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Determinants of farm diversification in Karnataka: A socio-economic assessment

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Abstract

The study examines a socio-economic assessment of farm diversification on income variability among farmers in Belagavi and Haveri districts of Karnataka during 2023-24. It involved 120 farmers, stratified by farm size and found a positive relationship between diversification and income stability. The study used the Simpson Index of Diversification (SID) to measure diversification and the Tobit model to identify factors influencing it. Farmers with no diversification had an average income of ₹6,31,716 and 59.10 per cent income variability, while fully diversified farms averaged ₹20,48,049 with just 8.03 per cent variability. Key factors influencing diversification included education, farming experience, landholding size, farm income, and non-farm income. Experience and farm income were the most significant determinants. Farmers with more experience and higher farm income were better able to diversify, reducing their reliance on a single income source. In terms of farm size, larger farmers had higher levels of diversification, driven by better resources and the ability to invest in multiple enterprises. Belagavi farmers exhibited greater diversification and higher incomes compared to those in Haveri, likely due to better market access and agro-based infrastructure. Chi-square analysis showed a strong positive association between farm income and diversification, with wealthier farmers more likely to diversify to mitigate risks and enhance profitability. The study concluded that farm diversification is an effective strategy for achieving higher and more stable incomes. In addition, it highlights that farm size and income are critical determinants of diversification. It recommends policy interventions that support education, market access and resources to help small farmers diversify and improve their incomes.

Keywords: Determinants, enterprise, farm diversification, income stability, farm income

Introduction

Diversification involves integrating multiple agricultural enterprises, such as combining crop production with livestock, horticulture or agro-processing activities. It also extends to non-agricultural enterprises like rural tourism, off-farm employment or value-added services, which can provide additional sources of income. Farm diversification is a critical strategy for enhancing income stability and resilience in agricultural systems. As the agricultural sector faces increasing challenges from market fluctuations, environmental uncertainties and limited resource availability, diversification has gained attention as a viable means of mitigating risks and improving farm incomes. The importance of farm diversification lies in its ability to reduce farmers' reliance on a single crop or enterprise. In a predominantly agrarian economy, where income is often unpredictable due to volatile commodity prices, climate variability and fluctuating input costs, diversification offers a buffer against these uncertainties. Engaging in diverse agricultural activities helps distribute risks across different enterprises, providing income stability in the face of adverse events like crop failure, pest outbreaks or market downturns. Economic factors such as income stability, risk management and efficient resource use are key drivers of diversification. By diversifying, farmers can increase their overall income through multiple revenue streams, thereby smoothing out

income variability. Diversification also serves as a risk management tool by reducing the financial dependence on a single enterprise, minimizing exposure to price shocks and climate risks. Additionally, it promotes efficient use of available resources, including land, labour and capital, by optimizing their allocation across different enterprises, leading to improved farm productivity and sustainability. In this context, understanding the impact of farm diversification on income stability and identifying the key factors influencing diversification decisions are essential. This study aims to explore the relationship between diversification and income stability while examining the economic, social and institutional factors that drive diversification in agricultural systems.

Materials and Methods

The study was conducted in Belagavi and Haveri districts of Karnataka in the year 2023-24. The districts were selected purposively based on the number of small-scale units, Belagavi was among the top three and Haveri among the bottom three districts in Karnataka. Farmers from each district were stratified based on different farm size categories, namely, small farmers (<5 acres), medium farmers (5-10 acres) and large farmers (>10 acres) and were randomly selected at the rate of 20 from each category spread across two districts for farm diversification (Type B

secondary agriculture activities). Thus, in all, a sample of 120 respondents was selected for the present study.

The study was based on primary data, which were gathered from selected sample farmers using pre-tested and well-structured schedule through personal interview method.

Descriptive statistical tools like percentage, mean, coefficient of variation etc were employed to analyse the contribution of farm diversification to farm income and income stability. The Simpson Index of Diversification (SID) was employed to analyze the level of diversification in the study area, following the same methodology used by Suhas (2023) [4]. Tobit model was employed to study the factors affecting farm diversification, following the same methodology employed by Mekuria *et al.* (2018) [2]. Analysis of variance was used to know the significant differences on mean farm diversification and farm size categories. Chi square test was utilized to examine the association between farm diversification and farm income.

