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Relationship of Profile Characteristics of Farmers with Occupational Diversification

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ABSTRACT: The increasing uncertainties surrounding agriculture and related sectors have raised concerns about the sustainability of farming communities, prompting a shift towards occupational diversification. While diversification can provide additional income sources, its effectiveness largely depends on the individual characteristics of farmers, influencing their decision-making in this regard. This highlights the necessity to examine farmers' current conditions, specifically in terms of their socio-economic profiles, and to analyze the potential connections to their diversification efforts. The research was conducted in Khordha district, Odisha, utilizing an ex-post facto design. A sample of 240 farmers was selected from eight villages through a multi-stage random sampling method. Data was collected via personal interviews using pre-tested semi-structured questionnaires. Occupational diversification was assessed through Simpson's index, alongside statistical measures such as mean and standard deviation. A significant proportion of respondents were middle-aged (37.50%) and earned between Rs. 50,001 and Rs. 1,00,000 annually (64.17%), with most possessing a medium level of education (39.58%) and belonging to average-sized families (48.33%). Participants exhibited moderate levels of experience in farming (47.08%) and non-farm activities (46.67%), alongside varying degrees of achievement motivation (40.00%) and other factors. The majority demonstrated a moderate degree of occupational diversification (48.75%). Correlation analysis inferred significant correlations with factors like age, family size, annual income, credit orientation and media exposure to that of occupational diversification. The study suggests focusing on improving these key variables to enhance the overall situation of occupational diversification among farmers.

Keywords: Profile, characteristics, correlation, occupations, diversification.

INTRODUCTION

The agricultural sector in Odisha is a cornerstone of the state's economy and essential for the livelihoods of its residents. Recent data shows a significant rise in the share of agriculture and related sectors in the Gross State Value Added, which increased 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 critical as it provides the primary source of income for about 70.0 per cent of the rural population, which represents 84.0 per cent of the state's total inhabitants (Chopde *et al.,* 2019; Pattanaik and Mohanty 2017). Despite its importance, Odisha's farming sector faces numerous challenges and transformations. The agricultural sector has experienced prolonged stagnation, even within an economy that is predominantly agrarian (Nayak, 2016). Significant socio-economic disparities across various regions, as indicated by Sahoo and Paltasingh in 2019, compounded by adverse environmental events such as cyclones, droughts, and floods, have adversely affected the rural economy (Pal *et al.,* 2022; Badekhan and Nayak 2021; Ganapathy Ramu and Asokhan 2022). Consequently, maintaining sustainable livelihoods in rural communities has become increasingly challenging, leading many to adopt strategies such as occupational diversification (Lakshman Reddy, 2019). Livelihood diversification encompasses the efforts by household members to engage in a variety of activities and to create a range of social support systems aimed at improving their chances of survival and enhancing their living conditions (Ellis, 2000; Abera *et al.,* 2021; Priyadarshini *et al*., 2022). This strategy is vital for rural households as it fosters sustainable livelihoods, minimizes exposure to risks, increases income, and improves overall well-being. Research has shown that diversified livelihood strategies empower farming households to achieve better financial outcomes, food security, and resilience against environmental pressures (Rahut and Micevska 2012; Nielsen *et al*., 2013; Martin and Lorenzen 2016).

It is clear that families at all stages of development engage in a diversity of activities to stabilize their income and mitigate risks, encompassing both agricultural and non-agricultural sectors as well as migration opportunities. In recent years, sustainable livelihoods have become recognized as a fundamental component of sustainable development. Nevertheless, small and marginal farmers in India are finding that traditional land-based livelihoods are increasingly unviable, as their land cannot sufficiently meet their food and fodder requirements (Hiremath, 2007). As such, rural households are often forced to seek alternative income sources. The effectiveness of occupational diversification depends on two primary factors: individual characteristics and environmental conditions. Environmental factors include access to credit, market trends, consumer demand, transportation and communication networks, policy environments, and agricultural inputs. Meanwhile, the personal attributes of farmers significantly influence their success under various conditions, thereby playing a critical role in their journey towards sustainability. The farming community comprises diverse groups, from marginal to large farmers, and their unique social, biological, psychological, and economic circumstances will vary significantly on an individual or household level. Thus, it is crucial to conduct a thorough assessment of farmers' existing conditions, focusing on their profile characteristics. Insights gained from such analyses should illuminate the relationships between individual characteristics and occupational diversification efforts. Therefore, a socio-economic profile study followed by an investigation into the connections between these characteristics and occupational diversification among Odisha's farmers is imperative.

