



Factors Influencing Occupational Diversification among Farmers in Khordha District of Odisha

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HIGHLIGHTS

- Moderate to higher extent of occupational diversification of farmers was found
- More than half of factors expressed significant association with occupational diversification
- 64 per cent of variation in occupational diversification caused by all the factors under consideration, whereas only four factors contributed towards such variations significantly

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ABSTRACT

Farmers of the Khordha district of Odisha have been proactively involved in diversifying their occupations from conventional on-farm like crops to off-farm sectors like storage, post-harvest, input dealers, etc and even in non-farm like government jobs, restaurants, renting, etc. A study was conducted to assess factors' influence on farmers' occupational diversification during 2022-23. Data collection was conducted by personal interview method. 240 farmers were picked up as respondents under simple random sampling. The majority of the farmers expressed to the medium extent of occupational diversification. Factors such as education, the number of non-farm activities, achievement motivation, and management orientation were found to show significant contributions towards occupational diversification as these along with others managed to elucidate about sixty-four percent of variation on diversification.

INTRODUCTION

In Odisha, agriculture is pivotal to both the economy and the well-being of its inhabitants, showing a growth in its contribution to the state's Gross Value Added from 17.90 per cent in 2011-12 to 22.50 per cent in 2022-23 (Odisha Economic Survey, 2022-23, 2023). This sector is the primary source of income for about 70 per cent of the rural population (Chopde et al., 2019) which makes up 84 per cent of the state's total demographic (Pattanaik & Mohanty, 2017). Despite Odisha's dependency on agriculture, the sector has struggled with stagnation and faced numerous challenges in recent years. The disparities in socio-economic conditions across different regions (Sahoo & Paltasingh, 2019), combined with natural calamities like cyclones, droughts, and floods, have severely

impacted the rural economy (Pal et al., 2022). These adversities have compelled rural communities to explore various strategies for sustaining their livelihoods, including occupational diversification, to combat the unpredictable and harsh impacts of environmental factors on their standard of living (Lakshman Reddy, 2019; Pathak & Amardeep, 2024).

Livelihood diversification refers to the process where members of a household engage in various activities and build up a range of social support systems to enhance their chances of survival and elevate their living standards (Abera et al., 2021; Jose et al., 2023). This approach is crucial for rural families, as it strengthens sustainable living, reduces vulnerability to hazards, secures greater earnings, guarantees nutritional security and combats climate change as supported by many research investigations (Martin & Lorenzen,

2016; Kisku & Ghosh, 2017). Farm families at any stage of development participate in diverse activities across both agricultural and non-agricultural sectors, including migration, to stabilize income and reduce risks (Singh et al., 2023). Over the last decade, livelihood systems have become a key aspect of sustainable development. Yet, in India, the land-dependent livelihoods of small and marginal farmers are becoming unsustainable because their lands can no longer sufficiently provide for their family's food and fodder requirements (Hiremath, 2007; Nirmala et al., 2024). The success of efforts toward occupational diversification in farming largely hinges on two key factors: the individual and the environment. The environment encompasses various elements such as access to credit, market trends, consumer demand, transportation and communication connectivity, policy frameworks, and the availability of inputs and outputs. On the other hand, the central figure in this scenario is the farmer, whose inherent qualities significantly influence their journey towards sustainable diversification. Parameters like income, from animal husbandry, income from marginal works and income from labouring, are positively correlated, with diversity; but land holding, income from agriculture, possession of household assets, average family education and maximum family education are negatively correlated with diversity (Pal et al., 2017). Given the diverse socio-economic backgrounds of farmers, individual circumstances including social, biological, psychological, and economic factors as well as their engagement with the environment, differ widely. Therefore, there is a requirement for a thorough investigation in this matter which necessitates the probe of impact of the factors responsible for and potentially beneficial in enhancing the current situation of occupational diversification among farmers.

