RESEARCH REVIEW JOURNALS
Volume-04
Issue-05
May-2019

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com[UGC Listed Journal]

Impact of Joint Forest Management in Tribal Livelihood- A Study on South-West Bengal

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ARTICLE DETAILS

Article History
Published Online: 25 May 2019

Keywords
Tribal, Forest, JFM, Livelihood.

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ABSTRACT

Typically tribal communities live in forest and its fringe areas. Forests dwelling tribal people directly or indirectly depend on forest or forest resources to meet their daily livelihood needs. For the dependency on forest resources causes of irregular collection of forest resources lead to degradation of forests and subsequent crisis of forest resources and environmental depletion. In this connection Government of India and forest department for the protection and management of forest resources launched a Participatory Forest Management programme which is popularly known as Joint Forest Management (JFM) programme in 1990. The JFM ensures sustainable and participatory management of forest as a forest based natural resources for development of livelihood of forest dwelling tribal communities. The present paper based on a field survey of tribal dominated Paschim Medinipur and Bankura districts in South-West Bengal. The study explores the impact of JFM programme in tribal livelihood basic indicators.

1. Introduction

The World majority of tribal people lives in the most isolated or forest periphery. The lifestyle and tradition of each indigenous community is unique and they are highly dependent on natural resource. They had been collecting resources from forest without causing any damage to it. The forest provides them with food and livelihood security (Mondal & Sarkar, 2018). Nearly about 100 million people reside in the forests and another 275 million live in the nearest forest areas and earn their livelihood from forests. The livelihoods of approximately 370 million people who directly or indirectly depend on timber and non-timber forest products including fuel wood, fodder, food, and medicines, etc. that act as natural resource inputs for converting them into economic outputs and thus contribute towards the livelihood of the forest dwellers (Vemuri, 2008). The Indian forest are mostly state owned and cover an area of 78.29 million hectares, corresponding to 23.81 percent of the total geographical area of the country according to the Indian State Forest Report 2011 (MEFGoI). The quality of the forest and the pattern of forest management will determine its productivity and flow of forest resources for generating livelihood opportunity for the forest base tribal communities. In this regard Ministry of Environment and Forest, Government of India make a provisions of Forest Policy of 1988 (MoEF,GoI 1988) and the subsequent government resolution on participatory forest management (MoEF,GoI 1990) emphasize the need for Community based programme in forest management, which is popularly known as Joint Forest Management (JFM) programme in India. The objective of the programme includes important aspects like proper management and conservation of forests, improving the livelihoods of forest dweller communities and reducing rural poverty. In India a large numbers of forest dwellers are tribals. In West Bengal also most of the tribal dominated blocks have forests and tribal communities live in nearby forest areas. More specifically in Paschim Medinipur and Bankura districts of South-West Bengal large sections of tribal community live in forest periphery. The present paper tries to explore the impact of JFM Programme in development of livelihood indicators of forest dwelling tribal people.

2. Objectives of the Study

The objectives of the proposed study are as follows:

1. To study the contribution forest resources for sustainable livelihood of forest dwelling tribal communities.
2. To study the impact of the JFM programme in the selected livelihood indicators of tribal households in the study area.

3. Methodology

The study is basically based on the primary field level survey. For the study 24 villages from 6 blocks has been selected purposively from Paschim Medinipur and Bankura districts of South-West Bengal. For a selection of village criteria used are i.e. (i) village must have Forest Protection Committee (FPC), (ii) the majority of populations belong to the tribal community. From the selected villages 240 sample tribal beneficiary households surveyed (e.g. 10 numbers of sample households surveyed from each selected village). For this study, structured questionnaires have been used to collect information. Besides the household survey, discussions have also been made by the officials of the Forest Offices and members of the FPCs in the surveyed area. Secondary data from different sources like Government Report, Books, Journals and other published literatures have also been used to supplement the information from primary sources. For analysis of data simple descriptive statistics and paired samples t test was used.

4. Empirical Results and Discussion

4.1 Contribution of Forest Product Household Economy:

The study areas are normally dependent on agriculture in monsoon. They grow rain fed crops during the monsoon season. As irrigation facility is not available within the forest