MATERIAL AND METHODS

The study was conducted in the Khordha district of Odisha due to its selection as a site characterized by diverse farming activities. This diversity is attributed to the presence of Bhubaneswar, the state capital, within the district and the increasing demand for products and services driven by the demographic growth in urban areas. A multistage sampling technique was employed to select villages, blocks, and subdivisions within the district for the investigation. The district comprises two subdivisions— 'Khordha' and 'Bhubaneswar'—and two blocks from each subdivision were purposively chosen based on their differing soil types. Within each selected block, two villages were randomly chosen, resulting in a total of eight villages from the four blocks.

Farmers from the region were identified as respondents, defined as individuals or groups engaged in agricultural activities. Within each designated village, 30 farmers were randomly selected, culminating in a sample size of 240 farmers. An interview schedule was developed with expert guidance and informed by a literature review to align with the study's objectives. This schedule was pretested with 10.0 per cent of the sample size, and although it was originally prepared in English, it was read to the farmers in their local language to ensure accurate responses. Feedback from the pretest was utilized to refine the schedule for relevance and validity before Finalizing the interview format.Data collection was conducted using the interview schedule at the respondents' homes and workplaces, fostering an informal atmosphere that encouraged candid responses without external influences. This process took place between July 2022 to December 2023, and the study followed an ex-post facto design.

Profile characteristics of the farmers. The profile study utilized independent variables categorized into two distinct sets. The first set included variables such as 'Age,' 'Education,' 'Family size,' 'Farming experience,' 'Annual income,' and 'Number of non-farm activities.' Data analysis for this group involved straightforward inquiries where respondents provided direct responses pertaining to these variables. The frequency of responses within each category was enumerated, and their corresponding percentages were calculated based on the total sample. The second set comprised qualitative variables, including 'Achievement motivation,' 'Risk orientation,' 'Credit orientation,' 'Innovativeness,' 'Extension participation,' 'Mass media exposure,' 'Social participation,' 'Market accessibility,' and 'Management orientation.' Data analysis for these variables employed standardized scales and procedures that were developed, pre-tested, and validated by various researchers, with minor adjustments made to fit the context of the investigation. A summary of the techniques and tools used for data analysis is presented in Table 1.

Table 1: Variables and their empirical measurement.

Sr. No.	Variables	Empirical Measurement
1.	Age	Chronological age of respondents (in years completed)
2.	Education level	Procedure followed by Devarajaiah (2010)
3.	Family size	Schedule developed for the study
4.	Farming experience	Schedule developed for the study
5.	Annual income	Schedule developed for the study
6.	Number of non-farm activities	Schedule developed for the study
7.	Achievement motivation	Scale developed by Reddy (1976) with modifications
8.	Credit orientation	Procedure developed by Beal and Sibley (1967)
9.	Extension participation	Schedule developed for the study
10.	Mass media exposure	Procedure followed by Kusumalatha (2018) with modifications
11.	Market accessibility	Procedure followed by Lakshman Reddy (2019)

Extent of Occupational diversification. Simpson's Index of Diversification was utilized to assess the degree of occupational diversification among all respondents in the sample, following the methodologies established in studies by Saha and Bahal (2014) in West Bengal and Lakshman Reddy (2019) in Karnataka.

