

**ROLE OF CREDIT FOR RURAL NON-FARM ACTIVITIES:
A CASE OF MARGINAL AND SMALL FARMERS IN INDIA**

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Abstract

Given the low income and negligible savings of the small and marginal farmers, access to finances for any income generating activities is critical. The current state of agrarian distress , with fragmented land holdings also makes it clear that development of rural nonfarm activities assumes particular importance for a labour surplus country like India. Nonfarm sector can not only absorb the excess labour from agriculture and but also generate additional income for the farm households. The sector can act as a risk mitigating instrument for the farmers and check migration to urban informal sector. Given the importance of the nonfarm sector, this paper discusses the nature and extent of nonfarm activities in India using NSSO unit record data. An exercise carried out to understand the determinant of income from nonfarm activities using Tobit regression shows that the households who could avail larger size loans (for any purpose) are the ones who could get higher nonfarm income. Given the fact that credit for nonfarm activities per say is rather limited , it can be inferred that higher level of credit for farm activities can help nonfarm sector as well and the paper discusses some of these linkage effects.

Key words: Nonfarm sector, agriculture sector, small and marginal farmers, credit, linkage.

JEL Classification Codes: Q14, R 51

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1. Introduction

Agrarian distress has been defined as a manifestation of crop failure, changing food consumption patterns, low remunerations and resulting debt traps. Decline in the agricultural output growth along with the decline in the per capita availability of food and shrinking farm profitability are few of the causal factors.² Pests, uncertainty of weather conditions, unsteady and costly supply of seeds, machinery and other farm inputs, have aggravated the misery of farmers in India. Additionally the recent commercialization of agriculture through the use of hybrid seeds, chemical pesticides and fertilizers has put the small and marginal farmers in a great disadvantaged situation due of their inability to compete. Although presently, the share of agriculture in the Gross Domestic Product has been declining, it continues to be the source of livelihood for more than half of the population and around 80 percent of the farmers in India belong to the small and marginal farmer group.

Agriculture activities being rural region based, agrarian crisis is a critical concern for rural India. These areas are generally characterized by underdevelopment, backwardness, landlessness, lack of resources, poverty, indebtedness, illiteracy and lack of proper health and sanitation facilities.³ The rural non farm sector is equipped with the potential to alleviate the agrarian distress of the small and marginal farmers through channels such as by provision of *employment and thereby generating income, which in turn can reduce poverty and inequality. In the event of unforeseen adverse situation nonfarm activities can be utilized as risk mitigation strategies.* While the farm sector includes activities like crop production, animal husbandry, plantation and forestry, the non-farm sector includes all other economic activities including agro processing, retailers,

² Barah, B. C., & Sirohi, S. (Eds.). (2011). *Agrarian Distress in India: Problems and Remedies*. Concept Publishing Company.

³ Rao, V. M., & Gopalappa, D. V. (2004). Agricultural Growth and Farmer Distress: Tentative Perspectives from Karnataka. *Economic and Political Weekly*, 5591-5598.

wholesaling, communication and storage.⁴ The complementary nature between the farm and non-farm sectors allows for diversification within the farms. Diversification provides means to smoothen fluctuations in incomes across different seasons in the absence of sufficient savings and credit. It can provide a source of employment for the landless farmers, who cannot sustain a livelihood in agriculture. Employment in the non farm sector during the off seasons can help to ensure a steady income flow by reducing the risk and uncertainty associated with agrarian activities. Poverty in the rural areas is mostly among the marginal farmers with small landholdings and among landless agricultural laborers. An expansion of the non farm sector can help in rising wages in the agricultural labor markets and lessen unemployment through an increase in labor demand. This contributes to a more equitable income distribution and stable demand for agrarian goods.⁵

The objective of this paper is to explore the nature and extent of nonfarm activities in certain selected states and the determinants of farmers (of smaller sized holding) income in these jobs. Non farm sector is very vast and it includes any economic activity carried out by a household in manufacturing, commerce or service sector. This has to be distinguished from 'off farm activities' which include all activities that are done outside the domain of a farmer's own farm. Specifically, off farm activities may include activities such as agricultural wage earnings, which is excluded from nonfarm activity and this paper is concerned primarily with the nonfarm sector only.

Livelihood diversification of a household into nonfarm activities can result either due to 'push effect' from agriculture or it may be a 'pull effect' by nonfarm sector. Previous studies (Haggblade et al, 2007) have found that in risky agricultural regions, household shifts to nonfarm activity to cope against risk of crop failure. In addition, agriculture may not generate adequate employment opportunities in risky zones and thus households may be pushed into nonfarm activities. The situation is completely different for developed agricultural zones. Here the

⁴ Reardon, T., Stamoulis, K., Balisacan, A., Cruz, M. E., Berdegúe, J., & Banks, B. (1998). Rural non-farm income in developing countries. *The state of food and agriculture, 1998*, 283-356.

