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Rural Transformation in India, with A Special Reference to Agrarian Transformation in Nagaland: Empirical Analysis

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Abstract

Fostering rapid and sustained agricultural growth in the rural area is the prime focus of the policy maker in many developing countries and especially in India for two important reasons. One, though the contribution of agriculture in the gross domestic product is declining still majority of the rural household depends directly on agriculture for their livelihood. Secondly, sustain agricultural growth is strongly associated with the reduction of poverty in India. One way to achieve a sustain growth with a higher level of income in rural economy is to diversify from farm to non-farm sector. Another emerging trend is diversification within the farm towards commercial crop. Many studies have looked at rural structural transformation separately through the lens of diversification from farm to non-farm sector or through diversification within the farm sector. But there is hardly a study that has tried to analyse the rural diversification jointly. This paper tries to study the rural structural transformation in Nagaland through two process- diversification from farm to non-farm and diversification within farm sector towards commercial crops. The study will also try to analyse empirically on the factors responsible for the household to diversify through the two processes. The present study uses the National sample Survey' (NSS) unit level data on Employment and Unemployment survey and DES, Govt. of India for secondary data. 200 household' field surveyed data with structured questionnaire is used for primary data. The rural occupational diversification in Nagaland has peculiar characteristics as compared to the all India level. It is found that the diversification is mostly dominated by regular salaried employed and non-farm self-employed unlike in the case of India, where household diversify generally towards casual nonfarm job which are informal in nature. These two processes for rural transformation have a larger policy implication for the poverty reduction and growth.

Key word: Rural, Transformation, Occupational diversification, Crop diversification, Non-farm.

Introduction

The emergence of rural non-farm (RNF) employment is an important and fast growing source of rural employment and income generation in India in the last few decades. Future possibility for the persistence of this feature, makes it more necessary and interesting to analyse and study the phenomenon comprehensively in all its dimensions such as the nature of diversification in the rural employment structure, diversity of emerging activities, shifts in

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'pluriactive' or multi-occupation, diversification in cropping patterns, levels of productivity and earnings, and sustainability. RNF employment is a complex phenomenon, and in the context of vast diversity of rural India in terms of agro-climatic, socio-economic and institutional conditions there is a need for detailed analysis of the various dimensions of the phenomenon with a focus on situation analysis based on micro-level studies (D Narasimha Reddy. et.al.2014). Decline in the agricultural employment growth rate from 1980's onwards, has led to dismal outlook for rural employment generation. India's growth process has consistently failed to generate a sufficient number of productive jobs for rural people, whereas prolonged decline in the growth rates of farm employment is largely responsible for the household occupational diversification which has led to the growth of the non-farm economic activities of household in rural area (Sheila Bhalla.2005). Nevertheless, it has also contested that Urban-rural spill overs have become important drivers of the rapidly growing rural non-farm sector, which now generates the largest number of jobs in India (Hans P Binswanger-Mkhize.2013). Scholarly debate on structural transformation of the Indian economy over the last three decades has been debatable. Some scholars viewed it as growth induced structural transformation that has contributed in reducing poverty and unemployment and generating income in the rural economy (Binswanger 2013; Himanshu 2013) whereas some scholars have looked at the transformation as distress driven rural transformation. These two processes of structural transformation have different implication for the growth and development of the economy as a whole, especially the rural Indian economy. And the weighted of the transformation increases when the rural economy is defined predominantly by agriculture. Rural non-farm self-employment is especially dynamic, both in terms of GDP growth and employment generation, with farm households diversifying into the sector to increase household income. The emergence of rural non-farm sector as the highest employment and income generating sector has been considered as one form of rural structural transformation by many scholars (Eswaran et. al. 2009). Thus diversification of workforce engaged in the agriculture to the other non-farm sector has been the fundamental target of many policies taken in the Indian Economy over the past three decades. In rural areas of developing countries like India, occupational diversification becomes very important where the average farm size and income is small and continues to shrink with demographic pressure, and where wage employment in a wide range of activities is casual and seasonal. It is generally obvious that any single source of income is not sufficient to meet rural individual or household needs. Perhaps, diversification of economic activities of an individual as well as household is likely to be more common. Thus, rural households or individuals tend to pursue a number of different economic activities, resulting in 'pluriactive' or multi-occupational households or individuals'.

Most of the developing nations have achieved self-sufficiency in food grain production in between the period of 1980s to 1990s and they had to change their agricultural policies to adjust to structural changes in the economy. As a result, there was an emphasis to diversify their agriculture sector towards high value crops (Godoy & Feaw, 1991). The shift in cropping pattern is observed as a response to the changes in demand side factors like economic growth, per capita income, rapid urbanization and dietary pattern. In recent years, the diversification

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towards high value crops is considered as a potential strategy to promote agricultural development, to increase farm income, to generate employment opportunity to exploit the comparative advantage in the production of region specific high value crops. A diverse agro-climatic condition, like in India, creates an ample of opportunities to grow most of the high value crops. The idea of 'agricultural diversification' intended hereafter is a phenomenon of a shift in cropping pattern towards high value crops. The phenomenon is not just a shift from food grain production and is also associated with change in production systems. The change is from consumption-oriented production to the market oriented production system where the profit maximization became the major concern (Pingali, 1997).

The process of crop diversification is not a costless process as it involves production and marketing risk. With an increasing numbers of small and marginal farmers in Indian economy, it is a real challenge for the policy maker to understand the process of crop diversification and the consequences of failure in the crop diversification. So for the future policy formulation, it is important to know who are diversifying from the food crops to the cash crops. The present study will explore the determinants of crop diversification. The North-eastern regions of India have shown an increasing importance of cultivation of plantation crops (rubber and tree beans plantation (parkai species) specifically) in the recent years. So this paper deal with an economy which is almost an egalitarian society, where there is lack of marketing infrastructure, information regarding crop growing, inputs and technology use (technology know how). What could be the implication of crop diversification in terms of the economic, social and institutional life of the household is an important area of research.

Many studies have looked at rural structural transformation separately through the lens of diversification from farm to non-farm sector or through diversification within the farm sector by diversifying towards high valued crops along with the concept of multi occupation. But there is hardly or no studies that have tried to study the rural diversification from farm to non-farm sector and within diversification within the farm sector to understand the rural structural transformation more clearly. Again the nature of rural transformation is not similar across time and space in the Indian context, different regions have different socio-economic and institutional set up that plays an important role in the decision making of every household to diversify. So given the different variation in the rate of growth of farm and non-farm sector in the Indian states, this study will attempt to focus on the emergence of rural structural transformation in Nagaland, one of the North-eastern states in India that has a peculiar institutional set up all together and how rural transformation has taken place. It will also try to study the nature, patterns and trends of rural transformation in rural Nagaland through primary field surveyed data. The study will also try to analyse empirically on the factors dependent for diversification from farm to non-farm sector and diversification within the farm sector.

