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RESEARCH PAPER

Factors determining the choice of marketing diversification for principal crops of Punjab

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Abstract: This study aims to identify the factors that determining farmers' choice of marketing diversification for the key crops in Punjab—wheat, moong, rapeseed, mustard and cotton. The research is based on primary data collected from 320 farmers through a multistage stratified random sampling method across these four principal crops. A logit regression model was employed to analyse the factors affecting the farmers choice of marketing channels diversification. The results of the study illustrated that 76.25% of farmers use a single marketing channel, categorizing them as non-diversified, while only 23.75% adopt multiple channels, reflecting diversified strategies. Factors such as education level, household size, primary occupation, agricultural training, market proximity significantly promote market diversification. In contrast, market distance and awareness of the Minimum Support Price (MSP) have negligible effects. The study highlights the need for timely payments, stronger financial support and targeted education and training to help farmers access and benefit from diverse marketing channels.

Key words: Agricultural policy, Logit regression, Marketing diversification, Principal crops, Socio economic factors

Introduction

Agriculture is vital to Punjab's economy, it support rural livelihoods and driving economic growth. Punjab is also known as the "Granary of India," because it occupies a crucial role in ensuring national food security, especially during the Green Revolution which saw large-scale production of wheat, paddy, and other staple crops. However, despite its importance, Punjab's agricultural sector faces continuing challenges, particularly in the marketing of produce. Marketing is a vital constituent of agricultural profitability. The farmers of the Punjab state often struggle not just with production but with selling their crops at favourable prices. Therefore, the selection of appropriate marketing channels is very important, it is influenced by various factors like farm size, distance to markets, pricing systems and the socioeconomic conditions of the farm household. In addition, the presence of intermediaries, high transaction costs, timely payments, price volatility further complicate these decisions. The diversified marketing channels are essential for enhancing profitability and reducing risk. The farmers who sell through multiple channels are better positioned to handle market fluctuations and tap into higher-value markets such as urban consumers. The marketing diversification strategy not only helps to stabilize farmers income level but also promotes sustainability and resilience within the farming community (Thakur *et al.*, 2022).

Agricultural marketing channels serve as the relationship between producers and consumers (Kala *et al.,* 2020; Mondal *et al.,* 2024). The diversification of marketing channels plays a crucial role in the agricultural economy, to strengthen the both traditional and alternative marketing channels can lead to better price realization, minimise post-harvest losses and improve efficiency across the supply chain and minimise the cost of cultivation. The higher costs of cultivation and the dominance of intermediary's limit farmers' returns and access to fair pricing. The choice of marketing channels in agribusiness significantly influences marketing efficiency and farmer profitability, as selecting the most efficient channel enhances overall performance (Panda & Sreekumar, 2012). Further, Liao *et al.* (2017) emphasize that choosing appropriate agricultural marketing channels can help mitigate risks, improve profitability, and guide farmers in making informed production decisions.These inefficiencies found in conventional APMC (Agricultural Produce Market Committee) markets the Punjab State Agricultural Marketing Board (PSAMB) was established under the APMC Act in 1961(Gohain & Singh, 2018). It oversees marketing activities and reforms are needed to modernize its functioning and expand marketing opportunities.The fundamental aim of this study is to identify the key factors that influence marketing diversification and to recommend policies that can enhance marketing diversification among Punjab's farmers. Addressing marketing constraints is critical to improving farm income, reducing poverty and promoting sustainable agriculture. Ultimately, effective marketing strategies are not just tools for profit, they are essential to building a robust and equitable agricultural system.

Material and methods

The present study was designed to identify the factors influencing the farmers' choices regarding marketing channel diversification in Punjab, India. To achieve this, a multistage stratified sampling method was meticulously employed to ensure comprehensive representation across the state's diverse agricultural landscape. To ensure representation across diverse crop groups, four principal crops—wheat (cereals), moong (pulses), rapeseed and mustard (oilseeds) and cotton (commercial crops) were selected on the basis of having the

