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ICAE

29th | Milan Italy 2015

UNIVERSITÀ DEGLI STUDI DI MILANO AUGUST 8 - 14

AGRICULTURE IN AN INTERCONNECTED WORLD



Role of rural off-farm employment in earning income and livelihood in the coastal region of West Bengal, India

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Abstract

The study was conducted in the coastal region of West Bengal, India to document the prevalent farming systems and explore the opportunity of nonfarm activities in generating income and livelihood for the rural households. This paper concentrates in finding out the key determinants of participation in nonfarm income and employment generation activities across rural households. The analytical framework yields different activity choices as optimal solutions to a simple utility maximization problem. The empirical inquiry reveals that education, family size and access to land assets plays major role in accessing more remunerative nonfarm employment. The region is quite underdeveloped such that traditional rural self-employment activities still contributes 30.94 percent of household income and provide employment to 40.71 percent rural household. The number of working men, number of working women, age and education level are the other important determinants of nonfarm activities for the rural households.

Keywords: Education, household income, nonfarm employment, rural households.

JEL Codes: J43, J62, Y90

1. INTRODUCTION

Rural development policies often neglect the role of rural nonfarm activities and their link with agriculture. Non-farm income refers to income earned from non-agricultural sources, either in wage-employment or self-employment (Barrett *et al.*, 2001). Rural households have been viewed as exclusively engaged in agriculture (Tijani *et al.*, 2010; Lanjouw and Shariff, 2002) though it constitutes 30-45 percent of household income across the developing world (Haggblade *et al.*, 2005). Rural India is home to 75% of the nation's population and about the same proportion of the poor in the country. Most of rural India's

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workforce (70%) remains primarily involved in agriculture (Himanshu *et al.*, 2011), but in recent decades this sector's growth has lagged than other sectors in the economy. While there is no escaping the need to galvanize agriculture, it is also clear that India needs to manage a transition of people out of agriculture. The gap between the number of new rural workers and the number of new jobs in agriculture is growing; agricultural advances alone will not meet the rural employment challenges. Migration to urban areas will be important, but the rural non-farm economy will also have to be a key source of new jobs. There is mounting evidence that rural households can and do participate in a wide range of non-agricultural activities to generate income (Lanjouw, 2001; Lanjouw and Lanjouw, 2001; World Bank, 2003) such as wage and self-employment in commerce, manufacturing and services, alongside the traditional rural activities of farming and agricultural labour that has great potential to substitute farm income (Zhu and Luo, 2006).

In the normal course of development, the share of people involved in the kind of small scale, petty self-employment in agriculture or the non-farm sector which is endemic in rural India, is expected to go down, while the share of regularly hired workers employed by medium and large enterprises on a more or less regular basis, is expected to rise. But in India this is not quite what has happened, even in rural and urban areas taken together. Because the rate of growth of medium and large-scale enterprises which hire significant numbers of regular workers has been too slow due to lack of capital investment and skilled manpower (Dercon and Krishnan, 1996; Collier and Gunning, 1999). Empirical evidences show that the growth of the nonfarm sector is particularly pro-poor (Ravallion and Datt, 2002; Foster and Rosenzweig, 2004) and can create favourable conditions to alleviate poverty in the rural areas (FAO, 1998; Matshe and Young, 2004). With a persistent rise in the access of the poor to nonfarm activities that yield high and stable incomes form a potential basis for upward income mobility that can prevent the portent of oncoming economic and social development disaster. Therefore, a paramount interest is focussed on this paper to understanding the determinants of participation in nonfarm activities and of the levels of incomes derived from these activities by different categories of farm households.

2. METHODOLOGY

The primary data required for the study was obtained from a survey of farm households, conducted in the coastal region of West Bengal in 2013 by direct interview method. The region is largely agrarian, characterised by traditional way of farming and problematic degraded coastal soils. Along with the information related to socio-economic

conditions of the sample farmers like age, education, size of the family, number of dependents, cropping pattern, size of operational holdings, existing farming system etc., information on cost of cultivation, inputs used, yield of crops, price of output, expenses and income from different enterprises, the detailed data on nonfarm sources of income were also gathered.

