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REVIEW ARTICLE

LIVELIHOOD DIVERSIFICATION, RURAL POVERTY AND INCOME INEQUALITY: A STUDY IN THE HILL REGIONS OF DARJEELING DISTRICT IN WEST BENGAL

***Sita Lama and Pravat Kumar Kuri**

Department of Economics, University of Burdwan, West Bengal

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ABSTRACT

Although Agriculture plays an important role in rural livelihood, agriculture on its own is increasingly unable to provide a sufficient means of survival in rural areas. Of late, there has been a built in bias in the choice of economic activities towards non-farm sectors. Livelihood diversification towards non-farm sector is associated with greater income opportunities and reduction in rural poverty. This paper has attempted to explore the nature and pattern of livelihood diversification in Darjeeling district of West Bengal. Based on a field survey in Darjeeling district of West Bengal, this paper intended to look at the degree of livelihood diversification and its impact on the extent of poverty and inequality of income distribution. Further, examined the determinants of employment diversification and explored the nexus between poverty, inequality and employment diversification in the district. Interestingly, the relationship between diversification index and the level of household per capita income depicted an inverse U-shaped curve indicating that at lower level of income, the diversification index increased with the level of income, reached maximum at medium level and then fell down as income increased further. The results also showed that there was a significant variation in average diversification across villages and among APL and BPL categories of households in the study area.

INTRODUCTION

The Himalayan region of Darjeeling district which is located in the extreme northern part of west Bengal comprises of three hill sub-divisions namely-Darjeeling Sadar, Kurseong, and Kalimpong and one plain sub-division namely Siliguri is mainly characterized by the Tarai and foothills of the district. The population of the district stands at 1.8 million in 2011 out of which 50.75 percent are male and 49.25 percent are female. The population density of the district is 586 per square kilometre (Census of India, 2011). Tea and Tourism are the two significant economic activities in the region, generating the most of the employment and revenue in the area. Resting on the lap of Kanchanjunga and Tiger Hill, tourism is the most promising industry which is growing and prospering with time. However, tourism is basically a seasonal activity and the economic benefits of tourism reach to only a few portion of urban and semi-urban population. According to West Bengal Census (2001), only 29.76 percent of workers in the Darjeeling district were main worker and the non-workers made up nearly 65 percent. During same period of time, the farm sector contributed only 21 percent of the total employment in the district, whereas, the non-farm sector shared a huge proportion of nearly 79 percent of male and 78 percent of female workers against the state average level of 60 % and 67% for male and female respectively in 2001. There exists a huge scope for enhancing non-farm employment in Darjeeling district as compared to the other districts of the state. The extent of increase in non-farm employment is also found to be significant in the district. The share of the non-farm employment which was nearly 60 percent in 1981 rose to almost 79 percent in just two decades time which indicates a continuous rising trend of the non-farm employment in the region. Non-farm sector generates diverse employment opportunities in rural areas and helps in reducing poverty level. Thus, livelihood diversification is assumed to have its influence in poverty reduction and rural development in the district. The district's overall per capita income stands at Rs. 18529.18 ranking second highest among all districts in West Bengal next to Kolkata. The district also ranks second in terms of per capita district domestic product and the rural monthly per capita consumption stands at Rs 465.42 in 2000-01. Further, the rural poverty ratio is recorded to be 19.66 percent only during same period (WBHDR, 2004-05). All these records indicate that the Darjeeling district performs quite well in terms of many development indicators like HDI, GDI, literacy rate, etc. All these indices pertain to the district as a whole. However, if we look at the development scenario of hill and plain regions separately then the state of affairs may

****Corresponding author: Sita Lama***
Department of Economics, University of Burdwan, West Bengal

appear to be little different in hill regions. Dearth of industries, factories, modern institute and higher academic institutions deprive the region from the mainstream development process. Moreover, small and cottage industries that have huge potentialities in the region are also lacking improvement. Subsistence agriculture, livestock, forestry, plantations and allied activities form the sizeable proportion of economic activities in the rural areas of the district. Agriculture with low marketed surplus does not prove to be reliable source of livelihood due to predominance of small and marginal landholdings. As a result, there has been a constant decline in the share of agricultural employment over time. There is very few employment choices left with the people. And those who are unable to find regular jobs either have to seek place in tourism sector or engage themselves as casual works in different capacities. Thus, the mountainous area of the district confronts a number of problems like poverty, wide inequality, unemployment, difficult landforms, small and marginal landholdings, landslides and even political instability to count few. The distinctive feature of the region, that separate it from the rest of the state and which has also lead to its backwardness in respect of socio-economic and infrastructural facilities, calls for a separate analysis of the development process whatsoever the region has undergone in recent time.

The emerging literature of peasant economies confirms that the rural people of developing countries are no longer confined to agriculture alone or any single source of livelihood but in fact combines a diverse portfolio of activities in order to survive and to improve their standard of living. Diversification of employment in a rural livelihood context means existence of different sources of income at a time. People diversify by adopting a range of activities which may include farm, non-farm, and off-farm activities. A household may diversify its economic activity due to involuntary and distress reasons like risk reduction, response to diminishing factor, population pressure, land fragmentation, reaction to crisis, high transaction cost, etc. On the other hand, factors like realization of strategic complementarities between activities, such as crop-livestock integration, specialization according to comparative advantage accorded by superior technologies, skills or endowments, etc. are the voluntary and proactive reasons that drive the household towards diversification (Chambers, 1989; Davis, 2003; Berret, *et al*., 2001).

Under this backdrop, based on a primary survey, this paper intends to study the nature and extent of employment diversification in Darjeeling district of West Bengal. It delves to examine the determinants of employment diversification and seeks to explore the nexus among poverty, inequality and employment diversification in the district. And finally it attempts to look into the variation in livelihood diversification across village types and economic status of the households. For the sake of convenience, the paper is divided into seven sections. After introduction, second section deals with data sources and survey methods. The third section examines the socio-economic features of the sample households, fourth section looks into the livelihood diversification behaviour by constructing a diversification index, the fifth section studies the poverty and inequality status and its relation with diversification in the study region, determinants of livelihood diversification are discussed in the sixth section. The seventh section checks for the effects of village characteristics and economic status on livelihood diversification with the help of ANOVA analysis and finally the eighth and last section gives conclusion.

