
Rural Livelihood Diversity in Jammu and Kashmir: Patterns, Processes and Determinants

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ABSTRACT

The purpose of this study was to examine the patterns, processes and the determinants of rural livelihood diversification activities of the rural household in the, Udhampur and Samba districts, state of Jammu and Kashmir. Data was gathered by household survey from 300 sampled households in the study area. On the basis of multiple regression model from 12 hypothesised predictors, nine variables were found to have significant effect in determining diversification of household livelihood activities. Accordingly, more natural capital, more physical capital, more financial capital, more human capital, economically active adults and female-headed households have positive and significant effect on diversification of livelihood activities. However, location, scheduled tribes and access to social capital have negative and significant effect on livelihood diversification activities. From policy perspective, policy-architects need to reflect on the most suitable ways of supporting livelihood diversity in the State of Jammu and Kashmir.

Keywords: Livelihood diversification, Capital assets, Per capita income, Jammu and Kashmir

JEL: C83, O12, Q15

I

INTRODUCTION

Jammu and Kashmir (J&K) state is predominantly agrarian and faces many problems such as low growth, low yields, limited scope of extending agricultural activities, land degradation, hilly terrain and small and fragmented land holdings. For instance, a number of studies made in Indian Himalayas and abroad have shown that agriculture in the mountains faces serious problems of dwindling crop yields and resource degradation which may aggravate if remedial measures are not undertaken immediately (Jodha, 1992; Dev, 1994). Moreover, 83.30 per cent of total operational holdings belonged to marginal farmers with land holding less than 1/2 hectare, i.e., 0.35 hectares (Government of India, 2014). These small and fragmented holdings made the adoption of farm mechanisation very difficult that influences adversely the farmer's income (Government of J&K, 2013-14). This, coupled with the highly

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undulating topography, has conditioned the agricultural and other livelihood practices of the people.

Nevertheless, agriculture had been able to respond positively with impressive growth rate to meet the requirements of the people. The tourism sector had been a major driver of growth of the J&K economy till the late 1980s. The dependence on agriculture became absolute due to the subsequent decline witnessed in the tourism sector (Sharma, 2007). In addition, the insurgency in the State has also introduced a high degree of risk and uncertainty to the economic activities. Industrial growth has been affected; and in the absence of an alternative, people have turned to agriculture for survival.

Given due importance to agriculture as a major source of livelihood for rural households, it is also well known that there is risk and uncertainty in farming activity which has serious implications on the households in terms of its inability to provide fully secured livelihoods. A number of studies verified the inability of agriculture to fully support livelihood security (For instance, see among others, Unni, 1996; Shylendra, 2002; Samal, 2006; Shukla and Shukla, 2007). Therefore, supplementary sources of livelihood and household diversification strategies have assumed importance in both the situations (agricultural as well as non-agricultural activities). This assumed more importance in the case of fragile region, like J&K, where 70 per cent of the population is dependent on agriculture for their livelihood (Government of J&K, 2011-12). It is in this context that diversification is a critical process at the empirical level and its implications on the livelihood of households are inevitable.

The overall aim of the study is to contribute to the analysis of rural livelihoods by investigating livelihood diversification strategy in two different settings in the State of J&K. The specific objectives of the study are two-fold; first, to understand the processes and patterns of livelihood diversification among different categories of households; and second, to examine the determinants of livelihood diversification across households in different categories. The inquiry is guided by the following sets of research questions: what are the household's main livelihoods activities? How these activities differ across regions/sampled villages? What are the characteristics of households that diversify- have small, resource-poor households diversified more or less than the larger, resource-rich households? To the best of our knowledge, practically, there is no study in this regard for the State of J&K. Therefore, the present study is an attempt to bridge this knowledge-gap.

The paper is organised as follows. Section II begins with reviewing the different strands of literature that deals with the determinants of diversification. The third section discusses the analytical framework, data and methodology followed by the fourth section which presents and discusses the results of the study. The final section concludes the discussion with policy implications.

II

LITERATURE REVIEW

For purposes of this review, the factors affecting the livelihood diversity are placed into four sub-categories.

2.1 Ecological and Climatic Factors

This set of studies indicated that in places where ecological and climatic conditions are favourable for farm production, the residents have wider crop choices and greater opportunities for diversification and prosperity within farming (Haggblade *et al.*, 1989; Reardon *et al.*, 1992; Ellis, 1998; Patnaik and Narayanan, 2010; Angles *et al.*, 2011). Conversely, where the agro-ecological potential is poor, people are said to derive relatively low proportions of their total incomes from farming and high proportions from non-farming activities, including migration (among others, Evans and Ngau, 1991; Bernstein *et al.*, 1992; Reardon *et al.*, 1992; Reardon, 1997; Reddy *et al.*, 2008; Sidhu *et al.*, 2011).

2.2 Access to Infrastructure and the Geographical Remoteness of a Location

The weaker sections of the society tend to be located in remote places where access to infrastructure and factors and product markets is poor and some studies suggest that this remoteness limits their opportunities for diversification between farm and non-farm activities (Haggblade *et al.*, 1989; Evans and Ngau, 1991; Chamber and Convey, 1992; Francis and Hoddinott, 1993; Reardon *et al.*, 1992; Dercon and Krishnan, 1996; FAO, 1998; Abdulai and Delgado, 1999). However, the positive effect of infrastructure on agricultural development has been articulated, theoretically and substantiated empirically, in many studies which indicate the importance of infrastructure for the development of agriculture (Mellor, 1976, Barnes and Binswanger, 1986, Fan *et al.*, 1999; Narayanamoorthy and Hanjra, 2006). These studies also suggested that access to better infrastructure makes it possible for the households to earn from non-farm activities.