The structure of the paper is organised in the following way. The Nagaland economy will be discussed in the second section, data and methodology will be discussed in the third section. Fourth section will explain and show the empirical analysis and results of the field data as well as secondary data of Nagaland with comparison of overall India data.

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Some of the major findings will be presented in this section followed by Conclusion in the fifth section and appendix at the last page of the paper.

Nagaland Economy:

Nagaland is a state situated at the Northeastern part of India with a literacy rate of 80.11%. The state has a communitised tribal society (Kilang Jamir, 2001); with seventeen different Naga schedule tribes and 11 districts. Each district has a predominant concentration of one of the major/ minor tribes of the State, making those region/districts distinct in their socio-economics and political, traditional, cultural and linguistic characteristics. Every district has their own customary laws and certain institutional norms which are not in written form but socially acceptable and followed by all households in the village.

Dr.Swabera Islam Saleh (1989) in his book 'Nagaland's Economy in transition since 1964' indicates that prior to independence, economic activities were almost invisible not to speak of economic progress in Nagaland and continued to be backward compared to other parts of the country as well as other administrative units of the North Eastern Region. An investigation into the transition of the Nagaland economy since 1964 in the light of Rostow's stages of growth gives an idea that the economy which was in stages of the 'traditional society' has slowly moved into the stage of nearing 'pre-condition for take-off'. The author further added that after the completion of 2 decades of planning since 1964, the economy of Nagaland made certain progress in the fields of Agriculture, industries, transport and communication into the stage of 'pre-condition for take-off'. According to Lima Sasai Aier,2009 (Encyclopedia of Nagaland) , area under jhum cultivation is 87,339 hectares and under terrace cultivation is about 62,091 hectares .The state agriculture mostly practice jhum and terrace cultivation, but with the disadvantage of jhum cultivation, at present more importance is given to terrace (permanent) cultivation. Phek, kohima and some parts of Peren districts popularly practice terrace cultivation. The rest of the districts in the state practices jhum cultivation due to geographical location of the areas , availability of water, or rain fed areas etc. plantation and horticulture are new trends that is replacing jhum cultivation in the state at present. Industries have confined only in small scale and cottage industries. At present scenario, we find that farmers are coming up with surplus production for commercialization of certain agricultural crops like potatoes, pulses, ginger etc apart from food grains horticultural crops are largely produced, but the farmers in the state has a little place for its marketable products.

Naga society is being predominantly an agrarian economy. Agriculture is the main occupation for their source of livelihood, where agriculture production so far is mostly for self-consumption and not much for commercialization. The contribution of agricultural sector in the state is very significant. The remarkable feature of the economy is that there are no landless peasants in the state. Agriculture produces a small marketable surplus, and there is lack of proper agro-marketing and agro-business structure and also with the fact that people followed unsustainable agricultural practices such as the jhumming method which give less productivity and unstable compared to terrace land and wetland. Land holdings and labour market are not

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so formalized in the rural economy. Property rights entitlement documents are yet to be systematized and maintained by the government, but held widely by land owning households because of strong tribal institutional norms and set up.

Out of total area of 165,783 hectares, covered by the state, 1, 008, 23 hectares comes under government control that accounts for 11.7% of the total area of the state. Community, clan recognized traditional rights based land holdings as well as more modern and formalized private property entitlements over land holdings held by two or more families are common. Of these types of ownerships, modern property rights based private individual ownership entitlements has the largest share and traditional rights based, clan recognized ownership rights the least. Customary law has a very strong hold in the society and quite effectively determines the ownership of land, the individual's right to use it, and is involved in settling disputes etc. Officially, 17 tribes inhabit the state each having its own customs and traditions. The laws governing the ownership of land, inheritance, use of land etc. differ from one tribe to the other (Kikon R, 2015).

Data Methodology

This paper has used both primary and secondary data. For the empirical analysis the paper has extensively used the primary surveyed data collected from three villages in rural Nagaland. Field survey data is collected with a structured questionnaire personal interview, and it was on intensive household survey, where the head of the family or anyone member of the family is the respondent to collect information for the whole family (household members). Total of 200 rural household has been surveyed in three villages under two districts, inhabited by two different tribes in Nagaland. The primary survey data has been collected in one village of Chakhesang tribe under Phek district and two villages of Lotha tribe under wokha district. Total sample size of 200 household has been surveyed, 60 sample household has been collected in village-1 yikhum village, 80 sample household in Village-2 Kutsapo village and 60 sample household in village-3 Mekokla Village, according to the total household in each villages. The primary surveyed data was analysed on the basis of income of the household. The three sample villages are selected on the basis of its difference in agricultural practice, tribe, and distance to nearby town, local governance and geographical location with accessibility. The village has no documented property right system so most of the respondents were unable to give standard measurement for their landholdings, as in the village the land holdings are measured by its land harvest during Kharif season. Thus, household land holdings and harvest of farming are calculated according to local standard measurements of each village. For, the empirical analysis both individual and household information were used. For the education standard of household, the highest educated member of the household is considered as the education level of the household. For the multi-occupation, not only the occupation of the respondent is considered but also the occupation practices by the members in the household are taken into account. The working member of the household is categorised by exclusively taking those members in between 15 to 65years and also the housewives and students are also excluded.

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For the secondary data National Sample Survey organisation (NSSO) data on employment and unemployment rounds (50th, 61th, 66th and 68th rounds) will be used to find out the determinants at the all India level and Directorate of Economics and statistics (DES) data is used to examine the crop diversification pattern and trend in India and Nagaland. For classification of the household into farm and non-farm, National Industrial Classification of Government of India has been used. An empirically analysis using multinomial logit model to study those factors that has contributed in diversification of the household from farm to nonfarm sector and diversification within the farm sector from food crops to high valued commercial crops (plantation).

Empirical Analysis and Results

In the discourse of rural structural transformation, sustain growth of the rural sector with a higher level of income for the rural population, has been given considerable attention. One strand of literatures suggest that occupational diversification of farm to the non-farm sector is an important source for rural household in generating rural employment and income that has contributed in reducing rural poverty. But one of the important areas that have to be studied is who are diversifying towards non-farm sector. In other words what are the factors influencing the decision of the household to enter into the non-farm sector? At the national level, researchers have established various socio-economic factors influencing the decision of the household to enter into the non-farm sector. But one of the major set-back in those studies is that they assume the states behaviours as homogenous. Secondly, the relationship has to be established empirically. Again due to the dominance of casual non-farm sector in the Indian economy, the sustainability of generating employment and income in the long run is questionable (Hans P Binswanger-Mkhize, 2013; Reddy D Narasimha. et.al.2014).) .So households hedge their physical and capital assets between different sectors and adopt multi-occupational strategy for their livelihood (Deshingkar Priya and John Farrington, 2009)

Another emerging trend for generating higher income for sustainability is diversification of crops from food crop to commercial crops that has market value. It has change the structure of rural Indian agriculture both in terms of the change in the process of production and change in the marketing network for better income (Godoy & Feaw, 1991). So there are two process of rural transformation that Indian economy is undergoing. Firstly, occupational diversification from farm to the non-farm sector and secondly, transformation of rural agricultural sector in terms of diversification from self-sufficient food crop economy to production of commercial crops for generating higher value or income. These two processes of rural transformation have been looked at as a separate process or stages of transformation in most of the studies of rural structural transformation. In many of the studies of rural transformation they have studied occupational diversification or crop diversification as the source of income generation, because farm or non-farm sector alone cannot provide sufficient income for the household to survive or meet their needs, they adopt multi-occupational strategy and diversify their resource portfolio between farm and non-farm sector and within the farm

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sector thy try to diversify their cultivation pattern from food crops to the commercial crop of high market value. In this way household reduces the uncertainty involve either in the farm or in the non-farm sector. So the present study is an attempt to look at these two processes of rural transformation and try to find out the factors responsible for the occupational diversification and crop diversification. For empirical analysis it has used the data collected from primary field study in three different villages of rural Nagaland.