Results and Discussion

Estimate of income variability in the study area

The analysis of income variability across different levels of farm diversification highlights significant differences in income stability. Table 1 provides an estimation of income variability in the study area based on different levels of farm diversification, as measured by the Simpson Index of Diversification (SID). Farmers who did not diversify (SID = 0) had the lowest average income of ₹6,31,716, along with the highest income instability, reflected in a coefficient of variation of 59.10 per cent.

As diversification increased, both income levels and income stability improved. Those with low diversification ($0 < \text{SID} < 0.092$) earned a slightly higher average income of ₹7,44,677, with a marginally lower coefficient of variation at 57.46 per cent.

Farmers with medium diversification ($0.092 \leq \text{SID} \leq 0.537$) saw a more significant rise in income, averaging ₹10,53,070 and a reduced coefficient of variation (49.61%), indicating that moderate diversification had a stronger impact on both income growth and stability.

At higher diversification levels ($\text{SID} > 0.537$), income jumped to an average of ₹17,67,210, while income variability decreased significantly, as reflected in a coefficient of variation of 27.82 per cent. Farmers with complete diversification (SID = 1) reported the highest mean income of ₹20,48,049 and the lowest income variability, with a coefficient of variation of 8.03 per cent. The decreasing coefficient of variation with increasing SID

levels confirmed that diversification was a key factor in ensuring more stable and higher income for farmers.

Thus, diversification reduces income variability by allowing farmers to distribute risks across multiple enterprises, minimizing dependence on a single source of income. Farmers who did not diversify faced greater income instability due to vulnerability to market fluctuations and environmental risks. As diversification increased, income levels rose while variability decreased, as the performance of one enterprise could offset potential losses in another. Diversified farms also took advantage of varying market opportunities, seasonal changes and efficient resource use, leading to more consistent earnings. Thus, diversification served as an effective strategy to achieve both higher income and greater financial stability for farmers.

Estimates of Tobit Model for determinants of diversification

The Tobit Model estimates for the determinants of farm diversification revealed several significant factors influencing the extent of diversification. The Table 2 revealed the factors influencing farm diversification using a Tobit model. The intercept, with a coefficient of 0.168 and significance at the 10 per cent level, indicates a baseline positive effect on diversification. Significant determinants included education (coefficient 0.045, $p < 0.10$), which promoted diversification by enhancing knowledge and skills and experience (coefficient 0.003, $p < 0.01$), which provided valuable practical insights. Larger agricultural land areas (coefficient 0.023, $p < 0.01$) and higher farm income (coefficient 0.00002, $p < 0.01$) also positively affected diversification, as they offered the resources necessary for engaging in a range of agricultural activities. Additionally, non-farm income (coefficient 0.00003, $p < 0.05$) supported diversification by reducing dependence on a single agricultural activity.

Conversely, age and family size were not significant, indicating they had little impact on diversification decisions. Overall, the findings highlight that education, experience, agricultural land, farm income and nonfarm income were crucial factors in farm diversification, with experience and farm income being the most influential.

The above results are in line with the findings of Theodore (1999) [5] who reported that the land holding, annual income, area under irrigation, research- extension linkage and market services are the determining factors for farm diversification.

Table 1: Estimate of income variability in the study area

Sl. No.	Level of diversification	Range of SID	Frequency (n=120)	Avg. SID	Mean income (₹)	Standard deviation of income (₹)	Coefficient of variation (per cent)
1	No	0	29 (24.17)	0	6,31,716	3,73,404	59.10
2	Low	$0 < \text{SID} < 0.092$	12 (10.00)	0.064	7,44,677	4,27,926	57.46
3	Medium	$0.092 \leq \text{SID} \leq 0.537$	65 (54.16)	0.370	10,53,070	5,22,428	49.61
4	High	$0.537 < \text{SID} < 1$	12 (10.00)	0.619	17,67,210	4,91,761	27.82
5	Complete	1	2 (1.67)	1	20,48,049	1,64,658	8.03

Note: Values in parentheses indicate percentage to respective total value

Table 2: Estimates of Tobit Model for determinants of diversification

Parameter	Coefficient	Standard error	Marginal Effect	Expected sign
Intercept	0.168*	0.078	-	-
Age (year)	0.001	0.002	0.001	+
Education (No. of years)	0.045*	0.023	0.045	+
Family size (joint -1; nuclear - 2)	0.012	0.034	0.012	+
Experience (No of years)	0.003***	0.001	0.003	+
Agricultural land (acre)	0.023***	0.012	0.023	+
Previous year farm income (₹/year)	0.00002***	0.00001	0.00002	+
Previous year nonfarm income (₹/year)	0.00003**	0.00012	0.00003	+

Note: ***, ** and * indicates significance at one per cent, five per cent and 10 per cent level, respectively

Distribution of farmers based on extent of farm diversification

The analysis of farm diversification presented in Table 3 showed that 24.17 per cent of farmers did not diversify, with Haveri having a higher percentage (30%) compared to Belagavi (18.33%). This could be attributed to Haveri's limited market opportunities and reliance on staple crops. In the low diversification category, 10 per cent of farmers were identified, with Haveri again having a higher percentage (13.33%) than Belagavi (6.67%).

