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A STUDY ON LIVELIHOOD DETERMINANT AT FARM HOUSEHOLDS OF KUMAUN HILLS (UTTARAKHAND)

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Abstract

Agriculture serves as the primary means of rural households' livelihood for majority of the populations' in developing countries. It has been the predominant activity for most rural farm households which offers a strong option for spurring growth, overcoming poverty, and enhancing food security. Smallholder rural farm households face an increasing need of looking for alternative income sources to supplement their small scale agricultural activities. However, livelihood diversification is determined by complex and yet empirically untested factors. Thus, the investigation was aimed to identify the determinants of livelihood diversification among different income categories of different altitude of Kumaun, Uttarakhand. The study is based on the findings from the data of 90 sample farm households consist of 30 labour income, 30 agriculture income and 30 government service income based farm households, selected through stratified random sampling from low, mid and high hill altitudes for the agriculture year 2013-14. To measure extent of livelihood determinants a set of factors viz: age of family head, family size, dependency ratio, education, asset value, farm size and land-man ratio and therefore these variables were incorporated in the model. Multiple linear regressions were fitted to examine the factors affecting livelihood diversification was the study area. The study has suggested the need to develop education and skill development trainings to poor farm households in the hilly areas, it surely provide a positive impact on the ability to diversify their livelihood options.

Keywords: Livelihood, Livelihood Determinant, Hill Altitudes

INTRODUCTION

Uttarakhand is one of the hilly states in the Indian Himalayas. Formerly a part of Uttar Pradesh, Uttarakhand (formerly called Uttaranchal) was created as the 27th state of the Indian Union on November 9th, 2000 by carving out the 13 hill-districts of Uttar Pradesh. It lies in the Northern part of India between the latitudes 28°43'-31°27'N and longitudes 77°34'- 81°02'E having a maximum dimension of east - west 310 km and 255 km north - south covering an area of 53,484 km^2 with the elevation ranging from 210 to 7817 amsl. The state shares border with China (Tibet) in the North and Nepal in the East and interstate boundaries with Himachal Pradesh in the West, Northwest and Uttar Pradesh in the South. Uttarakhand state falling in two major administrative units viz., Garhwal (northwest portion) and Kumaun (southeast portion). Garhwal Division consists of 7 districts, i.e. Dehradun, Haridwar, Uttarkashi, Tehri, Pauri, RudraPrayag and Chamoli while remaining 6 districts viz., Pithoragarh, Bageshwar, Almora, Nainital, Champawat and Udham Singh Nagar fall in Kumaon division.

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for means of living. A livelihood is sustainable when it can cope with and recover from stress

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and shocks and maintain or enhance its capabilities and assets both now and in the future (Chambers & Conway, 1991). Livelihood diversification has generally occurred as a result of an increased importance of non-farm wage labour in household livelihood portfolio or through the development of new forms of on- farm/on-site production of non-conventional marketable commodities. In both cases, diversification ranges from a temporary change of household livelihood portfolio (occasional diversification) to a deliberate attempt to optimize household capacity to take advantage of ever-changing opportunities and cope with unexpected constraints (strategic diversification). In fact, livelihood diversification is a process by which rural households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and improvement in their standards of living (Ellis, 1998). Livelihood diversification is defined as a process by which household members construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living (Ellis, 1998).

The present study has been conducted on Kumaun hills of Uttarakhand. Agriculture in Uttarakhand is broadly defined to cover all land-based activities such as cropping, animal husbandry, horticulture, forestry, and their linkages and support system, and is a prime source of sustenance for most mountain communities. Five major farming systems are prevalent, namely; (i) cereal based production system (ii) horticulture or agri-horti production system, (iii) vegetables, floriculture based production system, (iv) livestock based production system and (v) agri-horti- silvi-pastoral production system. In table 1 depicts farming situation in Uttarakhand. The economy of Uttarakhand is predominantly agrarian, Uttarakhand has only 14 percent of the total land under cultivation and about 65 percent of population depends on agriculture for their livelihood. Being a state with diverse agro-climatic endowments, conditions under which agriculture is carried out differ remarkably across areas (Uttarakhand: PHD chamber, 2013). The hilly regions are lacking behind in terms of infrastructure, i.e. electricity, roads and irrigation facilities. The inter-regions inequality in infrastructure leads to increasing disparity in terms of income and livelihood.

