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Research Article

INCOME VULNERABILITY OF TEA GARDEN WORKERS IN BANGLADESH

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ABSTRACT

Objective: The aim of the study was the assessment of the income vulnerability of tea garden workers in Bangladesh.

Methods: Household surveys were used to collect data from tea workers. Sixty households were selected for the study and face-to-face interview was conducted to collect data. A random sampling technique was used to select the sample. Vulnerability assessment tools were used to assess the vulnerability to income. Regression analysis was employed to determine the factors affecting income vulnerability.

Results: The result of the study showed that 95% of workers out of the total sampled workers were high vulnerable, i.e., they have a greater probability to fall in future income vulnerability and only 5% had a low probability to fall. The exposure variables such as gender, education, family size, and expenditure had significant effect on tea workers to become income vulnerable, but the variables such as gender, family size, and expenditure had a negative relationship with the tea workers income vulnerability that means these variables had a significant effect to reduce income vulnerability of the tea garden workers. The acquisition value of livestock assets and access to credit as adaptive capacity had a negative and significant effect on the income vulnerability of tea workers. It can help to decrease the income vulnerability of tea garden workers.

Conclusion: The result suggests that special attention should be given for the improvement of the livelihood of tea workers.

Keywords: Income vulnerability, Tea garden worker, Tea, Poverty, Bangladesh.

INTRODUCTION

Tea is one of the most important cash crops in Bangladesh. It is also an important food commodity of international trade [1]. Tea cultivation in Bangladesh is spread over the hilly zones on the eastern part mainly in four districts; these are Sylhet, Moulvibazar, Habiganj, and Chittagong. Sylhet, the northeastern region of Bangladesh, has more than 150 tea gardens. Hence, the people of this area are mostly dependent on tea gardens for their livelihood [1]. Bangladesh is the world's 10th largest tea producer and 15 number exporters and 16 number consumers in the world and it produces 1.68% of the global tea production and 0.58% of the world tea export [2].

At present, there are 166 tea gardens in Bangladesh and all the tea estates are managed by different companies while four Sterling companies own 27 estates and Bangladeshi companies and individual entrepreneurs own the rest of the tea gardens [3]. Tea workers were the main community for tea gardening in Bangladesh because they got this work from the order of heredity. They are landless and their families are depended on tea estates for their livelihoods for generations and they have no alternative employment opportunity [4]. Hence, generation after generation, they tied to them in tea gardens. Even the youth of tea gardens does not enjoy any opportunity in the other employment sphere and they are almost forced to join as tea labor workforce as unskilled labor [1]. The workers of tea gardens take this occupation as a challenge to maintain their livelihood and they are depended on the tea plantations for food, water, shelter, education, health, and sanitation which make them extremely vulnerable to closures [5].

Vulnerability in this context can be defined as the diminished capacity of an individual or group to anticipate, cope with, resist, and recover from the impact of the low wage of tea workers. It is a concept that has been used in different research traditions and the assessment of the [6] vulnerability of tea workers income has to identify the overall vulnerability of individual workers relative to their income threshold [7].

Bangladesh can earn a lot of foreign currency by exporting tea and this contribution is being possible mostly by the efforts of tea garden workers. However, it is very pathetic that there is no special priority for giving facilities to tea garden workers. Their poor housing conditions, low wages, long working hours, social discrimination, deprive of many human basic needs and rights, etc., make sure that the children of tea workers can do nothing else but become tea workers generation after generation [8]. Therefore, the assessment of income vulnerability could be an important issue to improve their livelihoods. By assessing the vulnerability of income, it can help to know how income variability creates and how it is sensitive to related factors, coping by the adaptive capacity. The present study tries to provide a clear understanding of the income vulnerability of tea workers. The study would be helpful to identify the factors which can influence the workers to fall into income vulnerability. The findings of the study would be helpful for the researchers and policy-makers in taking appropriate decisions to reduce the income vulnerability of tea workers. It would encourage new researchers for conducting research on this issue.

Research objectives

Two research objectives were set for this study. These are given below:

I. To examine the income vulnerability of tea garden workers
II. To determine the factors affecting the income vulnerability of tea garden workers.

