

POVERTY ERADICATION OF SHIFTING CULTIVATORS THROUGH BAMBOO CULTIVATION: A CASE STUDY OF NORTH DISTRICT OF TRIPURA, INDIA

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ABSTRACT

The study makes an attempt to assess the poverty eradication of Jhumias through the bamboo cultivation in North Tripura district of Tripura. The present study is an empirical study based on both primary and secondary data. Primary data was collected with the help of a well-structured questionnaire from 120 bamboo cultivator households randomly (who previously involved in shifting cultivation) selected from the three subdivisions of the North Tripura district. The result indicates that poverty among the shifting cultivators are reduced after rehabilitation through the bamboo cultivation. The headcount index, poverty gap index, human poverty index and multidimensional poverty index showed that during shifting cultivation respectively 100 per cent, 87 per cent, 88.2 per cent and 90 per cent jhumias were fallen under the poverty line in North Tripura district. It means intensity of poverty were very high during the shifting cultivation period. Headcount index, poverty gap index, human poverty index and multidimensional poverty index showed that after rehabilitation of jhumias through the bamboo cultivation respectively zero per cent, zero per cent, 3.29 per cent and 0.3 per cent are under the poverty line. It means poverty among the jhumias are effectively reduced after bamboo cultivation. Thus the paper suggests that bamboo cultivation will be a useful strategy for rehabilitation of jhumias and poverty eradication.

Keywords: Bamboo cultivation, Income opportunity, Jhumias family Poverty, and Shifting cultivation.

INTRODUCTION

Bamboo is fast growing plant that traditionally considered the 'Poor man wood' or 'Green Gold' in India. Bamboo is sufficiently low-priced and abundant to meet the vast requirements of human (Ming-Gang et. al., 2008). The people of Asia, Africa and South America are reliant on it for construction of house and home utensils. It is similarly used for construction of furniture, food and medicine, fuel and handicrafts for a long time. (Nath et. al., 2009). Bamboo is a multipurpose, durable, renewable and environment-friendly material. Because of its strength and flexibility, bamboos are utilized as a building material (scaffolding, roofing, flooring etc.) in construction industry. The market for bamboo and bamboo products is increasing and over the past years has been rapid increase in bamboo production (Ghosh et. al., 2006).

Bamboo plant raises in both arid and semi-arid climates, and is easy-going to poor soil. It is mostly used in production of domestic commodities in cottage industries and in paper industries (Yadav & Yadav, 2008). It is found to grown basically in the tropical sub-tropical and temperate region where the temperature varies between 16°C and 38°C and the annual rainfall ranges between 1,200 mm to 4,000 mm (Ram et. al., 2010). Bamboo appears to be extremely talented in not only preserving the soil and but also for productive utilization of gullies (Pande et. al., 2012). Research emphasis has long been put to its biological features and the practices for its propagation, organized cultivation, management and utilization, due to bamboo's economic benefits, (Chen, 2009).

Because of its cultivation practices at arid and semi-arid areas, it is encouraged by government and nongovernment organizations, especially in tribal areas in order to harmonize the international food safety, security and nutrition (Sharma et. al., 2008). Bamboo cultivation increases mineralization rate, microbial biomass, carbon and net primary

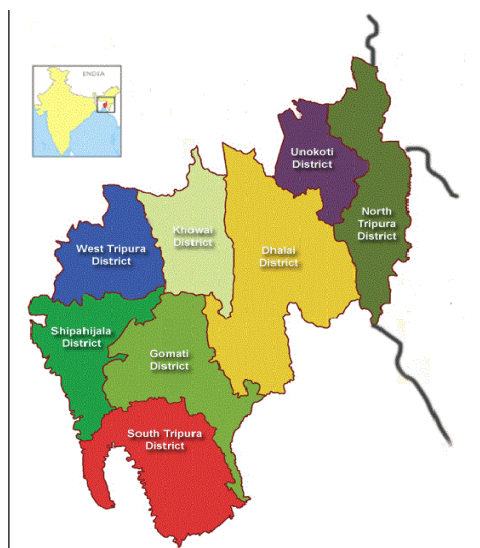
production, so bamboo cultivation is a great need in semi-arid area (Aseri et. al., 2012). Bamboo is a common plant in North-eastern India. It is one of the most abundant and environmental-friendly and sustainable resources and is not being used to its full potential. Bamboos have numerous opportunities and potential for expanding in the region (Panwar & Tarafdar, 2006). To meet the increasing demand in other section of the society apart from elevating bamboo-related traditional industry as well as bamboo enterprise, it is essential for increasing production of quality bamboo (Antonio et. al., 2014).

OBJECTIVES

The objective of this paper is to study the role of bamboo cultivation on poverty eradication of shifting cultivators in North Tripura district.

