

Income Diversification of Rural Households in Punjab

Simranjit Kaur, Jasdev Singh and Sanjay Kumar

Department of Economics and Sociology, Punjab Agricultural University, Ludhiana, Punjab

Abstract

This study investigated the nature and extent of income diversification of rural households across caste categories, land ownership categories, and peri-urban and peri-rural settings of Punjab along with determinants of income diversification. The study is based on primary data collected from 360 rural households. The highest share in total income of rural household came from crop farming (40.05%) followed by non-farm income (31.15%) and livestock (18.32%). Income diversity was found to be more prominent in villages located closer to urban areas. As landholding status of rural households increased, reliance on farming grew significantly, leading to a decline in income diversification towards the non-farm sector. The income for households belonging to the general caste was substantially higher than that of scheduled caste and backward caste households. The study employed the Simpson Index of Diversity (SID) to measure income diversification and the Tobit regression model to identify factors influencing income diversification.

Keywords: Income diversification, Punjab, Rural households, Tobit regression

JEL Classification: Q10, R20, O15

Introduction

Income diversification means that total income of household accrues to more than one income source and relative to other sources of income, a single source is not influential. Due to distress driven reasons comprising saturation of employment generation capacity in agricultural sector, declining land-to-man ratio, unviable and fragmented land holdings and mechanization of agricultural operations or intensive use of labour-saving production technologies, the growing rural population is being pushed to the non-farm sector of economy (Ghuman, 2005). Moving towards non-farm sector is increasing the growth of rural areas by diversifying and increasing the income of the rural people as the non-farm wage is usually higher than the agricultural wage. It also provides security and reduces the uncertainty associated with farm income. The motive for mitigation of risk as well as the adverse effects of declining factor returns in a single source of income, and dispersed land holdings is the set primary drivers also referred as “push factors” for diversification. Complementarities among various agricultural and non-farm activities, specialization in line of comparative advantage conferred by superior strategies, talents or bequest are termed as “pull factors” for income diversification (Barett *et al.*, 2001). In emerging economies, such diversification has greatly lowered the widespread

income disparity that exists amongst households (Lanjou, 1999). Focusing on skilling rural workforce can bring more interest in the non-farm sector. Besides generating additional income, the non-farm activities comprising construction, manufacturing and trade related activities will contribute towards reduction of the income gap between the rich and poor households (Pavithra and Vatta, 2013). However, to accommodate the manpower released from agriculture and allied sector, the non-farm sector has to develop at a faster rate than earlier. There is a pressing need to diversify the agrarian economy within the state, extending beyond crop diversification to fostering the growth of agricultural-related and non-farm enterprises, as well as agro-processing in rural areas (Sidhu, 2002). Improving agricultural productivity along with promoting non-farm employment in rural areas would lead to higher wages and provide better livelihood security for those working in agriculture (Venkatesh, 2013). The participation in non-farm employment and non-farm income is determined by several factors including age, gender, degree of education, size of land holding, household size, etc. All of these factors contribute to the diversity of household incomes. Moreover, among the rural households, the access to income sources may significantly vary across caste and land holding categories (Vatta, 2006). In above backdrop, the present study has been taken to make in depth examination of income diversification of rural households in Punjab and factors affecting the same.

Data Sources and Methodology

Multi-stage stratified random sampling procedure was used for selection of the study sample. At the first stage of sampling, the districts of state were stratified into three groups based on proportionate share of rural workers in total workers. Further, one district representing each group of rural employment intensity was selected randomly. At second stage of sampling, from each of the sample districts, one town (urban settlement) was selected randomly. At third stage of sampling, four villages, two falling within the periphery of each selected town and two that falls out of its periphery were selected randomly. The villages within the periphery of 10 km had been termed as peri-urban villages and those outside the periphery as peri-rural villages. Thus, total 12 villages (6 within periphery of selected 3 towns and 6 outside the periphery of towns) were selected from the three sample districts. At final stage, 30 rural households representing different categories were selected from each of the selected village making a total sample of 360 rural households, pertaining to non-cultivating, marginal, small, semi-medium, medium and large cultivating categories. The collected data from these households was analysed using following statistical tools and techniques:

Descriptive Statistics

Averages and percentages were utilized to determine household income from various sources, as well as to analyse the distribution of income by industry according to NIC-2008 (National Industrial Classification-2008). This breakdown was also examined across caste categories, land ownership categories, and peri-urban and peri-rural settings. Percentages quantified the number of income sources available to rural households, categorized by caste, land categories, and by geographical context.

Simpson Index of Diversity (SID)

Simpson index of diversity (SID) was worked out to determine the degree or extent of income diversification among the rural households in Punjab. Its value lies between 0 and 1; the value zero indicates that the farm household is completely specialized, while a value of one indicates higher degree of diversification (Harishankar *et al.*, 2022). The formula of Simpson Index of Diversity (SID) is:

$$SID = 1 - \sum_{i=1}^n P_i^2$$

Where, 'n' represents the total number of sources of income and P_i is the share of income from the i th source. Number of income sources were classified in SID as self-employed in agriculture, casual labour, self-employed in non-farm, regular job, pensions, remittances and rental income.

Tobit Regression Model

Tobit regression (1958) was used to investigate the determinants of income diversification among rural

households. It is widely used in analysing datasets where the dependent variable experiences censoring and it has been used by many researchers including Ahmed *et al.* (2018); Rahut *et al.* (2015); Amandeep (2021); Harishankar *et al.* (2022) and Das *et al.* (2023). Simpson index of diversity for income was considered as the dependent variable. Mathematically, the Tobit model can be expressed as follows:

$$SID_i = \beta_0 + \beta_1 \text{Land} + \beta_2 \text{Family size} + \beta_3 \text{Caste} + \beta_4 \text{Periphery} + \beta_5 \text{Literacy index} + \beta_6 \text{Age} + \beta_7 \text{Education} + \beta_8 \text{Worker population ratio} + \beta_9 \text{Education Squared} + \beta_{10} \text{Age Squared} + u_i$$

Where, SID=Simpson index of diversification, β_0 = intercept, $\beta_1, \beta_2, \dots, \beta_{10}$ = Coefficients of explanatory variables and u_i = Error term

Results and Discussion

Pattern of rural household incomes

The extent of income earned by rural household from crop farming, livestock, agricultural labour, MGNREGA, non-farm activity, pensions, remittances and rental income has been presented in Table 1. On an average, a rural household in Punjab was estimated to earn Rs. 631872 per annum. The per capita rural household income thus turned out to be Rs. 154115. Income from crop farming (Rs. 253065 per annum), livestock (Rs. 115762 per annum) and agricultural labour (Rs.12482 per annum) accounted for 40.05 per cent, 18.32 per cent and 1.98 per cent of per annum rural household income of the sample respondents. Rural household was estimated to earn Rs. 196811 per annum from non-farm sources, its share being quite significant at 31.15 per cent. The pensions, remittances and rental income contributed about 8.14 per cent to the total rural household income.

Table 1: Pattern of rural household income in Punjab, 2022-23

Source of income	Average income per household (Rs/annum)	Share in total income (%)
Crop farming	253065	40.05
Livestock	115762	18.32
Agricultural labour	12482	1.98
MGNREGA	2338	0.37
Non-farm income	196811	31.15
Transfer income*	15867	2.51
Remittances	32917	5.21
Rental income	2630	0.42
Total income	631872	100
Per capita income	154115	

*Transfer income includes old age pensions, pensions from Government schemes like PM KISAN YOJNA and retirement pensions.