METHODS

The selected area of the study was Sreemangal Upazila of Moulvibazar district. Moulvibazar district is bounded on the north by Sylhet district, on the east by Assam state and the Tripura state of India, on the south by Tripura state of India and on the west by Habiganj district. Moulvibazar district was selected purposively as the highest number of tea gardens in Bangladesh is located here. After conducting a preliminary survey, 60 sample households were selected purposively. Sixty samples were

taken due to fund constraints. Two tea estates of Sreemangal Upazila under Moulvibazar district, namely, Clonal tea estate and Saif tea estate were selected randomly for the study. The collected data were manually edited and coded. Then, the summation of collected data was calculated where necessary. All collected data were summarized and scrutinized carefully. Data entry was done in computer Microsoft Excel and analyses were done using STATA software.

Analytical framework and tools

Assessment of vulnerability using econometric approach

Econometric and indicator approaches are popular tools to measure vulnerability. The econometric approach method uses household-level socioeconomic data to analyze the vulnerability levels of the different social groups. The present study used that econometric approach developed by Chaudhuri (2003) to measure income vulnerability [9]. Chaudhury (2002) developed expected poverty framework measurement which is preferred in the study to interpret the income vulnerability of tea workers [10]. Vulnerability in this study is defined as susceptibility of income of tea workers or in other words, the probability of income will lie below the threshold income level, Z=4446 Tk [11]. Chaudhury (2003) approach is given by household income of tea workers fall below the benchmark income due to income vulnerability [9]. The Stochastic process represented vulnerability as follows:

$$V_h = Pr(C_h \leq Z)$$

Where, V_h is the vulnerability of tea workers income, Pr is the distribution of income for household h, C_h is the income of tea workers, and Z is the threshold level of income. The probability that a tea worker is to fall in income vulnerability used by a threshold level of income when the household is considered to be poor.

Assuming for household h, the data generation process for income is captured by the following equation:

$$lnC_h = \beta X_h + e_h$$

Where, lnC_h is the natural logarithm of tea workers monthly income; X_h is a vector of characteristics of tea garden workers (characteristics of the head of the family, working as a tea garden worker: Age, education, gender, family size, and expenditure); β is a vector of parameters to be estimated; and e_h is a disturbance term with zero mean.

The income vulnerability of household h with characteristics X_h can now be calculated by Chaudhury (2003) approach as follows:

$$V_h = Pr(lnC_h < lnZ \mid X_h = \varphi(\frac{lnZ - Xh\hat{B}}{6})$$

Where, V_h denotes predicted vulnerability to income, that is, the probability that income level C_h will be lower than the threshold level of income (Z) conditional on household characteristics X_h. Φ is the cumulative density of standard normal distribution, and 6 is the standard error of the error term in equation [9].

To examine the determinants of vulnerability to poverty, the following regression model was used:

$$V_h = \mathrm{Xh}\varphi + uh$$

Where, V_h is the vulnerability by equation (3.10), the vulnerability by equation, X his the vector of household idiosyncratic characteristics, φ is the vector of coefficients, and u_h is the error term.

$$V_h = aX'h + \beta C'_h + \mu_h$$

Where, V_h represents income vulnerability of tea workers that calculated based on the equation; X' h is the factor those affect income of tea workers (i.e., age, education, gender, experience, family size, and expenditure), and C'_h is the adaptive capacity (i.e., physical assets, livestock assets, access to credit) and μ_h is the error term.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Socioeconomic characteristics are very useful to determine the behavior of any community. The specific characteristics such as age, education, experience, access to credit, and training received are the specific characteristics that determine the behavior of the community. Decision-making of any individuals would be influenced by their characteristics.

In this research, the workers of the tea gardens of the study area were classified into different age groups. The age of the workers varied from 19 to 60 years. Based on their age, the workers were classified into four groups and the groups were 0–14 years, 15–49 years, and 50–59 years and above 60 [12]. From Table 1, it was estimated that among the majority of the selected samples of the tea workers, i.e., 70% were belonged to the age group of 15–49 years.