⁵ Lanjouw, J. O., & Lanjouw, P. (2001). The rural non-farm sector: issues and evidence from developing countries. *Agricultural economics*, 26(1), 1-23.

nonfarm sector may provide an opportunity to farmer households to invest surplus arising out of agriculture and get additional returns. Farm and nonfarm linkages in different forms are also very strong in developed regions⁶.

However, the nature of farm nonfarm linkage may vary from one region to other in developed agricultural zones. According to previous studies the different nature of farm nonfarm linkage depends on the pattern of development that has taken place in agricultural sector and also on trade between rural and urban sector (Haggblade et. al., 2007). If agricultural sector in a region is dominated by big farmers, it is less likely to produce demand for locally produce goods leading to poorer consumption linkage (see Chakrabarty et al., 2011; Harriss, 1991). In fact, presence of bigger farmers can augment demand for city products. The opposite phenomenon may occur if regions are dominated by smaller farmers.

Presence of a modern sector may also influence the existence and nature of rural nonfarm sector. Either the nonfarm sector may erode over time due to competition from urban sector or a complementary relation may develop between rural and urban sector (See Hymer and Resnick, 1969; Ranis and Stewart, 1993).

Given this background, the present paper addresses the following issues. It first looks into the nature nonfarm sector in selected Indian states. Secondly, it looks at small farmer's income generation from these activities. It is to be noted that most studies on nonfarm sector are based on micro level evidences of local regions and thus studying a macro picture based on micro evidences from the analysis of National Sample Survey (NSS) unit record data assumes importance. In the present context we have selected the following states for analysis: an agriculturally as well as industrially backward region (Madhya Pradesh), agriculturally backward state but with developed modern sector (Gujarat), developed agricultural region dominated by big farmers (Punjab) and an agriculturally developed region with relatively smaller farmers (West Bengal).

The paper presents analysis of several macro level data bases; viz., 67th round NSS Enterprise survey (2010), India Human Development Survey⁷ (2005), 59th round NSS data on Situation

⁶ The different forms of linkage has been discussed in next section.

⁷ Conducted by NCAER, New Delhi.

assessment survey of farmers (2002-03) and 59th Round All India debt and Investment Survey (2002-03) in this analysis.

The paper is subdivided into the following sections. The next section provides the review of literature on nonfarm sector. This is followed by a section that focuses on nonfarm sector in the selected states. To understand the problem of income generation of small farmers in nonfarm sector, a regression analysis is performed in section 4. A concluding section is presented at the end.

2. Rural Nonfarm Sector and its Linkage with Rural Farm Sector: A Brief Review Of Literature

Since literature on rural nonfarm sector is vast therefore we have concentrated only on some of the important studies. We have segregated the literature into three categories.

2.1 Development Planning and Importance of Farm and Nonfarm Sector

As far as development planning is concerned, initial studies viewed agriculture as having a passive role. This is because following Engel's law it was presumed that with growth of any economy, demand for food product will face slow down. Literature on international terms of trade also supported this with evidence of rising price of manufactured goods vis-à-vis agricultural products (see Prebisch, 1950, Singer, 1950). This demand side argument against agriculture coupled with the supply side argument of low or zero marginal product of labour in the agricultural sector led to formation of development models which emphasized transfer of resource from agriculture to big manufacturing sector (Lewis, 1954; Ranis and Fei, 1961). As far as small scale rural nonfarm sector was concerned, it was presumed to be inefficient and was expected to not sustain competition from big manufacturing sector and imported goods (Hymer and Resnick, 1969). The perception about agriculture and nonfarm sector changed with the advent of green revolution in late 1960s and early 1970s when agricultural growth went up, accompanied by growth of rural nonfarm sector, which not only led to augment of rural income but also created nonfarm employment opportunities (see Haggblade et.al 2007). Literature during this time also pointed out problems of urban unemployment arising due to transfer of resources from rural to modern urban sector (Harris and Todaro, 1970). It was well recognized that modern sector is incapable of creating mass employment opportunities and the problem of

unemployment can be addressed if rural nonfarm sector along with agriculture is given importance. The argument of inefficient nonfarm sector stand to be feeble with new studies showing small scale industries to be technically efficient across certain activities (see Little, Mazumdar and Page,1987).

Given the importance of agriculture in growth of RNFS, the next section focuses on literature on agriculture and nonfarm sector.