The household incomes and share of different income sources varied significantly across different caste categories (Table 2). Average annual earnings of a scheduled caste (SC) and backward caste (BC) household were Rs. 391254 and Rs. 521025 and that of general caste (GC) household was Rs. 829078 respectively. Income from agriculture (sum total of Crop farming, Livestock and Agricultural labour) accounted for 78.30 per cent, 23.16 per cent and 14.90 per cent of total income of GC, SC and BC rural households respectively. The share of income from agricultural labour was 7.92 per cent in SC, 3.84 per cent in BC and negligible in GC households. MGNREGA accounted for 1.47 per cent as total income of SC households. Rural non-farm income was relatively higher among BC households. Non-farm income source accounted for the major proportion i.e. 76.55 per cent and 68.86 per cent of the total income of BC and SC household respectively. In contrast, this source contributed only about 13 per cent of total income of GC households. The per capita income of an SC, BC and GC household was Rs. 93156, Rs. 130256 and Rs. 202214 respectively.

Further, a clear trend can be seen of the increasing importance of crop farming and decreasing importance of non-farm, and agricultural labour sources of income with an increase in size landholding among rural households. The average annual income per household of non-cultivating households, marginal, small, semi-medium, medium, and large farm households was Rs. 422163, Rs. 422048, Rs. 666776, Rs. 838794, Rs. 1618995 and Rs. 2271362 respectively (Table 3). The per capita income for respective categories was Rs. 102967, Rs. 117236, Rs. 179939, Rs. 186399, Rs. 344467 and Rs. 454272 per annum. The per capita income of large farm households was about four times higher than that of marginal farm households.

The share of crop farming had positive relationship with the land size and was observed to be 37.58 per cent,

43.54 per cent, 62.27 per cent, 70.30 per cent and 87.16 per cent of the total income of marginal, small, semi-medium, medium and large farm households respectively. No income accrued to the semi-medium, medium and large farmers from agricultural labour and its share declined from non-cultivating to small farm households from 5.72 per cent to 0.15 per cent. The proportionate share from non-farm income sources was inversely related to the land size, it accounted for 82.14 per cent, 16.01 per cent, 6.73 per cent, 9.07 per cent, 1.37 per cent and 0.79 per cent of total income for non-cultivating, marginal, small, semi-medium, medium and large farm households respectively. The share of remittances and transfer income in total household income also decreased with the increase in landholding size. Transfer income and remittances which contributed 2.75 per cent and 5.33 per cent towards the total income of non-cultivating rural households, had shown a clear negative relationship with land size of the cultivating rural households. The respective share of these income sources in total income of cultivating rural households varied from zero and 1.54 per cent of large farm households to 6.57 per cent and 10.0 per cent of marginal farm households.

The overall average income per household in peri-urban and peri-rural villages was Rs. 598506 and Rs. 662369, respectively. The share of crop income in total income was higher at 47.38 per cent in peri-rural villages than at 32.13 per cent in peri-urban areas (Table 4). This reflects the heavy dependence of peri-rural households on agricultural activities, while peri-urban households may have more diversified income sources. Livestock contributed 21.21 per cent of the income in peri-rural areas and 15.22 per cent in peri-urban areas. This highlights that livestock component of farming is also more intensive in peri-rural households. Further the per capita rural household income was Rs. 145977 and Rs. 157707 per annum in the peri-urban and peri-rural areas,

Table 2: Pattern of rural household income across various caste categories in Punjab, 2022-23

Source of income	(Rs./annum)					
	SC	BC	GC	SC (%)	BC (%)	GC (%)
Crop farming	27773	38338	455335	7.10	7.36	54.92
Livestock	31851	19259	193548	8.14	3.70	23.34
Agricultural labour	31004	20000	317	7.92	3.84	0.04
MGNREGA	5760	643	0	1.47	0.12	0.00
Non-farm income	269399	398857	107725	68.86	76.55	12.99
Transfer income	10615	5357	21397	2.71	1.03	2.58
Remittances	13385	34286	47492	3.42	6.58	5.73
Rental income	1469	4286	3263	0.38	0.82	0.39
Total income	391254	521025	829078	100.00	100.00	100.00
Per capita income	93156	130256	202214			