The socio-economic structure of the rural Nagaland is different from most of the major states of India. The rural tribal institutional set up of Nagaland influence the socio-economic structure of the rural area. With a different institutional set up how the rural household in Nagaland take decision to enter into the non-farm sector in one hand and which household diversify their crops from food crops cultivation to cultivation of commercial crops have been studied in the present work. So the empirical analysis is done at two parts. Part one studies the occupational diversification and part two tries to study the household crop diversification strategy. In order to do this data of 200 households from 3 different rural villages of Nagaland has been used. For part one the households are classified into four categories: Farm Sector Household, Regular Non-farm Sector Household, Casual Non-farm Sector Household and Self-employed in Non-farm sector household. The classification is based on the major source of income of the household.

In part two the farm sector diversification towards commercial crops cultivation is studied by dividing the crops into two category, such as High Capital Investment (HCI here after) crops and Low Capital Investment (LCI here after) crops. HCI crop includes Rubber, Ginseng, Cardamom, Kiwi, Ginger, Beetle Nut, Apple, Sugarcane, Litchi, and Passion Fruit and LCI crop includes Pineapple, Local trees, Orange, Banana, Yongchak, King Chilli, Tree Tomato and Mango. If a household is only engaged in cultivating at least one of the HCI crops, that household will be considered as HCI crop household. If a household is only engaged in cultivating at least one of LCI crops that will be considered as LCI crop household. If a household is engaged in cultivating both HCI and LCI crops, that household will be considered as Mixed Cropping (MC) Household. And finally if a household is not engaged in cultivating any crops that household is Not Engaged Household.

Occupational Diversification of the Household in Rural Nagaland

The secondary data collected from the different employment and unemployment survey of National Sample Survey Organisation (NSSO) rounds (50th, 61st, 66th, and 68th) provides the evidence of increasing non-farm sector household in the rural Nagaland. Table.1 below gives the information about the share of farm and non-farm households over the four periods. The share of non-farm household in the rural Nagaland has increased from 37.8 per cent to 38.5 per cent from the year 1993-94 to 2011-12. The share of increase in the non-farm sector is not very significant. It could be because of two reasons. The binary classification of farm and non-farm does not fit in rural Nagaland economy as most of the household engaged in both farm and non-farm sector. Another reason could be the under reporting of the NSSO data in the north-

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east regions because of geographical location and methodology limitations in rural Nagaland. However the field survey data collected from the three different villages in the rural Nagaland shows the dominance of non-farm sector. Table.2 provides the occupational distribution of the household in rural Nagaland.

Table.2 shows that only 27% of the households are getting their major source of household income from Farm sector. The non-farm sector has been further classified into Regular Non-farm, Casual Non-farm and Self-employed in Non-farm sector. The share of these three categories of households all together is 67%. Regular Non-farm sector has the highest share (36.5%) followed by self-employed in non-farm sector (30.5%). What are the factors which influence a household decision to diversify to the non-farm sector? In the present paper six factors have been identified from the field survey data. The explanation of the six factors is given in Table.3 in the Appendix. A Multinomial logit model has been used to find out how the chances of the households of entering into the different occupation are affected by these six factors identified (see table.3 in appendix).

The Functional Form of the Model:

The econometric model:

$$Y = \alpha + \sum_{i=1}^{6} \beta_i X_i + u \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

Y=1 If the household is in the farm sector.

  =2 if the household is in the regular non-farm sector.

  =3 if the household is casual non-farm household.

  =4 if the household is self-employed in non-farm sector.

X_1=Educational Index

X_2=Illiteracy Index

X_3=Household Per Capita Land Holding

X_4=No of Working Member

X_5=Distance from nearby town (1=village1, 2=village2 and 3=village3)

X_6=Social Network (1=yes, 0=no)

The Estimated Model:

Equation-1 has been estimated by using a Multinomial Logit model to show how the chances of entering into the different occupation are affected by the above mentioned

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independent variables. In order to avoid the problem of multi-collinearity, as a first approximation the correlation among the independent variable has been checked and presented in Table.4 in the appendix. The correlation matrix shows that there is no high correlation between two independent variables. The highest correlation that has been observed is 0.47 (between education index and illiteracy index). So there is a negligible chance of multi-collinearity among the independent variables.

After checking the degree of correlation among the independent variables, equation-1 has been estimated by using Multinomial Logit model and the resulted has been presented below (Table.5). The sign of the coefficients are as expected. The result in Table.5 shows that a one acre increase in the per capita landholding is associated with a 0.0402 increase in the log odds of being in regular non-farm sector than in the farm sector. Per capita land holding has the same effect for casual non-farm and self-employed non-farm sector vs. farm sector. A one acre increase in the per capita land is associated with 0.115 and 0.035 increase in the log odds of being in the casual non-farm and self-employed in non-farm than in the farm sector. So an increase in the per capita land holding increases the chance of the household to enter into the non-farm sector as compared to the farm sector. Predicted probability of unit change in the per capita land holding is calculated and it has been plotted against different occupations of the household in Figure.1. It shows that when the per capita landholding of a household is increasing the predicted probability of choosing farm sector as household occupation is declining. The predicted probability of entering into casual non-farm sector is increasing with the increase in the per capita land holding. Education also plays an important role in influencing the occupational choice of the household (Mukesh Eswaran et.al , 2009). In the present estimated model it shows that a unit increase in the educational index increases the log odds by 0.20 for being in the regular non-farm than in the farm sector. Similar is the case for self-employed in non-farm sector where a unit increase in educational index increases the log odds by 0.21 to be in the self-employed in non-farm vs. farm sector. Table.6 provides the predicted probability for education index. It shows that when household education standard improves from illiteracy to higher education standard, one can see that the predicted probability of being in the farm sector has declined. For a graduate and diploma the predicted probability of entering into the farm sector is 5.07% and 0% respectively. But for the same qualification the predicted probabilities of entering into the regular non-farm sector are 71.78% and 42.61% respectively. And also for self-employed in non-farm the predicted probabilities for the same qualification are high (23.15 and 57.39% respectively). Another important observation from Table.6 is that educated people are not interested to be in the casual non-farm sector as the predicted probabilities are almost equal to zero for all education categories.