2.2 The Role of Agricultural Sector in the Formation of Rural Nonfarm Sector (RNFS)

The initial presumption about rural nonfarm employment in developing countries was that RNFS is a residual sector and therefore the relation between farm and nonfarm employment is inverse. In other words, the view was that if agriculture does not generate enough employment, it leads to growth of RNFS (see Bhaumik, 2002). This perception of RNFS as a residual segment, however, has changed over time. The initial explanation was provided by Mellor and Lele (1973) who argued that growth in agriculture due to green revolution increases income of farmer households and this in turn increases demand for rural non farm goods and services. Thus Mellor and Lele (1973) was emphasizing on consumption linkage i.e. consumption of locally produced nonfarm goods and services by farm households. However, later studies have indicated several other forms of linkages (see Hazell et al, 2007) such as production linkage, factor market linkage and productivity linkage. Production linkage mainly includes either forward linkage from agriculture to nonfarm sector or backward linkage from nonfarm to farm sector. Factor market linkage includes farm nonfarm linkage in the background of seasonal change in demand for labour/other inputs. Farm and nonfarm linkage may also influence productivity of workers. This aspect is known as productivity linkage. For instance, a rise in food price may adversely affect nutritional status of nonfarm workers. Recent studies have argued that the nature of agricultural development in a state largely determines the linkage between agriculture and rural non agricultural sector (Chakrabarty et. al, 2011). For instance if agricultural sector is dominated by big farmers, consumption linkage between farm and rural nonfarm sector becomes weak because big farmers generally demand products produced in the modern sector (see Harriss, 1991).

Competition between modern sector and may augment capital intensive production in the nonfarm sector.

2.3 Modern Sector and RNFS

Since RNFS was considered as producing inferior goods and services, it was presumed that with increased income and opportunity to purchase imported goods, demand for nonfarm produced goods will eventually diminish (Hymer and Resnick, 1969). However, studies afterwards have observed positive income elasticity for non farm goods and services thereby rejecting the inferior goods presumption (see Haggblade, 2008). Ranis Stewart (1993) have criticized Hymer and Resnick (H-R) on the ground that the H-R model considers nonfarm activities as homogenous, which in reality is incorrect. In fact the non farm sector may also have a modern segment, which may not wipe off under increased competition from external world. Secondly, the research paper by Ranis and Stewart (1993; 1999) have also criticized H-R model on the ground that it did not considered backward and forward linkages between RNFS and agriculture. In addition there can be instances of subcontracting of works from modern sector to informal sector (Bairagya, 2011). Thus the argument of diminishing RNFS may not always happen in presence of growing modern sector. But it is also true that not in all cases a complementary relation exist between modern and RNFS. Since both modern as well as RNFS uses agricultural resources as input, recent studies have pointed out to the possibility of resource conflict between informal and modern sector due to shortage of agricultural resources (Chakrabarty and Kundu, 2009).

After looking at the existing literature, in the next section we present an analysis of (primarily) NSS data on the nature of nonfarm sector in the selected states of India.

3. Nature of Nonfarm Sector in Selected States in India

Given that the rural non farm sector can provide additional financial support, in particular to the small and medium farmers, it is necessary to examine whether they have the required financial resources for investment in the nonfarm activities. Table 1 provides information on yield of farm output and distribution of output among small and marginal farmers. While defining small and

marginal farmers, land owned by the farmer household has been considered, but one should note that small and marginal farmers also lease in land and therefore they may cultivate larger sized holdings compared to what they own. As expected, it is observed that yield of output for farmers is higher in Punjab and West Bengal compared to the other two states. However, as far as share of small and marginal farmers in total output is concerned, West Bengal is ahead, possibly due to land reforms. All other states selected here have a lower share of small and marginal farmers in total value of output. The table also shows that Madhya Pradesh and Gujarat having lower yield in agriculture. All these features are expected to have implication for the RNFS.

TABLE 1 STATUS OF SMALL AND MARGINAL FARMERS IN TERMS OF PROPORTION OF LAND OWNED, SHARE IN TOTAL VALUE OF OUTPUT, YIELD PER HECTARE AND THEIR PRESENCE IN EACH OF THE SLECTED STATES AS COMPARED TO MEDIUM AND LARGE FARMERS

STATES	Percentage of Small and Marginal Farmers	Percentage of Land Owned by Small & Marginal Farmers	Share of Small and Marginal Farmers in Total Value of Output	Yield per Hectare of Small and Marginal Farmers (in rupees)	Yield per hectare of Medium and Large Farmers (in rupees)
GUJARAT	75.5	33.6	35.3	11,807	11504
MP	67.6	27.83	28	7,927	8,783
PUNJAB	77.7	26.3	19.4	27,213	28,983
WEST BENGAL	95.7	81.007	86.3	20,874	19,004
TOTAL	83	39.72	51.2	13944	11,333

Note: Small and marginal farmers cultivate less than 2.00 hectares of land.