Multistage sampling technique was adopted for the selection of study area and sample respondents for collection of information required for the study. Among the salinity affected districts of West Bengal, the maximum proportion of salinity affected cultivable land comes under (around 86 percent) the district, South 24 Parganas. Thus this district is purposively chosen for the study. In the first stage, two blocks were selected by simple random sampling without replacement (SRSWOR) technique out of twenty nine development blocks in the district. At the second stage, three villages from each block totalling six villages were selected in random manner, following SRSWOR technique. At last stage, thirty farmers from each village were selected randomly following the same method. Thus, in all together, 180 sample farmers form the basis of the study.

Basically the study was conducted to know the farmers' desire to continue less profitable agriculture or moving out from agriculture. To analyse the data and draw inferences on importance of nonfarm sector in maintaining the livelihood for the people belonged to traditionally underdeveloped agricultural background, the method of central tendency (mean, median), measures of dispersion (standard deviation) are employed.

Income is taken as single most important constraint, as people will be interested to participate to those activities which generate greater income. To know the probability of participation in nonfarm activities a binary logistic model is employed, where p denotes the predicted probability of occurrence of the event. The odds ratio indicates the factor by which the independent variables increases or decreases (if negative). The odds ratio for four dependent variables namely, inclination towards nonfarm employment over farm employment, inclination towards non-agricultural wage employment over agricultural wage employment, non-agricultural self employment and non-agricultural wage employment are estimated based on age of the head of the household, age of the head of the household squared, education level of head of the household, family size, number of working men, number of working women, number of dependents (child younger than 15 years of age and adults older than 60 years of age), mean age of working men, mean age of working women, mean education of working men, mean education of working women, land-man ratio and land asset per adult (X_i).

To construct the dichotomous dependent variable for the inclination towards nonfarm employment, if nonfarm income is greater than farm income then it is denoted as 1 otherwise 0. Similarly, to know the farmers preference towards non-agricultural wage employment, if non-agricultural wage income is greater than agricultural wage income then it is denoted as 1 otherwise 0. If the household engaged in nonfarm self employment activities then it is denoted as 1 otherwise 0. The dependent variable for non-agricultural wage employment is constructed in the similar fashion.

$$\ln (\text{ODDS}) = \ln \left(\frac{p}{1-p} \right) = a + \beta_i X_i$$

To estimate the intensity of participation in nonfarm activities with marginal effect, a Tobit model is estimated by following the same method of Micevska and Rahut (2007). The labour can be allocated to agricultural production and to different nonfarm activities, which are denoted as L_f and L_n , respectively. So, the labour endowment of the household is $L = L_f + L_n$. The returns in last year to agricultural production and to nonfarm activities are denoted by R_f and R_n , respectively. It is assumed that $R_n \geq R_f$ for the rural households to find it advantageous to engage in nonfarm employment. Let the utility function of the household be as follows:

$$u = R_n L_n + R_f L_f - (S / L_n > 0)$$

Where, S denotes an entry-constraint to the nonfarm employment which the household may encounter in case of activity diversification. Let, the number of adult household members is N , Thus, the utility function can be rewritten as

$$u = R_n L_n + R_f (N - L_n) - (S / L_n > 0)$$

3. RESULTS AND DISCUSSION

The analysis of survey data shows that nonfarm activities generates 59.31 percent of household income as compared to 40.69 percent from agricultural activities (Table 1). While farming is the main activity, about 81.42 percent of the sample households are engaged in nonfarm activities, proves the indispensability of nonfarm income for sustaining livelihood. The mean annual income from agricultural sector is Rs. 38343 followed by Rs. 29159 and Rs. 7425 from trade or self employment and construction sector, respectively. It is worthwhile to note that animal husbandry component contributes 13.98 percent of total income as compared to crop production (19.47 percent). Around 40.71 percent households are engaged in self employment activities like driving modified motor-tricycle, auto-rickshaw, tricycle, vegetable

vending, shop keeping, fish business, tuitions, designing and fabricating clothes etc., in comparison to the engagement of 25.13 percent household in nonfarm wage employment activities (construction work, MGNREGS work, transportation, mechanic, electrician, road labour, and other manual labour etc.). The share of nonfarm self-employment income (30.94 percent) in total income by far exceeds the share of nonfarm wage income (13.11 percent). This result contradicts with the findings reported by Reardon *et al.* (2001) for Latin America and Micevska and Rahut (2007) for Eastern Himalayan Region and strengthening the traditional focus on self-employment versus the need for more attention to wage employment.