$SID=1-\sum_{i=1}^{n} Pi^2$, where $Pi = \frac{Xi}{\Sigma_{i=1}^{n} Xi}$

In this context, 'Xi' represents the 'ith' activity, while 'Pi' indicates the income proportion derived from the 'th' activity out of the total number of activities. The values for the Simpson Index of Diversification (SID) range from 0 to 1. The SID values are influenced by the number of occupations (serving as income sources) and the distribution of income across these activities. Data on the income sources and their distribution among the respondent farmers were gathered through an interview schedule. The income proportions from each source were calculated and utilized to compute the Simpson Index of Livelihood Diversification for all participants. Following the calculation of diversification index scores, the respondents were categorized into low, medium, and high diversification levels using the half standard deviation method, based on the mean and the standard deviation of the computed index values. This classification is illustrated in the following table:

Category	Criteria
Low	Less than (Mean – ½ SD)
Medium	Between (Mean + ½ SD)
High	More than (Mean + ½ SD)

Correlation test was conducted to determine the prevalence of relationship between the variables representing profile characteristics and the extent of occupational diversification of the concerned sample farmers.

RESULTS AND DISCUSSION

The analysis of socio-economic status is a joint evaluation of an individual's or group's position in terms of social and economic affairs in relation to others in the concerned society. It engages in prominent roles of determining one's access to resources availability, livelihood pattern accompanied with food as well as nutritional security of the households (Roy *et al*., 2013). In this concerned study, various independent variables representing the socio-economic profile of the farmers in the Khordha district has been depicted in the following sections.

Age. The results revealed that 53.33 per cent of farmers belonged middle age category (35-50 years) followed by 13.75 per cent and 32.92 per cent of farmers belonging to young age (less than 35 years) and old age categories (more than 50 years) respectively which is presented in the Table 1. This concludes to the fact that farmers from middle aged to elderly are prominently involved in the farming activities of the region. These findings were found to be in line with that of Rai (2015); Lakshman Reddy (2019); Tanushree (2021); Panta (2022).

Table 2: Distribution of farmers according to their age.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Young	Less than 35 years	33	13.75
2.	Middle	35-50 years	128	53.33
3.	Old	More than 50 years	79	32.92

Education. The information displayed in Table 3 reveals that 39.58 per cent of farmers possessed medium level of education whereas 27.92 per cent and 32.50 per cent of farmers possessed high and low level of education respectively. The scenario of prevalence of low to medium level of education can be owed to the fact that in the farming community, the importance of formal education has been realized in recent times as majority had passed upto primary education. This can be attributed to the poor financial and educational background of their families which makes the venture of higher studies a faraway feat to achieve for the next generations. These findings are analogous to that of Saha (2008); Gakkhar *et al*. (2010); Amurtiya *et al*. (2016); Panta (2022).

Table 3: Distribution of farmers according to their education level.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<2.42	78	32.50
2.	Medium	2.42-4.70	95	39.58
3.	High	>4.70	67	27.92

Family size. The data depicted in Table 4 concurs that around half of the farmers (55.42 %) had medium level of family size while 20.42 per cent of farmers had low level of family size and 24.16 per cent had high family size. This implies of the existence of joint family system in which different relatives of same family tend to live together unlike nuclear family settings which are quite norm in urban areas. The results do share analogy with the findings of Mamathalakshmi (2013); Gouda *et al.* (2013), Tanushree (2021); Satishkumar (2022);

Table 4: Distribution of farmers according to their family size.

Sr. No.	Category	Criteria (no. of members in the family)	Farmers	
			No.	%
1.	Small	<4	49	20.42
2.	Medium	4-6	133	55.42
3.	Large	>6	58	24.16

Farming experience. The data presented in Table 4 revealed that 48.33 per cent of farmers possessed medium level of experience in the field of farming followed by less level and high level of experience by

18.75 per cent and 32.92 per cent of farmers respectively. This indicates that on an overall basis, farming experience of most of the farmers fall under moderate to higher categories. The prevalent farming experience of the farmers laid on to moderate to higher levels is of positive sign of their ability and wisdom to make their farming occupation into sustainable livelihood. The findings are supported by Preethi (2015); Lakshman Reddy (2019); Dechamma (2020); Abdulai (2021).

