

RURAL NON-FARM ECONOMY IN BANGLADESH: NATURE, EXTENT, TRENDS AND DETERMINANTS¹

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ABSTRACT

Recent literatures suggest increased importance of non-farm economic activities as a source of rural livelihoods in many Asian countries. This study examines the recent trends in rural non-farm (RNF) economic activities in Bangladesh. Relative importance of the non-farm sector for rural livelihoods and their linkages with farming activities are investigated. Rural non-farm activities are of many different types. This study has documented all different types of RNF activities, the level of diversity in RNF activities and their determinants. We have also tried to understand the participation behaviours of household members in non-farm employment and factors which enables or retard them to engage in RNF activities. The study is based on household level panel data collected under the Village Dynamics Studies in South Asia (VDSA) project from 500 household for three years (2010 to 2012). Sample households are located in 12 villages spanning over 11 districts in Bangladesh. The 12 study villages and sample households come from a number of agro-ecological zones and represent varied infrastructure and socio-economic conditions in Bangladesh. Both descriptive and econometric analyses are carried out to examine the above mentioned issues. Role of land ownership, education level of household head, family size, sex of head, asset ownership, and access to credit etc. in the process of participation and intensity of participation in RNF activities was examined using Probit and Tobit model, respectively. The study revealed significant increase in RNF activities over time. However, the extent and growth in RNF activities varied across villages. Households have increasingly been using RNF activities as multi-occupation strategy for sustaining their livelihoods.

Keywords: Rural non-farm economy, livelihood, Panel data, Probit and Tobit regressions

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1. INTRODUCTION

Bangladesh economy was historically dominated by agriculture and allied activities. Majority of the rural people used depend on agricultural activities for their livelihood. The situation has changed during the last two decades. Rural non-farm sector has playing an important role in terms of income source as well as for employment. While both agriculture and non-agriculture sector of the economy has grown over time, non-agriculture sector grew rapidly in the recent years. Bangladesh is an extremely scarce country and there is no scope for increasing total cultivable area. Access of rural households to land has been eroding due to continued growth of population and limited employment generation in the formal industrial and service sector activities. Nearly half of the rural households in Bangladesh are “functionally landless” owning less than 0.2 ha of land that cannot be a significant source of income. The average size of farm holding has declined from 1.70 ha in 1960 to 0.91 ha in 1983-84 and 0.68 ha in 1996 and then 0.10 ha in 2011. Thus, the capacity of agriculture to generate productive employment for its expanding labor force and provide a decent standard of living is becoming increasingly limited (Hossain, 2004, BBS 2014). Nonfarm activities are found to be most important for the poor, who are pushed out of agriculture due to limited and poor land resources.

Recent literatures (Hossain 2004, Hossain and Byes 2009, Balagtas et al. 2012) suggest increased importance of non-farm economic activities as a source of rural livelihoods in Bangladesh as in many other Asian countries. Rural non-farm economy (RNFE) in Bangladesh is comprised of a broad range of heterogeneous activities: cottage industries, mechanics, wage employment in rural business enterprises, transport operations, and construction labor, salaried service in public and private sector institutions, teachers, religious leaders, lawyers, village doctors, and various types of personal services (barbers, laundry services, mid-wives etc.), agro-processing, shop- keeping, peddling, petty trading, medium and large scale trading, and contractor services. This heterogeneity is driven by different incentives and capacity to undertake nonfarm activities among rural household. Therefore, it is important to know nature and extent of various non-farm activities in rural areas and identify the factors associated with access and income from nonfarm activities.

The present study deals with the recent trends, patterns and determinants of non-farm economy in rural Bangladesh. Specific objectives of the study are as follows:

- To understand the occupational patterns and employment situation among rural households in Bangladesh.
- To document and identify various types of rural non-farm (RNF) activities.
- To understand the participation behaviour of household members in rural nonfarm employment and factors affecting participation in the rural nonfarm activities.
- To quantify the contribution of various RNF activities to employment and household income and there determinants.

This paper consists of six major sections. After this introductory section, section 2 discusses about the sample households and data sources used in the study. Section 3 deals with the

nature and extent of rural non-farm economy in Bangladesh. Drivers of rural non-farm economy are mentioned in section 4. Section 5 describe about the contribution of the rural non-farm economy. Conclusions and implications for policy are put forward in the last section.

2. DATA SOURCES AND SAMPLE HOUSEHOLDS

The study is based on household level panel data collected from 500 household located in 12 villages spanning over 11 districts in Bangladesh. The 12 study villages and sample households come from a number of agro-ecological zones and represent varied infrastructure and socio-economic conditions in Bangladesh (Table 1). Sample households come from four different land ownership categories, landless (Up to 0.20 ha), small (0.21 to 0.40 ha), medium (0.41 to 1.00 ha) and large (1.01 ha and above). Year wise distribution of the sample household according to their land ownership status is presented in Table-2. Half of the total sample households were landless households (48 percent). Two-fifth of the sample households was under small farm size category. Only 2 percent of the households had large farm holding while 10 percent of the total sample households were in the category of medium farm size.

In Bangladesh, families are now-a-days engaged in multiple occupations. Therefore, it is important to understand the sample households in terms of their occupational preferences. In a family, different members are engaged in different types of activities. Sometimes the same person is engaged in multiple occupations. Therefore, to define the occupation of the household, we have used their main sources of income. We have classified the sample households under two major categories, namely, Farm and Non-farm households. Distribution of the households using their occupational category is presented in Table 3.

During the study period (2010 to 2012) 50 percent the households had agriculture as major occupation and the other 50 percent had nonfarm as their major occupation. However, there was year to year variation. About five percent of the households oscillated between agriculture and non-agriculture as their major occupation. Among non-farm households, top most three occupations were business followed by “foreign service” (migrant work), and salaried job. On the other hand, agriculture families were engaged in crop farming, livestock farming, agriculture labor and fish farming.