[TABLE 1 HERE]

The sources of household income classified by farm size are presented in Table 2. It is worth mentioning that nonfarm income contributes larger portion of household income across all the size classes, confirming the importance of nonfarm activities for the entire rural households. The result shows that greater the farm size lesser the dependence on nonfarm activities for earning livelihood. Among the non-agricultural sources of household income, self-employment generates 30.94 percent of household income followed by nonfarm wage income (13.11 percent) and service sector (11.51 percent). Thus nonfarm self-employment seems to compensate the lack of access to land. The seasonality of production, communication to Kolkata and its suburban areas, less wage rate, etc. makes agricultural labouring out non remunerative with respect to nonfarm wage employment.

[TABLE 2 HERE]

Table 3 shows the role of education of the head of household in contribution of household income to both farm and nonfarm sector. The level of education of household head has a positive relation to the income derived from off-farm activities. Most of the uneducated head of the household is engaged in farming, indicating that the level of education changes the mindset and widens the scope of earning through non-agricultural activities where the wage rate is quite higher than agricultural wage employment. Higher the level of education of head of the household, larger the share of income from self-employment activities proves the fact that education opens the door of outside world of various profitable, self-sustaining nonfarm activities. The average income of the households shows a direct relation with the education level of the household head, irrespective of farm size. Thus, it can be concluded that household's poor in land and in education appear to be involved mainly in nonfarm

activities with less entry-constraints. Hence, it is important to explore further the determinants of access to different types of nonfarm employment.

[TABLE 3 HERE]

The probability of participation in nonfarm activities is estimated through fitting binary logistic models and presented in Table 4. The estimates of first column show the dependency of the household towards off-farm activities for income and employment. Age of the household head and land-man ratio are negatively related, implying the fact that the log of odds increases with educated younger household head, smaller farm size and more number of working male members. The chances of occurrence of choosing non-agricultural wage employment over agricultural wage employment will be 64.7 percent correct according to the estimates of second column. It shows that larger family size, number of working women, mean education of working men are the major factors behind encouraging the household members for opting more remunerative off-farm wage employment. It confirms that larger labour supply by the household is associated with higher probability of participation in the high-return nonfarm sector, as larger households benefit from returns to scale in household chores and can more easily let some members engage in nonfarm work (Dercon and Krishnan, 1996; Micevska and Rahut, 2007). The estimates also confirm that household with large family are inclined towards both nonfarm self-employment as well as wage employment. With the decrease in farm size and increase in number of working men and women alongwith their education level, the odds ratio favours the nonfarm wage employment. Whereas, education level of the head of the household, household with more number of educated younger working male members increases the chance of engagement in nonfarm employment activities. Intergenerational effects are important for participation in self-employment, suggesting that the occupational effect on the propensity to engage in self-employment carries over across generations (Fafchamps and Quisumbing, 1999; Fafchamps and Quisumbing, 2003).

[TABLE 4 HERE]

The marginal rate of participation or the intensity of participation in nonfarm activities is estimated on the basis of share of income from a particular nonfarm activity in the total household income. Since, the dependent variables are censored (data about income from nonfarm activities for some households are not available) and bounded between the value 0 and 1, the equations are estimated as Tobits. The findings of Table 4 are strengthened

by the results of Table 5. Education level and age are the key determinants that influence the household members' off-farm employment. Taken together, the results indicate that the key determinants of the intensity of participation in nonfarm employment are education, family size, inherited wealth (land), number of working men, their education level and mean age; these regressors account for most of the variation in the intensity of participation as more educated households are likely to farm less, while those with more inherited wealth tend to farm more.

[TABLE 5 HERE]

4. CONCLUSION

It is well understood that with rising population, declining land-man ratio, degraded coastal soils coupled with high salinity, lack of freshwater and dwindling of land and labour productivity, agriculture alone would not be able to provide adequate income and employment to households in India (Behera *et al.*, 2001). Under such circumstances, to ensure a regular flow of income for decent living and to achieve food and nutritional security the household members must be dependent more on nonfarm income generating activities to supplement the farm income. On an average, nonfarm income accounts for about 60 percent of total household income in which share of Self-employment dominates and exceeds the share of nonfarm wage employment income across all categories of rural households. The households received a higher proportion of their income from self-employment activities and a lower proportion of income from non-farm wage employment. The labour market is so underdeveloped that most households are not able to earn sufficient income from non-farm wage income and hence, are forced to be self-employed. A key determinant of participation in more remunerative nonfarm activities is education. Hence, education is an important factor to alleviate poverty, if nonfarm activities are to compensate for asset disadvantages. This is particularly important because expanding nonfarm sector increasingly favours employment that requires skill and education. The number of working men and their education level affect labour allocation in systematic fashion. A policy implication in that will be beneficial, using nonfarm employment as sole criterion for the development of coastal region of West Bengal.