Table 4: Distribution of farmers according to their farming experience.

Sr. No.	Category	Criteria (in years)	Farmers	
			No.	%
1.	Low	<11	45	18.75
2.	Medium	11-20	116	48.33
3.	High	>20	79	32.92

Annual income. As per data presented in Table 5, majority (64.17 %) of the farmers were earning annually in the range of "Rs 50,00,001 to Rs 1,00,000" followed by 8.33 per cent, 21.25 per cent and 6.25 per cent of the farmers were earning in the range of "upto Rs 50,000", "Rs 1,00,000 to Rs 2,00,000" and "Above Rs 2,00,000" respectively. Efforts must be made to register significant growth in the income of the farmers for making the farming sector a sustainable against contemporary era of fast changing modernization occurring in the ones other than the farming sector. Since majority of the farmers do not come from sound background, these sources of income stand as their support system in the bad times of hailstorms, uneven distribution of rainfall, unsuitable temperature changes, hoarding, cyclonic storms, distressed sale, hoarding, etc. the results yielded found to be contradictory to that of Gouda *et al*. (2013).

Table 5: Distribution of farmers according to their annual income level.

Sr. No.	Income Criteria (in Rs)	Farmers	
		No.	%
1.	upto Rs 50,000	20	8.33
2.	Rs 50,001 to Rs 1,00,000	154	64.17
3.	Rs 1,00,000 to Rs 2,00,000	51	21.25
4.	Above Rs 2,00,000	15	6.25

Number of non-farm activities. The data of Table 6 about the number of non-farm activities conveys that 50.84 per cent of farmers were involved 'one to two activities' whereas 32.08 per cent and 17.08 per cent of farmers were involved at 'no activity' and 'more than two activities. The prevalence of non-farm activities for the farmers is for the purpose of backup option of earnings with more profits in demanding businesses in a more regular as well as assured manner in comparison to that of farm activities for the farmers. A very few portions of farming society opting for more than two activities can be attributed to their low levels of family as well as educational background causing less exposure to various available options of earnings.

Table 6: Distribution of farmers according to their involvement in number of non-farm activities.

Sr. No.	Category	Farmers	
		No.	%
1.	No activity	77	32.08
2.	One to two activities	122	50.84
3.	More than two activities	41	17.08

Achievement motivation. The results as presented in Table 7 conveys that 40.00 per cent of farmers had medium level of achievement motivation whereas 31.25 per cent and 28.75 per cent of farmers had low and high levels of achievement motivation. So, the overall level of achievement motivation of the farmers found to be low to moderate predominantly which can be owed to the issues of less accessibility to resources, poor socio-economic background and less exposure which are the driving forces to innately drive the farmers to strive for more better ways of living. The results are line with that of Biradar (2008); Raksha and Yadav (2012); Lakshman Reddy (2019); Shivanandagowda (2022).

Table 7: Distribution of farmers according to their level of achievement motivation.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<15.33	75	32.08
2.	Medium	15.33-23.44	96	46.67
3.	High	>23.44	69	21.25

Credit orientation. According to Table 8, 40.83 per cent of farmers had medium levels of credit orientation whereas 29.17 per cent and 30.00 per cent of farmers had high and low levels of credit orientation respectively. In recent days there is an increase in the cost of all agricultural inputs which are always linked to the investment pattern of farmers and hence, farmers were well exposed to credit system to take up suitable adaptation measures. But few farmers still have low credit orientation due to poor levels of education and socio-economic background. The findings are supported by Datta (2013) ; Shivanandagowda (2022).