Demographic characteristic of a society is very important for analysing its livelihoods system. A society might be poor in terms of endowment of natural resources but, given appropriate policies and their proper implementations, a developed human resource could show the paths to prosperity. In contrast, a resource-rich society could pass through hardships in the presence of rapid population growth and high dependency ratio (Hossain and Bayes, 2009). Demographic and household characteristics of the sample households are reported in Table 4. Average household size was 5.4. About one-fourth of the household members were children, Dependency ratio was relatively low (ranged between 0.79 and 0.65 across years). Per capita

land ownership was only 17 decimal (0.08 ha). Important positive change among the households within a short span of three years was increase in per capita ownership of non-land assets which has gradually increased from USD 745 in 2010 to USD 856 in 2012.

Figure 1: Locational map of the study villages in Bangladesh

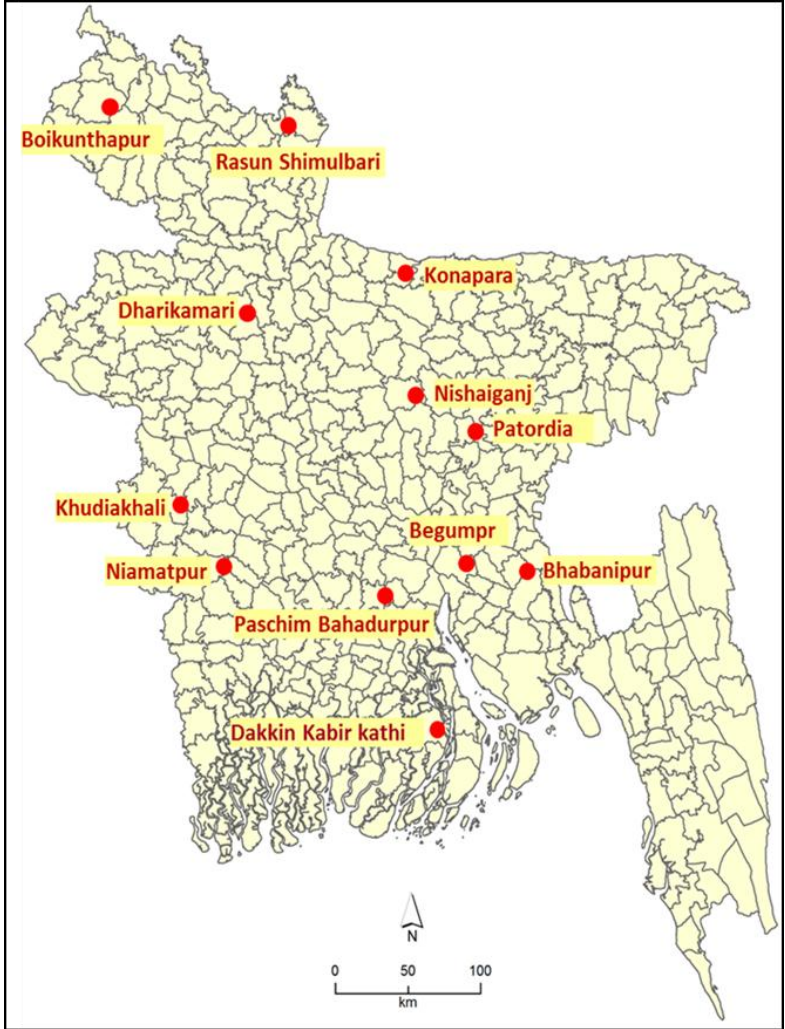


Table 1: Some Basic Characteristics of the sample villages

Sl. No	Village Name	District	Agro-ecological Zone (AEZ)	Agro ecology	Total Households in the Village in 2011 (No)	Distance from District HQ (Km)	Distance from nearest national highways (Km)
1	Begumpur	Chandpur	Middle Meghna River Floodplain (AEZ 16)	Flood-prone	233	25	25
2	Bhabanipur	Comilla	Old Maghna Estuarine Floodplain (AEZ 19)	Favorable	237	26	23
3	Boikunthapur	Thakurgaon	Old Himalayan piedmont Plain (AEZ 1)	Drought	147	12	14
4	Dakkhin Kabir Kathi	Patuakhali	Ganges Tidal Floodplain (AEZ 13)	Coastal	187	38	42
5	Dharikamari	Bogra	Level Barind Tract (AEZ 25)	Favorable	236	7	0.5
6	Khudiakhali	Chuadanga	High Ganges River Floodplain (AEZ 11)	Favorable-drought	233	7	7
7	Konapara	Mymensingh	Old Brahmaputra Floodplain (AEZ 9)	Favorable-drought	255	50	1
8	Niamatpur	Jhenaidah	High Ganges River Floodplain (AEZ 11)	Favorable-drought	423	19	3
9	Nishaiganj	Mymensingh	Madhupur Tract (AEZ 28)	Flood-prone	184	40	4
10	Paschim Bahadurpur	Madaripur	Low Ganges River Floodplain (AEZ 12)	Flood-prone	169	20	10.5
11	Patordia	Narsingdi	Madhupur Tract (AEZ 28)	Favorable	180	22	20
12	Rasun Shimulbari	Kurigram	Active Tista Floodplain (AEZ 2)	Flood-prone	189	16	11

Source: Author's calculation based on VDSA data base

Table 2: Distribution of the sample households according to farm size group

Farm Group	2010	2011	2012
Landless (Up to 0.20 ha)	234 (47)	240 (48)	239 (48)
Small (0.21 to 0.40 ha)	204 (41)	202 (40)	201 (40)
Medium (0.41 to 1.00 ha)	50 (10)	50 (10)	49 (10)
Large (1.01 ha and above)	12 (2)	11 (2)	11 (2)
All	500 (100)	503 (100)	500 (100)

Note: Values in the parenthesis indicating percentage to total

Source: Author's calculation based on VDSA data base

Table 3: Distribution of the sample households according to main occupation of the households (defined by the highest source of income): 2010-2012