Table 3: Pattern of rural household income across different land size categories in Punjab, 2022-23

Source of income	(Rs. /annum)					
	Non cultivating	Marginal	Small	Semi-medium	Medium	Large
Crop farming	0 (0.00)	158592 (37.58)	289910 (43.48)	522336 (62.27)	1138187 (70.30)	1979767 (87.16)
Livestock	10507 (2.49)	122755 (29.09)	255890 (38.38)	235818 (28.11)	333708 (20.61)	238595 (10.50)
Agricultural labour	24131 (5.72)	2000 (0.47)	1000 (0.15)	0 (0.00)	0 (0.00)	0 (0.00)
MGNREGA	4676 (1.11)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Non-farm income	346761 (82.14)	67580 (16.01)	44880 (6.73)	76100 (9.07)	22240 (1.37)	18000 (0.79)
Transfer income	11200 (2.65)	27720 (6.57)	23520 (3.53)	13560 (1.62)	22800 (1.41)	0 (0.00)
Remittances	22500 (5.33)	42200 (10.00)	48000 (7.20)	43800 (5.22)	37500 (2.32)	35000 (1.54)
Rental income	2389 (0.57)	1200 (0.28)	3576 (0.54)	1440 (0.17)	10300 (0.64)	0 (0.00)
Total income	422163 (100.00)	422048 (100.00)	666776 (100.00)	838794 (100.00)	1618995 (100.00)	2271362 (100.00)
Per capita income	102967	117236	179939	186399	344467	454272

*Figures in parentheses represents the per centage values

respectively. The share of non-farm income in peri-urban areas was higher at 40.61 per cent as compared to 22.3 per cent in peri-rural villages. Thus, the villages near the urban settlements had more access to non-farm employment sources and their dependence on agriculture was relatively less and income from non-farm sources was higher as compared to that of peri-rural villages.

Industrial distribution of rural income

Overall industrial classification of rural income in Punjab has been given in Table 5. On an average, a rural household earned an income of Rs. 580458 per annum (excluding transfer incomes, remittances and rental incomes). Further split of rural income revealed that 65.69 per cent of this income came from the primary sector. It was followed by

Table 4: Pattern of rural household income across peri-urban and peri-rural villages in Punjab, 2022-23

Source of income	(Rs. /annum)			
	Peri-urban villages	Peri-rural villages	Peri-urban villages (%)	Peri-rural villages (%)
Crop farming	192313	313816	32.13	47.38
Livestock	91065	140459	15.22	21.21
Agricultural labour	11953	13011	2.00	1.96
MGNREGA	2608	2068	0.44	0.31
Non-farm income	243056	147698	40.61	22.30
Transfer income	23033	8700	3.85	1.31
Remittances	31267	34567	5.22	5.22
Rental income	3211	2049	0.54	0.31
Total income	598506	662369	100.00	100.00
Per capita income	145977	157707		

a 20.6 per cent share of the service sector and 13.7 per cent of the secondary sector. Under secondary sector, share of construction was highest (5.57%) in rural income. Income from MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) only added 0.4 per cent to rural incomes, averaging Rs. 2,338 per household. This limited income share suggests that while MGNREGA provides employment, it does not substantially impact the overall household income. Sub-sectors like education, health, and social work (4.85%), financial and real estate activities (5.46%), and trade (4.16%) represent the most substantial contributors towards rural household income within the service sector.