Data Source and Survey methods

Be it agro-climatic condition, geographical features and socio-economic status or cultural aspect, the Hilly regions of Darjeeling district display a totally different features from the rest of West Bengal. Therefore, it becomes crucial to look into the diverse pattern of livelihood structure and the pattern and forces behind trends of diversification in this region. The study was conducted in the Himalayan regions of Darjeeling district of West Bengal during 2012-13. The analysis is exclusively based upon primary data collected from the survey; however, some secondary data has also been consulted for the study. According to the intensity of non-farm employment in three sub-divisions of the Darjeeling Districts, we have taken two sub-divisions, Darjeeling Sadar (where the intensity of non-farm employment is less than the district average) and Kurseong (where the intensity of non-farm employment is higher than district average) which recorded 73.33 percent and 82.19 percent share of non-farm employment respectively in 2007 (Darjeeling District Statistical Handbook, 2007).

Darjeeling as a whole accounted for much higher share of non-farm employment of around 78 percent than the state's average of 63 percent. A multi-stage random sampling technique has been followed. In the first stage, two sub-divisions namely Kurseong and Darjeeling were purposively selected for the study. In the next stage, from each sub-division one block has been selected on the basis of the intensity of the prevalence of non-farm activities. Subsequently, from each block one advanced village and two backward villages have been chosen. The selection of advanced and backward villages was guided by the available socio-economic indicators at the block level. Thus from two blocks altogether six villages have been selected namely Batasia (advanced village), Sidaline and Nayabasty (backward villages)form Sukhia-pokhari block of Darjeeling sub-division and Prasanti gram (advanced village), Bagora and Chatakpur (backward villages) are choosen from Kurseong-I block of Kurseong sub-division. Once the villages are selected the sample households have been chosen using the technique of random sampling to make up a total sample of 302 households.

A well structured questionnaire was framed and used as survey instrument. Information was collected on the household socio-economic conditions, livelihood activities and income sources, food and non-food expenditures, etc. Data are analysed using suitable statistical tools. Descriptive analysis, Tabular, and diagrammatic representations are used for investigating socio-economic features of sample households and their diverse income sources. Diversification index is measured with the help of Simpson Index of Diversification (SID). Prevalence and severity of poverty in the study villages are captured using Head Count Ration (P_o), Poverty Gap (P_1) and Square Poverty Gap (P_2). A simple measure is adopted for measuring inequality in income distribution across quintile groups.

Further, determinants of livelihood diversification are identified using a household model based on multiple regression analysis. And finally, variation in diversification across types of villages and economic status of the household is examined with the help of two-ways ANOVA with replication.

Socio-Economic Features of the sampled households

Table 1 gives the descriptive statistics of our sample households. It is found that our average sample household head is a male of about 52 years of age and has seven years of formal education. He has an average family size of about 5 people with at least two dependents. He earns an average monthly income of around Rs. 7543 per month. Our average sample household has access to about 0.71 bigha of land and has at least two livelihood activities in the nature of principal economic activity. On an average, our sample household per capita monthly income is around Rs.3486 and so our average sample household is non-poor.

The socio-economic features of the sample villages for advanced and backward villages separately are given in table 2. It is seen that the average size of family is more or less equal is both villages. It is slightly higher in backward village (4.70) than that in advanced villages (4.48). The average literacy rate is found to be quite higher in advanced villages (93.08 percent) than in the backward villages (84.67 percent). However, it needs to be mentioned here that though the overall literacy rate is found much higher in the sample villages and is much higher than the states' average but the overall mean year of schooling of the sample households as depicted in the table 1 is found to be quite low at 8 years, indicating that on an average the individuals in our sample are educated up to eight years of schooling only. Regarding the structure of occupation, workers are basically concentrated more in tertiary sector and the share of tertiary sector is much higher in the advanced villages (70.50) than that in backward villages (60.99). On the other hand, the share of primary sector is higher in backward villages.

Table 1. Descriptive statistics on socio-economic features of household (n=302)

	N	Minimum	Maximum	Mean	Standard Deviation
Age of head	302	24	87	52.12	12.578
Sex of head	302	1	2	1.83	.372
Household average yr. of school	302	1.66	1.62	8.66	2.85
Family Size	302	2	14	4.71	1.845
No. of Dependents	302	0	10	2.28	1.458
Land (in Bigha)	302	0	8	.71	1.220
No. of Livelihood Activities (PEA)	302	1	6	2.17	.958
Monthly income of head	302	0	46000	7543.32	732.96
P.C. total monthly income of family	302	100	11700	3486.13	2189.17
P.C. food expenditure	302	100	12000	1202.63	824.013
Valid N (listwise)	302				

Table 2. Some socio-economic characteristics by types of villages

	Villages	No. of HH	Average Family size	Literacy rate	Sex Ratio*	Occupations (in %) PEA		
						Primary	Secondary	Tertiary
Advanced villages	Prashanti Gram	51	4.25	92.45	104.67	24.73	21.50	53.76
	Shivgram	71	4.71	93.71	91.30	7.025	5.70	87.25
Total		122	4.48	93.08	97.98	15.87	13.6	70.50
Backward villages	Sidaline	54	4.48	85.46	90.55	26.59	14.89	58.51
	Chatakpur	46	4.93	91.40	100.88	10.22	19.31	70.45
	Nayabusty	35	4.8	72.57	109.75	35.61	9.58	54.79
	Bagora	45	4.6	89.17	99.04	25	14.77	60.22
Total		180	4.70	84.67	100.05	24.35	14.63	60.99

HH – household, PEA – Principal Economic Activities.
Note* sex ratio is defined as number of male per 100 female.