Family size means the members living together in a family. The family members considered as the members who permanently live together. From Table 1, the maximum number of the family are small, i.e., 53% of the household were small. About 40% of the families were medium and the rest 7% were large families. It was cleared from the table that there were a very little number of extended families in the selected households. The average family size of the sampled households was 4.43 and lower than the national average.

In the case of education, about half of the respondents had passed primary, 45% were illiterate, and only 8% had passed secondary. In the selected study area, the total literacy rate was 55% which was almost near to the national average. In the selected households of tea gardens, the percentage was 43.60% which is almost near to the national percentage. Hence, the employment status of the tea garden workers was satisfactory. However, all members of the households were found working as tea workers.

Income vulnerability of tea workers

The results of the regression equation of income of tea workers are given in Table 2. Table 2 shows the effect of the idiosyncratic variables on the income of tea workers. In the estimation of income vulnerability, household idiosyncratic characteristics such as age, gender, education, experience, and family size affected the income of the tea workers. The estimation ensured that the effects of the household idiosyncratic characteristics were statistically significant on the income of tea

Table 1: Socioeconomics characteristics of the areas

Variables	Number of workers	Percentage of workers (%)
Age group (years)		
0–14	0	0
15–49	42	70
50–59	13	21.66
>60	5	8.33
Family size		
Small (up to 4 members)	32	53.33
Medium (5–6 members)	24	40
Large (above 6 members)	4	6.67
Educational status		
Illiterate	27	45
Primary	28	46.67
Secondary or above	5	8
Employed members in households		
No employed member	0	0
One employed member	0	0
Two employed member	17	28.33
Three employed member	43	71.66

workers. The value of R^2 was 76% which ensured that 76% of the total variation can be explained by the explanatory variables to get the income vulnerability of tea workers.

The magnitude of the regression coefficient of the gender of household head was positive, i.e., 0.155. Hence, there was a positive relation of tea workers income with the gender. The value of the regression coefficient of the age of tea workers was 0.002 with a negative sign. There was a negative relationship between tea workers income with their age. On the other hand, the value of the coefficient of educational level of tea workers was 0.062 with negative sign, so there was a negative relation of the educational level of tea workers with their income. There was a positive relationship of income with the experience of tea workers. In the estimation of the relation of income with the family size, the coefficient of family size was positive.

The calculation of frequency distribution of the vulnerability group is presented in Table 3. It helped to know the percentage of workers to fall in income vulnerability in five groups. There was the highest frequency in high vulnerable individual to fall in income vulnerability, i.e., the highest number of workers was high vulnerable to fall in income vulnerability.

From Table 3, 95% of workers out of the total sampled workers were highly vulnerable to fall in income vulnerability, i.e., the vulnerability >0.5 or has a probability of 50% and above to fall in income vulnerability in the near future. That means 95% of tea garden workers had a higher probability to fall in income vulnerability. Only 5% of the tea garden workers were low vulnerable to fall in income vulnerability.

There were no workers in the range of relatively low vulnerable. Maximum number of workers was high vulnerable, i.e., these workers had higher probability to fall in income vulnerability.

Determinants of income vulnerability of tea garden workers

The variables, used to identify the determinants of income vulnerability of tea workers, were gender, age, education, and experience of the household head who work in tea garden, family size, expenditure, and acquisition value of physical assets, acquisition value of livestock assets, access to credit, and expenditure of tea garden workers (Table 4).

The magnitude of the regression coefficient of gender was negative but statistically significant at 1% level. That means the effect of gender will decrease the income of tea workers significantly. There was the highest number of female workers in the selected sample workers of the tea gardens. Hence, if the female workers in the tea gardens will increase, then the income vulnerability of tea workers will decrease significantly. Therefore, female-headed households were less vulnerable than the male-headed households. The age of the household head was a positive coefficient, but there was an insignificant relationship of the age of household head with the income vulnerability of tea workers. The coefficient of the variable education was positively related to the income of tea workers and statistically significant. If the educational level of the household head is increased, then the vulnerability of income will increase. However, the households headed by people who do not have any formal education had higher income vulnerability. Although very small numbers of workers were educated, they did not want to go out the boundary of the tea garden. Educated tea workers did not want to engage them in other income-generating activities because they become tea workers generation after generation. They got this job as heredity from their family and influenced them to work in tea garden. Hence, they were not encouraged to work in other activities as an increase in their educational level. The coefficient of the family size of tea workers was statistically significant at 5%, i.e., the size of the family had a significant effect on the income vulnerability of tea workers. Family size had the negative sign coefficient means that the increase in the family size decreases the probability of income vulnerability. An increase in family size can increase the earning members in the family.