2.3 Interactions between Seasonal Changes, Labour Market Processes and Migration

The seasonal changes assume importance, especially when agriculture is dependent fully on rainfall, in influencing farm and non-farm activities pertaining to the availability of employment in the local economy and migration to other economies (Chambers, 1989, Sahn, 1989, Reardon *et al.*, 1992; FAO, 1998; Desai *et al.*, 2010). These studies understood the seasonal changes in food availability that motivates households to diversify between farm and non-farm activities in order to smoothen their consumption needs. Nonetheless, the movement to rural non-farm activities may be limited for poor households due to their lack of assets, limited

access to credit and lack of entrepreneurial ability, as confirmed by Kaur *et al.* (2010). The central concern of other set of studies is to understand how rural labour market processes create and perpetuate seasonal livelihood insecurity for landless, near landless, labour deficit, and food deficit households (Ellis, 1998; Devereux, 1997; Nair and Menon, 2007). These studies explained households' motive to minimise their risks of consumption failure as the driving force behind rural labour market and migratory livelihood diversification, most of them investigate only how such distress-driven livelihood diversification processes generate livelihood insecurity.

2.4 Coping Behaviour and Livelihood Adaptation

Coping behaviour is seen as one of the determinants of diversification process. In fact, "the sequence of coping behaviour as a response to crises can involve searches for new income sources in an early stage, and, at a later stage, the enforced asset sales can irrevocably alter the future livelihood patterns of the family", as argued by Ellis (1998: p.14). As per Davies (1996), adaptive behaviours are coping activities which have become permanently incorporated into the normal cycle of activities. It is to be noted that "adaptation may be positive or negative. It is positive if it is by choice or increases security, otherwise it is of necessity or fails to reduce vulnerability" (Strasser, 2009: p.84). Berloff and Modena (2009) in their empirical study, in the context of Indonesian farmers, noted that the coping strategies adopted by the farmers to overcome a crop loss are quite different between asset poor and non-poor households. The latter are more likely to run down assets and use savings, while the former are more likely to adjust their labour supply, even if the percentage of households that use extra labour is high in both groups.

From the aforementioned studies, some of the main determinants of diversification are to be noted: seasonality, differentiated labour markets, risk strategies, coping behaviour, credit market imperfections, inter temporal savings and investment strategies, and differentiated portfolio of capital assets.

III

ANALYTICAL FRAMEWORK, DATA AND METHODOLOGY

3.1 Analytical Framework

The concept of sustainable livelihoods is increasingly being accepted as providing both a basis for understanding the nature of poverty and for identifying the types of strategies that can reduce poverty in an effective and sustainable manner using different types of assets (or capitals). It is in this setting that the UK's Department for International Development (DFID) has suggested the Sustainable Livelihoods Framework (for more elaboration, refer Scoones, 1998; Ellis, 2000).

Within this wider context of sustainability of livelihoods of rural people, the following pertinent question arises: why should the households attempt to diversify their livelihood strategies? The purpose of diversification is two-fold: first, to increase household incomes; and second, to minimise risks of livelihood failure. The rationale for diversification emanates from the opportunities for more employment and generation of higher incomes through more efficient use of resources and through exploitation of comparative advantage (World Bank, 1990). Households may choose to adopt various strategies to secure their livelihood: such as agricultural intensification, livelihood diversification, migration, reduction in consumption expenditure, de-capitalisation of assets (for instance, selling of animals, implements and other assets), increase in use of family labour, etc. It may be noted that the present study focuses on livelihood diversification¹ which is recognised by many as a strategy to overcome risk and uncertainties or to minimise cost or to accumulate wealth, amongst other livelihood strategies.

3.2 Data and Methodology

This study is based on primary data. It is worthwhile to mention that the analysis of rural livelihoods by investigating livelihood diversification strategy has been carried out for two different settings in the Jammu region of the state². The field survey was conducted in eight rural villages during 2009-10. The data collected represents a snapshot in time. While household members were asked about changes over time, this did not yield longitudinal quantitative data, but rather qualitative reflections on trends and tendencies. Questionnaires were modified in the light of feed-back obtained from the pilot-survey.

To provide contrast in the study, the developed and less developed districts were selected at first stage on the basis of infrastructure index; more diversified tehsil from a developed district whereas less diversified tehsil from less developed district were selected at second level. Thereafter, four villages from each tehsil were undertaken for primary survey. Finally, a random sample of 300 households was proportionately allocated among different villages on the basis of number of households in each village (For detailed selection of districts, tehsils and villages; refer Sharma, 2018). The sampled distribution of households in the study area is given in Table 1.

Most of the quantitative data collected are analysed by tabulating the descriptive statistics, the distribution of sources of income across different quartiles, livelihood diversity index (LDI) and conducting regression analyses of the determinants of livelihood diversification across households in the study area.

To calculate LDI at household level, this study used the ‘inverse Herfindhal-Hirschman Diversity Index’ as suggested by Anderson and Deshingkar (2005)³. The index values for three capitals; namely- physical capital, financial capital and social capital- are calculated as follows.

