Employment Diversification of Rural Households in Punjab

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ABSTRACT

This paper investigates the nature and extent of employment diversification of rural households of Punjab and its determinants, based on the data collected from 360 rural households. The findings reveal that rural men exhibit greater employment diversity than rural women. Employment diversity was found to be more pronounced in villages situated closer to urban areas and tended to decrease as the landholding size of rural households increased. The research applied the Simpson Index of Diversity to measure employment diversification, as well as the Tobit model to identify the key factors affecting employment diversification and the Logit model to determine the factors that influence participation in non-farm activities.

I

INTRODUCTION

The state of Punjab has experienced a lot of horizontal and vertical structural transformation of employment during the process of agricultural development after the mid-1960s. With the slowing down of agricultural growth, the agriculturally based rural economy of Punjab is now in crisis. The increase in population leads to the growing incidence of landlessness and further marginalisation of operational holdings. One-third of the farmers in the State belong to marginal and small categories. The economically unviable holding size yields very small income that is hardly enough to sustain these farm categories. Further, the positive effect of increasing agricultural output on human labour use in agriculture got neutralised, and the significant negative effects of farm size, use of combine harvester, and rising wage rates became stronger, leading to a severe fall in the demand for human labour in Punjab agriculture. The labour absorption potential of the crop sector in Punjab, thus, seems to have been fully exploited (Devi et al., 2011). At the same time, there are very few opportunities for such farmers to diversify towards off-farm employment. The stagnation in productivity, increasing input costs, and slower rise in output prices are impacting the profitability of agriculture and consequently affecting household incomes (Chand et al., 2018). It is necessary to discover potential employment opportunities that can enhance the development of the rural economy (Das et al., 2023). The non-farm sector, therefore, needs to be developed for the rapid transfer of surplus labour from agriculture as well as raising the rural household incomes. However, participation in non-farm employment is determined by several factors, including age, caste, degree of education, size of land holding, household

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size, etc. All of these factors contribute to the employment diversity of households. Also, among the rural households, the access to employment sources may significantly vary across caste and land holding categories (Vatta, 2006). In the above backdrop, the present study has been taken to make an in-depth examination of employment diversification of rural households in Punjab and factors affecting the same.

II

DATA COLLECTION

Multi-stage stratified random sampling procedure was used for the selection of the study sample. At the first stage of sampling, all the districts of the state were stratified into three groups based on the proportionate share of rural workers in total workers. All districts were then arranged in ascending order with respect to the proportion of rural workers, and further, they were grouped into three main categories: low, medium, and high employment intensity. Further, one district representing each group of rural employment intensity was selected randomly. At the second stage of sampling, from each of the sample districts, one town (urban settlement) was selected randomly. At the third stage of sampling, four villages, two falling within the periphery of each selected town and two that fall 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, a total of 12 villages (6 within the periphery of the selected 3 towns and 6 outside the periphery of towns) were selected from the three sample districts. For the selection of respondents, total households of each of the selected villages were enumerated with the selective information w.r.t name, caste, owned and operational land area, and were categorised into cultivating households (those cultivating the land) and non-cultivating households (those who did not cultivate the land). The cultivating households, based on the operated area, were further categorised into different farm size categories, namely marginal (below 1 ha), small (1 to 2 ha), semi-medium (2 to 4 ha), medium (4 to 10 ha), and large (more than 10 ha). The number of cultivating and non-cultivating households was selected as per their share in the total number of rural households. Further, a number of cultivating households amongst different land size categories were selected in proportion to their share in the total cultivating households. At the final stage, 30 rural households representing different categories were selected from each of the selected villages, making a total sample of 360 rural households, pertaining to non-cultivating, marginal, small, semi-medium, medium and large cultivating categories.

III

ANALYTICAL TECHNIQUES

3.1 Descriptive Statistics

Percentages were employed to illustrate the distribution of workers by industry according to the National Industrial Classification- 2008 (NIC-2008). They were also used to represent status-wise worker distribution across caste categories, land categories, and across peri-urban and peri-rural settings. Furthermore, gender-specific labour force participation rates (LFPR), worker population ratios (WPR), and unemployment rates (UR) were calculated using percentages for both principal status (PS) and principal plus subsidiary status (PS+SS) across the geographical context of peri-urban and peri-rural villages.

To assess the significance of differences in the distribution of workers by industry and employment status across gender and between peri-urban and peri-rural settings, Z-tests were computed, and based on this, corresponding P-values were derived for each category.

3.2 Simpson Index of Diversity (SID)

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

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

Where n represents the total number of sources of employment and Pi is the employment proportion of the i-th source of employment. The number of employment sources is taken as self-employed in the farm sector, casual labour, self-employed in non-farm and regular job activity.

3.3 Tobit Regression Model

Tobit regression (1958) was used to investigate the determinants of income diversification among rural households. It has been used by many researchers, including Rahut et al., 2015, Ahmed et al., 2018, Amandeep 2021, Harishankar et al., 2022 and Das et al., 2023. Simpson index of diversity (SID) for employment was considered as the dependent variable. Mathematically, the Tobit model can be expressed as follows:

$SID = \beta_0 + \beta_1 Land + \beta_2 Familysize + \beta_3 Caste + \beta_4 Periphery + \beta_5 Literacyindex + \beta_6 Age + \beta_7 Education + \beta_8 Workerpopulationratio + \beta_9 EducationSquared + \beta_{10} AgeSquared + ui$