Table 3. Frequency distribution and diagnostic statistics of the income sources of household head generated from the livelihood activities

Livelihood activities	Frequency	%	Minimum Income (in Rs.)	Maximum Income (in Rs.)	Mean income (in Rs.)	Std.Dev.
Agriculture	42	13.9	250	8000	1741.00	1738.077
Construction	23	7.6	833	18000	4847.87	4774.015
Manufacturing	18	5.9	2000	18000	5451.33	4464.391
Electricity	7	2.3	3000	12000	6428.57	2760.262
Business	30	9.9	3000	25000	8425.00	6174.597
Communication	6	1.9	4000	12000	5833.33	3060.501
Service	59	19.5	1200	46000	15662.29	10818.40
Tourism	29	9.6	1666	26250	6147.86	4695.841
Other services	10	3.31	1000	8000	4450.00	1950.071
Pensions	48	15.89	400	20000	9079.33	4269.022

Remaining 30 HH heads are unemployed

It is only 15.8 percent of workers that are engaged in primary sector in advanced villages whereas in backward villages around one-fourth of the workers are in primary sector. And the share of secondary sector is also recorded slightly higher proportion in backward villages (14.64) than in advanced villages (13.6). Table 3 shows the frequency distribution and other diagnostic statistics of livelihood activities of household head and income earned from them per month. It is found that out total 302 households; almost 78 (25.79 percent) households head were not engaged in any kind of livelihood activity. Out of them, 48 household heads accounting for 15.89 per cent of total has the provision of pensions. Pension is one of the major sources of income of household heads in the study area which generates second highest mean income annually. The remaining 224 heads were engaged in different activities like construction, services, manufacturing, business, tourism, electricity, communications, and other services apart from agriculture. The table reveals that service is the most favoured activities of the household heads accounting for about 19.5% and generating a highest mean income in a year. Income from business is the second highest after pensions, followed by tourism, electricity manufacturing, and communications. On the other hand, agriculture yielded the lowest annual income and is pursued by nearly 14 per cent of total household head.

Livelihood Diversification and Diversification Index among households in the study area

Empirical evidences suggests that in Africa non-farm sources of income accounts for as much as 40-45 % of average household income and seems to be growing in importance. In South Asia on average roughly 60% of rural income comes from non-farm income. Using NCAER data, Lanjouw and Shariff in 2004 estimated that around one-third of rural income is derived from the non-farm sectors in India. Bhaumik (2007) in the study of two districts of West Bengal found that the share of non-farm sector is much higher in the agriculturally advanced villages than the agriculturally backward villages and that the share of non-farm income in total income declined with rise in farm holding. Figure 1 presents the diverse sources of livelihood of our study region in the form of pie chart. The figure depicts that the overall livelihood of the study area are composed of tourism sector, service sector, business, pensions, remittances, farm sector, livestock and others which includes construction, manufacturing, and water electricity and gas.

The livelihood structure in the advanced villages depicts that service sector is one of the major source of income for the people which accounts for 34 percent of total income in the region. Tourism sector is the second highest source of income followed by business, pension, others, and remittances. Pension as another important source of income in the study regions accounting for 12 percent in advanced villages, where as agriculture accounts for only 2 percent as a source of livelihood and no one engages in livestock rearing in the advanced villages of the study area. In the backward villages, tourism sector is the major source of income for around 38 percent of working population whereas service sector occupies second position as source of income accounting for 27 percent, followed by business with 11 percent and remittance and others which account for 8 percent. In contrast, pension makes up only 4 percent of total income in backward villages and a meagre 1 percent of the total income accrue from livestock rearing and 2 percent from agricultural pursuit. The tourism (specially, the transport activities in tourism sector) is found to be the major source of livelihood in the backward villages. Since, such types of occupation do not require huge capital investment in terms of high educational qualification or skill and capital assets; people find it easy to get absorbed in the tourism sector. And therefore tourism sector has been found as an important employment generating sector in the study area especially for those workers who are unable to find work in other sectors due to different barriers to entry.

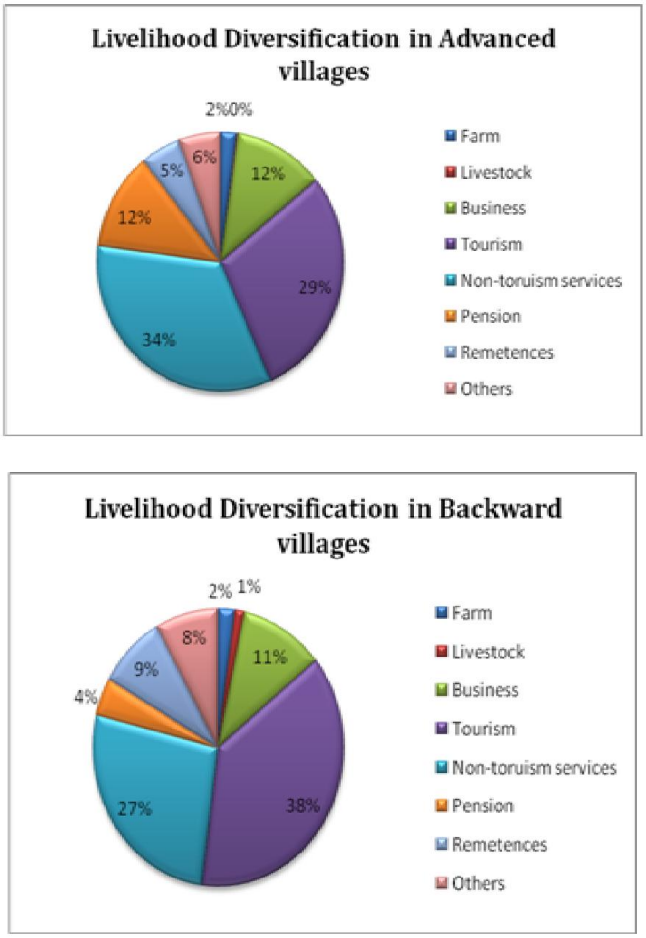

Figure 1. Household's diverse sources of income

Diversification Index

We have intended to measure the level of employment diversification and the nature of its variation in the advanced and backward villages. In this context, the Simpson index of diversity (SID) is used to construct diversification index because it is easy to compute, robust and has wider application. The index is constructed for both advanced villages and backward villages separately to look at the diversification behaviour of villages with different development levels. The Simpson index of diversity is defined as:

$$SID = 1 - \sum_{i=1}^{n} P_i^2 \quad \ldots (1)$$

Where, n is the total number of income sources and P_i represents income proportion of the i-th source of income. The value of SID always lies between 0 and 1. If there is only one source of income, P_i =1, so SID =0. So the value of index is 0 when there is complete specialisation and approaches 1 as the level of diversification increases. Diversification may be taken to mean multiple income sources. The Simpson index of diversification is widely used to measure the extent of diversification. It relates to the number of sources of income and balance among them. Table 4 presents the distribution of diversification index among advanced and backward villages in the study region. The table depicts that majority of household in the advanced villages fall in the category of low diversifier index which account for 43.44 percent. Whereas in backward villages, only 36.11 percent of household has low diversification index, 20 percent of the households experiences a high diversification index in the backward villages as compared to 15 percent in advanced villages. Medium level of diversification index accounted for 40.98 percent and 43.88 percent in advanced and backward villages respectively. Overall, the average livelihood diversification index of household in advanced villages is estimated at 0.378 and that in backward villages it is 0.415. Which implies that on an average, the advanced villages are low diversifiers where as backward villages are medium diversifiers in our study area.

Poverty, Inequality and Livelihood Diversification

Poverty is a phenomenon and a state of being deprived from the basic necessity of life. Poverty is a condition where one cannot generate sufficient income for sustenance of life. Lack of assets, skills, education and good health are some of the common features shared by poor people.

Table 4. Distribution of diversification index among advanced and backward villages

Diversification Index	Advanced Villages		Backward Villages	
	No. of Household	Percentage	No. of Household	Percentage
Low (upto 0.38)	53	43.44	65	36.11
Medium (0.38 -0.63)	50	40.98	79	43.88
High (above 0.63)	19	15.57	36	20
Total	122	100	180	100
Average Index		0.378		0.415

In rural context, landlessness and low human capital are highly accurate indicators of poverty. Poverty is a multi-dimensional phenomenon and various measures have been evolved to measure the level of poverty. However, one of the most preferred and frequently used measures for distinguishing poor from non-poor is per capita consumption. Per capita food consumption that allows the individual to satisfy their minimum required nutrition in calorie constitutes a poverty line. There are several measures of capturing the prevalence and severity of poverty. The most common and widely used measures are the headcount index (P_o), the poverty-gap index (P_1), and the poverty severity index (P_2). These are often referred to as the prevalence, depth and severity measures of poverty respectively. The headcount index is the most frequently used measure of poverty it represents the proportion of the population living below the poverty line. The poverty gap index measures the amount of money required to raise the income of a poor person to the level of the poverty line. The poverty gap is interpreted as measuring the depth of poverty. The defect of poverty gap index and head count index is that these indices fail to capture variations in income distribution amongst the poor. The poverty severity index takes this into account and also measures the consumption shortfall of the poor[1]. We have used per capita monthly food consumption as a tool for distinguishing poor from the non-poor. Since the study villages are semi- rural areas, poverty line for the study area is Rs. 736.9 per month which is estimated by averaging the rural and urban poverty line for West Bengal as given by Planning Commission in 2009-10. The three indices of poverty namely poverty incidence or headcount index (P_0), poverty gap index (P_1) and severity of poverty (P_2) is estimated for both advanced and backward villages in the study area. The values of all these indices are presented in table 5.

The value of headcount index estimated for the study area as a whole is 0.165 implying that the proportion of the household whose per capita food expenditure fell below the poverty line is 16.5 per cent. The respective poverty ratio for advanced and backward villages is 12 per cent and 20 per cent. Thus, a higher percentage of household are found below poverty line in backward villages as compared to advanced villages in our study area, though the severity is not much high in either of these villages. The overall computed value of poverty gap index is 0.04 and the severity of poverty index has a value 0.0151 which implies that severity of poverty in the study area is only 1.5 per cent. The squared poverty gap index takes into account not only the distance separating poor from the poverty line, but also the inequality among the poor. One reason why poverty is low in the Himalayan region of the district may be because of the fact that the people in this region has reached certain point of equilibrium in the sense that majority of household have at least one member in the service sector which assures them a fixed income at the end of the day and others who are not in service sector, have been able to find some mixed and alternative sources for survival though low in productivity. Moreover, the majority of households in the study area are in a reasonable level of diversification index which has provided them a kind of safety-net from falling back into the poverty. And other reasons for low poverty in the study area are low family size of the sample households, lower dependency ratio, and larger number of livelihood activities. Thus, it is found that around 16.5 percent of the sample households are below poverty line and the poverty does not appear to be very sever among them but there exists a high inequality in the distribution of income among sample households as depicted by table 6. Inequality is not the same as poverty.

[1] Reference Lipton and Ravallion (1995); and Awotide, O. D. (2010).

Table 5. Poverty measures for rural household in Darjeeling District (n=302.)

Poverty Measures	Advanced villages	Backward villages	All villages
Head Count Ratio (P_0)	0.119	0.202	0.165
Poverty Gap (P_1)	0.035	0.044	0.040
Square Poverty Gap (P_2)	0.0147	0.0155	0.0151
	Poverty line = 736.9		

Source: Author's calculation, 2013.