Source: Computed using 59th Round Situation Assessment Survey of Farmers Data

Table 1 shows that in some states small and marginal farmers generate higher revenue/yield per hectare compared to large farmers. However, this does not necessarily mean that they earn more income per hectare, which could be invested for nonfarm activities. This is because small and marginal farmers face higher cost of credit and other inputs. They also face cost of hiring capital goods and machineries which large farmers own including land. Needless to say, due to lower land holding their total income will be rather low. In order to have certain estimates regarding savings of the small and marginal farmers we have rigorously collected data from the farmers of

Karnataka⁸ regarding their total farm income. It is seen that many small and marginal farmers in fact earn negative profit. Small and marginal farmers for meeting their daily expenses generally sell the produce just after harvest period when price is low. They may also get engaged in different kinds of interlinked deals which eventually lead to lower revenue (Bhattacharjee, 2012).

During our survey concerning Karnataka farmers we made an attempt to estimate the surplus that the farmers generate after taking care of their basic consumption needs. Even after considering very basic consumption expenditure, it is seen that 70% of the marginal farmers and 40% of the small farmers are not able to meet such basic expenditure; let alone having savings for investment in other activities (Table 2).

TABLE 2 SHARES OF HOUSEHOLDS NOT BEEN ABLE TO MEET THE BASIC EXPENDITURE

Marginal	Small	Medium	Large	Total
71	40	25	0	39

Source: Authors Filed Survey (as mentioned in Footnote 8).

This clearly shows the need for credit for investment in the non farm sector. However our analysis of NSSO 59th round Situation Assessment Survey data shows that the small farmers' accessibility to credit from the formal sector is limited even for the farm activities. Indeed only 18.9 percent farmers with land holding 0.01 hectare (out of the total farmers in that category) access formal credit while such percentage increases to 86 and 97 for the farmers with higher land holdings. Thus if the small and marginal farmers need to take up nonfarm activities to supplement their income to reduce distress, credit for nonfarm activities is to be made accessible for the marginal and small farmers.

TABLE 3 FARMERS ACCESSIBILITY TO CREDIT FROM FORMAL AND INFORMAL SOURCES

⁸ This is done as a part of a study conducted by Meenakshi Rajeev and B P vani titled: Farm Sector and Farmers Indebtedness and Risk Management in Karnataka, funded by the State Planning Department, Government of Karnataka. We thank both GoK and Ms Vani for this.

<i>Land in Hectares</i>	<i>Incidence of Indebtedness (percentage of farmers accessing credit from both formal and informal sources)</i>	<i>Source of Loan from</i>		<i>Loan used for</i>		<i>Modal Interest Rate</i>
		<i>Formal</i>	<i>Informal</i>	<i>IGA</i>	<i>NIGA</i>	
<0.01	36.88	18.90	81.10	24.44	75.56	36.00
0.01 - 0.40	58.37	32.25	67.75	39.80	60.20	36.00
0.41 - 1.00	59.48	61.68	38.32	68.44	31.56	36.00
1.01 - 2.00	65.42	58.14	41.86	79.82	20.18	12.00
2.01 - 4.00	62.00	74.12	25.88	87.88	12.12	12.00
4.01 - 10.00	69.40	86.49	13.51	85.98	14.02	12.00
>10.00	58.68	97.00	3.00	97.93	2.07	15.00
Total	61.61	68.89	31.11	78.04	21.96	36.00

Note IGA: Income generating activities

Source: Authors analysis of NSS 59th round data

Though small farmers may have lower income to invest in nonfarm activities, they may still generate demand for locally produce goods (consumption linkage) which in turn may lead to growth of nonfarm sector.

3.1 Nonfarm Employment: A State-wise Picture

In order to identify development strategies for the rural nonfarm sector it is necessary to identify the salient features of the sectors. The first question that arises is what is the size of the sector in terms of employment and do we see any growth in this sector?

TABLE 4 STATE-WISE AND ALL INDIA SHARE OF AGRICULTURE EMPLOYMENT IN RURAL EMPLOYMENT

States	1993-94	2004-05	2009-10
Andhra Pradesh	79	71.8	68.7
Assam	78.6	74.3	70.5
Bihar	83.5	77.9	66.9
Gujarat	76.1	77.3	78.3
Haryana	62.4	64.1	59.8
Karnataka	80.3	81.0	75.7
Kerala	51.8	42.0	35.7
Madhya Pradesh	89.1	82.5	82.4
Maharashtra	81.9	80.0	79.4
Odisha	79.9	69.0	67.6
Punjab	67.7	66.9	61.8
Rajasthan	76.7	72.9	63.3
Tamil Nadu	69.4	65.4	63.7
Uttar Pradesh	78.2	72.8	66.9
West Bengal	61.7	62.7	56.3
All-India	76.9	72.7	67.9

Source: Computed using employment unemployment survey data, NSSO, Different rounds

Table 4 shows that the share of employment in agriculture is declining over the years in total rural employment for most states which imply that the share of employment of the nonfarm sector is increasing. Thus more and more people are obtaining their livelihood from the nonfarm sector rather than depending on the subsistence agriculture employment.