Where,

SID=Simpson index of diversification,

$\beta 0$= intercept,

$\beta 1$, $\beta 2$……. $\beta 10$=Coefficients of explanatory variables and

u= Error term

3.4 Logit Regression Model

The Logit model was used to estimate the factors influencing participation in rural non-farm activity. The logit model, commonly referred to as logistic regression, was developed by statistician David Cox in 1958 and used by many researchers (Puan et al 2019, Batool and Jamil 2009, Kumar 2009). Dummy dependent variable was represented as participation in non-farm activity by rural households. Hence, it was binary in nature, attaining only two values, i.e. either zero (when a rural household did not participate in a non-farm activity) or unity (when a rural household participated in a non-farm activity). A typical logistic regression model of the following form was used:

$$\text{Logit}(P_i) = \ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 X_i + e$$

Where P_i is the probability of participating in rural non-farm activity, and $1-P_i$ is the probability of not participating in non-farm activity. $P_i/(1-P_i)$ is simply an odds ratio in favour of being employed in rural non-farm activity. β_i = Logit parameters for the variables, X_i =Independent variables and e =Error term

The marginal effects of the variables within the logit model were estimated to reflect the change in the dependent variable resulting from a one-unit change in the explanatory variables.

IV

RESULTS AND DISCUSSIONS

4.1 Labour Force Participation Rate (LFPR) and Worker Population Ratio (WPR)

The estimates of key labour market indicators, viz. Labour Force Participation Rate (LFPR), Worker Population Ratio (WPR) and Unemployment Rate (UR) are presented in this section for Usual Principal and Subsidiary Status (PS+SS) for persons of age 15 to 65 years. For rural households in Punjab, information in this regard has been compiled in Table 1 based on gender and village type. The LFPR for rural males was 87.11 per cent in peri-urban villages and that of 81.76 per cent for peri-rural villages for principal status, and 94.97 per cent and 89.90 per cent for PS+SS, respectively. The WPR of males in peri-urban villages was about 79.87 per cent, and that of peri-rural villages was 77.20 per cent for principal status and 85.85

per cent and 81.76 per cent for PS+SS. Decrease in LFPR and WPR of males with an increase in the distance of the village from the urban periphery, indicating higher labour force participation closer to urban centres.

Also, the LFPR and WPR of females were much lower than compared of males. The differences in the LFPR and WPR of rural males and females might be due to the withdrawal of rural females from the labour force, reason may be lack of sufficient employment opportunities. Even if some work opportunities exist, which may largely be of a distress nature, many females prefer to stay away from the labour force and do their household chores. Moreover, for females, LFPR and WPR in principal status were more in peri-rural villages as compared with peri-urban villages, which according to PS were 35.46 per cent and 28.69 per cent for peri-rural villages and 24.81 per cent and 20.23 per cent for peri-urban villages, respectively. The higher labour force participation and workforce participation of women in peri-rural areas suggest that women in these regions are more likely to be part of the labour force due to economic necessity, following the U-shaped hypothesis of Female Labour Force Participation (FLFP). The FLFP (Female labour force participation) rate displays a U shape as the economy develops (Uberti and Douarin, 2023; Verick, 2014). As a result, FLFP rates are typically higher when a region is in an underdeveloped stage, such as in peri-rural villages, since women must work to provide for their families.

Another significant finding was regarding the difference in LFPR and WPR of females in PS and in PS+SS. LFPR and WPR were very high in PS+SS as compared with PS status for females. According to PS+SS, it was 62.6 per cent and 53.82 per cent in peri-urban villages and 62.55 per cent and 50.2 per cent in peri-rural villages. This difference was relatively less in peri-rural villages. This disparity highlights that many women are engaged in temporary or part-time work, contributing to the labour force in a subsidiary status. Women's labour force participation was more of a subsidiary status, while it was primarily of the principal status for men. This demonstrates that a relatively higher proportion of women get temporary and short-term employment, which they readily accept due to family obligations, and thus contribute to the labour market, with their spare time (Dhanoa and Uppal, 2014; Vatta et al., 2011). Also, for females, the unemployment rate was notably higher when subsidiary status is included, which suggests that women may face difficulties transitioning from temporary to permanent nature of employment. Moreover, the unemployment rate for females in peri-urban villages is less than the same for their male counterparts. This may be due to lower female labour force participation in peri-urban villages. Female LFPR is only 24.81 per cent in PS, and 62.60 per cent in PS+SS, much lower than the male LFPR of 87.11 per cent in PS and 94.97 per cent in PS+SS, and this difference of male and female labour force participation is highly significant in peri-urban villages.

TABLE 1. LABOUR FORCE PARTICIPATION RATE (LFPR) AND WORKER POPULATION RATIO (WPR) ACROSS RURAL HOUSEHOLDS IN PUNJAB, 2022-23 (in per cent)

	Principal Status (PS)				Principal +Subsidiary Status (PS+SS)			
	LFPR	Not in LF	WPR	UR	LFPR	Not in LF	WPR	UR
Peri-urban villages								
Male	87.11	12.89	79.87	7.23	94.97	5.03	85.85	9.12
Female	24.81	75.19	20.23	4.58	62.60	37.40	53.82	8.78
Pooled	58.97	41.03	52.93	6.03	80.34	19.66	71.38	8.97
Peri-rural villages								
Male	81.76	18.24	77.20	4.56	89.90	10.10	81.76	8.14
Female	35.46	64.54	28.69	6.77	62.55	37.45	50.20	12.35
Pooled	60.93	39.07	55.38	5.56	77.60	22.40	67.56	10.04