TABLE 1. SAMPLED DISTRIBUTION OF HOUSEHOLDS ACROSS REGIONS AND VILLAGES OF J&K

Regions (1)	Villages (2)	Total no. of households (N) (3)	Sampled households (n) (4)
Region I (Developed)	Mandi Paswalian	494	50
	Mandi Thalora	409	41
	Mandi Ghorgalian	472	48
	Mandi Dansal	110	11
Sub-Total		1485	150
Region 2 (Less-developed)	Jandrari	294	22
	Marta	689	51
	Sunetar	624	46
	Bhatyari	420	31
Sub-Total		2027	150
Total		3512	300

Source: Sampled surveys carried out in eight villages, 2009-10.

For physical capital, it includes the value of productive (value of livestock) as well as non-productive assets per member of the household. This study considers the following non-productive assets, wherein two types of assets are distinguished: agricultural (cart, plough, thresher, tractor and electric motor) and non-agricultural (car, motorcycle, scooter, bicycle, lantern, radio, tape-recorder, compact disk, mobile, computer, television, refrigerator, sewing machine, and modern furniture). Both productive and non-productive assets are rated between 0 and 1 as an index.

For financial capital, an index has been generated to capture financial capital by including the following variables. First, ratio of members having bank account to economically active adults (age: 15-60 years, excluding school going children, disabled and old aged members); and second, savings (difference between monthly per capita income and monthly per capita expenditure). The index varies between 0 and 1. For social capital, the following qualitative variables were taken into consideration: first, whether households have migrant member; and second, has any member of the household availed society membership? The index varies between 0 and 1.

IV

RESULTS AND DISCUSSION

This section is divided into two sub-sections.

4.1 *Patterns and Processes of Rural Livelihood Diversification*

The distribution of households according to various sources of income in different per capita income quartiles are presented in the Table 2. The results are not unexpected. As we move from bottom 25 per cent of the households to the top 25 per cent of the households, the dependency of households on farm income is on the

decline and the opposite is found true in the case of non-farm income, which is clearly pronounced from the Table 2.

TABLE 2. OVERALL DISTRIBUTION OF HOUSEHOLDS ACCORDING TO SOURCES OF INCOME IN DIFFERENT PER CAPITA INCOME QUARTILES

Sources (1)	Per capita income quartiles (Rs.)				Total (n=300) (6)
	I (n=75) (2)	II (n=75) (3)	III (n=75) (4)	IV(n=75) (5)	
	Cultivation	133 (11.85)	274 (10.54)	331 (8.22)	
Livestock	416 (36.87)	888 (34.13)	1000 (24.84)	1366 (21.55)	851 (24.62)
Farm income	550 (48.72)	1162 (44.67)	1331 (33.07)	1956 (30.85)	1183 (34.22)
Labour	262 (23.21)	272 (10.46)	457 (11.35)	515 (8.12)	376 (10.88)
Conductor	0 (0.00)	0 (0.00)	3 (0.07)	33 (0.52)	9 (0.26)
Shops	106 (9.39)	195 (7.50)	197 (4.89)	575 (9.07)	268 (7.75)
Govt. teachers	26 (2.30)	75 (2.88)	129 (3.20)	354 (5.58)	146 (4.22)
Private teachers	0 (0.00)	0 (0.00)	49 (1.22)	44 (0.69)	23 (0.67)
Govt. services	36 (3.19)	287 (11.03)	724 (17.99)	1231 (19.42)	569 (16.46)
Private services	70 (6.20)	149 (5.73)	239 (5.94)	456 (7.19)	228 (6.60)
Private driver	0 (0.00)	0 (0.00)	0 (0.00)	36 (0.57)	9 (0.26)
Defence services	0 (0.00)	46 (1.77)	151 (3.75)	124 (1.96)	80 (2.31)
Pension	54 (4.78)	375 (14.42)	668 (16.60)	990 (15.62)	522 (15.10)
Remittances	26 (2.30)	43 (1.65)	77 (1.91)	28 (0.44)	43 (1.24)
Non-farm income	579 (51.28)	1439 (55.32)	2694 (66.93)	4384 (69.15)	2274 (65.78)
Total income	1129 (100.00)	2601 (100.00)	4025 (100.00)	6340 (100.00)	3457 (100.00)

Source: Sampled surveys carried out in eight villages, 2009-10.

Note: Figures in parentheses represents the percentages to the total income.

After looking into the composition of income sources by quartiles, it is important to quantify the livelihood diversity in both the regions and also across different household categories. The simplest way in which diversity in livelihoods can be measured is by counting the number of sources on which households depend. In the study area, even though majority of the households (31.67 per cent) had multiple sources of income on the whole, most of the households who have one source of income belong to the lower quartile (48 per cent). And, diversity increases as we move towards the higher quartile (vide Table 3).

TABLE 3. DISTRIBUTION OF HOUSEHOLDS BY QUARTILES AND FARM SIZE CATEGORIES, ACCORDING TO NUMBER OF SOURCES OF INCOME

Per capita income quartiles (1)	Households with number of sources of income (per cent)						
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quartile I (poorest 20 per cent)	48.00	18.67	28.00	5.33	0.00	0.00	0.00
Quartile II	32.00	24.00	30.67	9.33	2.67	0.00	1.33
Quartile III	15.58	29.87	32.47	18.18	3.90	0.00	0.00
Quartile IV (Richest 20 per cent)	9.59	26.03	35.62	26.03	1.37	1.37	0.00
Land holding categories							
Semi-marginal (0.002-0.5 ha)	40.22	32.07	20.11	7.07	0.54	0.00	0.00
Marginal (0.51-1.0 ha)	5.00	11.67	50.00	31.67	1.67	0.00	0.00
Small (1.01 -2.00 ha)	4.35	17.39	52.17	15.22	8.70	2.17	0.00
Semi-medium (2.01 ha and above)	0.00	0.00	40.00	50.00	0.00	0.00	10.00
Total	26.33	24.67	31.67	14.67	2.00	0.33	0.33

Source: Sampled surveys carried out in eight villages, 2009-10.