Table 8: Distribution of farmers according to their level of credit orientation.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<7.385	72	30.00
2.	Medium	7.385-12.35	98	40.83
3.	High	>12.35	70	29.17

Extension participation. With respect to extension participation of farmers as depicted in Table 9, 42.08 per cent of farmers belonged to medium category whereas 31.67 per cent and 26.25 per cent of farmers belonged to low and high category of participation respectively. This speaks of the prevalence of low to

moderate levels of extension participation which highlights on the less eagerness from the side of farmers for their indulgence in activities being undertaken by line departments, KVKs and NGOs in expressing the problems encountered in field and take back solutions in the form of guidance and knowledge. This needs to be taken care of by those stakeholders to increase the levels of participation among the farmers for their betterment in the rural community. The results were found to be in line of that of Shankara (2019); Satishkumar (2022).

Table 9: Distribution of farmers according to their level of extension participation.

Sr. No.	Category	Criteria	Farmers	
			No.	%
	Low	<4.23	76	31.67
	Medium	4.23-7.12	101	42.08
	High	>7.12	63	26.25

Mass media exposure. In terms of mass media exposure as stated in the Table 10, about 43.75 per cent of farmers had medium level of mass media exposure while 22.50 per cent and 33.75 per cent of farmers had low and high levels of mass media exposure. It can be inferenced that the level of exposures to mass media of the farmers were in the range of moderate to high which is quite a positive sign since it indicates the ease in accessibility to the items like television, newspapers, radio, mobile phones, etc which can act as an empowerment tool facilitating and encouraging the participation of rural people in farm beneficial activities run by the stakeholders of rural development along with voicing their opinions on the issues related to agriculture and allied sector to the state directly or indirectly. These findings do draw similarity from that of Gouda *et al.* (2013); Lakshman Reddy (2019) but contradiction to that of Mamathalakshmi (2013) and Shankara (2019)

Table 10: Distribution of farmers according to their level of mass media exposure.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<4.56	54	22.50
2.	Medium	4.56-7.01	105	43.75
3.	High	>7.01	81	33.75

Market accessibility. As per the information of market accessibility of farmers displayed in Table 11, it states that 46.67 per cent of farmers had medium levels of market accessibility followed by low and high levels of accessibility being portrayed by 27.50 per cent and 25.83 per cent respectively. Here the market accessibility levels have been more on low to medium levels which can be owed to the lack of transportation at affordable rates, absence of a prompt communication network relaying market news and absence of condition regulated storage as well as transit facilities for the harvested produce coming from the enterprises. These findings are supported by Lakshman Reddy (2019).

Table 11: Distribution of farmers according to their level of market accessibility.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<2.22	66	27.50
2.	Medium	2.22-3.11	112	46.67
3.	High	>3.11	62	25.83

Occupational Diversification of farmers. From the information displayed in Table 12, near about half (48.75%) of farmers reported to express medium extent of occupational diversification whereas 29.58 per cent of them reported to express high extent of occupational diversification. The remaining 21.67 per cent expressed low levels of occupational diversification. It can be inferred that the overall picture of extent of occupational diversification was found to be medium to high levels. It is of positive segno that there is a considerable existence of diversifying their occupational ventures to stabilize their sustenance by attaining additional earnings. But since the majority had expressed moderate levels of extent, it infers to future scope of further improvements in the current existing levels which can eventually the raise the income levels of the farmers and cementing the stability of their sustenance in a better way.

Table 12: Distribution of farmers according to their extent of occupational diversification.

Sr. No.	Category	Criteria	Farmers	
			No.	%
1.	Low	<36.78	52	21.67
2.	Medium	36.78-49.87	117	48.75
3.	High	>49.87	71	29.58

Relationship between selected profile characteristics and occupational diversification of the farmers. The following sections sheds light on the profile characteristics which expressed significant relationship with occupational diversification of the farmers with the appropriate justifications:

Age: Research has demonstrated a significant negative correlation between the age of farmers and their tendency towards occupational diversification. As the age of farmers increases, their inclination to diversify their occupational activities tends to decrease. This trend arises from the fact that older farmers often prefer to adhere to traditional farming practices, demonstrating a reluctance to adapt to new methods or explore alternative income-generating activities.