THE SURVEY AREA

Tripura is the third smallest state in India. It is bordered by Bangladesh to the north, south and west, and also by Assam and Mizoram to the east. The state has eight districts. Total area of state is 10,491 km². Bengali, English and Kokborok are the official languages. Total area of North Tripura district is 1422.19 km² and has a population of 693,947 (as of 2011). Density of population is 290/km². The district has 12 percent of the total population of Tripura. District has literacy rate and sex ratio respectively 97.22 percent and 967/1000. Dharmanagar, Kailashahar and Kanchanpur are the three sub-divisions of the district. Shifting cultivation is a traditional cultivation in the district. Such cultivation is also known as jhum cultivation and those families who involved in such cultivation is called as jhumias.



MATERIALS AND METHODS

(a) Data collection methods

The present study is an empirical study based on primary and secondary data. Primary data was collected with the help of a well-structured questionnaire from 120 bamboo cultivator households randomly (who previously involved in shifting cultivation) selected from the three subdivisions of the North Tripura district. The secondary data has been collected from the various annual reports of the Forestry department, internet pages, various newspaper clips, journals, various published or unpublished reports and working papers available at different state and national level institutions.

(b) Sample collection

There are three sub-divisions (namely Dharmanagar, Kanchanpur, and Panisagar) in North district of Tripura. Stratified random sampling method was used and from each sub-division four villages were selected where shifting cultivators were rehabilitated by bamboo cultivation. From each village 10 farmers were selected randomly as sample who are rehabilitated from shifting cultivation to bamboo cultivation. Therefore, the total sample households to be selected from each sub-division is 40 ($10 \times 4 = 40$) and the total sample sizes are $40 \times 3 = 120$.

(c) Data analyse methods

For measure of impact of bamboo cultivation on poverty of jhumias, index method was used, i.e. Headcount Index, Poverty Gap Index, Human Poverty Index and Multidimensional Poverty Index.

RESULTS AND DISCUSSION

For measure of impact of bamboo cultivation on poverty of jhumias, Headcount Index, Poverty Gap Index, Human Poverty Index, and Multidimensional Poverty Index are used. The sample size of the study is 120 families who are now settled by bamboo cultivation but previously were involved in shifting or jhum cultivation. For measurement of income of the family, current income of bamboo cultivation and the income of shifting cultivation of last year before transferred to bamboo cultivation were collected and compared. Income from shifting cultivation in rupees was converted in USD of that year and then converted in USD of 2019.

Headcount Index

Headcount Index of Jhumias

Headcount Poverty Rates of 120 samples, Assuming 1.25 US\$ per day (US \$ = Rs. 70)

$N_p = 120$; $N = 120$; $P_0 = \text{Number of poor/ total population (or sample)} = 120/120 = 1$. Result of sub-division-wise headcount ratio of jhumias after calculation is showed in the following table:

Table 1: Headcount Index of Jhumias (in Rupees)

Per Day Income	Per Month Standard Income	Highest Income (monthly)	Minimum Income (monthly)	Average Income (monthly)	Headcount Poverty Rate (P_0)	Poverty in Percentage
Poverty in Dharmanagar sub-division						
\$1.25	2625	1400	432	760	1	100
Poverty in Kanchanpur sub-division						
\$1.25	2625	1240	540	800	1	100
Poverty in Panisagar sub-division						
\$1.25	2625	1000	320	790	1	100
Poverty in North Tripura District						
\$1.25	2625	1213.33	430.66	783.33	1	100

Source: Field Survey (2020).

The above table showed that all jhumia families were fallen under the poverty line in North Tripura district of Tripura. In three sub-divisions 100 per cent jhumia's households were below the poverty line.

Headcount Index of Bamboo Cultivation

Headcount Poverty Rates of 120 Samples, assuming 1.25 US\$ per day (US \$ = Rs. 70) (Rs. 2625 per month). $P_0 = \text{Number of poor/ total population (or sample)} = 0/120 = 0$

Result of sub-division-wise headcount ratio of rehabilitated jhumias through bamboo cultivation after calculation is showed in the following table:

Table 2: Headcount Index of Bamboo Cultivator (in Rupees)

Per Day Income	Per Month Standard Income	Highest Income (monthly)	Minimum Income (monthly)	Average Income (monthly)	Headcount Poverty Rate (P_0)	Poverty in Percentage
Poverty in Dharmanagar sub-division						
\$1.25	2625	17000	5500	8500	0	0
Poverty in Kanchanpur sub-division						
\$1.25	2625	23000	6500	7000	0	0
Poverty in Panisagar sub-division						
\$1.25	2625	21000	5500	9000	0	0
Poverty in North Tripura District						
\$1.25	2625	20333.33	5833.33	8166.66	0	0

Source: Field Survey (2020).