This finding is quite plausible. This is because the sampled households belonging to lower quartiles had fewer capital assets which might restrict them to diversify into other activities. Similar results were observed when we view diversity across land holding categories that is, 40.22 per cent of the households depended on single source of income fall in the semi-marginal category (Table 3).

While delineating diversity across selected regions of the study area, it would not be unreasonable to believe that 46 per cent of the sampled households belonging to the developed region are less diversified (see Table 4).

TABLE 4. DISTRIBUTION OF HOUSEHOLDS BY QUARTILES AND FARM SIZE CATEGORIES, ACCORDING TO NUMBER OF SOURCES OF INCOME IN REGION 1 (DEVELOPED)

Income quartiles (1)	Households with number of sources of income (per cent)						
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quartile I (poorest 20 per cent)	72.22	25.00	2.78	0.00	0.00	0.00	0.00
Quartile II	51.06	34.04	12.77	2.13	0.00	0.00	0.00
Quartile III	29.27	48.78	21.95	0.00	0.00	0.00	0.00
Quartile IV (Richest 20 per cent)	26.92	46.15	23.08	3.85	0.00	0.00	0.00
Land holding categories							
Semi-marginal (0.002-0.5 ha)	50.38	36.84	12.78	0.00	0.00	0.00	0.00
Marginal (0.51-1.0 ha)	10.00	50.00	20.00	20.00	0.00	0.00	0.00
Small (1.01 -2.00 ha)	14.29	42.86	42.86	0.00	0.00	0.00	0.00
Semi-medium (2.01 ha and above)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	46.00	38.00	14.67	1.33	0.00	0.00	0.00

Source: Sampled surveys carried out in eight villages, 2009-10.

Nonetheless, 48.67 per cent of the households had multiple sources of income in the less developed region as is evident from Table 5. Another significant result from both the regions is that 72.22 per cent of the sample households who had single source of income fit in the bottom quartile in the developed region than that of the less-developed region – the percentage of households having single source of income was only 25.64 in the similar quartile.

TABLE 5. DISTRIBUTION OF HOUSEHOLDS BY QUARTILES AND FARM SIZE CATEGORIES, ACCORDING TO NUMBER OF SOURCES OF INCOME IN REGION 2 (LESS- DEVELOPED)

Income quartiles (1)	Households with number of sources of income (per cent)						
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quartile I (poorest 20 per cent)	25.64	12.82	51.28	10.26	0.00	0.00	0.00
Quartile II	0.00	7.14	60.71	21.43	7.14	0.00	3.57
Quartile III	0.00	8.33	44.44	38.89	8.33	0.00	0.00
Quartile IV (Richest 20 per cent)	0.00	14.89	42.55	38.30	2.13	2.13	0.00
Land holding categories							
Semi-marginal (0.002-0.5 ha)	13.73	19.61	39.22	25.49	1.96	0.00	0.00
Marginal (0.51-1.0 ha)	4.00	4.00	56.00	34.00	2.00	0.00	0.00
Small (1.01 -2.00 ha)	2.56	12.82	53.85	17.95	10.26	2.56	0.00
Semi-medium (2.01 ha and above)	0.00	0.00	40.00	50.00	0.00	0.00	10.00
Total	6.67	11.33	48.67	28.00	4.00	0.67	0.67

Source: Sampled surveys carried out in eight villages, 2009-10.

The aforementioned results regarding households' diversity in the study area are further corroborated by implying the livelihood diversity index (LDI). Table 6 showed means and standard deviation of livelihood diversity in each of the eight villages, in both the regions and for the whole sample. The average livelihood diversity, the LDI, across all the households is 2.01. Region-wise results indicated that livelihood diversity was more in the less-developed region as against the developed region, which is as per our expectation. A plausible explanation is that households tend to be more specialised in the developed region because they have less need to diversify on the account of earnings in individual occupations being higher on an average and more predictable over time. On the other hand, households tend to be more diversified because most of them in the less-developed region are dependent on agriculture for their livelihood, which is more vulnerable to risk and uncertainty. The pertinent reason is that the households in the study do not possess sufficient holdings, therefore cultivation does not provide adequate income for them; they are obliged to depend on other sources of income. Furthermore, levels of diversification varied by village, most notably in the cases of Mandi Ghorgalian and Bhatyari villages; wherein households were more specialised (or less diversified) than the other villages at household level as is pronounced in the Table 6.

TABLE 6. LIVELIHOOD DIVERSITY, BY VILLAGES, REGIONS AND IN OVERALL REGION

Developed villages (region 1) (1)	Livelihood diversity index (household level, by activity) (2)
Mandi Paswalian (n=50)	1.87 (0.81)
Mandi Thlora (n=41)	2.13 (0.99)
Mandi Ghorgalian (n=48)	1.49 (0.56)
Mandi Dansal (n=11)	1.92 (0.69)
Sub-Total	1.82 (0.80)
ANOVA (n=150)	F-ratio: 5.22 [0.002]
Less-developed villages (region 2)	Livelihood diversity index (household level, by activity)
Jandrari (n=22)	2.49 (1.06)
Marta (n=51)	2.08 (0.75)
Sunetar (n=46)	2.52 (0.68)
Bhatyari (n=31)	1.73 (0.74)
Sub-Total	2.20 (0.84)
ANOVA (n=150)	F-ratio: 7.86 [0.000]
Total (Region 1 and Region 2)	2.01 (0.84)

Source: Sampled surveys carried out in eight villages, 2009-10.