For the illiteracy index, a one unit increase in the illiteracy is associated with a 0.235 decrease in the log odds of being in the regular non-farm as compare to the farm sector. The predicted probability for unit change in illiteracy is presented in Figure.2. When the illiteracy is increasing the predicted probabilities of being in the regular non-farm and self-employed in non-farm is declining while farm sector and casual non-farm is increasing. The predicted probability of working member is presented in Figure.2. It shows that when the working

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member in a household increases the predicted probability of joining the casual non-farm increases. Probability of entering the rest of the categories in the non-farm sector is declining. It could be because the educated people in Nagaland do not prefer to be in low end job rather remaining unemployed or wait until they get into white collar regular salaried jobs. The occupational choice for a household based on the distance from town and social networking is given in Table.6. The lesser is the distance from the town the higher is the chance of entering into the non-farm job. A household in village1 and village2 has higher predicted probability of being in the regular non-farm and self-employed in non-farm than village3. A household in village3 has almost 60% chance of being in the farm sector. For social networking it is the household with good social networking who have higher probability of being in the regular and self-employed in the non-farm sector. A household with no social networking has 65% chance of being in the farm sector where as the probability of being in the regular non-farm and self-employed non-farm is 42%.

So it can be concluded that the regular and self-employed non-farm job is access by educated, high per capita land holding and social networking household. Distance from the town also has a significant effect in the occupational choices of the household. It shows the spill over effect in the rural Nagaland.

Crop Diversification in Rural Nagaland

Cultivation of commercial crops is a recent trend in Nagaland Agriculture. Figure.4 shows the increasing trend of area under commercial crops cultivation in Nagaland. The data for the area under different crops has been taken from Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. The data on area has been collected for 15 available crops for Nagaland and the area has been aggregated to get total area under the commercial crops. The data available for the 15 crops are Sugarcane, Chilli, Turmeric, Cardamom, Mango, Citrus fruits, Grapes, Pome Fruits, Papaya, Apple, Cashew, Tapioca, Sweet Potato, Tea and Coffee from the year 2003-03 to 2012-13. A two year moving average has been taken on the aggregate data to remove the fluctuation and the data has been plotted in the figure below. It reveals that after 2007-08 there was a continuous increase in the area under commercial crops. In 2003-04 total area under commercial crops was 15.34 thousand hectare which has increased to 33.059 thousand hectare in 2012-13.

The significant increase in the area under the commercial crops gives the indication of household diversifying in the cultivation of commercial crops for high market value. Here one has to check what has happen to the area under the food crops that the household have diversified their crops from food crops to commercial crops. Or is that because of the increase in the net area sown? But the important question here is what factors has influence the household to diversify towards crop diversification? What is the intensity of crop diversification? What are the commercial crops that the rural household in Nagaland cultivate? In order to answer these questions, data from the field survey of three villages in the rural Nagaland has been used. From the field survey it is found that the villagers cultivate 18

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different crops which have been classified into High Capital Investment Crop (HCIC) and Low Capital Investment Crops (LCIC)[1], where the households have been classified on this ground. If a household is only engaged in cultivating at least one of the HCI crops, that household will be considered as HCIC household. If a household is only engaged in cultivating at least one of LCI crops that will be considered as LCIC household. If a household is engaged in cultivating both HCI and LCI crops, that household will be considered as Mixed Cropping (MC) Household. And finally if a household is not engaged in cultivating any crops that household is classified as Not Engaged Household. The distribution of households into different crop cultivation is presented in Table.7.

Table.7. shows that the share of Mixed Crop is maximum. 53% of the household are engaged in cultivating Mixed Crops i.e. both HCIC and LCIC. It could be because of the high investment and high risk in the High Capital investment crops that household are trying to minimise by cultivating low capital investment crops. It is followed by the low capital investment crops (20.5 per cent) and high capital investment crops (14 per cent). There are 12.5% of the household who are not engaged in cultivating any of the commercial crops.

Factors Influencing Cultivation of Commercial Crops

Again using the field surveyed data, this paper tried to find out the factors influencing the households within the farm sector to diversify towards the cultivation of commercial crops in the three villages of rural Nagaland. The factors/variables influencing the cultivating pattern of the household is listed in Table.8 in the appendix. A Multinomial logit model has been used to find out the factors influencing the decision making of a household to cultivate different categories of commercial crops.

Figure.5 provides the information about the effect of monthly income of the household on crop diversification. When the monthly income of the household is increasing the predicted probability of cultivating High Capital Investment Crops is increasing. It is shown in the upward curve in panel 1 of the figure.5. For the rest of the cropping classification the curve is downward slopping which indicates decline in the predicted probability. It can be concluded that only rich household or individual can afford to cultivate the High Capital Investment crops. But when the per capita land holding of a household is increasing, household tends to move towards the cultivation of mixed crops. Figure.6 provides the predicted probability for per capita land holding. The reason could be because the HCI crops need a longer gestation period and a household can only cultivate HCI if that household has sufficient land for cultivation food crops as well low capital investment crops.

The type of crops cultivated by a household is dependent on the number of working member. If the number of working member in a household is large, it facilitates some of them

[1] HCIC includes Rubber, Ginseng, Cardamom, Kiwi, Ginger, Beetle Nut, Apple, Sugarcane, Litchi, and Passion Fruit. LCIC includes Pineapple, Local trees, Orange, Banana, Yongchak, King Chilli, Tree Tomato and Mango.

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can to look after the HCI and LCI crops and the remaining members can continue in the cultivation of food crops. The result shows that when the number of working member is increasing the predicted probability of cultivating Mixed Crop is increasing.

Similarly the effect of distance from the nearby town, network, education and household's occupational characteristic on the diversification of crops has been checked. Table.8 provides the predicted probability for distance from town, network, education and household's occupational characteristic.

Distance from the nearby town decides the marketing network of commercial crops. If the distance from the town is larger it increase the transaction cost to sell the product and also the overall spill over effects from the nearby towns. The result shows that when the distance from the town increases the predicted probability for cultivation of HCIC has decreases. But for the LCI and Mixed crops it gives a mixed result. For the medium distance village (Village2) the predicted probability of cultivating LCI and Mixed is higher as compare to smallest distance village (village1). Household with networking has higher probability of cultivating HCI and LCI crops whereas the Mixed crops does not need networking as it can be seen that the probability of cultivating mixed crop for a household without networking is higher than a household with networking (60>38.17 per cent). Education does not have a significant impact on cultivating HCI crops, but it has a significant impact on cultivating LCI and Mixed crops. If the education standard is 10th for a household that household has the highest chance of 55.35 per cent to cultivate mixed crops which is higher than the probability of cultivating HCI (15.03 per cent) and LCI (17.33 per cent). Similar is the case for 12th, graduate and diploma categories. HCI crops is dominated by the farm sector household as the predicted probability of farm sector household (15.04 per cent) is greater than the non-farm (10.48 per cent) and mixed (9.45 per cent). So it is the rich farm household who are cultivating the HCI crops. LCI crops are dominated by the non-farm household. For Mixed crops the predicted probability for farm is highest (68.94 per cent) followed by mixed household (58.17 per cent) and non-farm household (46.03 per cent). So it can be concluded that most of the household are engaged in the mixed crops and all the factors have highest predicted probability of cultivating mixed crops. It could be because most of the rural household in Nagaland are adopting a portfolio diversification technique to avoid the risk of default in high value crops in one hand and maximizing the income from high value crops on the other hand.