Occupation of the Household	2010	2011	2012
Agricultural	51	46	54
Farming	29	11	27
Livestock	13	25	24
Farm Labour	7	7	2
Fish Farming	1	2	1
Non-agricultural	49	54	46
Business	16	14	12
Salaried Job	8	8	9
Caste Occupation	2	1	1
Foreign Service (Remittance income)	10	15	6
Income from Interests	1	2	2
Other Non-farm Sources	13	14	16
Total	100	100	100

Source: Author's calculation based on VDSA data base

Table 4: Basic characteristics of the sample households: 2010-2012

Indicators	Periods		
	2010	2011	2012
Household Size	5.40	5.35	5.33
Children (%)	28.10	27.39	26.55
Number of Households	500	503	500
Female-male Ratio (Child)	0.93	0.87	0.91
Female-male Ratio (Adult)	0.91	0.92	0.91
Reproductive Women	48.68	49.44	50.00
Child-woman Ratio	58.74	57.72	55.67
Dependency Ratio (%)	0.79	0.76	0.65
Average Own land Per-capita (Ha)	0.087	0.089	0.088
Average land holding Per-capita (Ha)	0.089	0.086	0.085
Average Age of the hh Head (Years)	50	51	51
Average Education of the hh Head (Years)	4.49	4.54	4.62
Worker per household	3.75	3.77	3.89
Per-capita non-land Assets Ownership (Current US \$)	745	790	856

Source: Author's calculation based on VDSA data base

3. COMPOSITION OF THE RURAL NON-FARM ECONOMY

3.1 Structural Transformation of the Rural Economy

The rural economy of Bangladesh has witnessed remarkable structural changes and diversification during the 1990s. The recent statistics show that the proportion of rural households depending on non-farm activities is expanding at a faster rate (Chowdhury et. al., 2009). Trends in composition of Bangladesh economy during the last four decades is reported in Table 5. All sectors of the economy (Agriculture, Industry and Services) have experienced consistent growth with some year to year ups and downs. Total GDP of the country has increased from USD 8.919 billion in 1973-74 to USD 130.188 billion in 2012. During this period, per capita GDP has increased from USD 211 to USD 750. With the expansion of the non-agriculture sector at a rapid pace, dominance and share of the agriculture sector has declined. During the last four decades, share of the agriculture sector has declined from about 58 percent in 1973-74 to 17 percent in 2012-13. During the same period, contribution of the industry sector which is the main component of non-farm sector was quite remarkable. Annual compound growth rate of industrial GDP was 2.48 percent and its contribution to the total GDP increased to 28 percent from 10 percent. Contribution of the services sector has increased to 55 percent from 31 percent.

At the macro-level there is lack of information about growth of non-agriculture sector particularly in the rural areas. However, nationally representative household survey based studies (Hossain, 2004; Hossain and Byes, 2008 and Balagtas et.al, 2012) indicated that growth of the non-farm sector was also high in the rural areas. In the late eighties, rural nonfarm activities comprised 42 percent of the income in rural areas which has increased to 57 percent by 2008 (Table 6). There was substantial and rapid increase in various non-farm activities in rural areas. Hossain (2004), classified rural non-farm economy into three broad types of activities: (i) Manual labor-based activities, such as self-employment in cottage industries, mechanics, wage employment in rural business enterprises, transport operations, and construction labor; (ii) Human capital based occupations, such as salaried service in public and private sector institutions, teachers, religious leaders, lawyers, village doctors, and various types of personal services (barbers, laundry services, mid-wives etc.), and (iii) Physical and human capital intensive activities, such as agro-processing, shop-keeping, peddling, petty trading, medium and large scale trading, and contractor services.

**Table 5: Trends in sectoral composition of the Bangladesh economy, 1973-74 to 2012-13
(Current GDP in Million USD)**

Sectors	1973-74	1980-81	1990-91	2000-01	2005-06	2012-13
Agriculture	5207 (58)	5830 (41)	8425 (36)	10941 (23)	11708 (19)	21655 (17)
Industry	914 (10)	2395 (17)	3682 (16)	11778 (25)	16660 (27)	36322 (28)
Service	2798 (31)	6008 (42)	11279 (48)	24269 (52)	33607 (54)	72210 (55)
Total	8919 (100)	14233 (100)	23385 (100)	46988 (100)	61975 (100)	130188 (100)

Note: Values in the parenthesis indicating percentage

Source: Bangladesh Bureau of Statistics

Table 6: Sources of rural household income in Bangladesh (%), 1988–2008*

Components	1988	2000	2004	2008
Crop income	34	24	26	26
Rice income	26	16	15	15
Non-rice crop income	8	8	11	11
Nor-crop agricultural income	11	13	12	11
Agricultural wage income	13	5	6	6
Total farm income	58	43	44	43
Trade/business income	9	21	19	15
Service income	18	17	16	10
Remittance income	5	13	14	23
Non-agricultural wage income	9	7	7	9
Total non-farm income	42	57	56	57
Total household income	100	100	100	100
Total household income (in 2004 USD)	1105	1325	1395	2062
Average per capita income (in 2004 USD)	187	245	264	417

Note: * Represent Nominal income variables are converted to 2004 constant prices using the national GDP deflator of 64.78, 115.7, and 132.1 for 1987–1988, 1999–2000, and 2003–2004, respectively (base-year = 1995–1996). The real income variables are reported in 2004 constant prices and converted to 2004 constant US\$ using the exchange rate US\$1 = 58.83 in 2003–2004. Average total household income and per capita income are weighted by household size.

Source: Balagtas et.al., 2012, Table 2.

3.2 Rural Population and Labor Force

Rural labor force depends to a large extent on the demographic characteristics of the rural population. Distribution of people in different age group has a significant impact in the economy. Presences of different age groups member within the household impart differential impact on the livelihood strategy of the household (Hossain and Byes, 2009). Household with more children and old age people implies more dependent and leads to more burden of the family in the other hand household with more working age people reduced the burden and they can enjoy a good livelihood. It is because the former has more dependents (bread eaters), and the latter has more earners (bread-winners).