Table 2: Relation of income with the explanatory variables

Variable levels	Coefficient	Standard error	t-value
Gender	0.155	0.026	5.76
Age	−0.002	0.001	−1.75
Education	−0.062	0.004	−13.23
Experience	0.001	0.001	0.73
Family size	0.046	0.009	4.82
R^2	0.76		

Table 3: Category of individuals into relative vulnerability group

Vulnerability category	Frequency	Percentage
Relatively low vulnerable	0	0
Low vulnerable	3	5
High vulnerable	57	95

Table 4: Determinants of income vulnerability of tea garden workers factors using weighted generalized least squares linear model [13]

Variables	Coefficient	t-value
Gender (0/1 dummy)	−0.004***	−2.86
Age	6.75e−06	0.13
Education	0.001***	5.13
Experience	0.00003	0.57
Family size	−0.001**	−1.99
Expenditure	−1.49e-06***	−4.00
Acquisition value of physical assets	−2.75e−07	−0.99
Acquisition value of livestock assets	−7.44e−08***	−2.86
Access to credit (0/1 dummy)	−2.36e−07***	−3.51
R^2	0.79	

**5% level of significant, ***1% level of significant

The increased earning source will help to decrease the workers to fall in income vulnerability. Large family size tends to have lower income vulnerability than the small family size.

The value of the coefficient of expenditure was negative and statistically significant at 1%. Hence, the expenditure had a significant effect on the income vulnerability of tea workers. It implied that the probability of individuals to fall in income vulnerability is significantly affected by the increased in expenditure. The negative value of coefficient implied that an increase in the expenditure of the tea workers, then the vulnerability of income decreases. To maintain this increased expenditure, they need to engage them in other income-generating activities. Hence, the income from other sources can help to reduce income vulnerability. Acquisition value of physical assets had no significant effect on the income vulnerability of tea workers. However, the value of the coefficient was negative. Hence, a unit increases in the value of the physical assets decrease the workers income vulnerability. If the physical assets are increased, then there will lower chance to fall in income vulnerability. By selling these assets, they can decrease the income vulnerability. It will be supportive for them to increase their income. Physical assets help to build adaptive capacity to reduce income vulnerability. The coefficient value of livestock assets was negative and statistically significant at 1% level. Income vulnerability will reduce if the livestock assets are increased. Hence, the increase in the livestock assets can reduce the probability to shift from low to highly vulnerable conditions. They can build adaptive capacity by selling their assets in adverse conditions which can be used for alternative coping strategies to reduce income vulnerability. It can help the tea workers to reduce income vulnerability by increasing their income. The magnitude of the coefficient of access to credit was significant at 1% with a negative sign. There had a significant effect of credit on the income vulnerability of tea workers. The negative value of the coefficient means that income vulnerability can be decreased by taking a loan from non-governmental

organizations (NGOs). It implied that an increase in access to credit, decrease the income vulnerability of tea workers. The NGOs also provide extension services which will help to reduce income vulnerability.

CONCLUSION

In the determinants of the income vulnerability, some factors exposure to income vulnerability. These factors can affect the income of tea workers which influence the workers to fall in income vulnerability. The exposure variables gender, education, farm size, and expenditure had a significant effect on the income vulnerability of tea workers. Female-headed households were less vulnerable to income than male-headed households. Hence, the female workers in the tea gardens can reduce income vulnerability. On the other hand, acquisition of livestock assets and access to credit can reduce the income vulnerability of tea workers as adaptive capacity. Hence, the income vulnerability as sensitive which are affected by the exposures can be reduced by the adaptive capacity of the tea workers. Some policies can be recommended for the improvement of their livelihood condition and increase their income to reduce income vulnerability.

AUTHORS' CONTRIBUTIONS

The entire authors have contributed equally.

CONFLICTS OF INTEREST

No conflicts of interest exist.

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