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Table1: Composition of household income by sector and activity

Sectoral composition	Income (Rupees)			Share in total income (%)	Number of households (%)
	Mean	Median	Std. dev.		
Agriculture	38343	29684	34857	40.69	100.00
Construction	7425	0	19154	7.88	16.81
Trade	29159	0	53151	30.94	40.71
Private services	5544	0	18492	5.88	12.39
Public Services	5299	0	24348	5.62	5.31
Other	8467	0	17484	8.98	42.48
Total household income	94237	74000	79138	100.00	
Farm Verses Nonfarm Composition					
Total farm income	38343	29684	34857	40.69	
A. Crop production	18349	14431	13949	19.47	100.00
i. Cereals	10712	8863	7344	11.37	95.57
ii. Vegetables	6139	0	13523	6.51	36.28
iii. Others	1499	0	4229	1.59	39.20
B. Animal resource	13176	6325	27428	13.98	87.61
i. Cattle	2786	1500	3781	2.96	53.09
ii. Goat	495	0	1183	0.53	18.58
iii. Pig	637	0	5387	0.68	2.65
iv. Poultry	2951	0	20411	3.13	24.78
v. Fish	6307	2386	12627	6.69	73.45
Wage labour	5610	0	9949	5.95	37.17
Others	1208	0	5336	1.28	21.24
Total nonfarm income	55894	40000	66155	59.31	81.42
Non-agricultural wages	12351	0	21563	13.11	25.13
Self employment	29159	0	53151	30.94	40.71
Service	10483	0	31443	11.51	16.81
Other income	3541	0	14305	3.76	16.81

Table 2: Sources of household income by farm size (in acres)

Particulars	≤0.5	0.51-1.0	1.1-2.0	2.1-3.0	>3.0	Total
Number of households (%)	4.44	25.00	48.89	13.89	7.78	180
Total income (rupees)	1,44,416	82,100	86,599	1,16,046	1,12,022	94,237
Shares in total income (%)						
Total farm income	48.41	32.59	43.51	34.56	51.58	40.69
Farm self employment	41.21	22.66	36.81	30.09	42.81	33.45
Agricultural wages	7.20	9.30	4.56	3.67	8.21	5.95
Other income	0.00	0.63	2.13	0.80	0.56	1.28
Total nonfarm income	51.59	67.41	56.49	65.44	48.42	59.31
Non-agricultural wages	5.32	6.22	12.39	26.84	12.48	13.11
Skilled labour	1.16	1.56	6.56	7.88	5.33	5.23
Unskilled labour	4.15	4.66	5.84	18.95	7.14	7.88
Self employment	43.90	37.11	28.65	26.71	26.19	30.94
Micro enterprise	9.97	9.83	9.61	11.15	1.19	9.15
Small enterprise	33.93	27.28	19.05	15.56	25.00	21.79
Service	0.00	21.69	12.74	6.46	0.00	11.51
Other income	2.37	2.38	2.71	5.43	9.76	3.76

Table 3: Sources of household income by education level of the head of the household

Particulars	Uneducated	1-4	5-8	9-10	>10	Total
Number of households	40	16	79	32	13	180
Total income (rupees)	86,001	74,993	89,534	1,03,937	1,49,180	94,237
Shares in total income (%)						
Total farm income	45.68	50.72	43.30	41.35	14.42	40.69
Farm self employment	35.31	38.50	35.20	37.41	13.50	33.45
Agricultural wages	9.69	12.23	6.14	2.84	0.00	5.95
Other income	0.68	0.00	1.96	1.10	0.92	1.28
Total nonfarm income	54.32	49.28	56.70	58.65	85.58	59.31
Non-agricultural wages	21.57	10.27	14.22	7.21	5.74	13.11
Skilled labour	7.40	4.75	5.84	4.71	0.21	5.23
Unskilled labour	14.17	5.52	8.38	2.50	5.53	7.88
Self employment	16.88	27.96	31.64	43.18	34.19	30.94
Micro enterprise	4.19	5.08	13.48	6.49	9.05	9.15
Small enterprise	12.70	22.88	18.17	36.69	25.14	21.79
Service	5.37	7.04	10.07	7.79	37.20	11.51
Other income	10.49	4.00	0.76	0.46	8.45	3.76