The distribution of rural income by caste across industries in Punjab for 2022-23 reveals significant disparities among Scheduled Castes (SCs), Backward Castes (BCs), and General Castes (GCs). While an SC household earned Rs. 365786 per annum, the respective income for BC and GC households was Rs. 477097 and Rs.756925 per annum (Table 6). GCs show a heavy reliance on the primary sector, which comprises 85.77 per cent of their income. This high reliance suggests that GCs have greater access to land, resources, or capital to engage in agricultural activities. SCs and BCs, in contrast, derive only 24.78 per cent and 16.26 per cent of their income, respectively, from primary sector or agriculture. Their lower involvement in agriculture is due to limited access to land ownership and agricultural resources, forcing them to seek income from other sectors. As compared to GC households, SCs and BCs depend more on the secondary sector. Construction is a significant income source for SCs and BCs (18.86% for SCs and 13.25% for

BCs) but negligible for GCs. This reflects that SCs and BCs often rely on labour-intensive sectors.

MGNREGA is a small income source for SCs and BCs, contributing 1.57 per cent and 0.13 per cent of their income, respectively. This program serves as a supplementary income source, primarily benefiting SCs who are more dependent on wage labour. The service sector an important source of income for SCs and BCs, contributed 39.64 per cent and 37.46 per cent of their income, respectively. GCs, however, derived only 11.94 per cent of their income from services. Within the service sector, financial and real estate activities had significant role in income of BCs (Rs. 81,857), surpassing that of GCs (Rs. 22,333) and SCs (Rs. 32,573), indicating potential financial literacy among BCs.

Table 7 highlights the differences in industrial distribution of rural income between the peri-urban and peri-rural villages. The average income of rural household in peri-urban village was Rs. 540995 per annum and that for peri-rural household was Rs. 617053 per annum. In peri-rural villages, share of primary sector (75.73%), in rural income was more as compared to peri-urban villages (54.59%). The income from agriculture sector in peri-rural villages was almost 1.5 times that of peri-urban villages, while the income from almost all other sectors was relatively less, which indicated towards relatively high dependence on agriculture in peri-rural areas, with limited diversification into other sectors. The share of income from secondary and services sector (17.63% and 27.78%) in peri-urban villages was significantly higher as compared with peri-rural areas (10.18% and 14.10%). Moreover, for both peri-rural and

Table 5: Distribution of rural income by industry in Punjab, 2022-23

Industry/NIC 2008	Average annual income (Rs./household)	Per cent share
Agriculture, forestry, fishing / Primary sector (A)	381309	65.69
Manufacturing (C)	24111	4.15
Utilities (D, E)	20778	3.58
Construction (F i)	32319	5.57
MGNREGA (F ii)	2338	0.40
Secondary sector (C-F)	79546	13.70
Trade (G)	24128	4.16
Transportation and storage (H)	8950	1.54
Financial, insurance and Real estate activities (K, L)	31697	5.46
Administrative and support service activities (N, O)	15467	2.66
Education, health and social work (P, Q)	28150	4.85
Other services (I, J, M, R-U)	11211	1.93
Service sector (G-U)	119603	20.60
Total income	580458	100.00

Table 6: Distribution of rural income by castes in different industries in Punjab, 2022-23

Industry/NIC 2008	Caste category (Rs. /annum)			Caste category (%)		
	SC	BC	GC	SC	BC	GC
Agriculture, forestry, fishing / Primary sector (A)	90627	77597	649201	24.78	16.26	85.77
Manufacturing (C)	31497	78357	10487	8.61	16.42	1.39
Utilities (D, E)	23916	78571	6878	6.54	16.47	0.91
Construction (F i)	68986	63214	0	18.86	13.25	0.00
MGNREGA (F ii)	5760	643	0	1.57	0.13	0.00
Secondary sector	130159	220786	17365	35.58	46.28	2.29
Trade (G)	19881	31714	26217	5.44	6.65	3.46
Transportation and storage (H)	12252	15000	5556	3.35	3.14	0.73
Financial, insurance and Real estate activities (K, L)	32573	81857	22333	8.91	17.16	2.95
Administrative and support service activities (N, O)	19301	27857	10730	5.28	5.84	1.42
Education, health and social work (P, Q)	41091	13714	20497	11.23	2.87	2.71
Other services (I, J, M, R-U)	19902	8571	5027	5.44	1.80	0.66
Service sector	145000	178714	90360	39.64	37.46	11.94
Total income	365786	477097	756925	100.00	100.00	100.00