To discuss the state wise picture we present both farm and nonfarm employment shares in one table for the selected states (table 5). One finds that states having higher yield rate have more percentage of households engaged in nonfarm employment in rural areas. It is possible that higher agricultural productivity releases farm worker for nonfarm jobs. A closer look also reveals that share of rural nonfarm employment has gone up even higher if state with smaller sized farm land holdings. For example, in WB more than 50 percentage of workforce are engaged in nonfarm activities. Thus small and marginal farmers generate better consumption linkage. Summarizing the above two tables one can infer that higher agricultural output accompanied by smaller sized land holdings generate more rural nonfarm employment.

TABLE 5 SHARE OF RURAL FARM AND NONFARM EMPLOYMENT (2009-10)

States	Share of Agriculture in Rural Employment	Rural Nonfarm Employment share
Gujarat	78.3	21.7
Madhya Pradesh	82.4	17.6
Punjab	61.8	38.2
West Bengal	56.3	43.7
All India	72.7	27.3

Source: Computed using figures obtained from Ministry of Rural development.

Table 5 provides information only on employment in nonfarm sector. But it is also important to understand the type of nonfarm enterprises existing in the rural regions of these states.

3.2 Activities and Type of Enterprises

It is observed that more than 80 percent of enterprises in all states are owned account enterprise i.e. enterprises using family labour only (table 6). Thus these (nonfarm) enterprises are of small size and probably giving only subsistence income to these households. If one wishes to further develop this sector, dissemination of technical information and knowhow and financial support are essential.

If we look at number of establishment we find that states like Gujarat and Punjab have more number of establishment (or capitalist enterprises having hired labour) than states like West Bengal and Madhya Pradesh. It is interesting to note that the states with larger share of establishments also have very high per capita income (PCI) (see appendix Table A.1 for PCI of states), which may be due to presence of developed urban sector in these states.

TABLE 6 DISTRIBUTION OF ENTERPRISE TYPE IN RURAL AREAS OF THE SELECTED STATES

States	Type of Enterprise
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	Owned Account Enterprises	Establishment	Total
GUJRAT	89.6	10.4	100
MP	93.2	6.8	100
PUNJAB	85.0	15.0	100
WB	93.7	6.3	100
India	91.4	8.6	100

Source: Computed using 67th round unit level NSS data (Enterprise Survey)

It is often argued in the context of the Indian economy that enough emphasis has not been placed for the development of the manufacturing sector. Manufacturing sector is important for a labour surplus economy like India as it can generate more employment both directly and also through their forward and backward linkages with other sectors. However, if we examine at the rural nonfarm sector we again observe prevalence of the services sector (table 7) amongst which trading constitute a large share (see also table A.2 in appendix). Thus an emphasis to develop rural nonfarm manufacturing activities is required, rather than the service based activities like petty shops. A state-wise analysis reveals that WB and MP have relatively more manufacturing enterprises while other states have more service sector activities. It is to be noted that table 7 excludes construction; which is also one of the major sector. Using employment and unemployment data from NSS in appendix (see table A.2.) we have shown distribution of workers in different activities.

TABLE 7 ACTIVITY-WISE DISTRIBUTIONS OF ENTERPRISES

States	Manufacturing	Trading	Transport storage	Accommodation and food	Other Services
Gujarat	29.3	41.0	13.0	3.2	13.5
MP	40.2	36.0	2.8	3.6	17.4
Punjab	29.0	34.5	12.5	2.3	21.7
Wb	47.2	26.5	13.4	2.5	10.4
Total	32.9	34.9	9.5	4.6	18.1

Notes: 1. An enterprise can carry out more than one activity 2. Construction sector is excluded.3. Other services include information and communication, education, health, financial and insurance etc.

Source: Computed using 67th round unit level NSS data (Enterprise Survey)

Services enterprises constitute a larger share possibly due to the fact that they require comparatively lower level of investment. In order to develop more productive and employment

generating activities through the nonfarm sector one therefore needs to also have an estimate of the kind of investment requirement and the credit facilities to be delivered. Using NSSO data we have computed average value of fixed asset per enterprise which would provide information about capital expenditure required to open enterprises. Table 8 provides information about estimated value (in Rs.) of owned fixed assets per enterprise. The table shows that as expected, average value of asset is higher in states having more establishments or higher PCI. However, it also provides information regarding the kind of finance required for these enterprises.