TABLE 2. PERCENTAGE DISTRIBUTION OF RURAL MALE AND FEMALE WORKERS (PS+SS) BY INDUSTRY IN PUNJAB, 2022-23

Industry/NIC 2008	Males	Females	Total	P-values
Agriculture, forestry, fishing / Primary sector (A)	53.15	67.92	58.24	0.00*
Manufacturing (C)	6.88	3.77	5.84	
Utilities (D, E)	4.02	0.38	2.79	
Construction (F i)	13.00	0.75	8.76	
MGNREGA (F ii)	0.19	13.96	4.82	
Secondary sector	24.09	18.87	22.21	0.10***
Trade (G)	6.69	1.13	4.82	
Transportation and storage (H)	3.25	0.00	2.16	
Financial, insurance and Real estate activities (K, L)	5.74	2.64	4.70	
Administrative and support service activities, public administration and defense; compulsory social security (N, O)	1.34	0.75	1.14	
Education, health and social work (P, Q)	2.29	6.79	3.81	
Others services (I, J,M,R-U)	3.44	1.89	2.92	
Service sector	22.75	13.21	19.55	0.00*
Total	100.0	100.0	100.0	

4.2 Classification of Rural Workers by Industry

The overall classification of rural male and female workers by industry is given in Table 2. The classification is based on NIC-2008 (National Industrial Classification-2008), considering both principal and subsidiary status of employment. Due to the significant proportion of MGNREGA workers in villages, it has been taken as a different category under the secondary sector.

The primary sector remains the largest employer for both men and women in rural areas, accounting for 53.15 per cent of male workers and 67.92 per cent of female workers, with a total of 58.24 per cent of the workforce engaged in this sector. Non- farm employment contributed relatively less to total household employment compared to farm employment of rural households. As compared to rural male workers, rural female workers were relatively more concentrated towards the farming sector, and the concentration of male workers was considerably higher in the non-farm sector as compared to female workers. While agriculture is a significant source of employment, the higher reliance of women on this sector reflects the limited access to more diverse or formal employment opportunities for rural women compared to men.

The secondary sector employed a total of 22.21 per cent of rural workers, with 24.09 per cent of men and 18.87 per cent of women engaged in this sector. Within the secondary sector, the highest proportion was engaged in the construction sector (8.76%), followed by manufacturing (5.84%). The construction industry employs 13.0 per cent of rural men but only 0.75 per cent of rural women. However, MGNREGA is a crucial source of employment for rural women, with 13.96 per cent of rural females working under this scheme, compared to just 0.19 per cent of men. This highlights that women, especially those with fewer skills or limited job prospects, rely heavily on this government-guaranteed employment program. The low male participation in MGNREGA could suggest that men are more likely to find other forms of employment, while women, due to household obligations or lack of opportunities, gravitate toward this temporary form of work. It signifies the dominance of casual and unskilled nature of employment among rural females.

The service sector employed 22.75 per cent of rural men and 13.21 per cent of rural women, making up 19.54 per cent of the total rural workforce. Amongst rural males, 6.69 per cent work in trade, compared to only 1.13 per cent of rural females, indicating that men are more likely to be involved in trading activities, which might require mobility or access to markets, something women in rural settings may not easily have. In contrast, 6.79 per cent of rural women are employed in education, health, and social work, while only 2.29 per cent of men work in these sectors.

These roles are traditionally considered more appropriate for women and align with societal norms that view women as nurturers. Sectors like transportation, administrative and support service activities, and public administration, also see

higher male participation, with 3.25 per cent of men working in transportation and 1.34 per cent in public administration, compared to negligible female participation in these industries. This highlights the phenomenon that the employment of rural females in traditionally male-dominated activities was the least. The statistical analysis of rural male and female workers revealed significant gender-based differences in sectoral employment patterns. The differences were highly statistically significant for primary (p=0.00) and service sector (p=0.00), and marginally significant for secondary sector (p=0.10), with rural women predominantly engaged in the primary sector, while rural men show higher participation in the secondary and the service sector.

TABLE 3. PERCENTAGE DISTRIBUTION OF RURAL WORKERS (PS+SS) BY CASTE IN DIFFERENT INDUSTRIES IN PUNJAB, 2022-23

Industry/NIC 2008	GC	SC	BC
Agriculture, forestry, fishing / Primary sector (A)	81.41	32.48	16.07
Manufacturing (C)	3.40	8.92	14.29
Utilities (D, E)	0.23	2.87	17.86
Construction (F*)	0.00	31.85	17.86
Secondary sector	3.63	43.63	50.00
Trade (G)	4.76	5.10	7.14
Transportation and storage (H)	1.59	2.87	3.57
Financial, insurance and Real estate activities (K, L)	3.63	4.46	12.50
Administrative and support service activities, public administration and defense; compulsory social security (N, O)	1.13	1.59	1.79
Education, health and social work (P, Q)	2.49	4.78	7.14
Other services (I, J, M, R-U)	1.36	5.10	1.79
Service sector	14.97	23.89	33.93
Total	100.00	100.00	100.00

(MGNREGA workers included)

        Caste seemed to be another factor influencing the nature and extent of employment among rural workers. The proportion of general caste (GC) workers engaged in agriculture was 81.41 per cent, which was much higher than the proportion of 32.48 per cent for scheduled caste (SC) workers and 16.07 per cent for backward caste (BC) workers (Table 3). Thus, GC rural households are found to be more dependent on agriculture for employment in comparison to SC and BC counterparts. Historically, the land has almost wholly been owned by higher castes, especially Jat families in Punjab and hence their greater dependence on agriculture for livelihood is justified.

        SC and BC workers were more employed in the secondary sector (43.63% and 50.0%) as compared to the service sector (23.89% and 33.93%), but their GC counterparts had the least proportion in the secondary sector, which was only 3.63 per cent. Employment in construction activities was largely casual in nature and was dominated by the SC and BC workers. GC households were not employed in

construction activities, where about 31.85 per cent of SC workers were employed in the construction sector. Also, within the secondary sector, GC had the highest proportion of employment in trade, which was 4.76 per cent. Trade activities mostly comprise self-employment activity, found to be dominating among GC households. Moreover, as compared to other categories, BC workers have the highest presence in the service sector (33.93%), particularly in higher-skill areas like finance and real estate (12.5%). To conclude, GC workers dominate agriculture, while SC and BC workers are more represented in the secondary and service sectors.