Table 7: Distribution of the population in sample household by age group (%)

Category	Age Group (yrs)	Male Population			Female Population			Total Population		
		2010	2011	2012	2010	2011	2012	2010	2011	2012
Children	0-4	7.69	7.26	6.82	6.78	5.87	6.61	7.25	6.60	6.72
	5-9	9.59	9.88	9.83	10.22	10.53	8.66	9.89	10.19	9.28
	10-14	10.69	10.75	9.91	11.25	10.45	11.26	10.96	10.61	10.55
Working Age	15-19	10.18	8.86	9.83	12.13	11.74	10.94	11.11	10.23	10.36
	20-24	9.66	11.18	10.34	9.50	9.89	10.55	9.58	10.57	10.44
	25-29	9.37	8.06	8.97	8.46	8.92	9.29	8.93	8.47	9.13
	30-34	7.10	8.35	7.82	6.07	6.11	5.51	6.61	7.29	6.72
	35-39	6.15	5.59	6.46	7.18	6.43	7.40	6.64	5.99	6.91
	40-44	5.27	5.95	5.24	4.55	5.63	5.35	4.93	5.80	5.29
	45-49	5.49	4.65	5.31	6.94	5.79	5.51	6.19	5.19	5.41
	50-54	4.83	5.30	4.74	4.55	5.95	5.28	4.70	5.61	4.99
55-59	4.10	3.78	4.31	3.83	3.46	4.72	3.97	3.62	4.51	
Old age and Retired	60-64	3.59	4.50	3.80	2.95	3.78	3.46	3.28	4.16	3.64
	65-69	2.20	1.60	2.30	2.31	2.33	2.60	2.25	1.95	2.44
	70+	4.10	4.28	4.31	3.27	3.14	2.83	3.70	3.74	3.60
All Group		100	100	100	100	100	100	100	100	100

Source: Authors' calculation based on VDSA Panel Data.

Following the conventional literature, we have defined the rural population into three categories: Children (up to 14 years), working age (15 to 59 years) and Old Age (60 years and above) (Table 7). Distribution of the population of sample households into different age cohorts revealed that about two-third of the population is in the working age. On the other hand, about one fourth of the total population is children while one-tenth of the total population is at the age of retirement (60 years and above). For both male and female population about two-third of the total population is at the working age group. It is pertinent to mention here that at the national level, share of working age population to the total population in 2011 Census was around 70 percent (BBS, 2014). With the improvement in life expectancy and better health service, now a day many at the age bracket of 60 and above are working in various economic and domestic activities.

Table 8: Growth in Labor Force among the sample households

Sex	Total number of working age population for all sample households			Growth rate per annum (%)	
	2010	2011	2012	2011	2012
Male	835	844	874	1.08	3.55
Female	780	789	817	1.15	3.55
Total	1615	1631	1689	0.99	3.56

Source: Authors' calculation based on VDSA Panel Data.

During 2010 to 2012, labor force among the sample households in the study villages grew at the rate of 1.50 percent (Table 8). Growth rate of women in the labor force was slightly higher (1.56 percent) than that of men (1.53 percent). At the national level, growth rate in rural population between 2001 and 2011 was 3 percent (BBS, 2014).

3.3 Occupational Distribution of Labor Force

Occupational distribution of the sample households during 2010 to 2012 is reported in Table 9. About one fourth of the total labor force was engaged in agricultural activity either as primary or secondary occupation. Crop farming was the important occupation for about one-fifth to one-fourth of the total labor force. Five percent of the labor force was engaged as agricultural labor. Thirty percent of the total labor force was engaged in nonfarm activities either as primary or secondary occupation. More than half of the total workers (56 to 58 percent) were engaged in non-economic activities. Thirteen percent of the labor force (15 years and above) were student and 37 percent were housewife. Within a short span of three years, unemployment rate decreased from 7.4 percent to 4.4 percent. It is important to recall here that in 1988 (about 25 years ago), agriculture was the major occupation for two-third of the rural labor force (Hossain and Bayes, 2009).

Major occupational pattern of the rural labor force having different levels of education during 2010-2012 is reported in Table 10. Workers with high levels of education (Graduate and above) were engaged mostly in service (76 percent) followed by business (11 percent). Workers without any formal education were mostly engaged in farming (52 percent) followed by service (12 percent) and business (10 percent). SSC and HSC passed workers were engaged mostly in service (57 percent), farming (23 percent) and business (15 percent).

Table 9: Distribution of rural workers by type of employment, 2010 to 2012

Occupation	Primary Occupation (%)			Primary or Secondary Occupation (%)		
	2010	2011	2012	2010	2011	2012
Agriculture:	18.66	18.34	17.28	31.23	30.01	27.71
Farming	16.05	15.87	14.52	23.1	22.18	20.91
Agri-labor	1.97	1.84	1.99	4.41	5.20	4.86
Other Agriculture Work	0.64	0.63	0.77	3.72	2.63	1.94
Non-agriculture:	26.79	26.76	27.1	30.84	30.9	31.51
Business	3.77	3.84	3.63	5.36	5.36	4.81
Cottage industry	0.48	0.37	0.36	0.69	0.79	0.67
Foreign Service	4.52	4.41	4.35	4.52	4.41	4.35
Maid Servant	0.11	0.21	0.15	0.11	0.21	0.15
Mechanics	1.22	1.42	1.48	1.33	1.68	1.79
Rickshaw/van pulling	1.33	0.95	0.92	1.38	1.06	0.97
Other Transport	0.8	0.89	1.28	0.91	0.94	1.54
Service	11.37	11.61	11.71	11.7	11.82	12.07
Shop keeping	0.8	0.74	0.82	1.12	1.11	1.23
Non-farm labor	1.06	1.16	1.33	1.12	1.26	1.89
Other Non-Farm Work	1.33	1.16	1.07	2.60	2.26	2.04
Non-economic Activity	54.58	54.91	55.63	56.69	57.12	58.39
Housewife	35.18	36.52	37.73	36.7	38.1	39.47
Student	12.01	12.77	13.45	12.6	13.4	14.47
Unemployed	7.39	5.62	4.45	7.39	5.62	4.45
Total	100	100	100	119	118	118