TABLE 8 ESTIMATED VALUE OF OWNED FIXED ASSETS PER ENTERPRISE FOR SELECTED STATES (IN RS.)

	Owned Account Enterprise	Establishment	Total
GUJRAT	78216	798120	153297
MP	58791	340004	77963
PUNJAB	103121	909354	223792
WB	35920	183124	45245
INDIA	59043	572834	103037

Computed using 67th round unit level NSS data (Enterprise Survey)

Table 9 shows gross value added per enterprise. Comparing with table 8 we can see that states having higher average value of asset per enterprise generally have higher GVA per worker. The picture clearly is not encouraging as GVA per enterprise is rather low for all states, possibly due to the fact that they are operating at a much lower scale with low technology and they get a low price for their product.

TABLE 9 GROSS VALUE ADDED (PER) RURAL NONFARM ENTERPRISE

STATES	GVA PER WORKER (RUPEES)		
	OAE	Establishment	TOTAL
GUJRAT	35779	63564	44535
MP	24398	82970	34621
PUNJAB	45780	64972	52445
WB	25650	43214	28994
INDIA	29873	63999	37241

Source: Computed using 67th round unit level NSS data (Enterprise Survey)

One of the important problems that a nonfarm rural enterprise face is marketing their products and hence we have examined this aspect. We observe that the percentage of enterprise having marketing linkage is rather low for almost all states. This is a matter of concern and special attention needs to be given to this aspect. Only with proper marketing arrangement manufacturing enterprises can flourish in the rural areas. Amongst the states, it is observed that West Bengal and Madhya Pradesh have higher prior marketing arrangements (these states also have larger presence of manufacturing enterprises).

TABLE 10 PERCENTAGE OF ENTERPRISE HAVING PRIOR MARKETING AGREEMENT WITH OTHER UNITS

STATES	Percentage having marketing Agreement
GUJRAT	0.2
MP	13.7
PUNJAB	0.1
WB	31.6
INDIA	7.9

Computed using 67th round unit level NSS data (Enterprise Survey)

Summarizing the tables from this section we can say that development in the agricultural sector determines growth of the rural nonfarm activities. Higher yield accompanied by smaller sized land holdings generates more nonfarm activities. As far as employment generation per unit of output is concerned, one also observes that states having relatively more manufacturing units and better marketing arrangements in rural areas generate higher employment.

The nature of enterprise may also have implication for small farmer's income generation from nonfarm activities. For example, if nonfarm enterprises are more in a state higher income generation may take place.

So far we have been emphasizing on the development of the non farm sector as it can generate additional income for the farm households and reduce their distress. An important question that arises is what determines the level of nonfarm income. Once we understand the determinants, policy impetus can be directed towards those aspects.

4. Determinant of Nonfarm Income by Farm Households having Smaller Sized Holdings

A farmer household's access to nonfarm jobs and income generation may depend on the following factors: physical capital, financial capital, human capital, natural capital and social capital. Physical capital may include land, buildings and machineries, whereas financial capital consists of savings done by a household and access to credit, human capital includes skill or other abilities possessed by individuals in a household. Generally one can expect human capital to depend on level of education that a household possess. Social capital helps a household in developing business networks and can help a household to get access to credit. In India social capital to a large extent is determined by caste and religion of the household. Households belonging to poorer caste (such as SC and ST) and religion (such as Muslim) are expected to have least advantage in social capital.

In the regression analysis carried here we have considered the following variables to capture the above mentioned aspects: land size, religion, caste, number of loans availed by a household in last five years, highest education of the household and state specific dummy variables. State specific dummy variables are considered to capture the agricultural development aspect. Moreover, the political scenario is also different from one Indian state to the other.

We have considered a Tobit model with nonfarm income of a farm household as the dependent variable and the above mentioned variables as explanatory variables. We expect agricultural development and land possessed by a household to positively influence nonfarm income of a household. In these regression only small farmers is being considered, i.e. farmers having land size below 5 acres. The data set used is India Human Development Survey, 2005. The data set provides information on 41554 households at the national level for more than 900 variables. Given below is the mean and standard deviation of the variables considered in this analysis.