Conclusion

Rural Indian economy in the last three decades has undergone a major structural transformation and the nature of this transformation is not similar across time and over the states. Specifying the rural agrarian economy of Nagaland it has undergone a change with the emergence of non-farm economy. As the share of income derived from the non-farm sector is higher than the farm sector, and farm sector alone is not sufficient for sustaining livelihood. Thus, households are diversifying their portfolio between farm and non-farm sector. It has been found in the field surveyed village that the intensity of the multi-occupation is very high among

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the households. Diversification towards commercial crops within the farm sector in the recent period is seen as another strategy adopted by the household in the study villages to earn and secure their livelihood. There is a diversification from farm to non-farm sector and diversification within the farm sector towards high valued commercial crops. The decision to diversify towards non-farm sector or commercial crops are factor dependent such as education index, literacy index, network of household, illiteracy rate, and distance to nearby town's etc. Social network, distance to nearby town and education and per capita land holding plays a major role in the diversification towards non-farm regular salaried jobs, for non-farm casual labour household per capita land holding, working member, distance to nearby town and social networking are the factors that affects the decision making of a household to diversify. In non-farm self-employed category education, per capita land holding, social network and distance to nearby towns are the factors that influence the decision making of a household to diversify. In the crop diversification, households have diversified mostly in both LCIC and HCIC which is also categorised as mixed cropping. Per capita land holding, household monthly income, education distance and networking of the household plays a major role in influencing the household to diversify.

Majority of the non-farm jobs are informal in nature. Education is one of the important barriers to enter into the formal non-farm job. Though agricultural income is not sufficient most of the households are engaged, it may be because of village norms or stigma and also one major reason could be the emergence of multi occupation where rural households have diversified to multiple occupation as part of their livelihood strategy. The government should focus on formalizing and exploring non-farm opportunities through various policies and schemes at grassroots level and also introduce various programmes to educate the farmers with sustainable and modern techniques of production in the cultivation of commercial crops. Government should by now start to explore market to disburse the output of the commercial crops specially those crops that has short durability but high market value like Yongchak (tree bean), ginger, cardamom etc and also for those crops that has gestation period with unstable market value like rubber . Priority should be given to improve the infrastructure development of the village with proper connectivity to nearby towns, which will encourage the non-farm sector as well as farm sector market to expand.

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Table.1

Year	All India (in %)			All India Rural (in %)			Nagaland (in %)			Nagaland Rural(in %)		
	Farm	Non-farm	Total	Farm	Non-farm	Total	Farm	Non-farm	Total	Farm	Non-farm	Total
1993-94	56.82	43.18	100	73.44	26.56	100	46.62	53.38	100	62.2	37.8	100
2004-05	50.27	49.73	100	66.51	33.49	100	44.84	55.16	100	62.33	37.67	100
2009-10	46.44	53.56	100	62.62	37.38	100	47.91	52.09	100	62.19	37.81	100
2011-12	43.03	56.97	100	59.22	40.78	100	42.85	57.15	100	61.5	38.5	100

Source: Authors' calculation from unit level data of employment and unemployment survey of NSSO

Table.2   Occupational Distribution of Households in Rural Nagaland

Household Type	No of Household	Share of Household (%)
Farm HH	54	27
Regular Non-Farm	73	36.5
Casual Labour in Non-Farm	12	6
Self-employed in Non-Farm	61	30.5
Total	200	100

Source: Author's calculation from field survey

Note: Distribution is based on the first/primary occupation of the household (major source of income).

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Table.5   Multinomial Logit regression result

```
Multinomial logistic regression                    Number of obs   =        197
                                                   LR chi2(21)     =      97.59
                                                   Prob > chi2     =     0.0000
Log likelihood = -197.68761                        Pseudo R2       =     0.1980

       first_occupation1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]

1                        |  (base outcome)

2                        |
          percapitaland  |   .040233   .0210899     1.91   0.056    -.0011024    .0815684
         education_index |   .2098292   .1358798     1.54   0.123    -.0564903    .4761486
         illiteracy_index| -.2352624   1.600527    -0.15   0.883    -3.372238    2.901713
  modified_workingmember |   .4109736   .2169626     1.89   0.058    -.0142653    .8362125
                         |
            distance_town|
                       2 |  -.6017841   .6281003    -0.96   0.338    -1.832838    .6292699
                       3 |  -2.954663    .683361    -4.32   0.000    -4.294026     -1.6153
                         |
       1.social_network1 |   2.061593   .5700187     3.62   0.000     .9443768    3.178809
                   _cons |   -3.49818   1.585003    -2.21   0.027    -6.604728    -.391632

3                        |
          percapitaland  |   .1154687   .0465795     2.48   0.013     .0241746    .2067629
         education_index | -.013851   .1938462    -0.07   0.943    -.3937826    .3660806
         illiteracy_index|  .8524924   2.035181     0.42   0.675    -3.136388    4.841373
  modified_workingmember |   .0025687   .4045164     0.01   0.995    -.7902689    .7954064
                         |
            distance_town|
                       2 |  -2.387926   .9452869    -2.53   0.012    -4.240654   -.5351976
                       3 |  -25.08639   809.3782    -0.03   0.975    -1611.439    1561.266
                         |
       1.social_network1 |   2.204163   .9558545     2.31   0.021     .3307228    4.077603
                   _cons |  -1.293299   2.183666    -0.59   0.554    -5.573205    2.986608

4                        |
          percapitaland  |   .0357664   .0214183     1.67   0.095    -.0062126    .0777455
         education_index |   .0218502   .1410746     0.15   0.877    -.2546508    .2983513
         illiteracy_index|  .9088473    1.52694     0.60   0.552    -2.083899    3.901594
  modified_workingmember | -.0523088   .2358945    -0.22   0.825    -.5146536    .4100359
                         |
            distance_town|
                       2 |  -.6527631   .6514626    -1.00   0.316    -1.929606    .6240803
                       3 |  -2.542406   .6903665    -3.68   0.000      -3.8955   -1.189313
                         |
       1.social_network1 |   3.027235    .681527     4.44   0.000     1.691467    4.363004
                   _cons |  -1.319307   1.635548    -0.81   0.420    -4.524921    1.886308
```