TABLE 4. PERCENTAGE DISTRIBUTION OF RURAL WORKERS (PS+SS) BY LAND SIZE IN DIFFERENT INDUSTRIES IN PUNJAB, 2022-23

Industry/NIC 2008	Non cultivating	Marginal	Small	Semi-medium	Medium	Large
Agriculture, forestry, fishing / Primary sector (A)	19.18	77.24	90.24	94.57	91.07	93.55
Manufacturing (C)	11.23	5.69	2.44	0.00	0.00	0.00
Utilities (D, E)	4.93	2.44	0.81	0.00	1.79	0.00
Construction (F)	30.14	1.63	0.81	0.00	0.00	0.00
Secondary sector	46.30	9.76	4.07	0.00	1.79	0.00
Trade (G)	9.86	3.25	0.00	0.00	1.79	0.00
Transportation and storage (H)	3.29	2.44	0.00	0.78	3.57	0.00
Financial, insurance and Real estate activities (K, L)	7.12	2.44	4.07	2.33	0.00	3.22
Administrative and support service activities (N, O)	2.19	2.44	0.00	0.00	0.00	0.00
Education, health and social work (P, Q)	6.58	1.63	1.63	0.78	1.79	3.22
Other services (I, J, M, R-U)	5.48	0.81	0.00	1.55	0.00	0.00
Service sector	34.52	13.01	5.69	5.43	7.14	6.45
Total	100.00	100.00	100.0	100.00	100.00	100.00

There were significant variations in the pattern of industrial classification of workers across different landholding categories of the rural households in Punjab (Table 4). It can be seen that employment diversification towards the non-farm sector declined, and the dependence on farming increased considerably with an increase in the landholding status of rural households. While just 19.18 per cent of non-cultivating workers were employed in agriculture, the proportion was much higher for the cultivating households, ranging between 77.24 per cent for marginal farm households to 93.55 per cent for large farm households.

A significant 46.3 per cent of non-cultivating workers had been engaged in the secondary sector, indicating their strong dependence on non-agricultural employment. About 10 per cent of workers from marginal and about 4 per cent from small farm households also participated in the secondary sector; however, this proportion was nearly negligible for relatively large farm households comprising semi-medium, medium and large ones. Individuals with extensive landholdings were far less engaged in this industry, as their primary concentration was on agriculture. In the manufacturing sub-sector, while 11.23 per cent of non-cultivating workers were engaged, 5.69 per cent of workers from marginal farm households and 2.44 per cent from small farm households were also engaged in this sector. However, none of the semi-medium onwards, including medium and large farm households, were found to be employed in manufacturing. Moreover, 30.14 per cent of non-cultivating workers were employed in construction, establishing it as a crucial industry for landless workers. Also, 1.63 per cent of workers from marginal farm households were employed in construction; however, participation of other categories of landholders was negligible in this sector. Thus, construction serves as a significant source of employment for non-agricultural labourers, mostly due to its labour-intensive characteristics and the prevalence of temporary positions; however, it plays a very insignificant role in providing employment to landholding groups. The service sector employed 34.52 per cent of non-cultivating workers, rendering it the second-largest employer for this group. From marginal farm households, 13.01 per cent were employed in the services sector; however, this proportion remained low at 5.69 per cent, 5.43 per cent, 7.14 per cent and 6.45 per cent for small, semi-medium, medium and large farm households, respectively.

Non-cultivating workers exhibit more diversification across sectors such as trade, education, health, and financial services, whereas landholders, particularly those with large holdings, have little involvement in these non-agricultural domains. Individuals with large landholdings were predominantly engaged in agriculture. This indicates that landholders remain reliant on agricultural pursuits for their sustenance and livelihood, with minimal diversification into alternative industries. Non-cultivating workers predominantly depend on the secondary sector (46.3%) and the service sector (34.52%). They were found to be increasingly involved in non-agricultural sectors such as manufacturing, construction, and diverse services, suggesting that landless rural labourers pursue employment outside agriculture. Marginal and small landholders occupy a transitory status. Though majorly of them remain involved in agriculture, their modest representation in the secondary and service industries indicates a certain level of occupational diversification. Nonetheless, this involvement diminishes with the expansion of landholding size.

Table 5 presents the distribution of rural workers by education in different industries. The major proportion of illiterate workers (67.61%) was employed in the primary sector, reflecting the historical dependence of low-educated individuals on

agriculture. Similarly, a large share of workers with primary to matric education were engaged in agriculture, showing that even those with basic education levels remain heavily dependent on the agricultural sector. Only 5.26 per cent of workers with postgraduate education or above were engaged in agriculture, indicating that those with higher education tend to move away from agriculture and pursue employment in other sectors. Therefore, the level of education and employment in the primary or agriculture sector was found to have having inverse relationship. Followed by the primary sector, the manufacturing sector employed a significant proportion of illiterate (32.39%), up to primary (26.04%), primary to middle (28.57%) and those having matric level education (20.36%).