and the agricultural land is relatively poor quality, forest dwellers cannot depend entirely on farming for their livelihood (Ghosal, *2011*). In that case very low production of agricultural crops make them too dependent on collecting Common Pool Resources (CPR) such as non-timber forest products (NTFP). Thus, NTFPs collections are an essential activity in their daily life. Forest as a source of food and domestic uses in the study area, the tribal people are economically very vulnerable in nature. They have limited scope to obtain their daily foods from the market (Dolui et al, *2014*). The tribal communities in the study area are highly dependent on the collection of non-timber forest products for household consumption purpose as well as commercial need. The most widely collected NTFPs are the *Sal* leaf including fair woods etc. On average more than 60,000 *sal* plates collect per year per family *(See table. 3)* of this study area. Other important NTFPs is leaves of *Kendu* and *Mahua* flower which have a high economic value because of *kendu* leaves are used in rolling *Biri* and *Mahua* are used in alcohol and medicine preparation. Majority of tribal women in study area has been engaged in collection of NTFPs to meet their daily livelihood need. All the tribal households in study area depend on forest resources for their source of food and different domestic uses. Different vegetables and fruits like *Bel* fruit, *Jam* fruit, *Kend* fruit, *Piyal* etc. are collected as a source of livelihood *(See Table.1).* These fruits have seasonal variation in their collection, because all those fruits are not available throughout the year. Generally the duration of availability of these different fruits is 2-3 months in the year, but in particular seasons (S*ee table. 1*). Collection of NTFPs is more easy and free after provider right through JFM. Forest Protection Committees (FPC) plays an important role protection and conservation of forest. Due to protection and conservation of forest flow of NTFPs is sustain. Volume of collection of NTFPs has increased than earlier period.

Table 1. Important of Non Timber Forest Products Locally Available in Sample Areas

Name of NTFPs	**Available in Blocks**	**Availability**	**Quantify of product collected in a year/family**	**Commercial importance** (Yes / No)	**Household importance** (Yes / No)	**Avg. Market value of NTFPs**	**Rank****
Sal leaf collection	All Sample Blocks	9 Months	>60,000 plates	Yes	Yes	Rs. 120 per 1000 plates	3
Mahua Flower collection	Bbinpur-II Salboni Ranibandh Sarenga	2 months	25kg	Yes	Yes	Rs. 7 to Rs. 9/- per Kg	3
Kendu leaf collection	Bbinpur-II Salboni Ranibandh	2 months	20 Chata (Bundle)	Yes	Yes	Rs. 30/- to Rs. 35/- per chata	2
Animal Fodder	All Sample Blocks	12 months	As per need	NO	Yes		3
Fuel wood collection	All Sample Blocks	12 months	>2500 Kg	Yes	Yes	Rs. 2/- to Rs.4/- per Kg	3
Mushroom	All Sample Blocks	3 months	20 Kg	Yes	Yes	Rs. 10/- to 12 /- per Kg	2
Bel fruit	All Sample Blocks	2 months	20 Kg	Yes	Yes	Rs. 6/- per Kg	2
Jam fruit	All Sample Blocks	1 month	12 kg	Yes	Yes	Rs. 10/- per Kg	2
Babui grass	Bbinpur-II Ranibandh	6 months	3-4 quintal per bigha	Yes	Yes	Rs.350/- to 400/- per quintal	2
Kend fruit	Bbinpur-II Salboni Ranibandh	2 month	10 Kg	Yes	Yes	Rs. 10/- per Kg	1
Medicinal Plant (root & leaf)	All Sample Blocks	4 months	8 to 10 Kg	Yes	Yes	Rs. 2/- to Rs. 3/- per Kg	1

Source: *Focus group discussion with villager in study area*, Rank**: 3– most important; 2-important; 1 – less *important*

According to above table it shows that higher income given by *Sal* leaf that available nine months a year in a bulk amount, its market price per 1000 plates Rs. 120/- (*See Table. 1*). It also found that every family per year collect fuel wood more than 2500 kg but maximum amount use in house cooking purpose, if it's excess, then sale out in the local market at Rs 2 /- to Rs. 4/- per Kg (*See Table. 1*). In generally animals feed directly from the forest, but some time they collect fodder from the forest. Above table it clearly shows that *Sal* leaf, *Mahua* Flower, Fuel wood collection and Animal Fodder get the highest rank it's more important for tribal household economy in the study area.

4.2 Changes in Livelihoods Indicators:

For the analysis of changes in livelihood indicators the Paired Samples t Test was used. The Paired Samples t Test compares two means that are from the same individual, object, or related units. The two means typically represent two different times (e.g., pre-test and post-test with an intervention between the two time points) or two different but related conditions or units (e.g., left and right ears, twins). The purpose of the test is to determine whether there is statistical evidence that the mean difference between paired observations on a particular outcome is significantly different from zero. The

Paired Samples t Test is a parametric test. This test is also known as Dependent t Test, Paired t Test, Repeated Measures t Test (ref: SPSS Tutorials: Paired Samples t Test, 2018)

• Arrangement of the Data Following Way:

At first data are arranged on the two periodical perceptions at present and before 2000 situation in livelihood condition of sample tribal households. In f**ollowing way sample households given their perception about the** livelihoods condition at present and at 2000 situation.