Source: Authors' calculation from the field survey data

Table.6   Predicted probability to access to different occupation

Predicted Probability to access to different occupation					
	Farm	Regular Non-Farm	Casual Non-farm	Self-employed Non-Farm	
Distance from the Town					Total
VIllage1 (Smaller Distance)	6.76	41.81	19.98	31.45	100
Village2 (Medium Distance)	14.12	47.85	3.83	34.20	100
Village3 (Larger Distance)	59.24	19.08	0.00	21.68	100
Social networking					
Yes	14.35	42.88	0.02	42.76	100
No	65.58	24.94	0.01	9.47	100
Education					
Illiterate	0.00	0.00	0.00	100.00	100
10th Standard	24.86	40.68	0.01	34.44	100
12th Standard	24.98	38.67	0.01	36.35	100
Graduate and Above	5.07	71.78	0.00	23.15	100
Diploma	0.00	42.61	0.00	57.39	100

Source: Authors' calculation from the field survey data

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Table.7   Distribution of household in different crops

Classification of household	No of Household	Share of Household
HCIC	28	14
LCIC	41	20.5
MC	106	53
Not-engaged	25	12.5
Total	200	100

Source: Authors' calculation from the field survey data

Table.8   predicted probability to cultivate different crops

Predicted Probability to cultivate different Crops					
	HCIC	LCIC	MC	Not cultivating any crop	
Distance from the Town					Total
VIllage1 (Smaller Distance)	12.99	18.33	55.90	12.78	100
Village2 (Medium Distance)	11.08	21.45	59.63	7.84	100
Village3 (Larger Distance)	8.71	19.62	51.97	19.70	100
Networking					
Yes	12.29	27.00	38.17	22.54	100
No	10.43	18.44	60.94	10.19	100
Education					
Illiterate	21.64	5.06	65.80	7.50	100
10th Standard	15.03	17.33	55.35	12.29	100
12th Standard	13.52	21.44	51.89	13.15	100
Graduate and Above	11.23	28.67	45.92	14.17	100
Diploma	10.48	31.34	43.76	14.42	100
Household Type					
Farm	15.04	13.09	68.94	2.93	100
Non-farm	10.48	29.42	46.03	14.07	100
Mixed	9.45	16.24	58.17	16.14	100

Source: Authors' calculation from the field survey data

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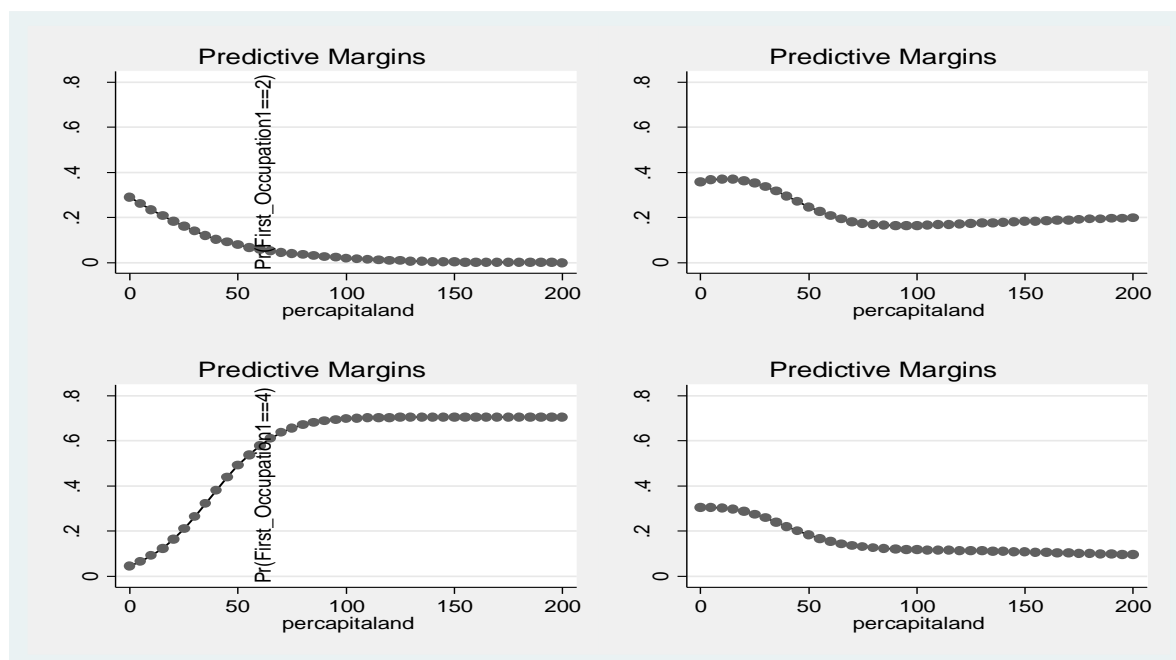11-13 January 2017 Bangkok, Thailand

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Figure.1   Predicted Probability of unit change in the per capita land holding
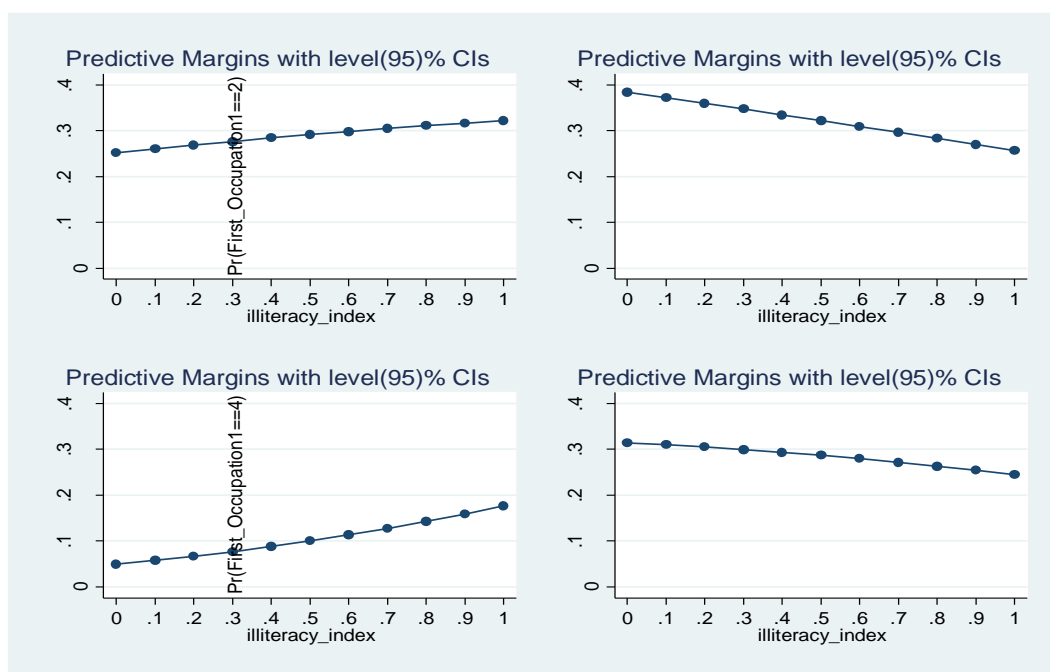
Source: Authors' calculation from the field survey data