Table 1. Crop-wise distribution of sample farmers

Crop Group	Selected Crop	Sample size
Cereals	Wheat	80
Pulses	Moong	80
Oilseeds	Rapeseed & Mustard	80
Commercial	Cotton	80
Total Sample		320

highest gross cropped area within their respective categories, as reported by the Directorate of Economics and Statistics, Government of India. Subsequently, for each crop relevant districts and tehsils with the largest cropped area were identified using average gross cropped area data from 2018-19 to 2020-21, ensure that the study focused on the most significant production zones. Within each selected tehsil, two villages with the largest area under the respective crop were chosen, further, refining the sampling frame to areas of concentrated agricultural activity. From each village, 40 sample farmers were randomly selected, resulting in a sample of 80 farmers per crop and a total sample size of 320 farmers. Data collection was conducted through a structured interview schedule, which was pre-tested to ensure accuracy and depth in responses. After data collection, farmers were classified according to the primary crop they cultivated as shown in Table 1, it enables detailed crop-specific analysis of marketing channel diversification and its determinants. This systematic and robust methodology allowed the study to capture a broad spectrum of marketing behaviours and fundamental factors across different agricultural systems in Punjab, thereby it provides valuable insights for policymakers and stakeholders aims to enhance agricultural marketing strategies in the region.

The study of the marketing diversification examines how productions select the most effective platforms to reach their goal. It analyses factors like cost-effectiveness, and alteration rates across various channels. The Fig1. shows crop wise selection map of the study area.

Farmers choice between using a single marketing channel or multiple marketing channels based on their goal of maximizing utility. To analyse these decisions, descriptive statistics were employed to summarise the demographic characteristics of the farmers.To identify the factors influencing the choice between single and multiple marketing channels, a logit regression model was used. This model is appropriate because the dependent variable is binary—indicating whether a farmer uses a diversified (multiple channels) or non-diversified (single channel) marketing strategy. The logit model helps uncover the underlying factors affecting this decision.The dependent variable is coded as:

- 1 for diversified marketing (use of two or more marketing channels)
- 0 for non-diversified marketing (use of a single channel)

The descriptive statistics as:

$$f(x_i) = \frac{\text{Count of observations where variable}=X_i}{\text{Total number of observation}} \quad (1)$$

Where; $f(X_i)$ = the frequency or percentage for each unique value of the variable and = the ith unique value of the variable.

Logit regression model

It is a typical logit regression model used in econometric to know the probability of a binary outcome Pi (usually noted as P(Y=1)) with respect to the independent variables (X1, X2…, Xi).

$$Logit(P_i) = \frac{1}{1 + e^{-(\beta 0 + \beta 1\, X1 + \beta 2\, X2 + \beta 3\, X3 + \beta 4\, X4 \ldots\ldots\ldots\ldots\ldots + \beta i\, Xi + \varepsilon i)}}$$

Where; P_i= probability of the farmer to adopt a diversified marketing channel, β_i= intercept term, β_i= slope coefficients. X_i= explanatory variables, ε_i= error term.

The brief description of the variables is given in the Table 2.

Table 2. Description of the selected variables for logit model

Variables	Labels	Coefficients	Description
Dependent Variable:			
Choice of marketing	P_i	β_0	Choice of marketing strategies Diversified (multiple marketing channel)=1;Non-diversified (single marketing channel) =0]strategies
Explanatory variables:			
Age	X_1	β_1	Age of the farmer (years)
Education	X_2	β_2	Education of the farmer (years)
Household size	X_3	β_3	Total family members living in a household (number)
Occupation	X_4	β_4	Main occupation of the farm household (farming as a sole profession=1; otherwise=0)
Agriculture training	X_5	β_5	Participated in any agriculture-related training (yes=1; no=0)
MSP awareness	X_6	β_6	Awareness about MSP (yes=1; no=0)
Vehicle ownership	X_7	β_7	Vehicle ownership by farmer (yes=1; no=0)
Market distance	X_8	β_8	Distance of the market (km.)
Credit availed	X_9	β_9	Credit availed by farmer (yes=1; no=0)
Landholding	X_{10}	β_{10}	Size of farming landholding (hectare)
Area under the crop	X_{11}	β_{11}	Area under the selected principal crop (hectare)
Production	X_{12}	β_{12}	Total production of the crop (in quintals)
Price	X_{13}	β_{13}	Average price received by the farmer (₹ /Qtl.)
Time of payment	X_{14}	β_{14}	Time of payment (timely payment=1; otherwise=0)

Table 3. Farmers' choice of marketing diversification in the study area

Choice of marketing strategies	Frequency	Percentage
Diversified marketing (sell to multiple marketing channels)	76	23.75
Non-diversified (sell their crop to a single agency/channel)	244	76.25
Total sample size	320	100

Results and discussions

The elements that influence the farmer's choice of a marketing channels for principal crops in Punjab is presented in Table 3.

