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A Study on Livelihood Diversification and its Determinants at Farm level in Uttarakhand

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ABSTRACT

Farm diversification is seen as a vital strategy for fostering rapid economic growth and development in hilly regions. This includes shifting from traditional crops to more valuable ones and engaging in additional activities like dairy farming, poultry, fishery, sheep and goat rearing, horticulture, and related pursuits. The present study was undertaken in Uttarakhand in 2023 with 140 sponsored farmers at SAMETI to investigate the extent and nature of livelihood diversification among the farmers. It was found that Simpson's diversity index was 0.89 and overall farmers were involved in 14 different types of farming enterprises, with 79 per cent involved in cereal cultivation followed by vegetables (55.71%), and fruits and plantation (40%) and a very less percentage of farmers involved in fishery (13.57%), forestry (9.29%), and mushroom (5.71%). The number of training attended (β_6 = 0.767) by a farmer had a major impact on the diversification of the farmers. The study suggests several less utilized farming enterprises, where more involvement of farmers should be ensured thus improving their profits. Farmer training will play a significant role in achieving the above goals.

INTRODUCTION

In India, the sustainability of land-based livelihoods for small and marginal farmers is progressively decreasing. The land cannot support the needs of rural farm households for food for a long time (Hiremath, 2007). Hence, rural households are compelled to explore alternative sources of income and diversification of farm enterprises significantly contribute to generate cash income for poor households. Diversification represents a strategic approach employed by individuals to meet their basic needs and enhance their overall well-being (Ezung, 2021). Diversification of farm enterprises by farmers means expanding and varying the ways of earning money and it has always been an important aspect of agricultural development not only for India but throughout the world (Kisku & Ghosh, 2017). According to the Food and Agriculture Organization (2001), diversification is the single most important source of poverty reduction for small farmers in South and Southeast Asia.

Livelihood diversification (LD) is an important approach used by people globally to meet their needs and enhance their well-being. It is an ongoing adaptive process where farming households add new enterprises and activities, keep existing ones, or let go of others, thereby creating diverse and evolving livelihood portfolios, ensuring not only survival but also continuous improvement in their standard of living (Saha & Bahal, 2010; Rejula et al., 2017; Jose et al., 2023; Singh et al., 2023). The diversification of agriculture is viewed as a crucial strategy for promoting swift economic growth and development in the hilly states. This involves a change in the types of crops grown while shifting towards more high-value crops instead of traditional ones. Additionally, it includes adopting various allied activities such as dairy farming, poultry, fishery, sheep and goat rearing, horticulture, and other related endeavors (Raj, 2010).

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It is widely acknowledged that traditional farming practices in the hilly areas of Uttarakhand are unable to generate more job opportunities for the growing labour force or sustain the livelihoods of farming households. This is mainly due to the increasing fragmentation of arable land, its declining quality, and the deterioration of natural resources that support agriculture (Mehta & Mehta, 2016). Thus, instead of relying solely on one crop or activity, farmers explore different avenues such as growing various crops, raising livestock, or engaging in related enterprises. Uttarakhand is a hilly state mainly dominated by marginal and small farmers; hence diversification of their farming enterprises becomes very important so as to reduce dependence on single or less enterprises and earn a sustainable income. This approach helps farmers reduce risks, enhance financial stability, and contribute to the overall sustainability of their farming practices. Diversification constitutes an integral aspect of the current rural economy of Uttarakhand, wherein 80.13 per cent of the total population relies on multiple income sources to sustain their livelihoods (Naudiyal et al., 2019). Literature has revealed the importance of diversification of livelihood options for farmers, particularly in Uttarakhand. Therefore, this study aims to investigate the nature and extent of diversification among the farmers of Uttarakhand.

METHODOLOGY

The present study was undertaken on the farmers of Uttarakhand. Farmers who were sponsored by Agricultural Technology Management Agency (ATMA) and state line department of Uttarakhand to attend the training programs in the State Agricultural Management and Extension Training Institute (SAMETI) of Uttarakhand constituted the population. Farmers were purposively chosen from SAMETI as they have a professional outlook towards farming and different farming enterprises. Sponsored farmers from seven different trainings programs conducted in 2023 were selected as respondents. One single training had a minimum of 20 farmers, thus a total of 140 farmers (20 from each training) were chosen purposively for the present study. Relevant data was collected through a pre-tested interview schedule containing structured as well as open ended questions. All the respondents were interviewed by the researcher. Data was collected regarding different variables relevant to the objective of the study including age, education, land holding, annual income, farming experience, number of trainings attended, and different farm and non-farm enterprises undertaken by the respondents to understand the level of diversification of livelihood sources by the farmers. Livelihood diversification was operationalized as the number of different farm enterprises undertaken by a farmer for his livelihood. The analysis involved the use of statistical methods, including frequency, percentage, standard deviation, and correlation coefficient. The diversity of the enterprises undertaken by the farmers was calculated using the Simpson Diversity Index (Simpson, 1949). The Simpson Diversity Index (SDI) is calculated as:

$$SDI = \frac{1- \Sigma^{n}_{i=1} n_i (n_i -1)}{N(N-1)}$$

Where, n is the number of farmers choosing a particular farm enterprise, N is the total number of respondents. The value of SDI ranges from 0 to 1, i.e., from no diversity to very high diversity. Also, multiple regression model was used to identify the determinants of farm diversification.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where, Y= number of livelihood enterprises, α = constant, β_1 to β_6 = regression coefficient, X_1 = age (years), X_2 = education, X_3 = land holding (hectares), X_4 = annual income (rupees), X_5 = farming experience (years), X_6 = number of trainings attended in last three years.

RESULTS

Farming enterprises undertaken by the farmers

Farmers of Uttarakhand did not limit themselves to single farming enterprise when it comes to livelihood options and thus, they prefer a diverse portfolio for farming enterprises. Table 1 provides a comprehensive view of this agricultural diversity, categorizing farmers' pursuits into four primary sectors. The mutually inclusive data shows that agriculture emerges as the predominant enterprise, engaging 86.43 per cent of the farmers, followed by horticulture (76.43%), animal husbandry (60%), and other miscellaneous enterprises (32.15%). The detailed look of these specific enterprises showed cereals as the leading agricultural enterprise, commanding a substantial 79.29 per cent share, followed by vegetables (55.71%) and fruits and plantation (40%). Noteworthy was the least share of mushroom growers (5.71%) and a complete absence of farmers involved in the piggery enterprise. Millets were practiced by only 37.14 per cent of the farmers. Less than 20 per cent of the farmers were involved in floriculture, medicinal and aromatic plants, fishery, poultry, goat, and sheep rearing, and forestry.

Diversification of farming enterprises by the farmers

In rural areas, livelihood diversification is a strategy wherein farm households engage in a variety of farming activities to sustain and improve their living standards. As evident in Table 2, a

Table 1. Different enterprises undertaken by the farmers

Categories	Percentage	Enterprise	Percentage
Agriculture	86.43	Cereals	79.29
		Pulses	38.57
		Millets	37.14
Horticulture	76.43	Vegetables	55.71
		Fruits and plantation	40.00
		Floriculture	12.14
		Medicinal and Aromatic	14.29
Animal husbandry	60	Fishery	13.57
		Poultry	16.43
		Dairy	38.57
		Piggery	0.00
		Goat and Sheep	17.86
Others	32.15	Honeybee	23.57
		Forestry	9.29
		Mushroom	5.71

Table 2. Diversity in farming enterprises

Number of enterprises	Percentage
Upto2	32.86
3 to 6	52.86
6 to14	14.29

Overall diversity index 0.89

significant majority of farmers in Uttarakhand participate in multiple farm-related enterprises. Specifically, 52.86 per cent of farmers are involved in three to six enterprises, while 32.86 per cent are engaged in up to two enterprises. Notably, 14.29 per cent of farmers exhibit a high level of diversity by managing between 6 to 14 enterprises. The overall enterprise diversification index, calculated at 0.89, underscores the propensity of farmers in Uttarakhand to engage in a broad spectrum of enterprises, reflecting a commitment to diversity.

Determinants of farm enterprise diversification

Multiple regression analysis and correlation coefficient showed the relationship of different variables with enterprise diversification (Table 3). Age and education were found to be non-significant and negatively related with diversification of the farming enterprises. Land holding also had a negative relationship (β_3 = -0.27849) and was found to be significantly related to diversification. One unit change in land holding will decrease diversification by 0.279 units approx. Annual income (β_4 = 0.01651), farming experience (β_5 = 0.04383) and number of trainings attended (β_6 = 0.76684) by the farmers were significantly and positively related to the diversification. It signifies that with the one unit increase in annual income, farming experience and number of trainings attended, a farmer becomes more diversified by 0.01651, 0.04383 and 0.76684 units respectively. The coefficient of determination was found to be 0.4240 that signifies these variables collectively explained 42.40 per cent variation in the diversification of enterprises by the Uttarakhand farmers.

