15.12)	3.44 (3.27)	1.48 (1.45)	34.29 (40.06)	0.00 (0.00)	41.90 (51.37)	13.50 (16.57)	
	<i>Total</i>	5.23 (7.33)	16.20 (17.63)	4.98 (4.49)	2.56 (2.40)	40.12 (39.65)	0.00 (0.00)	50.33 (51.47)	18.76 (20.03)	
<i>Grand total</i>		10.57 (8.10)	28.52 (17.10)	6.60 (4.51)	5.54 (2.71)	24.38 (36.81)	2.21 (0.00)	41.55 (49.42)	36.27 (19.81)	

Source: Field survey

Notes: i) Figures within ( ) indicate values during before situation of JFM programme; and

ii) \*TFPs' (timber forest products) earnings include earnings from two sources – share from government' timber sale (legal) and sale of illegally collected timber (illegal). Never did the respondents say that their source of income was illegal; rather, while examining the answers from the respondents regarding the break-up of their source of income, the distinction between legal and illegal source was clearly demarcated.

**Table 4b. Percentage Change of Forest Source of Income (Sex-Wise) Between After and Before Situations of JFM Programme**

Type of village	Category of households	NTFPs		Forestry wage		TFPs		Forest		
		Male	Female	Male	Female	Male	Female	Male	Female	
JFM village	Female FPC/ Core group	Landless	77.05	111.60	25.44	190.43	- 80.76	100.00	- 37.74	159.85
		Marginal	54.63	109.81	20.83	195.39	- 83.04	100.00	- 40.60	156.70
		Small	30.23	97.86	50.35	181.92	- 80.09	100.00	- 47.90	142.00
		<i>Total</i>	62.86	108.82	25.69	191.54	- 81.71	100.00	- 40.83	153.09
	Joint FPC/ First control group	Landless	60.50	102.03	104.28	154.37	- 27.91	0.00	- 3.77	110.24
		Marginal	41.58	93.93	100.09	100.56	- 38.53	0.00	- 14.07	94.92
		Small	22.64	79.05	62.99	20.45	- 43.98	0.00	- 28.15	73.01
		<i>Total</i>	48.96	94.85	98.44	109.68	- 33.82	0.00	- 11.23	96.69
Non-JFM village/Second control group	Landless	- 17.30	- 1.84	17.86	9.72	8.03	0.00	5.49	- 0.34	
	Marginal	- 29.42	- 8.27	9.19	7.76	0.03	0.00	- 3.36	- 6.35	
	Small	- 48.06	- 20.53	5.28	1.90	- 14.35	0.00	- 18.43	- 18.53	
	<i>Total</i>	- 27.68	- 8.18	12.07	7.50	1.02	0.00	- 2.21	- 6.34	
<i>Grand total</i>		30.03	68.08	52.43	102.11	- 36.81	100.00	- 15.92	83.09	

Source: Field survey