TABLE 5. PERCENTAGE DISTRIBUTION OF RURAL WORKERS (PS+SS) BY EDUCATION IN PUNJAB, 2022-23

Industry/NIC 2008	Illiterate	Upto Primary	Primary to Middle	Middle to Matric	Matric to Sr. sec.	Sr. sec. to Graduate	Post graduate and above
Agriculture, forestry, fishing / Primary sector (A)	67.61	68.75	61.90	61.99	55.36	27.40	5.26
Manufacturing (C)	1.41	3.13	4.76	5.88	11.31	9.59	0.00
Utilities (D, E)	0.00	1.04	1.36	4.07	4.76	4.11	0.00
Construction (F)	30.99	21.88	22.45	10.41	5.36	4.11	0.00
Secondary sector	32.39	26.04	28.57	20.36	21.43	17.81	0.00
Trade (G)	0.00	1.04	4.76	7.69	5.95	5.48	5.26
Transportation and storage (H)	0.00	1.04	0.68	3.62	2.98	4.11	0.00
Financial, insurance and Real estate activities (K, L)	0.00	0.00	0.68	0.90	5.95	26.03	15.79
Administrative and support service activities (N, O)	0.00	1.04	1.36	0.45	2.38	4.11	0.00
Education, health and social work (P, Q)	0.00	0.00	0.00	1.36	2.38	12.33	73.68
Other services (I, J, M, R-U)	0.00	2.08	2.04	3.62	3.57	2.74	0.00
Service sector	0.00	5.21	9.52	17.65	23.21	54.79	94.74
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Participation in the secondary sector decreased significantly for higher education levels, with only 17.81 per cent of senior secondary to graduate workers, and none of the postgraduates were engaged in this sector. Amongst the secondary sector, the construction sub-sector was more likely to employ illiterate and less-educated workers. In contrast to the primary and secondary sectors, employment in the service sector was rising very rapidly, with an increase in education ranging from zero per cent for illiterates to 94.74 per cent for post-graduate and above, indicating the service sector's role as the primary employer for highly educated workers. Also,

with an increase in education level, access to more paying jobs such as education, financial, insurance and real estate activities also increased. Financial, insurance, and real estate predominantly attract workers with higher education, as 26.03 per cent of senior secondary to graduate workers and 15.79 per cent of postgraduates were found to be employed in this sub-sector.

The major proportion (73.68%) of postgraduates worked in education, health, and social work, while only 1.36 per cent of middle to matric level educated workers were employed in this sub-sector. Employment in trade-related activities also increased with a higher level of education. This is due to the fact that trade-related activities require more investments and business skills. Therefore, as education levels rise, there is a clear shift from the primary sector to the service sector.

TABLE 6. PERCENTAGE DISTRIBUTION OF RURAL WORKERS (PS+SS) IN DIFFERENT INDUSTRIES IN PERI-URBAN AND PERI-RURAL VILLAGES IN PUNJAB, 2022-23

Industry/NIC 2008	Peri-urban villages	Peri-urban villages	Peri-rural villages	Peri-rural villages
Industry/NIC 2008	Male	Female	Male	Female
Agriculture, forestry, fishing / Primary sector (A)	48.59	62.88	55.31	75.37
Manufacturing (C)	9.24	7.58	5.49	1.49
Utilities (D, E)	2.81	0.76	5.49	0.00
Construction (F)	12.45	14.39	13.92	11.94
Secondary sector	24.50	22.73	24.91	13.43
Trade (G)	8.03	0.76	6.23	1.49
Transportation and storage (H)	3.61	0.00	3.30	0.00
Financial, insurance and Real estate activities (K, L)	6.43	3.79	4.40	1.49
Administrative and support service activities (N, O)	1.61	1.52	1.83	0.00
Education, health and social work (P, Q)	4.42	6.82	0.73	5.97
Other services (I, J, M, R–U)	2.81	1.52	3.30	2.24
Service sector	26.91	14.39	19.78	11.19
Total	100.00	100.00	100.00	100.00

A comparison of the industrial classification of rural workers between peri-urban and peri-rural villages is given in Table 6. The purpose was to study the influence of urbanisation on the distribution of rural workers. The proportion of male and female rural workers engaged in agriculture was 48.59 per cent and 62.88 per cent in peri-urban areas, and the same was 55.31 per cent and 75.37 per cent in peri-rural areas, respectively. The analysis revealed that dependence on agriculture as a livelihood, both for male and female rural workers, was significantly less in peri-urban areas when compared to peri-rural areas. It strengthens the hypothesis that rural non-farm employment opportunities are more accessible to rural workers in areas

near urban settlements (Vatta, 2006). Women workers were more predominantly engaged in agriculture than males in both peri-urban and peri-rural villages. However, in peri-rural villages, this difference was more pronounced. Peri-rural settlements have less sectoral diversification of employment, especially for women. Labourers in peri-rural regions exhibit more reliance on agriculture, with limited prospects in secondary and tertiary sectors.

The secondary sector employed 24.5 per cent of male and 22.73 per cent of female workers in the peri-urban village. In peri-rural villages, the proportion was similar for males (24.91%) but lower for females (13.43%), suggesting fewer opportunities for rural women workers in the secondary sector, especially in peri-rural areas. While 26.91 per cent of males and 14.39 per cent of females were employed in the service sector in peri-urban villages, in peri-rural villages, this sector employed only 19.78 per cent of males and 11.19 per cent of females, showing a considerably smaller proportion than in peri-urban villages. The service sector is more developed in peri-urban villages, with more opportunities in trade and finance, particularly for males. Employment prospects in non-agricultural industries, including manufacturing, utilities, trade, and services, are more attainable in peri-urban villages owing to their closeness and direct links to urban markets and infrastructure.

TABLE 7. P-VALUES SHOWING DIFFERENCES IN SECTORAL EMPLOYMENT DISTRIBUTION IN PUNJAB, 2022-23

Sector	Males and females		Peri-Urban and Peri-Rural villages	
	Peri-Urban villages	Peri-Rural villages	Males	Females
Primary Sector	0.01*	0.00*	0.12	0.03**
Secondary Sector	0.70	0.01*	0.91	0.05**
Service Sector	0.01*	0.03**	0.05**	0.43

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

The analysis of employment data across different sectors indicated (Table 7) that there are notable gender differences in both peri-urban and peri-rural regions of Punjab. In the primary sector, significant gender disparities were observed in both peri-urban (p=0.01) and peri-rural settings (p=0.00), showing that women were largely engaged in agricultural work. In the secondary sector, the gender difference was not significant in peri-urban areas (p = 0.70), but it became significant in peri-rural regions (p = 0.01), where rural males predominantly work in the secondary sector. The service sector displayed marked gender inequalities in both peri-urban (p = 0.01) and peri-rural areas (p = 0.03), with a greater participation of males in this sector.