METHODOLOGY

The study was undertaken in Khordha district of Odisha which was chosen for its agricultural diversity driven by the demands of the demographic boom from nearby urbanized settlements which provide the diversity in the choices and demand trends in consumption of food and nutritional products. The sample for the investigation was drawn out by employing multistage sampling technique for selection of village, blocks and subdivisions from the concerned district. Because the district encompasses two subdivisions, namely 'Khordha' and 'Bhubaneswar,' two blocks were chosen from each subdivision due to variations in soil types within their boundaries. From each of these selected blocks, two villages were randomly chosen, resulting in a total of eight villages from the four respective blocks. Thirty farmers from each village were identified randomly, constituting a sample of 240. Information from farmers was obtained between August 2022 & June 2023 through personal interviews in a relaxed environments to promote authentic answers. The research utilized *ex-post facto* design.

Occupational diversification concurs to the process of adopting wide range of income earning activities in different suitable combinations for incremental returns towards sustainability. The extent of occupational diversification was operationally defined as the equilibrium maintained in the quantity and dispersion of various sources of income, which can be evaluated by the use of Simpson's index of diversification as employed by Lakshman Reddy (2019) & Nirmala et al., (2024).

$$SID = 1 - \sum_{i=1}^n P_i^2, \text{ where } P_i = \frac{X_i}{X_{\text{Total}}}$$

Here, 'X_i' denotes 'ith' activity, 'X_{Total}' denotes total income of the farmers and thus 'P_i' denotes the proportion of income from the ith activity from the total income obtained from 'n' number of activities. The percentage of income from each source was then computed to ascertain the index of diversification for all farmers. Participants were classified from low to high levels based on index scores by the half-standard deviation method. The index values obtained individually for all the farmers were used as the values of dependent variable for the regression model.

Factors relevant to the study were chosen based on a comprehensive literature review, as well as expert consultation. Chi-square analysis was employed to measure the relationship between the factors and extent of occupational diversification of farmers, followed by multiple linear regression and stepwise regression to determine the relative contribution of the selected factors and their combined effect on the dependent variable, 'extent of occupational diversification'.

RESULTS

Extent of occupational diversification

The extent of occupational diversification was determined by the use of Simpson's index of diversification and the results are depicted in the Table 1. For occupational diversification, the average index value for all the respondents was found to be 0.57 with a standard deviation value of 0.34 which speaks of the considerable presence of diversification among farmers. Nearly about half (48.33%) of farmers reported medium extent of occupational diversification whereas 30.42 per cent reported high extent of occupational diversification. The remaining 21.25 per cent expressed low levels of the extent of occupational diversification. This offers a clear depiction of the current prevalence of occupational diversification among the farmers being studied. Therefore, efforts must be made to improve the existing levels of occupational diversification and with that respect, the findings of regression analysis in the upcoming section is going to answer about which aspects of the farmers are to be targeted, that would have direct positive impact on their extent of diversification.

Table 1. Distribution of farmers as per the extent of occupational diversification

S.No.	Category	Criteria (index values)	Farmers	Mean	SD
1.	Low	<0.40	21.25	0.57	0.34
2.	Medium	0.40-0.74	48.33		
3.	High	>0.74	30.42		

Association between selected factors and occupational diversification of the farmers

The chi-square test was undertaken by taking the selected factors as independent variable and the 'Extent of occupational diversification' as the other dependent variable, it was found that variables like 'Education', 'Number of non-farm activities' and

Table 2. Chi-square analysis between selected factors and occupational diversification of the farmers

S.No. Factors	Contingency Coefficient	Chi-square value
1. Age	0.421	7.138 ^{NS}
2. Education	0.325	10.352*
3. Family size	0.124	7.567 ^{NS}
4. Farming experience	0.348	4.371 ^{NS}
5. Annual income	0.453	14.234**
6. Number of non-farm activities	0.414	11.296*
7. Achievement motivation	0.936	15.793**
8. Risk orientation	0.125	8.348 ^{NS}
9. Credit orientation	0.632	5.106 ^{NS}
10. Innovativeness	0.825	7.784 ^{NS}
11. Extension participation	0.743	9.140 ^{NS}
12. Mass media exposure	0.479	15.177**
13. Social participation	0.536	7.556 ^{NS}
14. Market accessibility	0.127	10.789*
15. Management orientation	0.764	16.418**

'Market accessibility' exhibited association with the dependent variable at five percent level of significance whereas the likes of 'annual income', 'achievement motivation', 'mass media exposure' and 'management orientation' exhibited association at one per cent level of significance. The remaining variables such as 'age', 'family size', 'farming experience', 'credit orientation', 'innovativeness', 'extension participation' and 'social participation' expressed non-significant association.