TABLE 11: MEAN AND SD OF VARIABLES SELECTED FOR REGRESSION ANALYSIS

VARIABLES	MEAN VALUE	SD
NONFARM INCOME	6906.129	19113
HIGHEST EDUCATION IS SECONDARY EDUCATION =1, OTHERS =0	0.421916	0.67576
MUSLIM = 1, OTHERS = 0	0.0879265	0.283235
HINDU =1, OTHERS = 0	0.7562336	0.429424
SC/ST =1, OTHERS =0	0.3274278	0.469352
KERALA =1, OTHERS =0	0.1423885	0.349505
GUJARAT =1, OTHERS =0	0.1453412	0.352502
WB =1, OTHERS =0	0.1984908	0.398929
PUNJAB =1, OTHERS =0	0.1256562	0.331516
LANDSIZE IN ACRES	1.701222	1.46479
NO. OF LOANS LAST 5 YEARS	1.480315	2.768074
LARGEST LOAN SIZE LAST 5 YEARS	33995.96	115467.1

Source: computed using IHDS, 2005

Econometric Model

The dependent variable used here is nonfarm income of small and marginal farmers. It is important to note that the dependent variable assumes the value zero for large number of observations because nonfarm activities are not carried out by all households. Under this circumstance one may think of a Tobit model. Tobit models are generally used when a distribution is censored either from below or from above. In other words, the model is used when the actual dependent variable is not observed below or above a particular value. However, under circumstances in which the optimal choice for some individuals is itself a corner solution i.e. $y = 0$, literature suggest to use Tobit model (see Wooldridge 2002).

The structural equation in the Tobit model is:

$$y_i^* = X_i \beta + \varepsilon_i \dots (1)$$

$\varepsilon_i \sim N(0, \sigma^2)$ and y_i is a latent variable that is continuous for values greater than 0. The observed y is defined by the following measurement equation

$$\left. \begin{aligned} y_i &= y_i^*, \text{ if } y_i^* > 0 \\ y_i &= 0, \text{ if } y_i^* \leq 0 \end{aligned} \right\}$$

The Tobit model is estimated using maximum likelihood procedure and the likelihood function takes the following form

$$L = \prod_i^N \left[\frac{1}{\sigma} \phi \left(\frac{y_i - X_i \beta}{\sigma} \right) \right]^{d_i} \left[1 - \Phi \left(\frac{X_i \beta}{\sigma} \right) \right]^{1-d_i}$$

The parameters in this model i.e. β s and σ are estimated from the log likelihood function.

TABLE 12 DETERMINANTS OF NONFARM INCOME BY FARM HOUSEHOLDS HAVING SMALLER SIZED HOLDINGS (TOBIT MODEL)

No. of Observations	2122
F	28.9
Pseudo R square	0.161
Prob >F	0
Log Pseudo likelihood	-22755.29

Explanatory Variables	Coefficient	Robust S.E.	t	P>t
Farm income	-0.1135567*	0.0658801	-1.72	0.085
Secondary Education	19123.7***	1854.302	10.31	0.0000
Muslim	-1626.233	2476.48	-0.66	0.511
SC ST	-419.0218	1335.143	-0.31	0.754
Gujarat	-12948.6***	2459.772	-5.26	0.0000
MP	-11259.13***	2038.359	-5.52	0.0000
Punjab	11589.29***	3287.779	3.52	0.0000
Land size acre	1583.598***	558.1254	2.84	0.005
No of loans last 5 years	-466.2171***	162.8921	-2.86	0.004
Largest size loan last 5 years	0.1754592***	0.0314061	5.59	0.0000
Constant	16215.44***	2144.977	7.56	0.0000

Computed using IHDS 2005

Regression results

The results are provided in table 12. As expected, the regression analysis shows that compared to the agriculturally less developed states, rural nonfarm income generation among smaller farmers is higher in agriculturally developed region (such as Punjab and WB). Tables provided in earlier section shows that these are also the states that have more nonfarm employment. Thus development of agricultural sector seems to be a necessary condition for nonfarm income generation by smaller and marginal farmers. Table 12 also displays the relation between farm income and non farm income of small and marginal farmers. However, here one finds that nonfarm income decreases with farm income of the household. It may happen due to several reasons. Firstly, livelihood diversification of a household into nonfarm activity in a region may be a result of distress. Households who earn higher income from agricultural activities may not prefer to diversify into nonfarm activity. Secondly, it may happen that the institutional environment in a region is not conducive to start nonfarm business for small and marginal farmers and thus only those households who are pushed into nonfarm business carry it out. For example, the rent for hiring a room for opening a petty shop may be high or it may so happen that access to credit may not be easily available for nonfarm business. As far as access to credit is concerned, we have considered this as explanatory variable in the regression. We have considered two variables, namely largest size loan in last five years and number of loans in last five years. The result shows that households who could avail larger sized loan earns higher income from nonfarm activities. However, if one looks at the incidence of borrowing in last five years (i.e.no. of loans in last 5 years) one finds that it is negatively related with the dependent variable. It may happen that loans are mainly provided for using in farm activity and households which could avail larger sized loan can only diversify into nonfarm business. In this regard, a look into table 13 may be useful. Table 13 shows that incidence of borrowing for farm business is much higher than incidence of borrowing for nonfarm business. However, there is also a possibility that households which has availed more number of loans in last five years may have defaulted leading to problem in getting fresh loan.