When comparing peri-urban and peri-rural villages, the variations in rural male employment were not statistically significant for the primary sector (p = 0.12), and

the secondary sector (p = 0.91), but a significant difference was observed in the service sector (p = 0.05), indicating that more rural males work in peri-urban villages compared to peri-rural villages in this sector. For female workers, in the primary sector, the disparity between peri-urban and peri-rural villages was statistically significant (p = 0.03), with a higher number of rural females employed in peri-rural villages than in peri-urban villages. However, this remained insignificant for the service sector. In the secondary sector, a significant difference was again noted (p = 0.05), with a greater number of rural females employed in peri-urban villages compared to those in peri-rural villages within this sector.

4.3 Classification of rural workers by employment status

Gender-wise employment status of rural workers for peri-urban and peri-rural villages has been given in Table 8. In Punjab, 51.02 per cent of males and 58.07 per cent of females in peri-urban villages were own-account workers, indicating relatively greater dependence of women on own-account activity. The dependence on own account activity in peri-rural villages for both males (66.67%) and females (75.18%) was relatively higher in comparison to that in the peri-urban villages.

TABLE 8. EMPLOYMENT STATUS OF RURAL WORKERS (PS+SS) IN PERI-URBAN AND PERI-RURAL VILLAGES IN PUNJAB, 2022-23 (per cent)

Employment status	Peri-urban villages	Peri-urban villages	Peri-rural villages	Peri-rural villages
	Male	Female	Male	Female
Own Account	51.02	58.07	66.67	75.18
Regular Govt.	5.26	4.03	3.30	0.71
Regular Pvt.	19.43	12.90	9.89	5.67
Casual Labour	24.29	25.00	20.15	18.44
Total	100.00	100.00	100.00	100.00

Also, 5.26 per cent of males and 4.03 per cent of females were employed in regular government jobs in peri-urban villages. This proportion dropped to 3.3 per cent for males and 0.71 per cent for females in peri-rural areas. Regular government jobs are limited, with peri-urban males having slightly more access compared to peri-rural areas. The proportion of women in government jobs is generally low, with even fewer opportunities for peri-rural women. Further, 19.43 per cent of males and 12.9 per cent of females were employed in the regular private sector in peri-urban villages. In contrast, only 9.89 per cent of peri-rural males and 5.67 per cent of peri-rural females got employed in the regular private sector. About an equal proportion, i.e. 24.29 per cent of males and 25 per cent of females, worked as casual labourers in peri-urban villages. On the other hand, in peri-rural villages, the percentage of males and females in casual labour was observed to be slightly lower at 20.15 per cent and 18.44 per cent, respectively. Thus, casual labour remained a significant source of employment for both males and females, particularly in peri-urban villages.

The statistical analysis (Table 9) revealed that in peri-rural villages, only in own account (P=0.07) and regular government employment (p=0.1), there was a marginally significant gender difference in males and females, with more females employed as own account workers and more males employed as regular government employees. However, when comparing employment status between peri-urban and peri-rural areas, more significant differences were observed. For own account and regular private employment, there were significant differences for males (p=0.00) and females (p=0.00, p=0.04) in both areas, with more own account employment in peri-rural villages and more regular private employment in peri-urban villages. There was a significant difference for regular government employment for females (p=0.07) in peri-urban and peri-rural villages, with rural females residing in peri-urban villages having more participation in regular government employment. Overall, gender differences were less pronounced than area-based differences in employment status across peri-urban and peri-rural settings.

TABLE 9. DIFFERENCES IN EMPLOYMENT STATUS, GENDER WISE AND BETWEEN PERI-URBAN AND PERI-RURAL VILLAGES

Employment Status	Males and females		Peri-Urban and Peri-Rural villages	
	Peri-Urban villages	Peri-Rural villages	Males	Females
Own Account	0.20	0.07***	0.00*	0.00*
Regular Govt.	0.60	0.10***	0.27	0.07***
Regular Pvt.	0.12	0.14	0.00*	0.04**
Casual Labour	0.88	0.68	0.26	0.19

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

Employment status of rural workers by land size is given in Table 10. Ownership of land significantly improved the chances of self-employment in agriculture. Amongst the cultivating households, the proportion of self-employed further increased with an increase in the size of land holding. While only 26.56 per cent of non-cultivating workers were self-employed, this proportion was 87.01 for marginal, 86.96 per cent for small, 91.23 per cent for semi-medium, 96.09 per cent for medium and 99.5 per cent for large farmer households. In regular government jobs, 8.2 per cent of non-cultivating workers were engaged, indicating a stable and formal employment alternative for individuals without land. A very low proportion of cultivating households were engaged in government employment, indicating a reliance on farming over government jobs. Approximately 24 per cent of non-cultivating workers were engaged in regular private sector employment, indicating it is an important employment alternative for individuals lacking land ownership. The decline in private sector employment was observed as land size increases, with 9.74 per cent of workers from marginal, 6.52 per cent from small, 5.26 per cent from semi-medium, 3.13 per cent from medium, and merely 0.5 per cent from large farm households engaged in private employment. Thus, employment in the regular sector

(both government as well as private) was more common among non-cultivating workers. As land size increased, reliance on regular employment diminished significantly, suggesting that larger landholders depend more on their own agricultural activities than on external job opportunities.