Contribution of factors towards occupational diversification

Multiple regression analysis was performed to assess the relative contribution of all the factors to the occupational diversification of the farmers. A regression equation was established by taking the calculated index values of extent of occupational diversification as dependent variable and the selected factors as independent variable. The data depicted in Table 3 depicts the results of multiple regression analysis. This model's R^2 coefficient of 0.642 demonstrates that all those selected factors as independent variables can delineate 64.20 per cent of variation in extent of occupational diversification. Variables such as number of non-farm activities, extension participation and management orientation were found to have significant contribution to the dependent variable at one per cent of level of significance whereas the likes of education and achievement motivation found to contribute significantly at five per cent level.

As many independent variables were deemed not significantly influential on the dependent variable, the stepwise regression method was utilized. This involved initially loading all variables into the model and then systematically removing each variable to assess its relative impact on the overall contribution to the dependent variable. As depicted in Table 4 with the R^2 value of 0.692, it can be inferred that variables such as education, number of non-farm activities, achievement motivation and management orientation significantly influenced the dependent variable. Consequently, they account for 69.20 per cent of the observed variation in the dependent variable.

Table 3. Multiple regression analysis of independent variables (factors) with occupational diversification of the farmers

S.No. Variables	Regression coefficient	Standard error	t value
(b)			
1. Age	1.208	0.124	0.982 ^{NS}
2. Education	1.089	0.683	2.117*
3. Family size	-3.061	0.372	-5.170 ^{NS}
4. Farm experience	-0.104	0.264	-0.095 ^{NS}
5. Annual Income	0.657	0.412	1.47 ^{NS}
6. Number of nonfarm activities	0.332	0.583	6.360**
7. Achievement Motivation	1.802	3.319	2.589*
8. Risk Orientation	1.123	0.249	0.679 ^{NS}
9. Credit Orientation	0.067	1.148	1.133 ^{NS}
10. Innovativeness	0.059	0.429	1.431 ^{NS}
11. Extension Participation	0.524	0.259	3.419**
12. Social Participation	-0.927	0.883	-1.841 ^{NS}
13. Mass media exposure	1.438	0.628	1.197 ^{NS}
14. Market Accessibility	0.008	1.147	0.364 ^{NS}
15. Management Orientation	1.078	1.423	4.193**

$R^2=0.642$; **Significant at 1%; *Significant at 5%; NS=Non-significant

Table 4. Stepwise regression analysis of independent variables (factors) with occupational diversification of the farmers

S.No. Variables	Regression coefficient	Standard error	t value
(b)			
1. Education	1.873	0.533	2.548*
2. Number of nonfarm activities	1.089	0.683	3.025**
3. Achievement Motivation	3.558	1.254	5.837**
4. Management Orientation	1.971	0.526	4.753**

$R^2=0.692$; ** Significant at 1%; *Significant at 5%; NS=non-significant

DISCUSSION

Many surveyed households have adults involved in diverse income-generating practices. While sustainable livelihoods have gained importance in recent years, small and marginal farmers in India face challenges due to low land productivity, necessitating alternative income sources for survival (Jyothi & Subbaiah, 2020; Singh et al., 2023). Although most households reported moderate diversification levels and fewer report high levels, there is still scope for improvement. Stakeholders can address this through solution-oriented approaches to overcome obstacles. These findings were in line of Lakshman Reddy (2019) & Shankara (2019) but were different to that of Kumari & Ramanamurthy (2022); Nirmala et al., (2024) since their findings reported low to moderate extent of diversification.