Source: Author's calculation based on VDSA data base

Table 10: Major Occupational Pattern for Workers with Different Levels of Education: 2010-2012

Education Level and Period of Information	Occupational Pattern (Per Cent of Worker in Braces)				
	First	Second	Third	Fourth	Fifth
No Formal Schooling	Farming (52)	Service (12)	Business (10)	Non-Farm labor (9)	Agri-Labour (8)
Primary Attended	Farming (40)	Service (21)	Non-Farm labour (15)	Business (9)	Transport (7), Agri-Labor (7)
Secondary Attended	Service (45)	Farming (30)	Business (10)	Non-Farm labour (6)	Transport (3)
SSC or HSC Passed	Service (57)	Farming (23)	Business (15)	Non-Farm labour (2)	Fish Farming (2)
Graduate and Above	Service (76)	Business (11)	Farming (8)	Other Non-farm work (5)	

Source: Author's calculation based on VDSA data base

3.4 Labor Force Participation

Following Hossain and Byes (2009), we have defined economic activities as those that generate income for the households or saves household expenditure for the acquisition of the goods and services from the market. This includes employment in agricultural and non-agricultural labor market, and also unpaid work for the household in crop cultivation, homestead gardening, livestock and poultry raising, fishing, cottage industry, transport operation, construction, business, and personal services. There are many other activities done mostly by women that are quasi-economic in nature which are not valued in national income accounting. Examples are food processing and preparation of meals for the family members; child care, helping old and sick members of the household; and tutoring of children. If the household had hired workers for doing these jobs, it would involve some expenditure. We have termed these activities as domestic activities.

The distribution of people engagement in different types of activities by gender is quite interesting (Table 11). Number of working member per household has increased in these three years from 1.96 to 2.04 for male and 1.79 to 1.86 for female and overall it is 3.75 to 3.89. All other indicators showing the upward trend over time except time spend in economic activity (especially male). It is quite remarkable that female labor force participation rate is drastically move downward in 2012 (40 percent) compare to 2010 (26.20 percent) and overall 50 percent worker engaged in labor force. In recent time male people are also very much engaged in domestic work (around 70 percent) but their time spend in an average half of female worker. It is also to be noted that overall one third of their time engaged in economic activity and altogether half of the day they are engaged either economic or domestic activity.

Table 11: Labour force participation in economic activities by gender

Indicators	Male Workers			Female Workers			All Workers		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Working members per household (No.)	1.96	1.97	2.04	1.79	1.80	1.86	3.75	3.77	3.89
Members participating in economic activity (No.)	1.30	1.31	1.42	0.47	0.61	0.74	1.77	1.93	2.16
Labour force participation rate (% of workers)	66.33	66.84	69.58	26.20	34.03	40.09	47.20	51.16	55.52
Participation in domestic work (% of workers)	71.22	70.58	72.23	89.14	88.29	89.66	79.77	79.04	80.53
Duration of work (hours/day)	11.31	11.37	11.82	11.14	11.43	11.74	12.32	12.19	12.66
Economic activities	9.17	8.77	8.99	6.03	6.33	6.38	8.6	8.25	8.5
Domestic activities	2.14	2.6	2.83	5.11	5.10	5.36	3.72	3.94	4.16

Source: Author's calculation based on VDSA data base

**Table 12: Labour force participation in economic activities by Education level:
2010-2012**

Indicators	No Formal Schooling	Primary Attended	Secondary Attended	SSC or HSC Passed	Graduate and Above
Working age members per household (No.)	0.94	0.82	1.43	0.37	0.26
Members participating in economic activity (No.)	0.50	0.48	0.65	0.16	0.10
Labour force participation rate (% of workers)	53.44	57.94	45.51	43.86	36.31
Participation in domestic work (% of workers)	92.16	87.54	74.65	70.31	47.12
Duration of work (hours/day)	7.91	8.10	7.65	6.85	8.57
Economic activities	3.54	3.85	3.84	4.02	6.10
Domestic activities	4.37	4.25	3.82	2.83	2.47

Source: Author's calculation based on VDSA data base

**Table 13: Labour force participation in economic activities by Land ownership:
2010-2012**

Indicators	Landless (up to 0.20 ha)	Small (0.21 to 0.40 ha)	Medium (0.41 to 1.00 ha)	Large (1.01 ha and above)
Working age members per household (No.)	3.24	4.14	4.85	5.69
Members participating in economic activity (No.)	1.72	1.92	2.43	2.36
Labour force participation rate (% of workers)	53.05	46.34	50.07	41.41
Participation in domestic work (% of workers)	83.48	77.54	75.66	69.88
Duration of work (hours/day)	8.10	7.59	7.50	8.75
Economic activities	4.22	3.63	3.45	4.67
Domestic activities	3.88	3.96	4.04	4.08

Source: Author's calculation based on VDSA data base

In disaggregate level we have also analysed the distribution of member engagement in economic and domestic activity by education level and farm size category (follow Table 12 and 13). Education level wise household wise highest number of worker is in the category of secondary attended (1.43) followed by no formal schooling, primary attended, SSC or HSC passed and lowest value in graduate and above category (0.26). Household wise member participating in economic activity also follows the same trend as like worker description. The members with graduate and higher education level have spent their more time in economic activity (6.10 hrs/day) compared to domestic activity (2.47 hrs/day). In the other hand member with no formal education on an average they spent more time in domestic purpose (4.37 hrs/day) compare to economic activity (3.54 hrs/day). Therefore it is clear that the people with higher education prefer to spend their most of the time in productive purpose rather than domestic work purpose.

In respect to farm size category household wise large farmer have more workers (5.69) following medium (4.85), small (4.14) and landless (3.24) farm size groups. Whereas in

respect to participate in economic activity medium farmer have highest share (2.43) followed by large, small and landless. In an average large farm group spent 8.75 hours a day in economic and domestic activity followed by landless, small and medium farm group.