TABLE 10. EMPLOYMENT STATUS OF RURAL WORKERS (PS+SS) BY LAND SIZE IN PUNJAB, 2022-23
(PER CENT)

Employment status/ land size	Non cultivating	Marginal	Small	Semi-medium	Medium	Large	Overall
Own Account Worker	26.56	87.01	86.96	91.23	96.09	99.50	65.23
Regular Govt.	8.20	0.00	2.17	1.75	0.00	0.00	3.66
Regular Pvt.	23.93	9.74	6.52	5.26	3.13	0.50	13.20
Casual Labour	41.31	3.25	4.35	1.75	0.78	0.00	17.91
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Employment status of rural workers by land size is given in Table 10. Ownership of land significantly improved the chances of self-employment in agriculture. Amongst the cultivating households, the proportion of self-employed further increased with an increase in the size of land holding. While only 26.56 per cent of non-cultivating workers were self-employed, this proportion was 87.01 for marginal, 86.96 per cent for small, 91.23 per cent for semi-medium, 96.09 per cent for medium and 99.5 per cent for large farmer households. In regular government jobs, 8.2 per cent of non-cultivating workers were engaged, indicating a stable and formal employment alternative for individuals without land. A very low proportion of cultivating households were engaged in government employment, indicating a reliance on farming over government jobs. Approximately 24 per cent of non-cultivating workers were engaged in regular private sector employment, indicating it is an important employment alternative for individuals lacking land ownership. The decline in private sector employment was observed as land size increases, with 9.74 per cent of workers from marginal, 6.52 per cent from small, 5.26 per cent from semi-medium, 3.13 per cent from medium, and merely 0.5 per cent from large farm households engaged in private employment. Thus, employment in the regular sector (both government as well as private) was more common among non-cultivating workers. As land size increased, reliance on regular employment diminished significantly, suggesting that larger landholders depend more on their own agricultural activities than on external job opportunities.

About 41 per cent of non-cultivating workers were engaged in casual labour, indicating their economic vulnerability and reliance on temporary or seasonal employment. Only a small percentage of workers from marginal (3.25%) and small farm households (4.35%) participated in casual labour, as they predominantly depend on their own land or more stable employment alternatives. As land size increases, the

dependence on casual labour diminished significantly, with merely 1.75 per cent of workers from semi-medium and 0.78 per cent from medium farm households participating in casual labour. Workers from large farm households did not engage in casual labour activity. Casual labour predominantly occurs among non-cultivating workers who do not possess land and lack access to stable employment opportunities. The evidence shows an inverse correlation between the size of landholdings and the diversity of employment in rural Punjab. As the size of land increases, households were more likely to depend on a single source of income, mostly self-employment in agriculture. In contrast, those with small or no landholdings often diversify their employment due to necessity, frequently taking on casual labour and private sector jobs. This trend illustrates the distress-driven nature of employment diversification among marginal and landless households. The significant occurrence of casual labour (41.31%) among non-cultivating families highlighted this issue. Casual labour tends to involve unstable working conditions and is pursued out of necessity in the absence of better options. As landholding size grows, reliance on casual labour decreased markedly, suggesting that such employment is primarily a reaction to economic hardship rather than a strategic choice for improved income.

Thus, while diversification can be beneficial if it leads to stable and better income opportunities, it signifies economic fragility when it stems from necessity. Policy measures should aim at encouraging opportunity-driven diversification and the establishment of stable job prospects. Such initiatives can successfully reduce economic distress and foster sustainable livelihoods in rural Punjab.

TABLE 11. EMPLOYMENT STATUS OF RURAL WORKERS (PS+SS) BY CASTE CATEGORIES IN PUNJAB, 2022-23 (PER CENT)

Employment status	Males			Female		
	SC	BC	GC	SC	BC	GC
Own Account Worker	29.03	40.54	87.45	17.07	58.82	92.64
Regular Govt.	5.53	8.11	2.66	1.22	5.88	2.45
Regular Pvt.	17.51	24.32	7.60	15.85	29.41	3.68
Casual Labour	47.93	27.03	2.28	65.85	5.88	1.23
Total	100.00	100.00	100.00	100.00	100.00	100.00

The caste-wise and gender-wise differences in the employment status of rural workers have been presented in Table 11. A significant 87.45 per cent of rural males and 92.64 per cent of rural females from GC households were own-account workers, reflecting the dominant position of GC households in landholding and self-employment activities. In contrast, only 29.03 per cent of rural males and 17.07 per cent of rural females from SC households were own-account workers, indicating their limited access to land or self-employment opportunities. Also, 40.54 per cent of rural males and 58.82 per cent of rural females from BC households were own-account workers, suggesting greater economic autonomy compared to SC counterparts. As shown earlier, compared to rural male workers, rural female workers were relatively

more concentrated towards the farming sector; therefore proportion of rural females was more as own-account workers in agriculture.

BC households show the highest participation in regular government and private sector jobs, reflecting slightly better access of BC households to regular government and private sector jobs compared to GC and SC households, owing to relatively higher involvement of GC households in own account activity and of SC households in casual labour activity. A significant 47.93 per cent of SC males and 65.85 per cent of SC females were engaged in casual labour, highlighting their economic vulnerability and reliance on temporary work, while only 2.28 per cent of GC males and 1.23 per cent of GC females were in casual labour. Thus, SC individuals, especially females, demonstrate a significant dependence on casual labour. In contrast, individuals from GC households exhibit minimal engagement in casual labour, suggesting their significantly improved access to self-employment opportunities as they predominantly engage in own-account work, with greater access to land. Also, overall, males tend to have greater representation in stable employment forms, such as in own account work and in regular jobs. In contrast, females, particularly those in the SC group, are more frequently involved in casual labour, underscoring gender-based disparities in employment access.