Table 3 and Fig1., indicates that 23.75% of farmers in the study area sell their crops using multiple marketing channels and follow a diversified marketing approach and 76.25% of farmers sell their crops to a single marketing channel, indicating a preference for simplicity or possibly limited access to diverse channels. The result shows that the market is skewed towards simplicity, with most farmers not diversifying.

Table 4. presents the demographic characteristics of farmers and agricultural marketing practices across four major crops, along with aggregated data for Punjab state. The data show that most farmers are between 41 and 60 years old, with relatively few under the age of 30. Educationally, the largest group had completed matriculation, though a significant number were illiterate. Most farmers relied solely on agriculture as their main

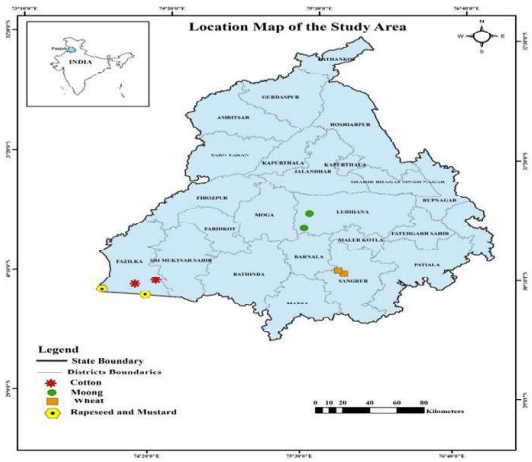

Fig 1. Crop-wise selection map of the study area

occupation. Among them, many had accessed credit facilities, with wheat farmers receiving the highest amount. Overall, 67.19% of farmers in the study area used credit. This reliance is largely due to rising cultivation costs, shifting consumption patterns, and growing incomes—factors that have increased demand for processed products and opened up greater opportunities for market expansion (Vatta *et al.*, 2022). Additionally, 46.88% of farmers fell into the medium-size land holding category. The data also indicate that 73.75% of farmers received timely

Table 4. Demographic characteristics of the farmers in the study area

Variable	Description	Moong	R&M	Cotton	Wheat	Overall
Age of the farmer (Year)	30 and below	2 (2.50)	3 (3.75)	6 (7.50)	2 (2.50)	13 (4.06)
	31-40 year	28 (35.00)	24 (30.00)	25(31.25)	16 20.00	93 (29.06)
	41-60 year	42 (52.50)	42 (52.50)	38(47.50)	41 51.25	163(50.94)
	Above 60 years	8 (10.00)	11(13.75)	11(13.75)	21 26.25	51 (15.94)
Education of the farmer	Illiterate	3 (3.75)	12 (15.00)	18(22.50)	13 16.25	46 (14.38)
	Primary	8 (10.00)	16 (20.00)	17(21.25)	28 35.00	69 (21.56)
	Matric	36 (45.00)	36 (45.00)	24(30.00)	27 33.75	123(38.44)
	Secondary	22 (27.50)	12 (15.00)	15(18.75)	7 8.75	56 (17.50)
	Graduation & above	11(13.75)	4 (5.00)	6 (7.50)	5 6.25	26 (8.13)
Occupation	Agriculture + other	14 (17.50)	35 (43.75)	25(31.25)	15 18.75	89 (27.81)
Agriculture as a sole professional		66 (82.50)	45 (56.25)	55(68.75)	65 81.25	231(72.19)
Credit availed	No	29 (36.25)	23 (28.75)	32(40.00)	21 26.25	105 (32.81)
	Yes	51 (63.75)	57 (71.25)	48 (60.00)	59 73.75	215 (67.19)
Farm size	Marginal & Small	8 (10.00)	7 (8.75)	13 (16.25)	9 11.25	37 (11.56)
	Semi-medium	22 (27.50)	5 (6.25)	7 (8.75)	21 26.25	55 (17.19)
	Medium	28 (35.00)	41 (51.25)	39 (48.75)	42 52.50	150 (46.88)
	Large	22 (27.50)	27 (33.75)	21(26.25)	8 10.00	78 (24.38)
Area under the principal crop	Marginal & Small	27 (33.75)	13 (16.25)	13(16.25)	9 11.25	62 (19.38)
	Semi-medium	25 (31.25)	26 (32.50)	13(16.25)	25 31.25	89 (27.81)
	Medium	20 (25.00)	36 (45.00)	43(53.75)	38 47.50	137 (42.81)
	Large	8 (10.00)	5 (6.25)	11 (13.75)	8 10.00	32 (10.00)
MSP awareness	Not aware	3 (3.75)	13 (16.25)	14(17.50)	9 11.25	39 (12.19)
	Aware	77(96.25)	67 (83.75)	66(82.50)	71 88.75	281 (87.81)
Time of payment received	Timely payment	52 (65.00)	68 (85.00)	67 (83.75)	49 61.25	236 (73.75)
	Otherwise	28 (35.00)	12 (15.00)	13 (16.25)	31 38.75	84 (26.25)
Yield (Quintal/Hectare)		16.05	32.94	25.97	45.37	
Average price received		7069	5020	5715	2120	
Market distance (km)		12.93	20.33	15.81	4.85	13.47813
Total		80	80	80	80	320
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in the parenthesis are percentage Source(s): Primary data, 2023-24