Note: (i) Figures in parentheses represent standard deviations. (ii) Figures in square brackets show significance level of F-ratio.

In terms of differences in mean diversification by income, the study noted that the diversification at household level increases as we move away from one-fourth of the bottom households. The caste-wise livelihood diversification at household level indicated that the households fits in the general category and are more diversified relative to other categories (refer Table 7). It is worth mentioning that there are significant mean differences in the livelihood diversity at household level across regions, in different quartiles and in caste categories, which is indicated by F-ratio as

shown in the Table 6 and 7. There is a lot of variation around these averages, as is evident from the values of the standard deviation of each diversity index. It indicates even within villages, and within income groups and caste categories, how some households maintained a more diversified portfolio than others. Nevertheless, it is worth pointing out that in most of the cases, the average levels of diversification have shown equivalence with studies of other areas. For instance, Ellis (2000) reports diversity indices in the range of 2.2 to 2.8 for three villages in the Hai district of Northern Tanzania.

TABLE 7. LIVELIHOOD DIVERSITY BY DIFFERENT QUANTILES AND BY CASTE CATEGORIES FOR WHOLE SAMPLE

Monthly per capita income quartiles (1)	Livelihood diversity index (household level, by activity) (2)
First quartile (poorest 25 per cent)	1.53 (0.59)
Second quartile	2.02 (0.78)
Third quartile	2.11 (0.72)
Fourth quartile (richest 25 per cent)	2.39 (0.99)
ANOVA (n=300)	F-ratio: 17.71 [0.000]
Caste category	
General (n=242)	2.09 (0.85)
Scheduled caste (n=56)	1.68 (0.72)
Scheduled tribes (n=2)	1.69 (0.15)
ANOVA (n=300)	F-ratio: 6.60 [0.002]

Source: Sampled surveys carried out in eight villages, 2009-10.

Note: (i) Figures in parentheses represent standard deviations, (ii) Figures in square brackets show significance level of F-ratio.

The ways in which we discussed above to understand household livelihood diversity at household level in the study area showed rural diversification at one point of time only (in our case, 2009-10). The complementary way to measure rural livelihood diversification is to consider how the proportion of income that households derived from farm and non-farm activities has changed over a course of time. For this purpose, we need a longitudinal data (or panel data), which is beyond the reach of our study. Nevertheless, we made an attempt in this direction to supplement the observed results with the qualitative information. The perceptions of the household pertaining to number of sources of income and patterns of non-farm income during the period of 10 years in the research area are presented in Table 8.

The results confirmed our earlier findings that the less-developed region is more diversified in relation to developed region. For instance, 34.33 per cent of the households reported increase in the number of income sources during the course of ten years, recalling only, in less-developed region while two-thirds of the households in developed region detailed that the number of income sources remained the same. The information regarding non-farm income revealed that 56 per cent of the households mentioned an increase in non-farm income over the same period in the developed region; whereas only 23 per cent of them reported increase in non-farm income in less-developed region. This is quite plausible finding because most of the

TABLE 8. PERCEPTIONS OF HOUSEHOLDS WITH RESPECT TO NUMBER OF INCOME SOURCES AND NON-FARM INCOME DURING THE PERIOD OF TEN YEARS (2000-01 TO 2009-10)

(1)	Number of income sources over time		Total (4)
	Region 1 (developed) (2)	Region 2 (less-developed) (3)	
Increased	24.46	34.33	29.40
Decreased	8.67	1.33	5.00
Stayed same	66.20	20.67	43.44
No response	0.67	43.67	22.17
Total	100.00	100.00	100.00
	Non-farm income over time		Total
	Region 1 (developed)	Region 2 (less-developed)	
Increased	56.00	23.33	39.67
Decreased	31.33	10.67	21.00
Stayed same	10.67	14.67	7.67
No response	2.00	51.33	31.67
Total	100.00	100.00	100.00

Source: Sampled surveys carried out in eight villages, 2009-10.

households dependent on high-paid salaries (for example, government services) in the developed region as compared to most of them dependent on livestock and wage labour, notwithstanding diversification of income sources, in the less-developed region often yield them low income.

It is with this background, the next section deals to examine the determinants of livelihood diversification.

4.2 Determinants of Rural Livelihood Diversification

Our limited aim in this sub-section is to assess the extent to which asset-based and insurance-based theories of diversification⁵ can explain differences in the observed levels of income diversity between households across eight villages in J&K. For this purpose, the study carried out multiple regression exercise by considering the LDI as a dependent variable. Drawing upon the aforementioned studies, this study specify a number of other variables that are expected to influence household's livelihood diversity, their description and the expected sign as reported in Table 9.