Farming Situation in Uttarakhand

Sl. No.	Farming situation	Soil	Principal crops grown
1	Irrigation lower hills (600-1200m)	Alluvial sandy soil	Rice, wheat & vegetables
2	Rainfed lower hills (600-1200m)	Residual sandy soil	Finger millet, maize, rice, wheat
3	Mid hills south aspect(1200-700m)	Sandy soil	Rice, finger millet, wheat, potato, tomato
4	Mid hills north aspect (1200-1700m)	Brown forest soil	Rice, finger millet, wheat, potato, tomato peas, cole crops
5	High hills (1700-2500m)	Red to dark	Amaranthus, finger millet, French bean, cole crops, potato, peas
6	Very high hills (2500-3500m)	Red to dark black clay	Amaranth, buckwheat, peas, cole crops, potato, peas

Source: Uttarakhand State Action Plan for Climate Change, 2013

RESEARCH METHODS & MATERIAL:

The study was conducted in the state of Uttarakhand Kumaun hill during the period 2013-2014. One districts were selected randomly, Then, two blocks from the district had been selected randomly. On this basis Hawalbagh block and Takula block were selected for further selection of the villages. For the selection of the villages a list of villages falling under both the blocks were prepared according to hill altitude in consultation with the respective Block Development Officers. From the list of the villages under the blocks, six villages were selected randomly; two villages from each stratum viz., low hill (600-1200 meter), mid hills (1200-1700 meter) and high hills (1700-2500 meter) by simple random sampling, thus two villages were selected from each altitude as; Pali and Bhesodi from low hill, Udyari and Bina from Mid hills, and Ghursu and Amkholi from high hills. Fifteen farmers from each village were selected randomly comprising 5 each from the 3 income groups. Thus 45 farmers from each block were selected to make total sample size of 90 farmers. To identify the major determinants of livelihood determinants, multiple linear regression analysis was fitted. It was hypothesized that the extent of livelihood determinant is a function of a set of factors viz: age of family head, family size, dependency ratio, education, asset value, farm size and land-man ratio and therefore these variables were incorporated in the model. Multiple linear regressions were fitted to examine the livelihood determinants.

The determinants of livelihood diversification

To identify the major determinants of livelihood diversification, multiple linear regression analysis was fitted using following equation:

$$\mathbf{DI = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_7 X_7 + U}$$

Where, **DI = Livelihood Diversity Index of farm households of different hill altitudes/income category**

X_1 = Age of the household head (years)

X_2 = Family size (numbers)

X3 = Dependency ratio

X4 = Education level (years)

X5 = Asset value (Rs.)

X6 = Farm size (ha)

X7 = Land man ratio

β_0 = constant,

$\beta_1 \ldots \beta_7$ = regression coefficient.

U = disturbance term.

RESULTS AND DISCUSSION

Table 2: Estimated regression function for the determinants of livelihood diversification at different altitudes N=90

Variables	Hill altitudes			
	Low Hill	Mid Hill	High Hill	Overall
Intercept	0.439** (0.21)	0.147*** (0.15)	0.14*** (0.18)	0.17** (0.09)
Age (X_1)	0.0036*** (0.0021)	0.01 (0.0014)	0.0078 (0.0012)	0.0078 (0.00087)
Family size (X_2)	0.042*** (0.029)	0.032** (0.019)	0.016*** (0.012)	0.018* (0.0089)
Dependency ratio(X_3)	-0.00068*** (0.0016)	-0.0016*** (0.0012)	-0.00028*** (0.0011)	-0.00043*** (0.00077)
Education (X_4)	0.013 (0.011)	0.009*** (0.007)	0.0035** (0.006)	0.0037*** (0.005)
Asset value (X_5)	0.0047 (0.0059)	0.0038*** (0.0036)	0.0051** (0.003)	0.0039*** (0.0025)
Farm Size (X_6)	0.029 (0.006)	0.019*** (0.0033)	0.014 (0.0017)	0.018 (0.0019)
Land man ratio (X_7)	-0.12 (0.032)	-0.09 (0.02)	-0.053* (0.015)	-0.087 (0.013)
R^2	0.66	0.81	0.92	0.72

Note: *, **, *** indicate significant at 1 per cent, 5 per cent and 10 per cent probability levels, respectively. Figures in parentheses denote standard error**.**

The livelihood diversification at different altitudes of study area was estimated using multiple liner regression function and the results are presented in Table 2 in the case of low hill the coefficient have been found positive and significant for age, and family size, but dependency ratio (DR) found negatively significant. Also, the coefficients for education, asset value, farm size, and land man ratio (LMR) have been observed non-significant. Coefficient of multiple determinations (R^2) was found 0.66, which indicated that 66 per cent of total variation in level of livelihood diversification was explained by the explanatory variables included in regression function.