The majority of farmers (54.16%) exhibited medium diversification, more prevalent in Belagavi (60%) likely due

to better access to agro-based industries and infrastructure, enabling farmers to expand into additional enterprises. High diversification, at 10 per cent, showed a similar trend, with Belagavi leading slightly (11.66%). This might be due to more diverse cropping patterns and secondary agriculture activities. Complete diversification was rare (1.67%) and only observed in Belagavi, indicating greater resource availability and market integration in the district.

The research conducted by Sachin (2020) [3] and Dudhatra (2021) [1] also reported similar patterns in extent of diversification with majority farmers belonging to medium level of farm diversification.

Table 3: Distribution of farmers based on extent of farm diversification

Sl. No.	Level of diversification	Belagavi District (n=60)	Haveri District (n=60)	Overall (n=120)	Range of SID	Avg. SID
		Frequency	Frequency	Frequency		
1	No diversification	11 (18.33)	18 (30)	29 (24.17)	0	0
2	Low	4 (6.67)	8 (13.33)	12 (10.00)	0 < SID < 0.092	0.064
3	Medium	36 (60)	29 (48.34)	65 (54.16)	0.092 ≤ SID ≤ 0.537	0.370
4	High	7 (11.66)	5 (8.33)	12 (10.00)	0.537 < SID < 1	0.619
5	Complete diversification	2 (3.34)	0 (00)	2 (1.67)	1	1

Note: Values in parentheses indicate percentage to the respective total value

One-way analysis of variance of farmers' mean farm diversification indices across different farm size categories

The one-way analysis of variance (ANOVA) revealed significant differences in farm diversification indices across different farm size categories in Table 4, with an F-value of 4.10, exceeding the critical value of 3.073 at a five per cent significance level. Large farmers had the highest mean diversification index (0.39) followed by medium farmers (0.30) and small farmers (0.28). This indicated that large farmers diversified more due to better access to resources, greater capacity to manage risk and opportunities to invest

in multiple enterprises. Small farmers, with limited land and resources, faced constraints in adopting diverse farming practices.

Contrasting results were obtained from Suhas (2023) [4] who found that there was no significant difference in mean farm diversification among different land holding category farmers with critical value 2.68. Medium and large land holding category farmers together had farm diversification of 29.87 per cent, followed by small farmers (23.31%), marginal farmers (22.67%) and semi- medium farmers (22.11%).

Table 4: One-way analysis of variance of farmers' mean farm diversification indices across different farm size categories

Sl. No.	Farm Size C	Mean farm diversification index	F value	δ
1	Small farmers (< 5 acre)	0.28	4.10**	3.073
2	Medium farmers (5-10 acre)	0.30		
3	Large farmers (>10 acre)	0.39		

Note: ** indicates 5 per cent level of significance

Table 5: Association between farm income and farm diversification (n=120)

Sl. No.	Farm income (₹)	Farm diversification (f)						χ^2
		No	Low	Medium	High	Complete	Total	
1	Low (< 1,91,656)	12	6	6	0	0	24	55.91***
2	Medium (191656 to 15,83,027)	14	4	51	3	0	72	
3	High (> 15,83,027)	3	2	8	9	2	24	
	Total	29	12	65	12	2	120	

Note: *** indicates one per cent level of significance with 8 degrees of freedom

χ^2 table value is 20.09

Association between farm income and farm diversification

The chi-square analysis of Table 5 showed a strong association between farm income and farm diversification, with a chi-square value of 55.91, exceeding the critical table value of 20.09 at a one per cent significance level. This indicated that higher-income farmers tended to diversify more compared to those with lower incomes. Among low-income farmers (earning less than ₹1,91,656), 50 per cent did not diversify, and none achieved high or complete diversification. This was likely due to limited financial resources and risk aversion.