It is worthwhile to mention here that we do not have any clear *a priori* expectation regarding the sign of the two coefficients: Location and Caste. This is because the households in developed region with higher income may tend to be less diversified, because the demand for insurance is lower, but may also tend to be more diversified, as the range of livelihood activities to which they have access is higher. Moreover, it is often argued, in the literature, that residents belonging to the poorer/under-developed region diversify for their survival unlike the households residing in the developed region, as they diversify their income sources when expected pay-offs are much better than the existing activity. Regarding caste, on the one hand, the more marginalised households – 'scheduled castes' and 'scheduled

TABLE 9. VARIABLES INCLUDED IN HOUSEHOLD INCOME REGRESSION

Predictors (1)	Variable Description (2)	Expected Sign (3)
DISDUM	Location of the district (developed=1, less-developed=0)	Positive/Negative
NACAPITAL	Access to natural capital (NACAPITAL), Land per capita in hectares	Positive
PHCAPITAL	Access to physical capital (PHCAPITAL), Index	Positive
FINC	Access to financial capital (FINC), Index	Positive
HIGEDU	Members who have passed 10th standard (human capital); in number	Positive
SOCC	Access to social capital (SOCC), Index	Negative
INCOMESOURCE	Dummy variables for two different sources of income: government services (GOS); (1=Yes, 0=No) and non-farm income except government services (OTGS); (1=Yes, 0=No) Farm income is the reference category	Negative
CASTE	Dummy variables for two different caste groups: scheduled caste (SC); (1=Yes, 0=No) and scheduled tribes (ST); (1=Yes, 0=No). General category is the reference caste group	Positive/Negative
AGE	Age of the household head; years	Negative
EAA	Economically active adults; in number	Positive
RISK	Household facing risk; (1=Yes, 0=No)	Positive
HHHS	Sex of the household head; (female=1, male=0)	Positive

Source: Field survey, 2009-10.

tribes' - may tend to be less diversified if they face discrimination in accessing some livelihood activities, but may, on the other hand, be more diversified if their incomes are lower and their demand for insurance as a result is higher.

In order to test these hypotheses, we estimated the following econometric model:

$$(LDI)_i = b_0 + b_1 (DISDUM)_i + b_2 (NACAPITAL)_i + b_3 (PHCAPITAL)_i + b_4 (FINC)_i + b_5 (HIGEDU)_i + b_6 (SOCC)_i + b_7 (INCOMESOURCE)_i + b_8 (CASTE)_i + b_9 (AGE)_i + b_{10} (EAA)_i + b_{11} (RISK)_i + b_{12} (HHHS)_i + e_i \quad \dots(1)$$

where, each 'i' indicates a separate household and i =1 to 300 (N). The results of estimating equation (1) by weighted least square (WLS) are presented in Table 10. Note that the intercept dummy (DISDUM) stands to differentiate the two regions. Thus, for example, if both b_0 and b_1 are significant and positive, then the regression for the developed region will have an intercept of $b_0 + b_1$, whereas for the other region will have an intercept of b_0 only. However, the slope coefficient for the two regions remains the same.

The first point to make is that we are able to explain much of the differences in the amount of livelihood diversification across households, using the set of selected explanatory variables. It is seen that only about 9 per cent of the variation remains unexplained in the livelihood diversity index. We also find that our predictors are, in most cases, related to diversification in the ways suggested by theory. In other words, the results are in line with our expectation in most of the cases. The estimated model is free from autocorrelation, as indicated by the Durbin-Watson statistic; and, it is also corrected for heteroscedasticity by using the WLS regression.

TABLE 10. WEIGHTED LEAST SQUARE (WLS) ESTIMATES OF VARIOUS FACTORS ON HOUSEHOLD LIVELIHOOD DIVERSITY IN THE STUDY AREA
(DEPENDENT VARIABLE: LIVELIHOOD DIVERSITY INDEX (LDI) BY HOUSEHOLD ACTIVITY)

Predictor (s) (1)	Coefficient (2)	t-ratio (3)
Constant	1.2407***	8.4694
Location (DISDUM), District (Developed=1; Less-developed=0)	- 0.5110***	- 8.1609
Natural capital (NACAPITAL), Land Per Capita in Hectares	0.68415***	5.2309
Physical capital (PHCAPITAL), Index	0.95438***	9.9164
Financial capital (FINC), Index	4.12692***	10.5069
Members who have passed 10th Class, Human capital (HIGEDU), Number	0.060060*	1.8008
Social capital (SOCC), Index	- 0.2831***	- 3.7172
Government services (GOS), (1=Yes; 0=No)	- 0.10562	- 1.3745
Non-farm income except Government services (OTGS) (1=Yes; 0=otherwise)	- 0.11157	- 1.4604
Scheduled caste (SC), (1=Yes; 0=No)	0.029859	0.3945
Scheduled tribe (ST), (1=Yes; 0=No)	- 0.18816**	- 2.1073
Age of household head (AGE), Years	0.0015575	0.7419
Economically active adults (EAA), Number	0.06637***	3.2405
Household facing risk (RISK), (1=Yes; 0=No)	0.0329217	0.4348
Sex of household head (HHHS), (Female=1; Male=0)	0.17838***	3.0993
Important Statistics		
N (Number of households)	300	
Unadjusted R-squared	0.91112	
Adjusted R-squared	0.90675	
Durbin-Watson Statistic	1.9523	
F-statistic (14, 285)	208.676	
	(p-value < 0.00001)	

Note: ***, ** and * denotes significance level at 1, 5 and 10 per cent, respectively.

In the case of location dummy, we found negative relationship between the developed region and the amount of diversification, the effect is statistically significant at the one per cent level. This finding is consistent with the hypothesis that livelihood diversification is used by the households as a form of insurance, and that the existence of other (unearned) sources of income reduces the need for that insurance in the developed region. Hence, the households in developed region with higher income may tend to be less diversified. We significantly found evidence of positive relationship between all the capitals (natural, physical, financial and human) the households possessed and its diversification control for other variables barring the social capital, which is shown by negative coefficient. These findings, statistically significant, contradict both the insurance and asset-based views of diversification.