For mid hills, factors like family size, education, asset value and farm size have depicted a positive impact, whereas, dependency ratio has negative impact on livelihood diversification. Value of coefficient of multiple determinations in mid hill found 0.81 which inferred that 81 per cent variation of total variation in livelihood diversification caused by regressor.

In case of high hill, the coefficient for family size, education and asset value were positive and significant, whereas, dependency ratio and LMR were negative and significant for livelihood diversification. The age and farm size have been observed non-significant. The coefficient of multiple determinations has been found highest 0.92 for indicating that 92 per cent variation in livelihood diversification explained by explanatory…variables.

Table 3: Estimated regression function for the determinants of livelihood diversification of different income group. N=90

Variables	Labour Class	Agriculture Class	Government service Class	Overall
Intercept	-0.031* (0.21)	0.023*** (0.096)	0.68*** (0.23)	0.17** (0.09)
Age (X_1)	0.0069 (0.0017)	0.011 (0.00091)	0.0046* (0.0016)	0.0078 (0.00087)
Family size (X_2)	0.0058*** (0.017)	0.0018*** (0.0088)	0.045*** (0.025)	0.018* (0.0089)
Dependency ratio (X_3)	-0.0015*** (0.0015)	-0.0016** (0.0008)	-0.0017*** (0.0016)	-0.00043*** (0.00077)
Education (X_4)	0.008 (0.008)	0.0048*** (0.006)	0.012** (0.012)	0.0037*** (0.005)
Asset value (X_5)	0.0084*** (0.0047)	0.0054** (0.0026)	0.00077*** (0.0069)	0.0039*** (0.0025)
Farm Size (X_6)	0.025 (0.0037)	0.0070* (0.0027)	0.02 (0.0031)	0.018 (0.0019)
Land man ratio (X_7)	-0.08 (0.026)	-0.031*** (0.017)	-0.12 (0.029)	-0.087 (0.013)
R^2	0.80	0.88	0.73	0.72

Note: *, **, *** indicate significant at 1 per cent, 5 per cent and 10 per cent probability levels, respectively. Figures in parentheses denote standard error**.**

The results of regression function for the determination of livelihood diversification of different income groups is shown in table 3 In case of labour based income category the coefficients have been found positive for family size and asset value while, coefficient has found negative for dependency ratio. Also, the coefficients for age, education, farm size and LMR have been observed non-significant. The value of coefficient of multiple determination was found 0.80 which indicated that 80 per cent variation in livelihood diversification explained by explanatory variables.

For agriculture based income category, family size, education, asset value and farm size have shown positive impact while dependency ratio and LMR have depicted a negative impact on livelihood diversification. The coefficient for age only has shown non-significant. The coefficient of multiple determination have shown very high association of explanatory variables to livelihood diversification of 0.88. It showed the 88 per cent variation explained by explanatory variables.

In case of government service income category, the coefficient for age, family size, education and asset value were positive and significant whereas, only dependency ratio was negative and significant. The coefficients for farm size and LMR were non-significant. The value of coefficient of multiple determination was found 0.72, which showed that 72 per cent variation to the total variation in livelihood diversification caused by explanatory variable. For overall study area, the coefficients for family size, education and asset value have been found positive and significant, whereas, coefficient for dependency ratio has found negative and significant. Also, coefficients

for age farm size and LMR have been found non-significant. Overall value of coefficient of multiple determinations was 0.72, which showed 72 per cent variation to the total variation in livelihood diversification explained by explanatory variables.

Age has been found to have a significant and positive influence on farm household's livelihood diversification of government service based farm households as multiplicity of activities increases with advancing age. Positive influence of age may be explained by two ways: first, experience increases with age, consequently, experienced persons have more prospects of getting jobs. Secondly, it is experienced that, in low hill and government service category, if the farm household heads were in government job than the probability of government job holders in his family may be relatively more. In line with the expectation, family size was found to be positively related with level of livelihood diversification.