Table 7: Distribution of rural income among peri-urban and peri-rural villages in different industries in Punjab, 2022-23
(Rs. /annum)

Industry/NIC 2008	Peri-urban villages	Peri-rural villages	Peri-urban villages (%)	Peri-rural villages (%)
Agriculture, forestry, fishing / Primary sector (A)	295331	467287	54.59	75.73
Manufacturing (C)	33600	14267	6.21	2.31
Utilities (D, E)	27502	13822	5.08	2.24
Construction (F i)	31654	32634	5.85	5.29
MGNREGA (F ii)	2608	2068	0.48	0.34
Secondary sector (C-F)	95364	62791	17.63	10.18
Trade (G)	30971	16925	5.72	2.74
Transportation and storage (H)	11337	6419	2.10	1.04
Financial, insurance and Real estate activities (K, L)	38292	23053	7.08	3.74
Administrative and support service activities (N, O)	10062	22083	1.86	3.58
Education, health and social work (P, Q)	47633	8253	8.80	1.34
Other services (I, J, M, R-U)	12004	10242	2.22	1.66
Service sector (G-U)	150299	86975	27.78	14.10
Total income	540995	617053	100.00	100.00

peri-urban villages, share of secondary sector in total rural income was less as compared with that from the service sector. Further, the service sector plays a critical role in peri-urban villages, contributing 27.78 per cent of income, nearly double that in the peri-rural villages (14.10%). The significant contributions come from financial, insurance, and real estate activities (7.08%) and education, health, and social work (8.80%) in peri-urban areas. The education and health sector alone contributes 8.8 per cent in peri-urban areas while its contribution in peri-rural areas was only 1.34 per cent, underscoring a disparity in access to higher-paying service jobs. This indicates greater employment opportunities in sectors such as education, healthcare, finance, and real estate for those closer to urban areas.

The pattern of rural income across different industrial

divisions for various land size categories of rural households has been presented in Table 8. While non-cultivating rural households earned only 9 per cent of their total income from primary sector, the share of income from this sector for land cultivating households was very high and showed a positive relationship with land size category ranging from 80.74 per cent for marginal farmers to 99.20 per cent for large farmers. This high dependence on agriculture among larger landholders indicates a traditional, land-intensive income base, with minimal diversification outside the primary sector. Non-cultivating households have a diversified income base due to their lack of agricultural involvement. The share of secondary sector in total income was also declining with increase in land, ranging from marginal to large farmers from 8.90 per cent to not at all respectively. The non-cultivating

Table 8: Distribution of rural income by land size in different industries in Punjab, 2022-23

(Rs. /annum)

Industry/NIC 2008	Non cultivating	Marginal	Small	Semi-medium	Medium	Large
Agriculture, forestry, fishing / Primary sector (A)	34637 (8.97)	283348 (80.74)	546800 (92.57)	758154 (97.20)	1471895 (95.06)	2218362 (99.20)
Manufacturing (C)	41544 (10.76)	19400 (5.53)	4640 (0.79)	0 (0.00)	0 (0.00)	0 (0.00)
Utilities (D, E)	33333 (8.63)	8000 (2.28)	4800 (0.81)	0 (0.00)	42000 (2.71)	0 (0.00)
Construction (F i)	63183 (16.37)	3840 (1.09)	1400 (0.24)	0 (0.00)	0 (0.00)	0 (0.00)
MGNREGA (F ii)	4676 (1.21)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Secondary sector (C-F)	142737 (36.97)	31240 (8.90)	10840 (1.84)	0 (0.00)	42000 (2.71)	0 (0.00)
Trade (G)	43783 (11.34)	11300 (3.22)	0 (0.00)	0 (0.00)	12000 (0.77)	0 (0.00)
Transportation and storage (H)	12800 (3.32)	8160 (2.33)	0 (0.0)	3600 (0.46)	16500 (1.07)	0 (0.0)
Financial, insurance and Real estate activities (K, L)	49639 (12.86)	7240 (2.06)	28240 (4.78)	9240 (1.18)	0 (0.00)	9000 (0.40)
Administrative and support service activities (N, O)	29667 (7.68)	4560 (1.30)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Education, health and social work (P, Q)	52111 (13.50)	3880 (1.11)	4800 (0.81)	4000 (0.51)	6000 (0.39)	9000 (0.40)
Other services (I, J, M, R-U)	20700 (5.36)	1200 (0.34)	0 (0.00)	5000 (0.64)	0 (0.00)	0 (0.00)
Service sector (G-U)	208700 (54.06)	36340 (10.36)	33040 (5.59)	21840 (2.80)	34500 (2.23)	18000 (0.80)
Total income	386074 (100.00)	350928 (100.00)	591680 (100.00)	779994 (100.00)	1548395 (100.00)	2236362 (100.00)