Table 4: Logit estimations of participation in nonfarm activities

Particulars	Inclination to Non-farm employment	Inclination to non Agri wage	Self employment	Wage employment
Age of household head	-0.011*** (0.153)	-0.068 (0.148)	-0.003 (0.146)	-0.203 (0.174)
Education level of head of household	0.051** (0.089)	0.056 (0.101)	0.064* (0.089)	-0.014 (0.028)
Family size	0.072 (0.142)	0.145** (0.147)	0.236* (0.146)	0.629*** (0.261)
Number of working men	0.306* (0.312)	0.228 (0.311)	-0.144 (0.297)	0.633** (0.384)
Number of working women	-0.503 (0.026)	0.021* (0.375)	-0.292 (0.363)	0.337* (0.477)
Mean age of working men	-0.001 (0.026)	0.022 (0.027)	-0.032** (0.027)	0.019*** (0.034)
Mean age of working women	0.012 (0.022)	-0.002 (0.025)	-0.001 (0.022)	0.011 (0.030)
Mean education of working men	-0.043 (0.095)	0.88** (0.111)	0.092*** (0.095)	-0.042 (0.144)
Mean education of working women	0.114 (0.074)	0.011 (0.076)	-0.077 (0.075)	0.041 (0.086)
Land –man ratio	-0.207** (0.128)	-0.136 (0.970)	0.324 (0.621)	-0.852** (1.071)
Number of adults older than 60 years	0.504 (0.495)	-0.509 (0.512)	0.128 (0.473)	-0.528 (0.545)
Log likelihood	-143.357	-139.874	-142.519	-116.197
Cox & Snell R square	0.110	0.093	0.086	0.294
Nagelkerke R square	0.147	0.127	0.117	0.394
Success rate of prediction (%)	61.9	64.6	63.7	74.3
Prob> chi-square	0.041	0.013	0.079	0.000

Figures in parenthesis indicate the standard error of the estimate. All regressions include a constant. The number of observations in each regression is 180.

***, **, and * indicate significance at the 1%, 5%, and 10% level of significance.

Table 5: Tobit estimations of intensity of participation in nonfarm activities

Particulars	Nonfarm employment	Unskilled labour	Skilled labour	Self employment	Wage employment
Age of household head	-0.031* (0.015)	0.037* (0.018)	-0.051* (0.029)	-0.031** (0.012)	0.036 (0.014)
Education level of head of the household	0.017 (0.012)	-0.023* (0.013)	0.011 (0.043)	0.037*** (0.014)	-0.047** (0.028)
Family size	0.037** (0.015)	0.108*** (0.040)	0.057** (0.028)	0.013 (0.049)	0.034*** (0.019)
Number of working men	0.122 (0.058)	0.023 (0.009)	0.021 (0.028)	0.067** (0.039)	0.122** (0.053)
Number of working women	0.027 (0.031)	0.024 (0.011)	0.063** (0.021)	0.037 (0.023)	0.121 (0.058)
Mean age of working men	0.082** (0.014)	0.013** (0.007)	0.067 (0.078)	0.077 (0.056)	0.027** (0.015)
Mean age of working women	0.039 (0.067)	0.008 (0.061)	-0.091** (0.041)	0.010 (0.007)	0.013 (0.071)
Mean education of working men	0.196** (0.091)	-0.033** (0.017)	0.027** (0.014)	-0.103*** (0.035)	-0.025* (0.012)
Mean education of working women	0.017 (0.008)	0.077 (0.054)	0.025 (0.069)	0.033* (0.018)	0.051 (0.033)
Land –man ratio	-0.119*** (0.037)	-0.091** (0.040)	-0.028 (0.081)	-0.137** (0.068)	-0.041 (0.165)
Number of adults older than 60 years	0.023 (0.051)	0.017 (0.045)	0.013 (0.118)	0.033 (0.030)	0.049 (0.071)
Log likelihood	-158.21	-213.73	-131.49	-335.16	-173.42
Pseudo R square	0.107	0.192	0.089	0.251	0.124
Wald Chi-square	63.45	111.26	51.34	89.31	129.37
Prob> chi-square	0.003	0.041	0.000	0.067	0.000

Figures in parenthesis indicate the standard error of the estimate. All regressions include a constant. The number of observations in each regression is 180.

***, **, and * indicate significance at the 1%, 5%, and 10% level of significance.