Many empirical studies of developed countries suggest that a highly unequal income distribution may co-exist with relatively low level of poverty. And in many developing countries, high level of income inequality and high incidence of poverty may often exist side by side. The diversification of livelihood leads to poverty reduction does not ensure reduction of income inequality in rural areas. The observation on this issue in particular has been very mixed. There are basically two opposing arguments regarding the effects of diversification on income distribution. The first opinion argues that diversification has a broadly equalising effect on rural incomes (Hazell and Haggblade, 1993) and this is because diversification raises the incomes of the poor relative to the rich. The second argument states that diversification has a de-equalising effect on rural income. It aggravates rural inequality. This view suggests that the better off households by virtue of their wealth are able to diversify to more lucrative non-farm activities than the poor. Whereas, the poor is excluded from the highly remunerative activities because they suffer from lack of assets, skill and educational constraints. Reardon *et al*. (2000) while studying a wide range of empirical studies across developing countries in the 1980's and 1990's, found support to both of the above hypothesises, on the other hand, few studies yielded a contrast result that showed a U-shaped relationship between non-farm share and level of income.

Indicating a relatively higher share of non-farm income for poor households, declines in middle income level and again rises at the higher end of income level. However, it was noted that the poor may spend large share of time on non-farm employment, but the absolute level of income obtained by them remained low. Bhaumik (2007) found that farm incomes are more unequally distributed in the advanced region and concluded that non-farm sector is not universally inequality enhancing. We have used the simple measure of describing income distribution under which we have divided total income into quintiles (fifths), with households ordered from lowest to highest income and then divided into five groups of equal size. The income within each group is summed, and its share of total household income is calculated. Each quintile will account for 20% of total income if aggregate income is equally distributed across households. However, if the quintiles group falls short of or exceeds its proportionate (20%) share then it will indicate the degree of inequality in the income distribution. Table 6 highlights the unequal income distribution by various quintile groups in the study area. The table shows that the bottom one-fifth of the population has an average per capita income of Rs.1193.6 per month and obtains only 6.9 per cent of the total income. Indicating that the bottom one-fifth of households accounted for much less than the equal distribution proportion of 20 % of total income. On the contrary, the upper one-fifth of the population has an average per capita monthly income of Rs. 7006 which accounts for 39.92 per cent of total income. This implies that the top 20% of the population enjoy almost twice of its share in income than what it would get in equal distribution.

Table 6. Per capita monthly Income distribution by various quintile groups in the Sample Households

Quintile	Avg. per capita monthly income (Rs.)	Share in total Income	Avg. diversification Index
Lowest	1193.6	6.9	0.39
Q2	2062.4	11.94	0.41
Q3	3023	17.23	0.42
Q4	4208	23.98	0.40
Highest	7006	39.92	0.38
Total	3486.35	100	0.397

Similarly, the 2nd, 3rd and 4th quintile group has an average monthly per capita income of Rs.2062, Rs.3023 and Rs. 4208 and enjoy respectively 11.94 percent, 17.23 percent and 23.98 percent of total income. The income ratio between the top and bottom quintile groups is found to be 5.86. This indicates that income was quite unequally distributed across sample households. The figures in the last column of the table show the average diversification index for each quintile groups. It indicates that in an unequally distributed income scenario where the lower income group share less than 7 percent of total income, their average diversification index also remained low at around 0.39. At a little higher level of income, it increases and reaches the peak level for the middle income quintile. However, as the income rises further (for the people in the upper level of income) the diversification index falls and touches the minimum level for the top most quintile group.

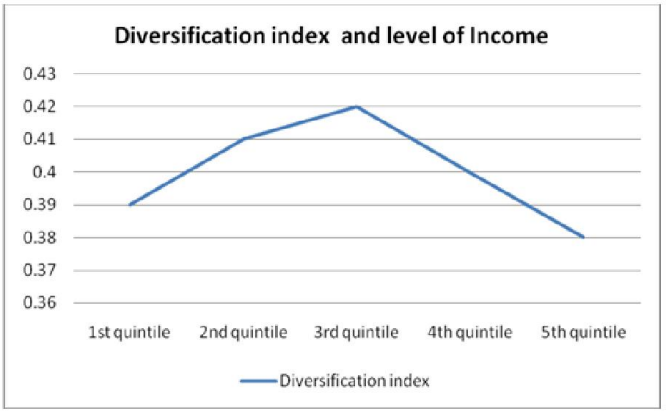

Figure 2. The relationship between Diversification index and level of income

In other words, the diversification index is found to rise initially with the rise in income level for the people in the lowest three quintile groups, but as the income level gets higher, diversification index tends to fall for the people in the higher and top quintile groups. The basic argument for finding low livelihood diversification for low income group as well as high income is that though low income from current and main source compels the workers to find various other alternative sources, but people in low income group are characterised by

low assets and human capital thus they face many barriers to entry to access non-farm jobs and thus they land up with low diversification and low income while the people belonging to high income level are those with comparatively high human skill and capital and thus they have access to lucrative high productive non-farm activities which demands specialisation rather than diversification. Thus, our result exhibits an inverted U-shaped relationship between diversification and the income level of people in the study area. This is shown in figure 2 below.

Determinants of Livelihood Diversification

In this section we examine the effect of different socio-economic characteristics of household on its degree of diversification. It has been hypothesised that the livelihood diversification index is a function of different household characteristics like age, sex, education, family size, dependency ratio, number of livelihood activities, land ownership and income of household head. In the rural areas, most of the important decisions on employment, consumption and expenditure are taken by household head. Therefore, some individual characteristics of household head are considered like age and sex of household head, and their level of income. We have used linear multiple regression to see the relationship between household characteristics and the degree of diversification among sample households for three categories of villages separately viz. Advanced villages, Medium villages and Backward villages (we have divided the backward villages further into Medium and Backward villages according to their socio-economic features).