*Figures in parentheses represent the per cent share in total rural household income

rural villages, so dependence on single income source was more in peri-rural villages. The largest proportion (45%) of households in peri-rural villages had only source of income. On the other hand, the largest proportion of peri-urban households (42.78%) received income from two sources. Though difference in this regard between peri-urban and peri-rural areas was not very high, still this indicates that income diversity is relatively high in peri-urban areas, where households may have a mix of agricultural and non-agricultural employment options.

Table 12: Income sources of rural households of peri-urban and peri-rural villages in Punjab, 2022-23 (per cent)

Income sources (Number)	Peri-urban villages	Peri-rural villages
Only one	38.89	45
Two	42.78	36.11
Three	13.89	16.11
Four and above	4.44	2.78
Total	100	100

Income diversification

Simpson Index of Diversity (SID) was computed to determine the degree or extent of income diversification of rural households of Punjab which has been presented in Table 13. The sample households have been categorized into three distinct groups with low diversification, moderate diversification, and high diversification (Challa *et al.*, 2019). According to the results, around 71 per cent household have SID values of 0 to 0.38 and thus have less diversification in income sources. Around 25 per cent households have SID values of 0.39 to 0.63 and were categorized as medium income diversifiers and only 3.6 per cent were considered as high-income diversifiers.

Table 13: Simpson index of diversity for income diversification of rural households of Punjab, 2022-23

SID Value	Per cent of household	Level of diversification
0 to 0.38	71.1	Low
0.39 to 0.63	25.2	Medium
Above 0.63	3.6	High

Determinants of income diversification among the rural households

Table 14 presented Tobit estimates of determinants of diversification of rural household income in Punjab. Independent variables included in the model were land size, family size, caste dummy, periphery dummy, literacy index, age of household head (number of years), age of household head squared, number of years of education of household head, number of years of education of household head squared

and worker population ratio (WPR). The literacy index of household was calculated by summation of weights given to different education status of individual members and dividing it by household size. The status of education considered were illiterate, up to primary, primary to middle, middle to matric, matric to senior secondary, senior secondary to graduate and post graduate and above. The working age group considered for this estimation lied between 15-65 years.

The results indicated that land size, caste, family size, literacy index, age squared, years of education and years of education squared were statistically significant. The negative and statistically significant coefficient of land size (-0.014) at the 1 per cent level suggested that increase in land size is associated with a decrease in income diversification among rural households. Thus, households with more land found to have less diversified income. An increase in land size might lead to have less time for a worker to diversify its income from other sources. Years of education had positive coefficient (0.038), significant at the 1 per cent level. Thus, years of education of household head found to be positively and significantly related with income diversification of household suggesting that education encourages income diversification and educated individuals may pursue multiple income-generating activities. But years of education squared was observed to be negatively associated with income diversification. Its coefficient -0.002 was significant at 5 per cent level, reflecting that the relationship got reversed at higher level of education. Thus, while initial increase in years of education lead to diversification of income in rural households, after attaining certain level of education, further increase in education tends to decrease the income diversification. Therefore, households with higher education found to have less diversified income. The age of household head had coefficient of -0.010 which was not significant reflecting that age could not make any significant impact on income diversification. But age of household head squared had positive coefficient and it was significant at 5 per cent level reflecting that beyond some level, higher age of head has positive effect on income diversification of rural household. Thus, households with relatively older heads are more likely to diversify their income sources, possibly due to accumulated experience and access to different income opportunities over time.