3.5 Occupational Mobility

To study the dynamics of rural labor force about their occupation it is worthwhile consider the occupational mobility matrix. The matrix illustrates the movements of rural households across occupations, and thus represents the dynamics of rural livelihoods which represent in Table 14.

Table 14: Individual Occupational mobility matrix: 2010 vs 2012

Occupation (2010) %	Occupation (2012) %							
	N (2010)	Farming	Other Agri-Work	Business	Service	Mechanics	Transport	Other RNF
Farming	272 (100)	88	2	2	5	0	2	0
Other Agri-Work	46 (100)	9	85	0	0	0	2	4
Business	72 (100)	8	1	76	6	1	1	6
Service	260 (100)	2	0	2	91	0	2	2
Mechanics	20 (100)	5	0	0	10	85	0	0
Transport	35 (100)	9	3	3	3	3	77	3
Other RNF	56 (100)	9	4	4	5	5	0	73

Source: Author's calculation based on VDSA data base

Firstly if we consider the agricultural activity we found that 88 percent are still remain in farming and 85 percent are remain in other agricultural related work in 2012 as compare to 2010. Out of this movement 9 percent from farming and 6 percent from other agricultural work shifted to non-farm work. Whereas in service occupation found to be less volatile. About 91 percent people stay in the same occupation in comparable time period. Another important non-farm activity is business. In business occupation 76 percent stay in business but remaining are shifted in other occupation either it is agricultural or non-agricultural. In an around of 9 percent of the worker are join in farm related work and 15 percent shifted other remaining non-farm activity and highest shift found in service and other non-farm work (6 percent each) among all other remaining non-farm work. Highest amount of movement is found in other non-farm work (27 percent) which includes all the non-farm activity other than the listed in the table. In other remaining listed occupation the mobility is varies from 15 to 23 percent. It is to be noted that many of the people who are earlier (2010) as engage in non-farm work are shifted to agricultural work due to the expansion of tenancy market which were mentioned by Hossain et.al. (2009) in their study.

4. EMPLOYMENT IN RURAL NONFARM AND DETERMINANTS

4.1 Employment and Labor Productivity

Sex wise distribution of different wage activities is presented in the Table 15. In the entire wage activity male are spending more hour than female in per day basis. Among all the activity except fisheries male worker spent around 7 to 10 hours in 2011 other farm-work like electrician, surveyor, earth worker, broker etc. In case of female worker highest time they are spend in agricultural labor, livestock and poultry, service and non-farm labor and the range of time spend is 2 to 9 hours a day. The distribution time pattern for both types of worker are not uniform and it has some irregular trend.

Table 15: Sex wise duration of employment in different wage activities (hours/day)

Wage Activity	2010		2011		2012	
	Male	Female	Male	Female	Male	Female
Farm						
Agricultural Labour	6.96	6.82	7.05	6.70	7.03	7.39
Fisheries	4.08	2.16	4.87	3.00	4.81	1.66
Livestock and poultry	8.09	-	9.28	9.00	7.77	8.00
Other Farm-work	10.76	-	3.81	5.57	6.50	6.50
Nonfarm						
Business	7.10	5.04	7.31	6.34	7.45	6.06
Service	7.79	6.80	7.62	6.57	7.60	6.96
Driver	9.11		9.16	-	8.76	
Non-farm labour	8.02	7.77	8.12	8.33	7.75	7.81
Other Non-Farm work	7.19	4.54	7.07	4.46	7.42	4.36

Source: Author's calculation based on VDSA data base

Table 16: Duration of Employment and Labour Productivity in 2010 to 2012

Activity	Duration of Employment (days/year)			Productivity (USD/day)		
	2010	2011	2012	2010	2011	2012
Agricultural Labour	102	102	100	2.39	2.52	2.51
Non-farm labour	134	94	134	2.69	2.87	2.88
Business	204	210	214	3.50	3.45	3.48
Service	260	246	278	2.88	3.04	2.95
Driver	150	169	168	4.79	5.39	5.79
Other Non-Farm work	192	165	174	2.20	2.54	2.52

Source: Author's calculation based on VDSA data base

The expansion of non-farm activity depends on the duration of work available to the worker. In the present study what the fact come in about the non-farm engagement time and what it reveal whether it is explain full time engagement or part time engagement also to be matter in expansion process. As mentioned by Walker and Ryan (1990) in India's semi-arid tropics

region the non-agricultural self-employment was a means to reduce household income variability. In the VDSA study the data collected for employment situation of the member is in round wise every year 12 rounds and also mentioned how many hours' people are engaged in what activity every month. The results are presented in the Table 16. The result shows that business, driving, service and other non-farm work are relatively full time work. In the other side agricultural labor non-farm labor are showing relatively part time occupation. Therefore it is accepted that the full time like non-farm activity are more useful for better livelihood in rural area. The comparisons between 2010 and 2012 it is to be noted that duration of employment has increased especially for business, driver, service whereas for agricultural labor, non-farm labor and other non-farm work the trend in downward.

It is to be noted that the labor productivity is one of the factor which is responsible for expansion of non-farm sector in rural area. It already stated by many literatures that if labor productivity is lower than agricultural wage rate then the push factors are try to expand the rural non-farm sectors. The trends of labor productivity in different wage activities are stated in the Table 16. Productivity of agricultural labor are low with compare to other stated non-agricultural related activities except in 2010 agricultural labor productivity (USD 2.39/day) is higher than productivity (USD 2.20/day) of other non-farm work. Highest productivity found in driving activity followed by business, service and non-farm labor. The table represent that though there is option of higher productivity in non-farm sector so people are yet to encourage joining in different non-farm activity.