The possible explanation is that livelihood diversification is only a partial form of insurance against risk, so that risk-averse households who tend to hold more diversified income portfolios also tend to hold a larger portion of their assets in relatively liquid form such as financial assets (vide Anderson and Deshingkar, 2005). However, the effect of social capital on the livelihood diversity supports the insurance-based theory of diversification. Also, we have found *ceteris paribus* as positive and significant impact of higher education on the livelihood diversity. This finding is consistent with the hypothesis that the household's higher level of

education attainment increases their ability to undertake non-farm activities (refer Table 10).

The higher number of working hands in the household has significant positive impact on the livelihood diversity in terms of income sources *ceteris paribus*. This finding confirms the hypothesis that more number of working members in the rural household has better chances of minimising risk faced by them. The study further found that the qualitative variable of female-headed households have shown significant positive effect on the average livelihood diversity index, as expected. This finding confirms our hypothesis that women were able to overcome their insecurity as compared to men by diversifying their income sources. It is also seen that more marginalised households that is, scheduled tribes; tends to be less diversified, which might be due to discrimination faced by them in accessing some livelihood activities in the state.

There is no significant relationship, statistically speaking, between the average household livelihood diversity index and the household-specific variables such as the principal source of income, scheduled castes, age and household facing risk. Nonetheless, many of these variables are related to diversification as suggested by theory. Although, from the above model, with an intercept dummy we have established significant differences in the livelihood diversity of households across regions and most of the selected variables have significant impact on diversity. However, we were unable to explain differential effects of the set of selected explanatory variables on diversity for the two different regions. In order to capture these differences, we estimated the following econometric model with both intercept dummy and interaction dummies:

$$\begin{aligned}
 (\text{LDI})_i = & b_0 + b_1 (\text{DISDUM})_i + b_2 (\text{NACAPITAL})_i + b_3 (\text{DISDUM} * \text{NACAPITAL})_i \\
 & + b_4 (\text{PHCAPITAL})_i + b_5 (\text{DISDUM} * \text{PHCAPITAL})_i + b_6 (\text{FINC})_i \\
 & + b_7 (\text{DISDUM} * \text{FINC})_i + b_8 (\text{HIGEDU})_i + b_9 (\text{DISDUM} * \text{HIGEDU})_i + b_{10} (\text{SOCC})_i \\
 & + b_{11} (\text{DISDUM} * \text{SOCC})_i + b_{12} (\text{INCOMESOURCE})_i + b_{13} (\text{DISDUM} * \text{INCOME} \\
 & \text{SOURCE})_i + b_{14} (\text{CASTE})_i + b_{15} (\text{DISDUM} * \text{CASTE})_i + b_{16} (\text{AGE})_i \\
 & + b_{17} (\text{DISDUM} * \text{AGE})_i + b_{18} (\text{EAA})_i + b_{19} (\text{DISDUM} * \text{EAA})_i + b_{20} (\text{RISK})_i \\
 & + b_{21} (\text{DISDUM} * \text{RISK})_i + b_{22} (\text{HHHS})_i + b_{23} (\text{DISDUM} * \text{HHHS})_i + e_i \quad \dots(2)
 \end{aligned}$$

Note that this model differentiates the two regions in terms of both intercept and slope coefficients. Thus, for example, if both b_2 and b_3 are significant and positive, then the *NACAPITAL* in the developed region will have an impact of $b_2 + b_3$ on diversity; whereas, in the other region it will have an effect of only b_2 . The WLS estimates of equation (2) are presented in Table 11. The first point to make is that the estimated model explained about 89 per cent of the variation in the livelihood diversity. Furthermore, the results are in line with our expectation in most of the cases. The model is corrected for heteroscedasticity and is checked for robustness.

TABLE 11. WLS ESTIMATES OF VARIOUS FACTORS (INCLUDING INTERACTION DUMMY) ON HOUSEHOLD LIVELIHOOD DIVERSITY IN THE STUDY AREA
DEPENDENT VARIABLE: LIVELIHOOD DIVERSITY INDEX (LDI) BY HOUSEHOLD ACTIVITY