TABLE 13 PERCENTAGES OF CULTIVATOR HOUSEHOLDS REPORTING
BORROWINGS (P) AND PERCENTAGE SHARE IN TOTAL BORROWINGS (S) DURING
1.7.02 TO 30.6.03 BY PURPOSE OF BORROWING

Purpose of Borrowing	P	S
Capital expenditure in farm business	3.3	20
Current expenditure in farm business	7.6	30.8
All expenditure in farm business	10.7	50.8
Capital expenditure in non-farm business	0.7	8.1
Current expenditure in non-farm business	0.5	3
All expenditure in nonfarm business	1.2	11.1
All non-business expenditure in household	12	38

Source: Computed using 59th Round All India debt and Investment Survey, NSSO

In addition to the above factors, the explanatory part of our regression analysis also included variables representing human capital such as education and social capital, such as number of family members, religion and caste of the household.

It is observed that secondary education (human capital) increases earnings from nonfarm activities. This may happen because education increases information (such as about government schemes etc) and knowledge about newer activities which in turn may increase earnings. One also observes number of family members to be positively related with nonfarm income of the household. More number of family members are expected to reduce labour cost and creates better networking and marketing facility. However, household caste and religion are not statistically significant.

5. Conclusions

We can conclude the following. Firstly, agricultural development to a large extent determines presence of nonfarm activity in rural regions. Nonfarm employment generation is more in a region (both for small and marginal farmers as well as for other households) if yield rates of agricultural sector are higher and land holdings are of smaller size. Higher agricultural surplus increases investment in nonfarm activities and if regions are dominated by smaller farmers demand for locally produced goods increases leading to further growth of nonfarm sector. Secondly, access to adequate credit plays an important role in nonfarm income generation. This

is because small and marginal farmers possess very less savings and therefore they require credit for investing in nonfarm business. In reality, however, availing a loan for farm business is much easier than that of nonfarm business. Thirdly, one observes that manufacturing activity generates higher employment per unit of output produced and states having higher marketing arrangement have larger presence of nonfarm activities in rural areas. Thus emphasis has to be given more on growth of rural manufacturing enterprises than on services. Lastly, education of the household plays a major role in increasing information and income generation from nonfarm activity.

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APPENDIX

TABLE A.1 PER CAPITA INCOME OF INDIAN STATES

States	2009-10	Share of Agriculture In NSDP
	Per Capita Income	
Gujarat	48511	21.1
Kerala	45908	16.9
Madhya Pradesh	21095	38.4
Punjab	42727	39.7
West Bengal	30372	27.6
India	33843	24.4

TABLE A.2 DISTRIBUTION OF WORKERS IN RURAL AREAS ACCORDING TO USUAL PRINCIPAL AND SUBSIDIARY STATUS BY INDUSTRY GROUP (NIC-2008) FOR DIFFERENT MAJOR STATES IN INDIA

SECTOR	INDIA	WEST BENGAL	MADHYA PRADESH	Punjab	GUJARAT
Agriculture forestry and fishing	64.1	53.21	72.14	52.37	74.56
Mining and Quarrying	0.47	0.3	0.56	0	0.48
Manufacturing	8.64	19.47	4.81	11.16	8.27
Electricity, gas, steam and air conditioning supply	0.14	0.04	0.06	0.94	0.03
Water supply;	0.09	0.02	0.03	0.18	0.01

sewerage, waste management and remediation activities					
Construction	11.05	8.43	12.91	16.19	4.32
Wholesale and retail trade; repair of motor vehicles and motorcycles	5.61	6.43	3.76	5.55	4.82
Transportation and storage	2.86	3.53	1.31	3.56	2.79
Accommodation and Food service activities	0.87	1.01	0.46	0.29	0.48
Information and communication	0.13	0.07	0.05	0.24	0.03
Financial and insurance activities	0.33	0.42	0.22	0.68	0.14
Real estate activities	0.07	0.02	0.01	0.05	0
Professional, scientific and technical activities	0.17	0.17	0.13	0.26	0.06
Administrative and support service activities	0.22	0.35	0.16	0.2	0.1
Public administration and defence; compulsory social security	0.79	0.58	0.63	1.06	0.69
Education	2.07	2.67	1.48	2.27	1.79
Human health and social work activities	0.47	0.48	0.21	0.81	0.28
Arts, entertainment and recreation	0.12	0.16	0.07	0.09	0.02
Other service activities	1.52	1.63	0.93	3.84	0.94
Activities of households as employers; undifferentiated goods- and services producing activities of households for own use	0.28	1.01	0.08	0.26	0.19
Activities of extraterritorial organizations and bodies	0	0	0		0

Source: Employment and Unemployment 68th round 2011-12