payments from procurement agencies. However, payment delays were most common for wheat farmers and least common for rapeseed and mustard growers.

Table 5 presents the results of the logit regression model and the corresponding marginal effects of various factors influencing the likelihood of farmers selecting a particular marketing channel. Specifically, it explores whether farmers sell through a single market or diversify across multiple channels. The marginal effects aid in interpreting how each independent variable impacts this choice.The findings indicate that farmers who accessed credit were significantly more likely to use multiple markets. Similarly, those with larger landholdings had a higher probability of marketing their products through diverse channels. The model, based on 320 observations, demonstrates a strong fit, with a Pseudo R^2 of 0.717, meaning 71.7% of the variation in the dependent variable is explained by the model. The likelihood ratio chi-square statistic (LR χ^2 = 251.41, p = 0.000) and a log-likelihood of - 49.71 confirm the model's robustness.

The results of the table shows that age has a negative correlation with marketing channel diversification, which reveal that the younger farmers are more likely to choose multiple markets while older farmers tend to avoid them, it is possibly due to risk aversion. An additional year in age reduces the probability of using multiple markets by 0.3%. The farmers level of education plays a significant role as well, it shows that each additional year of schooling increases the likelihood of market diversification by 1.3%, which underscoring the importance of education in decision-making of the farmers regarding marketing. The farmers household size positively affects diversification, an extra member of household raises the probability of choosing more than one market by 4.8%. According to Asad *et al.* (2019), direct marketing has proven most effective for citrus farmers in Punjab and Pakistan due to inefficiencies in traditional intermediary channels. Bhanot *et al.* (2021) emphasizes the role of institutional innovations such as direct procurement and e-trading platforms reduces the distress sales and boost farmer income level in India.The households are more likely to diversify their channels, especially

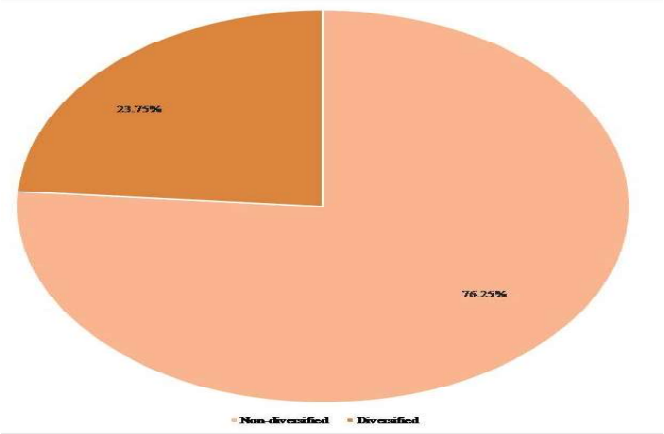

Fig 2. Farmers choice of marketing strategies

Table 5. Estimation results of the logit model and marginal effects
Dependent variable: Choice of marketing strategies[0=Non-diversified (single market); 1= Diversified (multiple markets)]