Family Size: Family size significantly correlates with farmers' occupational diversification, as larger families often provide more labor resources, enabling diversification into multiple income-generating activities. This increased labor can facilitate the cultivation of diverse crops or livestock, enhancing

income stability. Additionally, family support can encourage risk-taking in exploring new markets or practices, promoting greater adaptability in agricultural ventures.

Annual Income: Annual income is significantly correlated with occupational diversification as higher income levels provide farmers with the financial flexibility to invest in new ventures. A stable income encourages risk-taking, allowing them to explore alternative crops or services that may yield additional revenue streams. This financial security enables farmers to diversify their operations, thereby enhancing resilience against market fluctuations and environmental challenges.

Credit orientation: Credit orientation is positively correlated with occupational diversification, as access to credit enables farmers to invest in new technologies, equipment, and practices that promote diversification. Credit provides the necessary capital for farmers to explore alternative income sources, such as cultivating different crops or starting value-added ventures. This financial support mitigates risks associated with market fluctuations, fostering resilience in their agricultural activities.

Mass media exposure: Mass media exposure positively correlates with occupational diversification among farmers by enhancing access to vital agricultural information and resources. Exposure to agricultural programs, market trends, and best practices encourages farmers to adopt innovative techniques and explore alternative income sources. This informed decision-making fosters greater adaptability and resilience, enabling farmers to diversify their operations and improve their livelihoods amidst changing agricultural conditions.

The other remaining ones comprised of 'Education', 'Farming experience', 'Number of non-farm activities', 'Achievement motivation', 'Extension participation' and 'Market accessibility' were found to have no significant relationship with the extent of occupational diversification under the study arena. The findings are in line to that of Kundu and Das (2021).

Table 13: Relation between profile characteristics and occupational diversification of the farmers.

Sr. No.	Profile Characteristics	Contingency Coefficient
1.	Age	-0.321*
2.	Education	0.125^{NS}
3.	Family size	0.274*
4.	Farming experience	0.148^{NS}
5.	Annual income	0.432**
6.	Number of non-farm activities	0.134^{NS}
7.	Achievement motivation	0.536^{NS}
8.	Credit orientation	0.282*
9.	Extension participation	0.143^{NS}
10.	Mass media exposure	0.379*
11.	Market accessibility	0.127^{NS}

*=significant at five percent level; **= Significant at one percent level; ^{NS}= Non-significant

CONCLUSIONS

The study has provided valuable insights into the socio-economic profiles of farmers in Khordha district. The findings indicate that the majority of farmers are middle-aged, hold a medium level of education, belong to moderately sized families, and earn an annual income ranging from Rs 50,001 to Rs 1,00,000. Furthermore, most respondents engage in one to two non-farm activities and display medium levels of farm experience, achievement motivation, credit orientation, extension participation, mass media exposure, and market access. These data suggest that farmers predominantly operate at a moderate level across these parameters, indicating that there is considerable potential for improvement to achieve optimal outcomes in areas such as age and family size.Additionally, the analysis of the relationship between farmers' characteristics and their degree of occupational diversification reveals significant correlations with factors like age, family size, annual income, credit orientation and media exposure. Enhancing these variables could foster greater occupational diversification. In contrast, other factors were found to lack any association with diversification, indicating their independence from this phenomenon. These findings will inform policy discussions aimed at rural development.

FUTURE SCOPE

The future scope of this research includes conducting comprehensive studies that incorporate a broader range of socio-economic variables and diverse farmer demographics. Future investigations should focus on longitudinal data collection to observe changes over time, as well as exploring the specific impacts of various agricultural policies on occupational diversification. Also, research can be also be conducted with the different sample of the same region, another region of same state or different state to get knowledge insights for formulating the generalized viewpoints on the relationship the profile characteristics has on diversification, which will enhance understanding and facilitate targeted interventions for rural development.

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