Predictor (s) (1)	Coefficient (2)	t-ratio (3)
Constant	1.1701***	4.5996
Location (DISDUM), District (Developed=1; Less-developed=0)	5.9148	0.4186
Natural Capital (NACAPITAL), Land per capita in hectares	0.7899***	4.2505
Interaction Dummy (DISDUM*NACAPITAL)	- 1.8920***	- 4.0077
Physical Capital (PHCAPITAL), Index	1.4703***	3.0716
Interaction Dummy (DISDUM*PHCAPITAL)	- 1.0220*	- 1.778
Financial Capital (FINC), Index	3.3083***	5.8033
Interaction Dummy (DISDUM*FINC)	1.736**	2.2829
Members who have passed 10th Class, Human Capital (HIGEDU), Number	0.05949	0.6466
Interaction Dummy (DISDUM*HIGEDU)	- 0.01359	- 0.1388
Social Capital (SOCC), Index	- 0.09810	- 0.7098
Interaction Dummy (DISDUM*SOCC)	- 0.07815	- 0.458
Government Services (GOS), (1=Yes; 0=No)	- 0.3096***	- 2.7287
Interaction Dummy (DISDUM*GOS)	- 6.3206	- 0.4473
Non-Farm Income Except Government Services (OTGS) (1=Yes; 0=Otherwise)	- 0.1777*	- 1.7654
Interaction Dummy (DISDUM*OTGS)	- 6.4362	- 0.4555
Scheduled Caste (SC), (1=Yes; 0=No)	- 0.0224	- 0.2082
Interaction Dummy (DISDUM*SC)	0.0813	0.644
Scheduled Tribe (ST), (1=Yes; 0=No)	0.0727	0.4549
Interaction Dummy (DISDUM*ST)	- 0.6361**	- 2.3836
Age of Household Head (AGE), Years	0.0025	0.6806
Interaction Dummy (DISDUM*AGE)	5.62E-05	0.0123
Economically Active Adults (EAA), Number	0.0220	0.6876
Interaction Dummy (DISDUM*EAA)	0.0738	1.5435
Household Facing Risk (RISK), (1=Yes; 0=No)	0.2202	1.4773
Interaction Dummy (DISDUM*RISK)	- 0.2048	- 1.2676
Sex of Household Head (HHHS), (Female=1; Male=0)	0.1906	1.0662
Interaction Dummy (DISDUM*HHHS)	- 0.0159	- 0.0801
Important Statistics		
N (Number of Households)	300	
Unadjusted R-squared	0.8927	
Adjusted R-squared	0.8820	
Durbin-Watson Statistic	1.9586	
F-statistic (27, 272)	83.807	
	(p-value < 0.00001)	

Note: ***, ** and * denotes significance level at 1, 5 and 10 per cent, respectively.

It should be mentioned that location dummy in this model is not significant, which means that there is no significant difference in intercept dummy in the two regions. Controlling for household characteristics, we did find significant differential effects of natural capital, physical capital and financial capital on household livelihood diversity across the regions, as expected. This is indicated by the significance of these variables and their interaction with location dummies. For instance, take the case of natural capital, the coefficient for underdeveloped region is 0.789913 and is significant at one per cent level. However, the coefficient is (0.789913 - 1.89203) -1.102117 for developed region (see Table 11).

In a similar way, both the differential intercept and slope coefficients for financial capital are statistically significant, strongly suggesting that the impact of financial capital on livelihood diversity for the two regions is different. It is further observed that the interaction dummy for government services is not statistically significant, which indicates that there is no regional difference in diversity as far as the government service of the households is concerned.

V

CONCLUSIONS AND POLICY IMPLICATIONS

It is clear that rural households do indeed engage in multiple activities and rely on diversified income portfolios. Disaggregated analysis suggests that it is the households in the less developed villages that tend to diversify, while those in the developed villages tend to specialise more. But within the type of location, it is the larger land holdings which diversify more. Moreover, the econometric analysis demonstrated that the rural households are encouraged to adopt more diversified income sources when they have more natural capital, more physical capital, more financial capital, economically active adults (or more working hands), more educated residents and female-headed households. Diversification for the purpose of the paper is not limited to the confines of agriculture alone, but covers non-agricultural sources of income too.

The diversity of livelihoods is an important feature of rural survival but often overlooked by the architects of policy. Since vulnerability and risk is correlated with lack of assets, any developmental intervention that enhances the possibility of households control over diverse asset portfolios will indirectly leads to promote livelihood security among households. Based on the findings of the study, some of the policy recommendations may be noted: First, educational level of the household residents had a positive and significant effect on livelihood diversification. Thus, apart from imparting education to the households, there is also need to provide training to enhance their skill levels as it relaxes the entry barriers to different remunerative non-farm activities, particularly salaried jobs. Second, female-headed households positively impacted on livelihood diversification, so it is advisable for giving financial and vocational assistance to women which could accelerate rural livelihood transformation into non/off farm activities. Finally, access to more financial assets had positive impact on livelihood diversification, and hence there is need to enhance credit access through strengthening the institutional arrangement.

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NOTES

1) It is defined as the process by which rural families construct more diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living (Ellis, 1998). It is to

be noted that diversified rural economy does not necessarily implied diversified households. It may be the case that households tend to specialise in certain activities although the rural economy as a whole is economically diverse. As we are dealing with household level data, to avoid this confusion, we used the term 'livelihood diversification' to refer to rural household diversification rather than rural diversification.

2) J&K has three regions; namely Jammu, Ladakh and Kashmir. The Jammu region was chosen for survey because of the disturbances in Kashmir region. Ladakh region was not considered because of non-approachability to keep in mind the paucity of time.

3) The index is calculated by utilising the following formula: $LDI_i = \left[\frac{1}{\sum a_j^2} \right]_i$

Where, each a_j represents the proportional contribution of each livelihood activity j to household i 's overall income. The maximum possible value of this index is the total number of different income sources, which is attained if total income is distributed equally between each source. The minimum possible value is one, attained when all income is obtained from one source only.

4) This categorisation of land ownership is based on the definition of farmer household provided by the National Sample Survey Organisation (NSSO). However, we have divided marginal households into two categories: first, semi-marginal (0.002-0.50 ha) and; second marginal (0.51-1.00 ha). The simple reason for this is that in our study area more households had owned land less than 0.50 hectares.

5) According to assets-based view, the amount of diversity in a household's income portfolio reflects the amount of diversity in the assets (or factors of production) it owns or has access to. On the other hand, according to an insurance-based view, diversification is used by the household as a way of insuring against income shocks (see also Anderson and Deshingkar, 2005).

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