Explanatory variables	Coefficient	Standard Error	Marginal Effect (dy/dx)	Standard Error
Age	-0.074**	0.037	-0.003**	0.002
Education	0.273***	0.101	0.013***	0.004
Household size	1.053***	0.210	0.048***	0.007
Occupation	1.734**	0.874	0.080**	0.039
Agriculture training	2.332**	1.234	0.107**	0.055
MSP awareness	1.337	3.141	0.061	0.144
Vehicle ownership	2.364	2.644	0.109	0.121
Market distance	0.100***	0.037	0.005***	0.002
Credit availed	0.951	0.654	0.044	0.030
Landholding	-0.164	0.154	-0.008	0.007
Area under the crop	0.322	0.209	0.015	0.009
Production	0.019**	0.007	0.001	0.000***
Price	0.000	0.000	0.000	0.000
Time of payment	1.175	0.973	0.054	0.044
Constant	-20.817***	5.701		
Number of observations	320.000			
LR $chi^2(14)$	251.410			
Prob > chi^2	0.000			

%, respectively Source(s): Primary data, 2023-24

when agriculture isn't their sole livelihood. Additionally, main farmers are 8% more likely to use multiple channels and those who received agricultural training are 10.7% more likely to do so. Monika *et al.* (2022) studied pomegranate growers in Karnataka and identify profitability and market accessibility as key determinants in marketing channel choices. Market distance also plays a crucial role, a one-kilometre increase in distance raises the likelihood of using multiple markets by 0.5%, and larger production volumes also slightly increase diversification Naik and Mohan (2025) found similar results. The awareness of the MSP scheme positively influences marketing decisions, although its statistical significance is weak. Naik and Mohan (2025) and Dev (2023) +observe that government procurement under the MSP scheme benefits crops like paddy, wheat and cotton. For coarse grains such as jowar, bajra, maize and ragi, increasing state procurement can enhance price realization. Better transport and communication infrastructure significantly influence farmers' market choices by improving access to higher prices (Negi *et al.,* 2018). Factors like vehicle ownership, credit access, total land size, area under principal crops, crop price, and payment timing showed no significant effect.The results of the study are consistent with Sekhar *et al.* (2024), who identified farm size, education and agricultural training as key drivers of agricultural diversification. Thakur *et al.* (2023) also found that farmers selling directly to consumers perform better than those relying on intermediaries with income, experience, market distance, and information playing critical roles.Similarly, Naik and Mohan (2024) reported that Indian paddy farmers incline to use government marketing channels when they receive technical advice, use government input services, belong to higher social groups and own large landholding. In contrast, Siddique *et al.* (2018) noted that small citrus fruit farmers are

more sensitive to price and harvest timing. In summary, the key factors that influences farmers decision towards the selection of marketing channels or marketing diversification includes education level, household size, occupation, agricultural training, market distance and volume of the production. Notably, the findings of the study reveal that younger farmers are more inclined toward marketing diversification. These findings offer actionable insights for designing effective agricultural marketing policy.

Conclusion

The study underscores the need for marketing channel diversification among farmers in Punjab to boost income and reduce market-related risks. Present study shows that 76.25% farmers use only a single marketing channel which indicate low level of marketing diversification. The main determinants of marketing diversification include education, household size of the farmers, primary occupation, agricultural training participation, market distance and volume of production. In contrast, older age farmers are associated with a lower likelihood of adopting diverse strategies. These visions highlight the value of education and training in promoting market diversification. The greater production capacity enables farmers to explore more market options, but small-scale farmers still face structural barriers that limit their ability to diversify and require targeted support. The policy recommendations include to strengthen agricultural marketing infrastructure, expand access to institutional credit, and increase the awareness level of alternative marketing channels.These measures can help farmers make informed decisions, reduce overreliance on traditional channels, and improve profitability. The given agriculture's dominant role in Punjab's economy, realizing these strategies can promote sustainable practices and improve farmer well-being.In conclusion, marketing diversification is a vital strategy for manage risks, increase the farmers income level and ensure the long-term sustainability of Punjab's agricultural sector.

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