In contrast, medium-income farmers (earning between ₹1,91,656 and ₹15,83,027) exhibited greater diversification, with 70.83 per cent falling into the medium diversification category. This group may have had more flexibility to invest in additional enterprises. High-income farmers (earning above ₹15,83,027) showed the highest level of diversification, with 9 farmers achieving high diversification and 2 attaining complete diversification. Their financial stability likely enabled them to take on greater risk and adopt diverse farming practices for increased profitability.

The above results are in line with the findings of Suhas (2023)^[4] who reported that calculated Chi-square value was 10.08 at five per cent level of significance with four degrees of freedom was found to be significant. It implies that farm

diversification essentially increased the farm income of the farmers.

Farm diversification by different farm size categories and their farm incomes in the study area

The data from Table 6 revealed that farm size had a notable effect on farm income and diversification. Among small farmers (less than 5 acres), the average annual income was ₹3,85,495 per household in Belagavi and ₹1,31,004 per household in Haveri, with an overall average of ₹3,58,249 per household. The average Simpson Index of Diversification (SID) for this group was 0.28, indicating limited diversification, likely due to restricted land and financial resources.

Medium farmers (5-10 acres) showed a higher average income of ₹9,35,987 per household overall, with Belagavi farmers earning significantly more (₹12,76,476/HH) than those in Haveri (₹5,95,498/HH). The SID for medium farmers was 0.30, reflecting moderate diversification, as these farmers had more capacity to engage in multiple enterprises.

Large farmers (more than 10 acres) had the highest incomes, averaging ₹20,17,789 per household, with Belagavi again leading (₹27,15,119/HH). Their SID was 0.39, the highest among all groups, as larger landholdings allowed them to diversify extensively into different crops and enterprises.

Table 6: Farm diversification by different farm size categories and their farm incomes in the study area

Sl. No.	Different farm size	Belagavi district (n=60)			Haveri district (n=60)			Overall (n=120)		
		f	Avg. annual farm income (₹/HH)	Avg. SID	f	Avg. annual farm income (₹/HH)	Avg. SID	f	Avg. annual farm income (₹/HH)	Avg. SID
1	< 5 acres (Small)	20	3,85,495	0.31	20	1,31,004	0.27	40	3,58,249	0.28
2	5-10 acres (Medium)	20	12,76,476	0.32	20	5,95,498	0.29	40	9,35,987	0.30
3	>10 acres (Large)	20	27,15,119	0.44	20	13,20,460	0.34	40	20,17,789	0.39

Note: SID – Simpson Index of Diversification

HH – Household

Conclusion

The study concluded that farm diversification is crucial for increasing income stability. As diversification levels, measured by the Simpson Index of Diversification (SID), farmers experienced higher incomes and reduced income variability. Factors like education, experience, land size, and income sources were key determinants of diversification, enabling farmers to engage in diverse activities and manage risks effectively. Ultimately, the study concluded that diversification plays a vital role in improving farm incomes and providing greater financial resilience.

The analysis also emphasized that farm size and income significantly influenced diversification levels. Larger farmers, with more resources, diversified more effectively, while smaller farmers faced limitations due to land and financial constraints. Belagavi farmers, benefiting from better market access and infrastructure, showed higher diversification and income compared to those in Haveri. A positive link between farm income and diversification was observed, suggesting that wealthier farmers are better positioned to adopt diverse practices, enhancing profitability and risk management. Diversification emerged as a critical strategy for improving both income and financial stability.

References

1. Dudhatra HC. Diversification in agriculture among the farmers of Banaskantha district [M.Sc (Agri.) Thesis]. Sardar Krushinagar Dantiwada Agricultural University, Gujarat, India; 2021.
2. Mekuria W, Mekonnen K. Determinants of crop–livestock diversification in the mixed farming systems: evidence from central highlands of Ethiopia. *Agric Food Secur.* 2018;7. <https://doi.org/10.1186/s40066-018-0212-2>
3. Sachin KB. Agriculture diversification among the marginal and small farmers of Panna District [M.Sc (Agri.) Thesis]. Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh, India; 2020.
4. Suhas BV. Study of secondary agriculture and its contribution to farm income [M.Sc (Agri.) Thesis]. University of Agricultural Sciences, Dharwad, India; 2023.
5. Theodore RK. Farm Diversification for Sustainable Agriculture (FDSA)-An empirical analysis [Ph.D. Thesis]. Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India; 1999.