Figure.2   Predicted Probability of Illiteracy Index

Source: Authors' calculation from the field survey data

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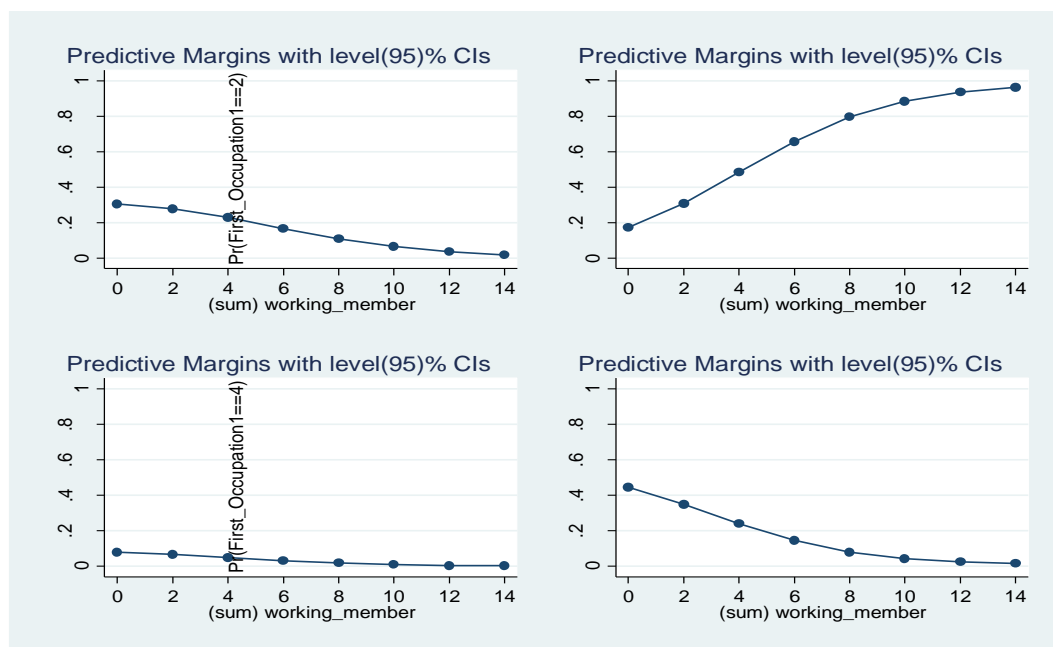11-13 January 2017 Bangkok, Thailand

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Figure.3   Predicted Probability of Working Member
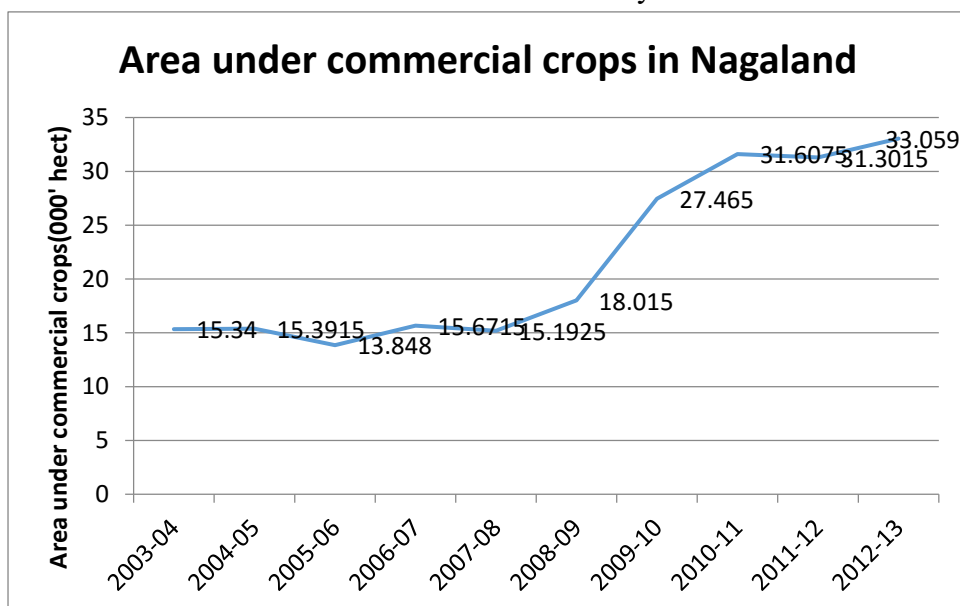
Source: Authors' calculation from the field survey data

Figure.4   Area under commercial crops in Nagaland

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India

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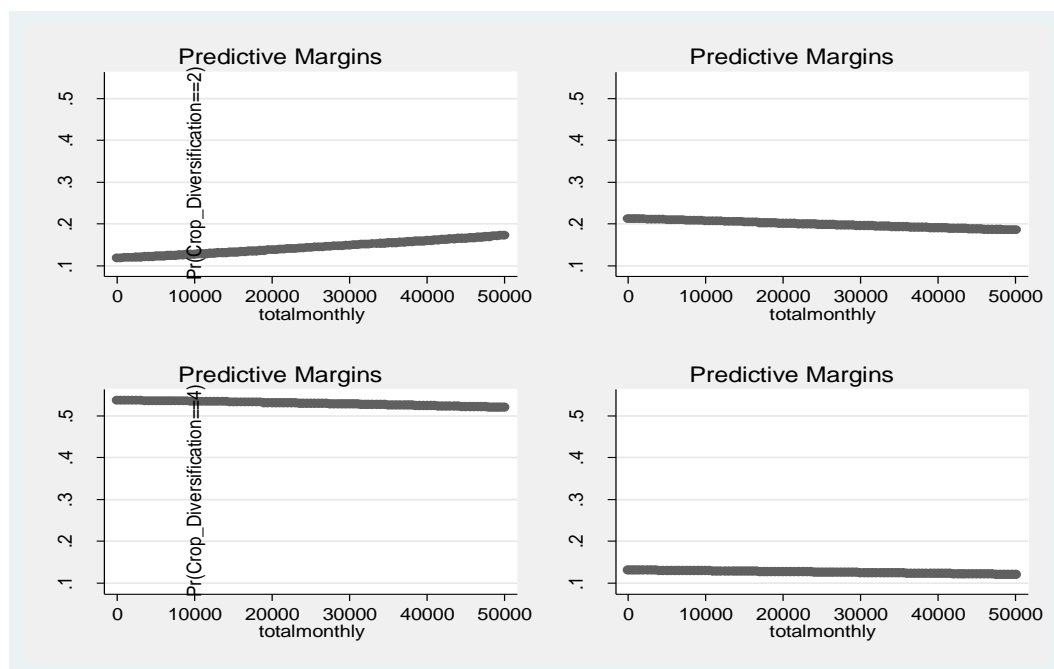11-13 January 2017 Bangkok, Thailand