Dependency ratio was found to be negatively related with the level of livelihood diversification. The possible explanation could be that an increase in dependency ratio increases the number of dependent persons in family. This means shortages of working hands to earn from diversified activities for meeting household needs. As expected, the educational level was found to be one of the important determinants of livelihood diversification across the hill altitudes, except in low hills and across income groups, except labour income based farm households. The highly educated persons diversify their livelihood options through opting for salaried jobs, self employment activities, etc., whereas, low educated and illiterate persons engage themselves in wage earning. The value of physical assets owned by a farm household was found to have a significant and positive effect on the level of livelihood diversification. Asset base is one of the limiting factor towards livelihood diversification in different hill altitudes except low hills as well as across income categories in the study area. As expected the relationship between livelihood diversification and farm size was found positive for agriculture based households as well as in mid hills. It could be explained as large farm size provided the option of farm diversification, which increases the source of income. According to presumed hypothesis land-man ratio found out to be an important determinant of livelihood diversification among agriculture based farm households. As expected, the relationship between the land-man ratio and diversification level was found to be negative. A similar results were also proposed by Khatun (2012) in his study on determinants and constraints to livelihood diversification among different livelihood groups reveals that household head experience (age), educational level, social status, training, asset position, access to credit, rural infrastructure, agro-climatic condition and the overall level of economic development of a region were the main driving force towards livelihood diversification in the state. The study has suggested the need to develop a number of strategies especially for the poor people to facilitate successful livelihood diversification. This includes the development of rural infrastructure in terms of road, market, electrification, telecommunication, storage facilities, etc. and also institutional innovations to reduce entry costs and barriers to poor livelihood groups

CONCLUSION:

In low hill the age and family size were found affecting the diversification directly, whereas, dependency ratio (DR) found affecting it negatively. In the mid and high hill, family size, education (), asset value and farm size have depicted a positive impact, whereas, dependency ratio has shown negative impact on livelihood diversification. In the labour and agriculture based income category the factor affect

diversification positively were family size and asset value while dependency ratio and LMR have depicted a negative impact on livelihood diversification. In case of government service income category, the impact of age, family size, education and asset value was positive whereas, that of dependency ratio was negative. For the overall study area, the factors family size, education and asset value have been found affecting positively, whereas, dependency ratio has found negatively affecting the farm household livelihood diversification. The study has suggested the need to develop education and skill development trainings to poor farm households in the hilly areas, it surely provide a positive impact on the ability to diversify their livelihood options. It can be concluded that education has always been found as an effective medium for increasing the livelihood diversification strategies, as it helps to relax the entry barriers for the non-farm activities like the salaried jobs.

REFERENCES

Agarwal, V. K., 2013. "*A Study of Sustainable Livelihood Security and Agriculture Diversification in Rajasthan*." Thesis, M. Sc. G B P U A T, Pantnagar, Uttarakhand.

Chambers, R., and Conway, G.R., 1991. "Sustainable Rural Livelihoods: Practical Concepts for the 21st Century." *Institute of Development Studies* DP 296.

Ellis, F., 1998. Survey article: "Household strategies and rural livelihood diversification."*Journal of Development Studies*, 35(1): 1-38.

Franklin, P. S., 2010. "Livelihoods diversification and gender in Malawi" *African journal of agricultural research,* 5 (3):204-216.

Freeman, H. Ade., Ellis., Frank. and Allison, E. 2004. "Livelihoods and Rural Poverty Reduction in Kenya*." Development Policy Review*, 22: 147-171.

Goswami, S., 2013. "Crop Diversification In Uttarakhand: An Economic Analysis." Thesis, M. Sc. G B P U A T, Pantnagar, Uttarakhand.

Hiremath, B.N. 2007. Institute of Rural Management, Anand, 4-6 December 2007. The changing faces of rural livelihood in India, In: National Civil Society Conference on What it Takes to Eradicate Poverty.

Khatun, D., and Roy, B. C., 2012. "Rural Livelihood Diversification in West Bengal: Determinants and Constraints." *Agriculture Economics research Review,* 25 (1): 115-124.

Kumar, P., Singh, N.P., and Mathur, V.C. 2006. Sustainable Agriculture and Rural Livelihoods: A Synthesis. *Agricultural Economics Research Review,* 19: 1-22.

Rahut, Dil. Bahadur 2012. "Rural Livelihood Diversification Strategies in Nepal".