From the above tables, the value of headcount index showed that during shifting cultivation 100 per cent jhumias were fallen under the poverty line. After rehabilitation of jhumias through the bamboo cultivation the situation has been changed and now all households are above the poverty line. Therefore, bamboo cultivation improved the economic situation of the rehabilitated jhumias.

Poverty Gap Index

The poverty gap index (P_i) may be written as

$$PGI = \frac{1}{N} \sum_{j=1}^q \left(\frac{z - y_j}{z} \right)$$

where N is the total population, q is the total population of poor who are living at or below the poverty line, z is the poverty line, and y_j is the income of the poor individual j . In this calculation, individuals whose income is above the poverty line have a gap of zero.

Poverty Gap Index of Jhumias

Result of sub-division-wise Poverty gap index of jhumias after calculation is showed in the following table:

Table 3: Poverty Gap Index of Jhumias

Per Day Income	$G_i = \text{Poverty line (z)}$ $\text{less actual income}$ (y_i)	$\sum G_i$	$\sum G_i/z$	$P_i = 1/N \sum G_i/z$
Poverty in Dharmanagar sub-division				
\$1.25 (Rs. 2625 per month)	-	98700	37.6	0.94
Poverty in Kanchanpur sub-division				
\$1.25 (Rs. 2625 per month)	-	87990	33.52	0.83
Poverty in Panisagar sub-division				
\$1.25 (Rs. 2625 per month)	-	88500	33.71	0.84
Poverty in North Tripura District				
\$1.25 (Rs. 2625 per month)	-	275190	164.46	0.87

Source: Field Survey (2020), Note: [Assuming 1.25 US\$ per day (US \$ = Rs. 70)]

From the above table, the value of Poverty Gap index showed that during shifting cultivation 87 per cent jhumias were fallen under the poverty line. Among the sub-divisions Kanchanpur sub-division had lowest poverty ratio and Dharmanagar had highest.

Poverty Gap Index of Bamboo Cultivator

Result of subdivision-wise poverty gap index of rehabilitated jhumias through bamboo cultivation are showed in the below table

Table 4: Poverty Gap Index of Bamboo Cultivator

Per Day Income	$G_i = \text{Poverty line (z)}$ $\text{less actual income (y}_i)$	$\sum G_i$	$\sum G_i/z$	$P_i = 1/N \sum G_i/z$
Poverty in Dharmanagar sub-division				
\$1.25 (Rs. 2625 per month)	0	0	0/40	0
Poverty in Kanchanpur sub-division				
\$1.25 (Rs. 2625 per month)	0	0	0/40	0
Poverty in Panisagar sub-division				
\$1.25 (Rs. 2625 per month)	0	0	0/40	0
Poverty in North Tripura District				
\$1.25 (Rs. 2625 per month)	0	0	0/120	0

Source: Field Survey (2020), Note: [Assuming 1.25 US\$ per day (US \$ = Rs. 70)]

From the above tables, the value of Poverty Gap index showed that during shifting cultivation 87 per cent jhumias were fallen under the poverty line. After bamboo cultivation the situation has been changed and now all households are above the poverty line.

Human Poverty Index

The Human Poverty Index (HPI) was an indication of the standard of living in a country, developed by the United Nations. The indicators used to measure the deprivations are already normalized between 0 and 100.

Human Poverty Index measures deprivations in the three basic dimensions of human development captured in the HDI: (a) A long and healthy life- vulnerability to death as a relatively early age, as measured by the probability at birth of not surviving to age 40.; (b) Knowledge- exclusive from the world of reading and communications, as measured by the adult illiteracy rate.; (c) A decent standard of living- lack of access to overall economic provisioning, as measured by the unweighted average of two indicators, the percentage of the population not using an improved water source and the percentage of children under weight-for-age.

Human Poverty Index of Jhumias

Result of subdivision-wise Human Poverty Index of jhumias after calculation is showed in the following table:

Table 5: Human Poverty Index of Jhumias

Survey Area	Value	Percentage
Human Poverty Index of Jhumias in Dharmanagar sub-division	87.8	87.8
Human Poverty Index of Jhumias in Kanchanpur sub-division	86.5	86.5
Human Poverty Index of Jhumias in Panisagar sub-division	90.3	90.3
Human Poverty Index of Jhumias in North Tripura District	88.2	88.2

Source: Field Survey (2020)

The above table showed that percentage of poverty was very high among the jhumias in all subdivisions. Poverty ratio was less in Kanchanpur sub-division compare to the other districts. HPI in percentage of Dharmanagar, Kanchanpur and Panisagar sub-divisions were 87.8, 86.5 and 90.3 respectively. Human Poverty Index of Jhumias in North Tripura district was 88.2, it means 88.2 per cent jhumias were under poverty line.