Table 7. Description of variables used in regression analysis

Dependent variable: SID = Index of livelihood diversification			
Independent Variables		Descriptions	Expected Sign
x_1	AGE SEX	Household head's age in years. Whether household head is male	-ve
x_2	AVGSCH	Average year of schooling in household	-ve
x_3	FAMSIZE	Total number of family members	+ve
x_4	DEPRATIO	Percentage of household members below 18 or and above 65 years	-ve
x_5	INCHEAD	Monthly income of household head	-ve
x_6	AGYIELD	Total agricultural yield in a year	-ve
x_7	ASSET	Estimated value of all physical assets owned by household	-ve
x_8	PCFDEXPD	Per capita monthly food expenditure of the household.	-ve
x_9	MIGRATION	Dummy, whether any member of the household is migrant or not	+ve
x_{10}	LOAN	Dummy, whether any member in the family has taken loan or not	+ve

It has been assumed that the households which are better endowed in terms of assets and human capital like education are those who prefer specialisation of economic activities that give better prospects rather than diversifying into different livelihood activities. As noted by Datta and Singh (2011), the people with low access to assets and devoid of any skill are likely to resort to wider diversification to supplement their subsistence level of earnings. Thus, it is assumed that household with low asset base and poor human capital like education may not be able to get access to lucrative non-farm jobs because of many entry barriers at work and thus they have to rely on different low productive non-farm activities to pull them throughout the year. The regression results facilitate the testing of the hypothesized relationship between our dependent and independent variables and their level of significance, the table 7 describes the our selected explanatory variables and dependent variable and the expected sign of the regression co-efficient of the multiple regression model.

Hypothesis

It is hypothesised that the diversification is a function of set of factors that includes individual, household, and village characteristics. Thus, in our model we have included variables like, age, sex, education, family size, dependency ratio, income of head, agricultural yields, assets, food expenditure and village dummy. Households with poor asset base are generally employed in low productive employment because of various barriers to entry that prevent their participation in highly remunerative jobs. Due to their low productivity and seasonal nature of work, the poor are more likely to look for different alternative sources of income to avoid the risk of income and consumption failure. Therefore, it is hypothesized that the poor household and people in less- advance villages tend to diversify to different livelihood activities than the non-poor households. Whereas, the well off households who by virtue of their assets, human capital and social contacts can easily get access to lucrative jobs in non-farm sectors and seeks specialization rather than diversification.

Regression Results

The results obtained from the multiple regression analysis are shown in table 8. The model is satisfactory as the overall adjusted R^2 value and F-value for all villages is quite reasonable and significant which indicates the good-fit of the model. The adjusted R^2 value is found to be 0.477 which means that the selected variables of the model explain nearly 48 percent of variation in model. The regression result for all villages taken together reveals that variables like, family size, dependency ratio, monthly average income of the household head and total asset value of the household, and access to loan are the significant factors that influence household livelihood diversification. Variables like family size, dependency ratio, and income of household head, asset values and loan are the significant factors that affect the household's livelihood diversification in backward villages. However, we find that agricultural yield and per capita food expenditure do not yield the expected sign and the coefficients are not significant.

In case of Medium villages, most of all variables have expected signs except agricultural yield, per capita food expenditure and migration. In contrast to our expectation we found a significant and positive association between diversification and per capita food expenditure of households which may mean that households with high food expenditure are more diversifier than others in Medium villages. Age of household's head is one of the important factors in livelihood diversification behaviour of the household. The relationship between age of the household's head and diversification is found to be negative in all types of villages except in medium

village though the coefficient is not significant. A negative relationship between these variables implies that a household with younger head have higher desire and access to non-farm activities and thus they are more diversified than other households. Sex of household head have positive impact on the level of diversification implying that male headed household are more diversified than the female headed households in our study area. Larger family reduces the risk of livelihood failure and larger family means larger supply of labour and higher number of livelihood activity and thus higher degree of diversification. In consonance with our expectation we found a positive and significant positive relationship between family size and level of diversification in all types of villages. In contrast to our hypotheses, we have found a positive correlation between average household schooling and the diversification index in advanced villages and all villages taken together and a negative relation between two variables as expected in Medium and Backward villages but the coefficient is not statistically significant.

Since, it was expected that the household with lower education and skill are more diversified than others, a positive relationship between the level of education and diversification may indicates either imply that with higher education the workers gain more knowledge and knowhow of the new techniques that enables them to adopt diverse livelihood or, it may also imply the existence of educated unemployment or underemployment in the study regions, implying that even some of the skilled workers prefer to diversify to various other economic activities due to low productivity of the activities they are involved in. The dependency ratio is found to have significant negative effect on household's diversification index in all categories of villages. As increase in dependency ratio means more members with inability to engage in productive work and thus shortage of working persons to earn livings from diversified activities. We have obtained a significant and negative relationship between diversification and monthly income level of household heads in all types of villages under study. This implies that lower income of the household head forces other members of the family to engage in various other activities to supplement household income.

On the other hand, high income of household head means higher investment in the skill development of children who in future may specialise in some high profile non-farm activities. Further, the value of physical assets owned by household is found to have a positive impact on the level of diversification in all categories of villages. Higher asset value in household helps to make investment and pursue different non-farm activities like setting up shops or purchasing taxies for pursuing tourism related non-farm activities in our study regions and thus encouraging diversification to various activities. Against our hypothesised negative relation between diversification and agricultural yield, we have obtained a positive relationship in most of villages except in advanced villages. Thus, in advanced villages we have found the evidence that lower agricultural yield has pushed the households towards higher livelihood diversification while in medium and backward villages agricultural yield and diversification are positively correlated but the coefficient is not statistically significant.