DISCUSSION

The farmers in Uttarakhand are involved in different types of farming enterprises as indicated in Table 1. Surprisingly there were no piggery farmers despite it being a profitable enterprise which may be due to the fact that people are not sensitized in Uttarakhand to take up pig farming and consume pork. The finding was consistent with that of Chauhan et al., (2016) who reported on pig production system as a livelihood option and that consumers' cultural perceptions regarding pork meat affects its consumption. Also, SAMETI, Uttarakhand do not conduct trainings on pig farming, thus affecting farmers perception and adoption for the enterprise. Among all the enterprises, cereal cultivation remains the top priority for the majority of the farmers, despite the size of their operational land holding. Farmers were involved mainly in rice and wheat cultivation, as it has become a part of their food system and consumption of cereals daily is very common in India. The finding is consistent with Sharma et al., (2020), who reported that people in India consume cereals in excess and less of vegetables, fruits, and protein. Uttarakhand has a lot of scope for millets cultivation and despite several initiatives of government still less than 50 per cent farmers are involved in it. However, continuous efforts from the government have made a positive impact on farmers (Rawat et al., 2020) regarding millet cultivation. Farmers had a positive attitude for millets cultivation and were keen to further explore this crop. A very less percentage of farmers are involved in mushroom cultivation, which is a very profitable enterprise and requires very little space (Pal et al., 2017; Pandey et al., 2018). Enterprises like poultry, fishery, medicinal and aromatic plants, agroforestry etc. should also be focused more by farmers in place of cereals, which has more potential for growth income wise. SAMETI can play a major role in this, by increasing the number of training programs in alternate enterprises to increase their adoption by the farmers.

The present study displays a significant diversity in farming enterprises, a trend likely attributed to the farmers' limited resources, small landholdings, and challenges stemming from demographic and topographic constraints, as indicated by Rana et al., (2019). Given the relatively lower agricultural output compared to the national average, relying on just two or three enterprises is neither sustainable nor profitable for these farmers. Consequently, they actively seek diversified livelihood options within farming and allied activities to enhance their economic prospects. This finding aligns with previous research by Ibrahim et al., (2009); Subbaiah et al., (2020), validating the trend of farmers embracing diverse agricultural activities to enhance their livelihoods. Also, farmers participating in training programs facilitated by SAMETI are characterized as progressive and socially engaged individuals, maintaining regular contact with various extension agencies. This exposure equips them with awareness about different enterprises and government schemes, contributing to the majority of farmers upholding a diverse portfolio of farming enterprises for increased sustainability and economic viability.

Table 3. Determinants of diversification of farm enterprises

Variable	Correlation	Coefficient	Standard error	t-value
Intercept		2.39670	1.379125	1.73784
Age (X_1)	0.041	-0.02291	0.019988	-1.14643
Education (X_2)	-0.006	-0.14810	0.205178	-0.72183
Land holding (X_3)	-0.135	-0.27849**	0.098359	-2.83142
Annual Income (X_4)	0.305	0.01651**	0.079652	2.79534
Farming experience (X_5)	0.327	0.04383**	0.014847	2.95242
Training attended (X_6)	0.525	0.76684**	0.119562	6.41371

**Significant at 5 per cent level

It was also identified that farmers of the study area despite their age and education level had a diverse portfolio of farming enterprises, which might have been due to their available resources for different farming enterprises in their respective locations because of demographic and geographical issues (Singh et al., 2018). Land holding is very crucial for any farmer for diversification and improving his livelihood sources. Farmers of the study area had more diversification of their farming enterprises if they own less land as they didn't limit their income by depending only on one enterprise (Beevi et al., 2015). Conversely, an increase in landholding appeared to correlate with a decrease in diversification, suggesting that larger landowners tend to concentrate their efforts on maximizing returns from a limited set of enterprises. Annual income, farming experience, and number of trainings attended emerge as pivotal factors influencing diversification in agriculture (Sharma & Singh, 2023). A farmer's annual income serves as a direct indicator of financial capacity, impacting their ability to explore and invest in diverse enterprises. Meanwhile, accumulated farming experience contributes to a farmer's knowledge base, fostering confidence in managing varied activities. Out of all the factors, the number of trainings attended played a major role in diversification, as it helps a farmer to understand about new enterprise practices and improve profitability ultimately driving diversification efforts in pursuit of sustainable livelihoods. The finding was consistent with Mehta et al., (2021) who concluded that training attended by farmers has a positive and significant impact on livelihood diversification. Additionally, the value of coefficient of determination (0.4240) signifies that there are several other intervening and extraneous variables that are impacting the diversification by the farmers.

CONCLUSION

Empirical findings indicated a notable diversity among farmers in Uttarakhand, underscoring their reliance on various farm enterprises for livelihoods. However, significant untapped potential exists for diversification into non-traditional sectors such as poultry, piggery, mushroom cultivation, fishery, and floriculture, all of which exhibit promising returns. Medicinal and aromatic plants cultivation also have a lot of scope in Uttarakhand. The farmers should be encouraged and assisted in the cultivation and marketing of medicinal and aromatic plants. Training and capacity building programs attended by the farmers play a significant role in making them aware of new farming enterprises. There is a need for conducting targeted training programs that equip farmers with the best diversification strategies based on their available resources and geographical locations, so they may reap the most out of farming.

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