Human Poverty Index of Bamboo Cultivator

Result of subdivision-wise Human poverty index of rehabilitated jhumias through bamboo cultivation are showed in the below table

Table 6: Human Poverty Index of Bamboo Cultivator

Survey Area	Value	Percentage
Human Poverty Index of Jhumias in Dharmanagar sub-division	3.21	3.21
Human Poverty Index of Jhumias in Kanchanpur sub-division	3.78	3.78
Human Poverty Index of Jhumias in Panisagar sub-division	2.90	2.90
Human Poverty Index of Jhumias in North Tripura District	3.29	3.29

Source: Field Survey (2020)

The above table showed that Human poverty index is improved after rehabilitation of jhumias through bamboo cultivation. After rehabilitation, HPI in percentage of bamboo cultivator is 3.29. It means during that period only 3.29 per cent bamboo cultivator are under poverty line after rehabilitation through bamboo cultivation. During that time, HPI in percentage of Dharmanagar, Kanchanpur and Panisagar subdivision of North Tripura district are 3.21, 3.78 and 2.90 respectively. This demonstrated poverty among the jhumias are reduced after involvement in bamboo cultivation.

Multidimensional Poverty Index

Multidimensional Poverty Index (MPI) is an international measure of acute poverty covering over 100 developing countries. The MPI combines two key pieces of information: (1) the proportion or incidence of people (within a given population) who experience multiple deprivations and (2) the intensity of their deprivation: the average proportion of (weighted) deprivations they experience. Formally, the first component is called the multidimensional headcount ratio (H):

$H = q/n$; Here q is the number of people who are multidimensionally poor and n is the total population.

The second component is called the intensity (or breadth) of poverty (A). It is the average deprivation score of the multidimensionally poor people and can be expressed as:

$A = \sum c_i(k)/q$; where c_i is the censored deprivation score of individual i and q is the number of people who are multidimensionally poor.

The MPI is the product of both: $MPI = H \times A$.

Multidimensional Poverty Index of Jhumias

Result of subdivision-wise Multidimensional Poverty Index of jhumias after calculation is showed in the following table:

Table 7: Multidimensional Poverty Index of Jhumias

Area	Multidimensional Headcount Ratio (H)	Intensity of Poverty (A)	Multidimensional Poverty Index (MPI)
Dharmanagar	1	0.93	0.93
Kanchanpur	1	0.90	0.90
Panisagar	1	0.88	0.88
North Tripura	1	0.90	0.90

Source: Field Survey (2020)

The above table showed that during the shifting cultivation, 90 per cent of jhumias were MPI poor. According to the MPI, this means that they were in acute poverty. The poor were deprived in 90 per cent of the weighted indicators in North Tripura district, so the intensity was 90 per cent.

Multidimensional Poverty Index of Bamboo Cultivator

Result of subdivision-wise Multidimensional Poverty Index of rehabilitated jhumias through bamboo cultivation are showed in the below table:

Table 8: Multidimensional Poverty Index of Bamboo Cultivator

Area	Multidimensional Headcount Ratio (H)	Intensity of Poverty (A)	Multidimensional Poverty Index (HxA)
Dharmanagar	0.007	0.50	0.003
Kanchanpur	0.006	0.69	0.004
Panisagar	0.007	0.53	0.003
North Tripura	0.006	0.57	0.003

Source: Field Survey (2020)

The above table showed that after rehabilitation of jhumias through bamboo cultivation, in the North Tripura district 0.6 per cent of people are MPI poor. The poor are deprived in 57 per cent of the weighted indicators, so the intensity is 57 per cent. However, because they are on average deprived in 57 percent of the weighted indicators, that society are deprived in 0.3 per cent of the total potential derivations it could experience overall.

During the shifting cultivation 100 per cent jhumias were under poverty line, but after rehabilitation only 0.3 per cent people are under poverty line. So poverty ratio decreased after the rehabilitation.

CONCLUSION

Bamboo cultivation has been changed the livelihood and income of jhumias. The value of headcount index showed that during jhum cultivation 100 per cent jhumias were under the poverty line. The situation has been changed after rehabilitation of jhumias and now all households are above the poverty line. The value of Poverty Gap index showed that during shifting cultivation 87 per cent jhumias were under the poverty line. The situation has been changed after bamboo cultivation and now all households are above the poverty line.

The human poverty index showed that 88.2 per cent jhumias were under the poverty line during shifting cultivation. The situation is changed after rehabilitation and now only 3.23 per cent jhumias are under poverty line. The multidimensional poverty index showed that 90 per cent jhumias were under poverty line during the shifting cultivation, but after rehabilitation only 0.3 per cent people are under poverty line. From the above analyse it has been concluded that bamboo cultivation reduced poverty among the jhumias families. More jhumias may be included under the bamboo cultivation schemes and it will be useful tool for empowerment of future generation.

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