4.2 Determinants of Participation in Rural Nonfarm Activities

To know the factors which contribute toward participation in nonfarm activities, we have carried out Probit regression analysis. In the Probit regression, dependent variable was participation in nonfarm activities. If the worker has participated in RNF activities then we have provided a value of 1 and 0 otherwise. Explanatory variables related to individual member characteristic, household characteristics and village level characteristics. The results of Probit regression is represent in Table 17. Estimated coefficients revealed that age and education level of the worker is positively associated with participation in RNF activities. If the worker is male adult then he is likely to participate in RNF then a female worker with similar kind of background and characteristics. If the member himself is the head of the family then there is higher probability to join in rural non-farm activity. As mentioned by Matshe and Young (2004) in their study 'having a certain level of schooling for young female adults, the social and religious norms might also lower their participation' in RNF activities. Among the household characteristics age of head and education level of the household head was positively associated with participation in RNF activities. Per capita land ownership had a negative association with the participation in RNF activities. It is probably because who can earn their living and engage themselves in agricultural activities they preferred to be engaged in agriculture rather than moving out of agriculture. On the other hand, square of land ownership had a positive association for participation in RNF activities. It indicates a real world situation where households having financial resources for expansion of their

agricultural enterprise but unable to expand their farming business due to lack of availability of land had opted for participation in RNF activities to fully utilize their economic potential. Village infrastructure dummy showed significantly positive association with the participation in RNF activities. Factors which were negatively associated with the participation in RNF activities include household size and dependency ratio. Higher the household size and dependency ratio lower the likelihood to participate in RNF activities.

Table 17: Determinants of individual participation overall Non-farm activities in the study villages: A probit model estimates

Variables	Coefficients
Constant	-2.951409***
Age of the member	0.077143***
Age Square of the member	-0.001037***
Marital Status (Married=1)	-0.072002
Years of Education	0.031150***
Gender Dummy (Male=1)	1.236203***
Member Dummy (Head=1)	0.315727***
Household Size	-0.024098**
Dependency Ratio	-0.160687***
Age of the Household Head	0.008154***
Gender Dummy for the Household Head (Male=1)	-0.250411***
Years of education of the Household Head	0.013005**
Per-capita land ownership (ha)	-2.722422***
Per-capita land ownership (ha) square	1.691158***
Credit obtained by the household (US\$)	0.000002
Non-land asset of the household (US\$)	-0.000009*
Dummy for large farms (Large farm household=1)	0.534805***
Infrastructural Dummy (Village with developed infrastructure=1)	0.300923***
Year Dummy (year 2010 is base year)	0.027359
Number of Observation	5594
LR chi2(16)	1308.300
Prob > chi2	0.000
Log likelihood	-2390.540
Pseudo R ²	0.215

Note: *, ** and *** represent the coefficients are significant at 10%, 5% and 1% level of significance respectively.

Source: Authors' calculation based on VDSA data base

To know the extent of participation in nonfarm activities we have conducted a panel Tobit regression. Results are provided in Table 18. We have used share of nonfarm income to total income as the dependent variable. We have tried to understand the factors which contribute

towards extent of participation in RNF activities in general and in particularly in business, services and non-agricultural labor. Extent of participation in nonfarm activities is positively associated with credit access, workers average years of education and village infrastructure. These factors facilitate participation in nonfarm activities. On the other hand, amount of land ownership and extent of tenancy in the village have significant negative impact. Extent of participation in business was positively linked with access to financial capital and better infrastructure of the village.

Variables positively associated with the extent of participation in services are average years of education of the worker, number of workers in the household, years of education of the household head, and village infrastructure. On the other hand, variables negatively associated with extent of participation in services include amount of land owned by the household, age of the household head. In other words, households having more land are likely to participate less in services. At the same time, if the household head is old then younger members need to take care of agricultural activities and were less likely to take part in services activity. Extent of participation in services was less in 2011 and 2012 than in the base year.

Table 18: Factor affecting participation in rural non-farm activities: Estimating through a panel Tobit Model

Factors	Business	Service	Non-agricultural labour	All non-farm activities
Size of own land (ha)	-3.33394	-19.18956***	-23.15889***	-36.24140***
Area under tenancy (ha)	-6.50580	-6.88454	-5.26771	-20.76918***
Age of the household head	-0.08546	-0.46012***	-0.76313***	-0.15108
Household head education (Years of schooling)	1.09943	3.08849***	-0.63266	0.70395
Household workers	-0.76432	5.11233***	1.92705*	0.50054
Dependency ratio	-1.82198	-4.83806	4.14795	-2.19826
Average education of the worker (years of schooling)	0.43782	5.30217***	-3.51961***	1.69578**
Value of non-land fixed assets (Current USD)	-0.00014	0.00044	-0.00083***	-0.00020
Credit Dummy (Received credit=1)	13.09216***	-1.16896	10.08811***	8.66779***
Infrastructural Dummy (Village with developed infrastructure=1)	19.55608***	9.23255	15.44199***	21.72631**
Year Dummy (Year 2010 is base year)	-4.42146***	-8.18571***	3.88597**	1.51789
Constant	-56.76465***	-105.08700***	18.84651	37.20780***
Log likelihood	-2422	-1496	-2711	-5553
Wald chi2(11)	36.05	74.79	88.89	169.76
Prob > chi2	0.00	0.00	0.00	0.00

Note: (1)The dependent variable is measured as the share (percent) of the non-farm activity to total household income; (2) *, ** and *** represent the coefficients are 10%, 5% and 1% level of significance.

Source: Author's calculation based on VDSA data base

The most important component non-agricultural labor that are most vulnerable group and how they are response to engage in non-farm sector is most important component because participation in manual labor-based activities (transport, construction and cottage industry and wage labor) seems to be poverty driven and they are focal point for policy makers. Number of workers in the family and infrastructure of the village are positively associated with participation in non-agricultural labor activity. It is quite natural, because there is more scope for employment in the villages with better infrastructure where construction work, transport and cottage industries are present. Factors negatively associated with extent of participation in non-agricultural labor activity include land ownership of the household. More the amount owned by the household less is the likelihood to work as nonfarm labor. Non-land asset owned by the household is also negatively associated with extent of participation as nonfarm labor. Other factors negatively associated with participation as nonfarm labor is average years of education of working members. With education people have more opportunities for earning and therefore they are less likely to be engaged in nonfarm labor activity.