Pair	Particulars	At Present				At 2000			
		Very Much (4)	Much (3)	Little (2)	Poor (1)	Very Much (4)	Much (3)	Little (2)	Poor (1)
1	Source of Income / Employment		√					√	
2	Food Security of House Hold	√					√		
3	Health and Nutrition status		√				√		
4	Education Status		√					√	
5	Household Condition						√		
6	Livestock	√							√
7	Household Assets			√					√
8	Drinking Water	√						√	
9	Credit Availability			√					√

In the present study total sample size is **N = 240**.

• **Hypotheses Testing with Possibility Tables**

The hypotheses can be expressed in two different ways that express the same idea and are mathematically equivalent:

H_0 : μ – μ = 0 ("There is no significant improvement between the paired sample means.) i.e. There no significant change in livelihood of sample households.

H_1 : μ – μ > 0 ("There is significant improvement between the paired sample means ") i.e. There positive significant change in livelihood of sample households.

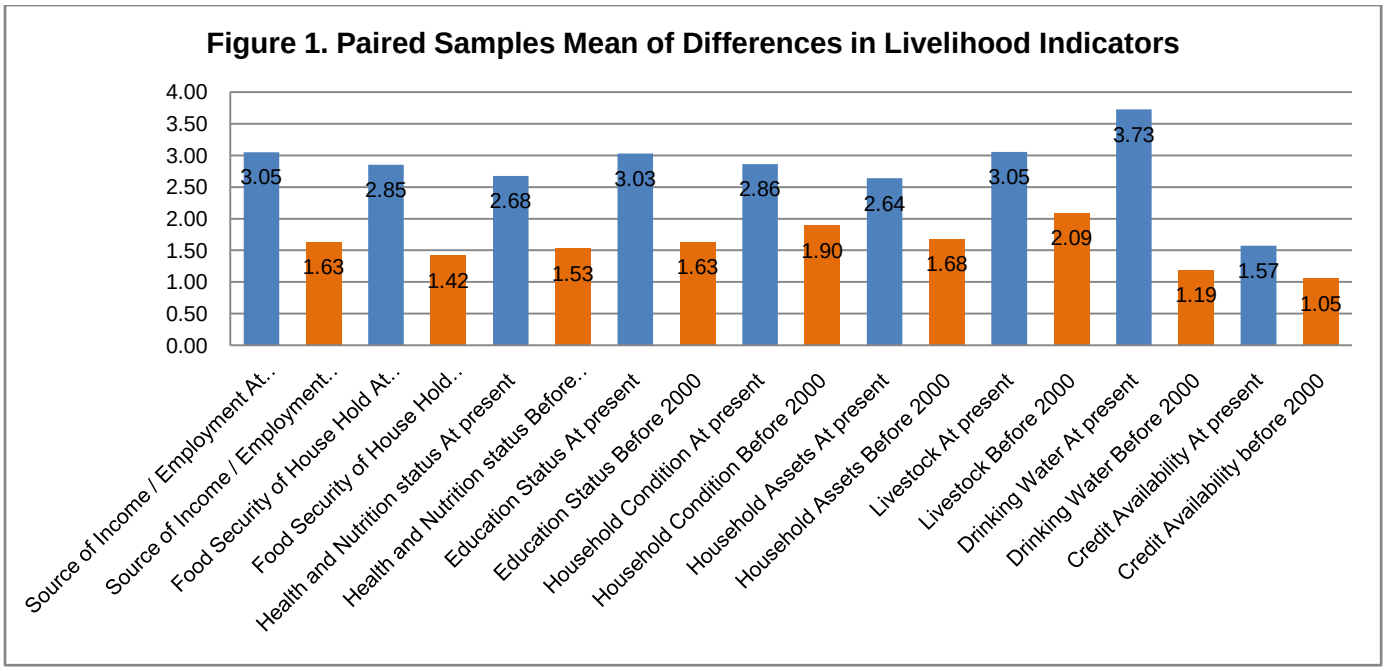
There any Significant Improvement of Livelihood during before 2000 to At Present

Observation of Paired Samples t Test below:

Table. 2. Paired Samples Statistics

Particulars		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Source of Income / Employment At present	3.05	240	.464	.030
	Source of Income / Employment Before 2000	1.63	240	.563	.036
Pair 2	Food Security of House Hold At present	2.85	240	.448	.029
	Food Security of House Hold Before 2000	1.42	240	.580	.037
Pair 3	Health and Nutrition status At present	2.68	240	.478	.031
	Health and Nutrition status Before 2000	1.53	240	.500	.032
Pair 4	Education Status At present	3.03	240	.504	.033
	Education Status Before 2000	1.63	240	.484	.031
Pair 5	Household Condition At present	2.86	240	.441	.028
	Household Condition Before 2000	1.90	240	.306	.020
Pair 6	Household Assets At present	2.64	240	.612	.039
	Household Assets Before 2000	1.68	240	.494	.032
Pair 7	Livestock At present	3.05	240	.883	.057
	Livestock Before 2000	2.09	240	.583	.038
Pair 8	Drinking Water At present	3.73	240	.620	.040
	Drinking Water Before 2000	1.19	240	.441	.028
Pair 9	Credit Availability At present	1.57	240	.656	.042
	Credit Availability before 2000	1.05	240	.218	.014