The coefficient of family size was found to be significant at 10 per cent level and positively related with income diversification, thus indicating that larger families may diversify their income sources, possibly due to more family members participating in number of non-agricultural activities to support household income. The coefficient of caste dummy was also found to be positively significant at 10 per cent level, indicated that general caste households have more diversified income sources. Income sources like transfer income from PM KISAN YOJNA and remittances

Table 14: Tobit estimates of determinants of diversification of rural household income in Punjab, 2022-23.

Variables	Coefficient	Std. Error	P value
Land size	-0.014*	0.003	0.00
Family size	0.021***	0.011	0.06
Caste dummy	0.066***	0.036	0.07
Periphery dummy	0.016	0.031	0.60
Literacy index	-0.044***	0.023	0.06
Age of household head	-0.010	0.007	0.16
Age of household head squared	0.0002**	0.000	0.04
Years of education of household head	0.038*	0.012	0.00
Years of education of household head squared	-0.002**	0.001	0.01
WPR	0.034	0.066	0.60
Constant	0.198	0.188	0.292

*, **, *** denotes 1%, 5% and 10% significance level respectively

were more common among general caste households and income of other categories were less diversified towards these sources. Literacy index had negative coefficient (-0.044) which was significant at 10 per cent level. This indicated that higher literacy rates are negatively associated with income diversification. The chances of getting employed in high paying regular job activities or high paying self-employment activities are more with increase in literacy level of household so there was less tendency of income to be diversified.

Conclusion and Policy Implications

On an average, a rural household in Punjab was estimated to earn Rs. 631872 per annum and crop farming had the highest share in the income of rural household. Income diversity was more significant in villages located nearer to urban centers. Moreover, income diversification towards non-farm sector declined and the dependence on farming increased considerably with an increase in the landholding status of rural households. The income of general caste households was much higher than that of SC and BC households. Majority of rural households had access to only one source of income. Tobit estimates of income diversification revealed that land size, literacy index and years of education of household head squared were significantly negatively related with income diversification. Family size, caste, years of education of household head and age of household head squared found to be significantly positively related with income diversification.

The study shows that income of non-cultivating households and marginal farm households significantly less than the income of other land size categories. So, there is need to focus on landless households and households with smaller size landholdings to increase and diversify their incomes. Households of these categories should be provided adequate training so that they may enhance their participation in higher income-generating activities. Also, the study found

that with increasing share of non-farm income as compared to agricultural income, total income of household did not increase, signifying better outcomes in crop plus livestock income than diversification into non-farm sector. Therefore, there is need for higher income generating opportunities in non-farm sector to make non-farm income as a better livelihood alternative.

Education in rural regions plays a key role in broadening income opportunities. To maximize the benefits of education in rural Punjab, there should be efforts to improve the quality of education, increasing access to educational resources, and align educational programs with local economic needs. Also, the promotion of higher education in rural areas needs to be prioritized to make self-employment opportunities as rewarding as official government jobs. Education is a requirement for admittance into the organized non-farm industry that pays quite well. Creating a specialized employment policy that focuses on agriculture and related sectors, can significantly impact job creation. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is important in providing employment to landless households. Therefore, sufficient employment opportunities can be generated for the rural people through strengthening of this type of government guaranteed employment programs.

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