However, in contrast to our hypothesis, we found a negative relationship between migration and diversification level of household in all types of villages and the coefficient is found to be significant at 10 percent level. This may imply that the household having out migrant have lesser number of available labour at home while household with no out migrant members have larger labourers for more diversified activities and thus they have higher level of diversification. Since, large part of rural household lacks resources to diversify their activities to non-farm sector, infusing small among of credit into rural sector can have a significant impact on improving livelihood diversification. As per our hypotheses, loan and availability of credit facilities is found to have a positive impact on the diversification level in all types of villages but the coefficient is significant at 1 per cent level of significance for advanced village only. In confirmation to our hypotheses we have found that the per capita food expenditure which is also the indication of poverty status of a household is negatively associated with diversification in all categories of villages. This implies that the poor households have more tendencies to diversify their livelihood activities in our study area. As poor household usually have to depend on diverse source of livelihood to supplement their household income though the type of diverse activities that they are engaged in may not be highly productive because of low human and capital assets.

Table 8. Multiple regression of Diversification index with socio-economic variables

z	Advanced villages	Medium villages	Backward villages	All villages
AGE_HEAD	-0.001	0.044	-0.021	-0.007
	(-0.86)	(0.23)	(-1.22)	(-0.85)
SEX_HEAD	0.006	0.072	0.067	0.064
	(0.15)	(1.43)	(5.52)	(10.31)
FAMSIZE	0.068***	0.058***	0.012***	0.026***
	(7.49)	(3.69)	(0.26)	(0.99)
AVGSCH	0.008	-0.005	-0.008	0.015
	(1.28)	(-0.79)	(-1.05)	(0.4)
DEPRATIO	-0.695***	-0.603***	-0.495***	-0.631***
	(-8.93)	(-4.87)	(-4.21)	(-11.36)
INCHEAD	-0.790**	-0.185***	-0.486***	-0.076***
	(-2.22)	(-3.03)	(-2.86)	(-4.46)
AGYIELD	-0.001	0.015	0.079	0.037
	(-0.18)	(1.05)	(0.79)	(0.83)
ASSET	0.218	0.767	0.437	0.107***
	(0.18)	(0.78)	(1.44)	(2.41)
PCFDEXPD	-0.032*	0.013**	0.506	-0.106
	(-1.79)	(2.42)	(0.09)	(-0.4)
MIGRATION	-0.058	-0.029	-0.013	-0.041*
	(-1.47)	(-0.55)	(-0.29)	(-1.64)
LOAN	0.075	0.059	0.035	0.060***
	(2.16)	(1.24)	(1.02)	(2.91)
CONSTANT	0.425***	0.240*	0.543***	0.420***
	(3.91)	(1.75)	(3.95)	(6.39)
No. of Observations	122	88	91	302
R^2	0.558	0.48	0.53	0.496
Adjusted R^2	0.518	0.41	0.47	0.477
F-statistic	14.05^{***}	7.21^{***}	9.18^{***}	21.40^{***}

Note: figures in parenthesis indicate t values. *, **, *** indicate level of significance at 10, 5, 1 percent respectively.

Our findings also corroborate with the results of several other past studies like Saith (1992) who pointed out that diversification is merely a transient phenomenon in declining economies associated with desperate struggle to survival. Thus, the capability to diversify income is critical for the survival capabilities of the rural poor (Hazell and Haggblade, 1993). This is because poor households lack assets and are

more vulnerable to seasonal and risk factors than the better off households. Therefore, the poor must diversify income in order to survive as diversification contributes positively to livelihood sustainability because it reduces vulnerability to stress and shocks (Ellis, 1998, 2000). In the same vein, Dercon (1998) states that income diversification enhances the survival capabilities of the rural poor since they cannot use assets such as livestock to safeguard their standard of living when confronted by adversity; they have to rely on diverse income sources. The result confirms our hypothesis that the poor households in our study villages tend to diversify more towards different livelihood activities. This is so because majority of individuals in our sample villages are engaged in casual works and semi-regular activities and undertake some self-employment and only one-third of population are employment in regular service sector. Self-employment ventures in the region are not highly productive as such these activities do not provide sufficient and secure livelihood options to the majority of population engaged in it and fewer employment opportunities in the hilly regions also forces people to seek other alternative sources to supplement their consumption and household income.

Secondly, the very seasonal nature of agriculture which is totally rain-fed also compels the household to look for additional sources of income during lean season. Moreover, tourism sector which provides major employment opportunities in the study region is considered to be more remunerative than agriculture, is also confronted with seasonality and workers in this sector seek to diversify their economic activities during off-season to smoothen their income during year. In rural areas diversification of livelihood is often found to be an important strategy for survival in case of rising insecurity from the current source of income. Diversification enables the household to fight against the poverty and food insecurity caused by frequent income failure. Diversification of livelihood facilitates the diversification of risks, if one income source fails, the household can have another income source to rely on for survival. However, there are several intertwined factors that act as barrier towards a successful livelihood diversification, and identifying such constraints is helpful for policy formulation.

Some of the major constraints to livelihood diversification in our study area are found to be: poor asset base, lack of employment opportunities, lack of proper infrastructure to support diversification, lack of awareness, and unavailability of credit facilities. Poor asset base is one of the important factors that prevent the household in diversifying their economic activities to non-farm self-employment. Lack of access to other means of diversification like unavailability of credit, training and awareness, lack of support groups like NGOs for creating awareness regarding new income creating activities and prevailing governmental schemes are also a major hindrance toward diversification. Lack of time, limited education attainment and skill development and limited time to pursue diversified livelihood; institutional factors that prevents women and other social groups from participating in certain activities and rules that prevent certain groups form availing credit, are some of the barriers that hampers livelihood diversification in rural areas. In addition to these, some of constraints that operate from the supply side of the economic system are lack of infrastructure (like market, transport facilities, and so on), lack of sufficient employment opportunities, different market regulations in wake of liberalisation and economic reforms also adversely affects the diversification behaviour of the rural households.