Source: *Primary field survey*



Source: *Primary field survey*, *(At present* *and Before 2000* *)*

Table 3. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Source of Income / Employment At present - Source of Income / Employment Before 2000	1.417	.580	.037	1.343	1.490	37.855	239	.000
Pair 2	Food Security of House Hold At present - Food Security of House Hold Before 2000	1.433	.567	.037	1.361	1.505	39.138	239	.000
Pair 3	Health and Nutrition status At present - Health and Nutrition status Before 2000	1.146	.525	.034	1.079	1.213	33.806	239	.000
Pair 4	Education Status At present - Education Status Before 2000	1.400	.547	.035	1.330	1.470	39.626	239	.000
Pair 5	Household Condition At present - Household Condition Before 2000	.967	.465	.030	.908	1.026	32.188	239	.000
Pair 6	Household Assets At present - Household Assets Before 2000	.958	.499	.032	.895	1.022	29.734	239	.000
Pair 7	Livestock At present - Livestock Before 2000	.967	.684	.044	.880	1.054	21.902	239	.000
Pair 8	Drinking Water At present - Drinking Water Before 2000	2.538	.838	.054	2.431	2.644	46.935	239	.000
Pair 9	Credit Availability At present - Credit Availability before 2000	.521	.592	.038	.445	.596	13.619	239	.000

Source: *Primary field survey*

Paired Samples t Test gives the results of the analysis. The statistics given under the label paired differences are calculated by computing the differences between the paired values (in this case by subtracting the "At present" variables from the "Before 2000" variables). The mean, standard deviation, and standard error of mean of these differences along with 95 percent (%) confidence interval for the mean of differences are given here. Next to this are given the results of the *t*-test. The test results show that all nine paired variables are significance value of paired samples t test less than 0.05. Therefore above paired samples t test table it can say that there significant improve in livelihood indicator of sample households i.e. there is statistically significant difference between the paired samples means of the all observed sample paired variable. It means that null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted in all cases. Further it can say that all indicators of livelihoods have been improved significantly compared to 2000 to present situation of sample households due to JFM intervention.

From the above figure.1 it is clear that all sample mean of livelihood indicators significantly increased due to JFM intervention of sample beneficiary households in study area. Among the livelihoods indicators income and employment, education status, livestock activity and drinking water is recoded highest improvement. JFM provides right to collect NTFPs, therefore tribal households use this product for value addition and processing purpose after that they seal this

product to the nearest market or buyer. Directly it helps to promote small NTFPs based business and also group wise micro entrepreneurship activities in the study area. Due to JFM activity provide sustainable income therefore they freely spend the money for child education and own skill development. It indirectly helps to promote the education status of the sample households. After providing JFM guideline free to collect animal fodder from the forest it boosts the livestock activity in the study area. During the field survey it was observed that most of villages FPC build submersible for drinking and irrigation purpose. Few villages in Garbeta-I and Salboni blocks of Paschim Medinipur district FPC arrange the pipe water supply through build a tank or submersible. Indirectly JFM improved the food, nutrition and health status of the sample households. From the additional income from forest they give to importance of their standers of livening. As result they buy some household assets and repairing or modification of household condition. Much improvement is noted in majority livelihood indicators through JFM programme in study area but they still straggle with formal credit facility in their area. They still depend on nonformula credit sources. It also seen some study area SHGs under the FPCs they lends small amount within the group members. Finally it can recognize that all selected livelihood indicators significantly improved through JFM intervention in study area compare to earlier condition.

5. Conclusion

From the above discussion, it is clear that the impact of JFM on different livelihood indicators in the study area, after analysis of livelihood basic indicators in sample households, it has been made known that more or less reliable with some variations in improvements of livelihood indicators. It is clearer from the paired samples t test in impact on livelihood indicator (like, source of income / employment, food security of household, health and nutrition status, education status, household condition, household assets, drinking water and credit availability) through JFM activity. JFM helps to create additional livelihood opportunity of the sample tribal households in the study area (like, NTFPs sale, Animal Husbandry, forest labour, value addition of NTFPs etc.). It also observed that during the field tribal women are more actively participate in the collection of NTFPs and processing activities. Finally, it can be concluded that the JFM programme directly or indirectly sustain the livelihoods of the tribal households in the study area.

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