5. CONTRIBUTION OF RNF TO THE RURAL INCOME

We have calculated income of the rural households by sources of income. Total and per capita household income showed an increasing but fluctuating trend (Table 19). Average household income increased from USD 1949 in 2010 to USD 2281 in 2011. It slightly declined (USD 2240) in 2012. Per capita income of the household increased from USD 361 in 2010 to USD 426 in 2011 and then declined to USD 420 in 2012. Share of nonfarm income increased from 46 percent in 2010 to 56 percent in 2012. Among the nonfarm sources highest income was from remittances from abroad followed by business and services.

Table 19: Trends in Household Income from Farm and Non-farm sources, 2010 to 2012

Sources of Income	Annual Income (current USD)			Share of Income (%)		
	2010	2011	2012	2010	2011	2012
Farm	1050	1077	981	53.87	47.22	43.79
Crop	620	327	479	31.79	14.34	21.38
Livestock	272	505	319	13.95	22.16	14.24
Fisheries	84	174	121	4.31	7.63	5.402
Farm Labour	75	70	63	3.83	3.09	2.813
Non-Farm	899	1204	1260	46.13	52.78	56.25
Business	229	236	218	11.77	10.36	9.732
Service	157	158	152	8.04	6.95	6.786
Remittance income	330	560	568	16.95	24.55	25.36
Caste Occupation	11	13	11	0.56	0.59	0.491
Interest Income	20	43	96	1.03	1.9	4.286
Other Non-Farm Sources	151	192	215	7.74	8.42	9.598
Total	1949	2281	2240	100	100	100
Per capita income (Current USD)	361	426	420	-	-	-

Source: Author's calculation based on VDSA data base

Policy makers and development practitioners often want to know the economic conditions of households engaged in various occupations. We have calculated income by sources for farm and nonfarm households. Both types of households were also grouped into some subcategories. Results are presented in Table 20. Income for both farm and nonfarm households increased in 2011 but experienced some decline in 2012 (for farm households). Average household income for farm households increased from USD 1539 in 2010 to 1807 in 2012. During the same period, total income of nonfarm households increased from USD 2054 to USD 2583. The farm households obtained about 85 percent of their income mainly from crop, livestock, and fish farming. In the other hand, nonfarm households obtained more than 80 percent of their income from nonfarm activities for their livelihood. The most important activities where the nonfarm households relied on are business, remittance income from migration, service etc.

Table 20: Trends in Annual Household Income (USD) of Farm and Non-farm Households, by sources, 2010 to 2012

Sources of Income	Farm Households			Non-Farm Households		
	2010	2011	2012	2010	2011	2012
Farm	1359	1704	1509	422	360	361
Crop	680	365	762	266	153	146
Livestock	398	832	460	122	182	154
Fisheries	147	374	214	19	7	10
Farm Labour	134	133	73	15	18	51
Non-Farm	180	221	298	1632	2024	2222
Business	65	63	76	397	381	384
Service	31	45	32	285	253	293
Remittance income	21	35	48	646	998	1012
Caste Occupation	1	8	6	22	18	17
Interest Income	10	9	79	31	72	116
Other Non-Farm Sources	53	61	58	251	301	399
Total	1539	1925	1807	2054	2384	2583
Per cap income (Current USD)	285	360	339	380	446	485

Source: Author's calculation based on VDSA data base

To know the contribution of various factors to the nonfarm income earned by the household we have conducted a panel data model feasible generalised least square (FGLS) estimation technique. Table 21 present the results of the FGLS regression analysis. Amount of nonfarm income was positively associated with statistical significance are amount of non-land asset owned by the household, better infrastructure in village, ownership of land assets. Male headed households had more nonfarm income from female headed households. Nonfarm income of the household was reduced age of the household head, dependency ratio. Households had more nonfarm income in 2011 than in 2010 and 2012.

**Table 21: Determinants of Non-farm Income of the Rural Household:
Estimating through a panel FGLS model**

Variables	Coefficients
Constant	138.4141***
Age of the Household Head (Years)	-1.2155**
Education of the Household Head (Years)	0.6528
Dummy for Gender of the Household Head (Male=1)	100.7031***
Dependency Ratio	-93.5490***
Per capita land ownership (Ha)	-41.4119
Ownership of Non-land Assets (USD)	0.0101***
Amount of loan obtained (USD) by the household	0.0070
Infrastructural Dummy (Village with developed infrastructure=1)	33.9685**
Large Farm Dummy (Large farm size=1)	-27.9920
Year_2011	48.9083***
Year_2012	25.3531
Number of Observation	1475
Log likelihood	-10380.39
Wald chi2(11)	168.69
Prob > chi2	0.00

Note: *, ** and *** represent the coefficients are significant at 10%, 5% and 1% level of significance, respectively.

Source: Authors' calculation based on VDSA data base

6. CONCLUSIONS AND POLICY IMPLICATIONS

Household level panel data based analysis of rural nonfarm economy during 2010 to 2012 revealed some important insights. Nonfarm sector provides 55 percent of the household income and employs 30 percent of the rural labor force. Participation of rural labor force in nonfarm activities are positively linked with age and education level of the worker, better infrastructure of the village. Male members of the household take part in nonfarm activities than their female counterpart. On the other hand, amount of land ownership, household size and dependency ratio are negatively associated with participation in RNF activities. Extent of participation in nonfarm activities is positively associated with credit access, workers average years of education and village infrastructure. These factors facilitate participation in nonfarm activities. On the other hand, amount of land ownership and extent of tenancy in the village have significant negative impact on extent of participation in nonfarm activities.

Results of our study indicate that RNF activities can be facilitated through supporting education in the villages, building better infrastructure and road network in the village, providing access to financial capital through credit market. We do hope that leaders will be able to provide necessary policy support to RNF sector and enhance economic growth and increase per capita income of the households.

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