Effects of Village Characteristics and Economic Status on Livelihood Diversification: An ANOVA Analysis

The characteristics of villages may have a substantial impact on the level of household's livelihood diversification, the more advanced the villages is in which the household is located in, the higher will be the socio-economic characteristics with larger numbers of skilled labourers. Thus the general tendency of the workers would be specialization rather than diversification. While in case of less-advanced or backward villages with comparatively lesser skilled workers, the economic activities they are involved may be equally less productive and thus in order to cope up with the insecurity from such activities they tend to diversify towards larger number of livelihood activities and hence we may find higher diversification level in case of less-advanced villages. Similarly, the economic status of a household may have a varied impact on the level of livelihood diversification. We apply two ways ANOVA with replication to analyse if there are any significant differences in the average diversification level amongst the three categories of villages namely Advanced, Medium and Backward, and economic status of the households. In Two-way ANOVA analysis, we can test the null hypotheses about the effects of other variables on the means of various groupings of a single dependent variable. We can investigate interactions between factors as well as the effects of individual factors. The basic aim is to test the null hypotheses that population mean (average diversification Index) for three different villages are equal. Two independent variables (factors) are the categories of villages and economic status of the households.

Hypotheses: Here we will test three hypotheses:

1. The population means of the first factors are equal. The main effects of villages.
2. The population means of the second factors are equal. The main effects of economic status.
3. There is no interaction between the two factors. The villages-by-economic status interaction effects.

The Homogeneity test of variance tests the condition that the variances of all sample villages are equal given by the Levene Statistic. The result in Table 9 shows the F_{Levene} found to have fall in the rejection region p-values <= 0.05 hence, we reject the hull hypotheses that all the variances across villages are equal. Thus, at the 0.041 level of significance, there is enough evidence to conclude that not all the variance across villages is equal. A post-hoc test will reveal more about the differences in villages. To see which group of villages differ among themselves we use Bonferonni procedure shown in Table 11.
The observed significance level of F-statistic for villages is 0.049. This means that H_o must be rejected. The variable villages have significant influence on the level of

diversification Index. The observed significance level F-statistic for economic-status is 0.073. This means that H_o must be rejected. The variable economic-status has influence on the average diversification level across villages at 0.073 level of significance. The significance level of F-statistic for interaction is 0.621, thus the interaction term does not have any significant impact on the level of livelihood diversification.

Table 9. Test of Homogeneity of Variance

Levene's Test For Equality Of Variances			
F	df1	df2	Sig.
2.270	5	295	.041

Table 10. ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.533[a]	5	.107	2.098	.066
Intercept	42.298	1	42.298	832.414	.000
Village	.248	2	.124	2.441	.049
Eco_Status	.102	1	.102	1.999	.073
village * Eco_Status	.048	2	.024	.477	.621
Error	14.990	295	.051		
Total	63.519	301			
Corrected Total	15.523	300			

diversification in the study region. The study reveals that farm income accounts for a meagre share in the total income of the village as a whole whereas non-farm activities shared a huge proportion of total income. Tourism is the major source of income in backward villages whereas service sector accounted for the largest share in income in case of advanced villages. It is found that around 16.5 percent of the sample households are below poverty line. Poverty does not appear to be severe among them as the severity of poverty index is only 1percent but there existed a high level of inequality in income distribution among sample households.

As the bottom one-fifth of the population has a per capita income of Rs.1193.6 per month and obtains only 6.9 per cent of the total income. On the contrary, the upper one-fifth of the population has a per capita monthly income of Rs. 7006 and share almost 40 per cent of the total income. The relationship between diversification index and the level of household per capita income depicted an inversely U-shaped curve indicating that at lower level of income, the diversification index rises with the level of income and at higher level of income it tends to fall down. On an average, the households in advance villages are low diversifier whereas households in backward villages belong to medium diversification level.

Table 11. Post Hoc Test- Bonferonni: Multiple comparisons (Dependent variable- Diversification Index)

(I) villages	(J) villages	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Advanced	Medium	-.000380	.0314236	1.000	-.076039	.075279
	Backward	-.077531*	.0313225	.042	-.152946	-.002116
Medium	Advanced	.000380	.0314236	1.000	-.075279	.076039
	Backward	-.077151	.0336976	.061	-.158285	.003983
Backward	Advanced	.077531*	.0313225	.042	.002116	.152946
	Medium	.077151	.0336976	.061	-.003983	.158285

Table 11 substantiates our previous finding that there is a significant difference in diversification level across villages and shows the multiple comparisons among three categories of villages, it is found that two out of three groups vary significantly at different level. The group advanced vs. backward villages significant at 0.042 levels and thus this group vary significantly. While the group medium vs. backward vary at only 0.061levels only. Thus, the above analysis confirms that there is a significant difference in the level of livelihood diversification across different categories of villages and across economic status of households in our study region.

CONCLUSION AND DISCUSSION

This study is conducted in the hill region of Darjeeling district of West Bengal. Using household data from the survey conducted in some selected villages of Darjeeling and Kurseong sub-divisions of Darjeeling district during 2012-2013, the whole villages (six villages) were divided into advanced villages and less advanced villages according to various socio-economic characteristics and their distance from the nearby market area. The study looks at the degree of diversification, extent of poverty and inequality in income distribution further, it examines various other covariates of

The proportion of households having higher diversification index is also greater in backward villages than in advanced villages. Diversification behaviour among sample household is basically explained by the extent of alternative non-farm opportunities in the region, socio-economic features of the household like level of income, family size, education, asset value, level of income, credit, and so on. The households in the study area are likely to diversify their livelihood activities if the household head are young in age and has low level of income and has some level of education. The household also tend to diversify if they are poor in terms of low level of per capita food expenditure, has low dependency ratio and high assets value and have access to credit facilities. Larger family size and high agricultural productivity also tend to enhance the diversification level of the household. On the other hand, out migration tend to reduce the level of household diversification. Finally, geographical structure, climatic condition and level of economic development, other socio-economic features and infrastructural facilities in the region have a strong influence on the livelihood diversification. The ANOVA analysis of the diversification indices shows that there is a significant variation in average diversification level across villages and among APL and BPL categories of households in our study area.

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