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Figure.5 Predicted Probability of Household Monthly income
Sources: Authors' calculation from the field survey data

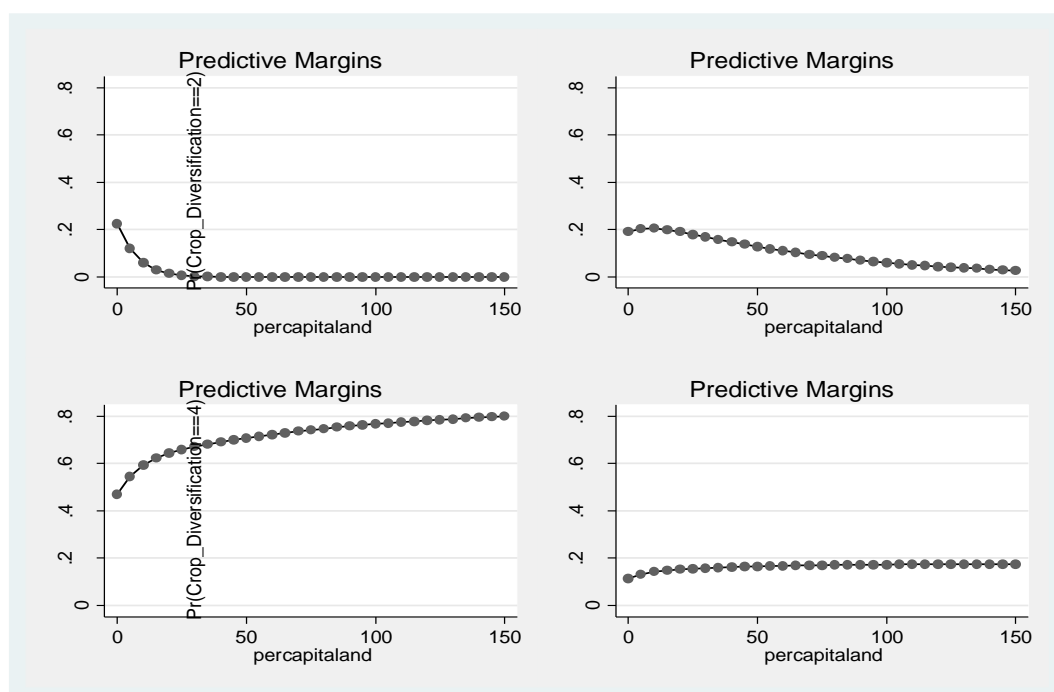Figure.6 Predicted probability of per capita land holding
Source: Authors' calculation from the field survey data

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Appendix

Table 3   Variable Table of household diversification from farm to non-farm sectors.

Name of the Variable	Explanation of the variable
Household type	This is the dependent variable in the model and it's a qualitative (response) variable. It contains the value 1, 2, 3 and 4. If the household is in the Farm sector the value assign to the household is 1. If the household is in the Regular Non-farm sector the value assign to the household is 2. Similarly for Casual Non-farm and Self-employed in Non-farm sector are assigned the value of 3 and 4 respectively.
Educational Index	A household educational index has been created by taking the highest educational qualification of the member of the household. It is hypothesized that an increase in the education level of the household, increases the chance of entering into the non-farm sector.
Illiteracy Index	It is the ratio of number of illiterate member to the literate member of a household. The range of the variable is 0 to 1. Moving towards 1 indicates higher illiteracy of a household. So it is expected that with a higher illiteracy index a household has less chance of entering into the non-farm sector.
Per capita Land holding	The large is the per-capita land holding the higher is the incentive to enter into the non-farm sector in a sense that, the capability of investment is high for a large landowner as compare to the small landowning household. Per capita land holding is defined as Acer per working member of the household.
No of working member	The number of working member (size of the working member) has a positive relation with the decision of the household to be in the non-farm sector. Some household member can move outside the farm sector if the size of the working population is high.
Distance from the town	The larger the distance of the village from the town, the lesser is the chance of getting into the non-farm sector because of the increasing transaction and other cost of the household. This is also a dummy variable containing the numbers 1, 2 and 3. E.g., Household in the village 3 has the highest distance to the nearby town. So the weight given to those households is 3 stating the highest distance.
Social Networking	The literatures on migration in India have recognized the role of networking. There is positive association between social network and the decision of the household to migrate. So it is expected that as networking facilitates migration decision of the household, there will be a positive association between networking and the decision of the household to diversify to non-farm sector.

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Table 4   Correlation Matrix.

```
                 educat~x illite~x percap~d modifi~r distan~n social~1
              ─────────────────────────────────────────────────────────
education_~x     1.0000
illiteracy~x    -0.4798*  1.0000
percapital~d    -0.0843  -0.0192   1.0000
modified_w~r     0.4173* -0.0594  -0.1467*  1.0000
distance_t~n    -0.1192  -0.0918   0.2331* -0.0481   1.0000
social_net~1     0.1951* -0.2088* -0.0510   0.1130   0.0484   1.0000
```

Source: Authors' calculation from the field survey data

Table 8   Variables table for crop diversification

Name of the Variable	Explanation of the variable
Household type	This is the dependent variable in the model and it's a qualitative (response) variable. It contains the value 1, 2, 3 and 4. If the household is in the Farm sector the value assign to the household is 1. If the household is in the Regular Non-farm sector the value assign to the household is 2. Similarly for Casual Non-farm and Self-employed in Non-farm sector are assigned the value of 3 and 4 respectively.
Educational Index	A household educational index has been created by taking the highest educational qualification of the member of the household. It is hypothesized that an increase in the education level of the household, increases the chance of entering into the non-farm sector.
Illiteracy Index	It is the ratio of number of illiterate member to the literate member of a household. The range of the variable is 0 to 1. Moving towards 1 indicates higher illiteracy of a household. So it is expected that with a higher illiteracy index a household has less chance of entering into the non-farm sector.
Per capita Land holding	The large is the per-capita land holding the higher is the incentive to enter into the non-farm sector in a sense that, the capability of investment is high for a large landowner as compare to the small landowning household. Per capita land holding is defined as Acer per working member of the household.
No of working member	The number of working member (size of the working member) has a positive relation with the decision of the household to be in the non-farm sector. Some household member can move outside the farm sector if the size of the working population is high.
Distance from the town	The larger the distance of the village from the town, the lesser is the chance of getting into the non-farm sector because of the increasing transaction and other cost of the household. This is also a dummy variable containing the numbers 1, 2 and 3. E.g., Household in the village 3 has the highest distance to the nearby town. So the weight given to those households is 3 stating the highest distance.
Social Networking	Networking plays an important role in crop diversification in two ways: one by affecting the quantity sell of the output through marketing channel of the households. Secondly by reducing the transaction cost of producing HCIC through minimising the information asymmetry.
Monthly income of Household	As monthly income increases, the possibility of investment in HCIC increases.