Since education has been found to be significantly tied to diversification, the more qualified farmers are, the more privy they are to the breakthroughs and development made in the field of agriculture and allied sectors, and this enables them to brainstorm notions for new earning activities that are feasible as well as compatible with existing conditions. The financial resources does define the nature of diversification as for starting and maintaining any sort of occupational activity requires inputs and capital investment irrespective of the nature of activity, that is why the

income level has connections with the diversification process. In comparison to on-farm and off-farm sectors, the non-farm ones are the source of stable and certain earnings which influence the farmers to diversify their occupational ventures towards it, thus explaining its significant association. The most fundamental requirement of the farmers as individual in any venture is their inner drive to take a leap of faith in trying out different income earning activities which would empower their sustainability efforts and thus it explains significant association of achievement motivation. Even when a farmer shows interest in a new business, they still need to make sure it provides guaranteed returns that are better than what's currently available. This calls for an examination of product demand trends and the availability of appropriate markets (Raina et al., 2011) where their goods can fetch profitable returns and linking them to market (Kumari et al., 2022). This supports to the point that market accessibility is associated with occupational diversification prominently. Despite the potential resolution of these issues through the provision of necessary infrastructure and fostering a positive mindset, one crucial aspect still remains: the ability to manage diverse activities within the constraints of limited resources which is integral to maintaining balance between input and output, minimizing wastage, and ultimately running multiple enterprises successfully. Therefore, effective management practices are closely intertwined with the process of diversifying occupational ventures which enlightens the prominence of management orientation for diversification. It can also be said that occupational diversification is not related to other remaining parameters of farm individuals such as 'age', 'education', 'family size', 'credit orientation', 'innovativeness', 'extension participation' and 'social participation' as there was devoid of any sort of significant association amongst them in the sample. The findings were analogous to that of Beevi et al., (2015); Pal et al., (2017); Singh et al., (2018) & Lakshman Reddy (2019) who had reported same factors to be significantly contributing to diversification in their investigatory scenarios.

The values of R^2 does ascertain the legitimacy of the factors considered under this investigation being capable enough to contribute towards the alterations generated on the extent of occupational diversification. The results of step-wise regression lays emphasis on those factors which are very much crucial to explain the contribution towards diversification. Regarding 'education', it can be inferred that education is vital for farmers as it equips them with essential skills, knowledge, and resources to enhance productivity, adapt to changes, access support, improve livelihoods, and thus able to employ diverse set of occupations properly. Another fundamental requirement from the individuals is their drive and innate desire to adopt different ventures with an action plan formulated under defined objectives and then constantly thrive to achieve profitable net returns, which essays the prominent contribution from achievement motivation. Equipped with required knowledge and positive drive, management orientation plays a vital role for farmers, aiding them in maximizing resource utilization, boosting productivity, and adjusting to evolving circumstances. Embracing management techniques allows farmers to streamline operations, mitigate risks, and enhance profitability. In essence, management orientation equips farmers with the ability to make well-informed decisions, tackle obstacles, and secure the enduring

success of their agricultural endeavors and this notion supports significant endowment towards diversification. The prominence in the contribution of number of non-farm activities can be easily owed to its distinct feature of stability and certainty in terms of its functioning and earning net returns. The results draw analogy to that of Mehta et al., (2021); Saba et al., (2022); Sharma et al., (2022); Nirmala et al., (2024); Pathak & Amardeep (2024).

CONCLUSION

Majority had reported moderate extent of diversification which is positive sign showcasing the considerate existence of occupational diversification but also points towards the scope of further improvements which has to be achieved in it. Most of the selected factors found to have association with the occupational diversification significantly. These factors are also responsible for causing more than half of the variation in occupational diversification into which factors like education, number of non-farm activities, achievement motivation and management orientation exhibited significant contribution in it. These findings would be insightful while devising action plan to upscale the diversification amongst the farmers. It is to be also noted that while this study provides valuable insights, it is not exhaustive, and further research with different samples, districts, states or regions of the country along with different set of variables in order to gain a comprehensive understanding of the factors influencing occupational diversification among farmers.

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