4.4 Employment diversification

Simpson index of Diversity was computed to calculate employment diversification of rural households of Punjab, and the results of the same have been presented in Table 12. The diversification status of the households was classified based on the rating given by previous authors as low (0 to 0.38), medium (0.39 to 0.63) and high (above 0.63) (Challa et al., 2019). Around 74 per cent of households have SID values of 0 to 0.38 and thus have a low level of employment diversification. About 24 per cent of households have SID values of 0.39 to 0.63 and were categorised as medium employment diversifiers, and only 1.39 per cent were considered as high employment diversifiers with SID values above 0.63.

TABLE 12. SIMPSON INDEX OF EMPLOYMENT DIVERSIFICATION OF RURAL HOUSEHOLDS IN PUNJAB, 2022-23

SID Value	Per cent of household	Level of diversification
0 to 0.38	74.44	Low
0.39 to 0.63	24.17	Medium
Above 0.63	1.39	High

4.5 Determinants of employment diversification among the rural households

This section carried out an analysis to examine the influence exercised on employment diversification among rural households by factors such asland size, family size, caste dummy, periphery dummy, literacy index, age of household head, 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 Tobit regression for employment diversification was carried out with the Simpson index of employment diversification as the dependent variable.

Tobit's estimates of employment diversification have been presented in Table 13. Coefficients of land size, family size, years of education, years of education squared and WPR were found to be statistically significant at the 1 per cent level. Rural households that possess more land tend to have fewer diverse employment options. A growth in the size of the operational area considerably enhances the likelihood of self-employment in agriculture, which in turn reduces the opportunity for diversification into other activities.

TABLE 13. TOBIT ESTIMATES OF EMPLOYMENT DIVERSIFICATION OR RURAL HOUSEHOLDS IN PUNJAB, 2022-23

Variables	Coefficients	Std. error	p value
Land size	-0.037*	0.012	0.00
Family size	0.126*	0.029	0.00
Caste dummy	-0.122	0.094	0.20
Periphery dummy	0.093	0.078	0.23
Literacy index	0.034	0.058	0.56
Age of household head	-0.023	0.016	0.17
Years of education of household head	0.110*	0.033	0.00
Age of household head squared	0.000	0.000	0.12
Years of education of household head squared	-0.008*	0.002	0.00
WPR	0.691*	0.177	0.00
Constant	-1.072	0.451	0.018

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

Family size of rural households had a positive and significant effect on employment diversification. Therefore, the chances of a worker with bigger households getting employed in diversified sources were significantly higher. An increase in family size may reduce per capita income and compel the diversification to compensate for the income loss. Moreover, with an increase in WPR, employment diversification significantly increases. An increase in WPR might have pushed the additional workforce to other employment activities. Years of education had a positive coefficient, reflecting that years of education of the household head were positively and significantly related to employment diversification of the household. But years of education squared were negatively associated with employment diversification, indicating that with an increase in years of education beyond a limit, the relationship of education and employment diversity gets reversed, and employment diversification tends to decrease. As a result, households with higher levels of education tend to have less varied employment. The likelihood of securing a well-paying, regular job or engaging in profitable self-employment increases with higher education, leading to a reduced inclination toward employment diversification.

4.6 Determinants of participation in non-farm activity by rural households

The logit regression was carried out, considering participation in non-farm activity by rural households as the dummy dependent variable. The independent variables included in the model are land size, family size, caste dummy, periphery dummy, literacy index, age of household head, number of years of education of household head, and worker population ratio. Logit estimates of the determinants of participation in non-farm activity by rural households in Punjab have been presented in Table 14. Coefficients of land size, family size, caste dummy, periphery dummy and number of years of education of household head were found to be statistically significant. Marginal effects of the variables had also been calculated to identify the change in the dependent variable resulting from a unit change in the value of the explanatory variables.

TABLE 14. LOGIT ESTIMATES OF DETERMINANTS OF PARTICIPATION IN NON-FARM ACTIVITIES BY RURAL HOUSEHOLDS IN PUNJAB, 2022-23

Variables	Coefficients	Std. error	Marginal effects	P value
Land size	-0.348**	0.140	-0.076	0.01
Family size	0.641*	0.151	0.141	0.00
Caste dummy	-2.544*	0.578	-0.505	0.00
Periphery dummy	0.7723***	0.39	0.159	0.06
Literacy index	0.006	0.052	0.012	0.91
Age of household head	0.018	0.018	0.004	0.31
Years of education of household head	0.153*	0.042	0.034	0.00
WPR	0.649	0.715	0.143	0.364
Constant	-2.337	1.263		0.064

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

Rural households with more land had less participation in non-farm activity. One unit increase in land reduces the chance of participation in non-farm activity by about 7 per cent. An increase in the size of the operational area significantly raised the chances of self-employment in agriculture and hence decreased the chance of participation in non-farm activity. Also, GC households had less participation in non-farm activity. The categorisation of workers in GC reduces the tendency to participate in non-farm activity by 50 per cent. This phenomenon is again related to land, as GC households have a higher proportion among cultivator households. Family size of rural households had a positive and significant effect on participation in non-farm activity. Therefore, the chances of a worker with a bigger family getting employed in rural non-farm activity were significantly higher, and the magnitude of the coefficients of this variable indicated that an increase in family size by one unit leads to an increase the participation in non-farm activity by about 14 per cent. A rise in

family size might lower per capita income and necessitate a shift toward rural non-farm activities to offset the income decline.

The coefficient of the periphery dummy was significant at the 10 per cent level and positively related to participation in non-farm activity. It means, the incidence of rural persons located near the urban areas increases the participation in non-farm activity. A household in the peri-urban villages was found to have higher odds in favour by 16 per cent of getting employed in non-farm activity. It confirmed that urbanisation leads to larger non-farm participation. Hence, urbanisation might be a crucial factor in determining the pace of rural household diversification. The coefficient of years of education of the household head was significant at the 1 per cent level and positively related to participation in nonfarm activity. With an increase in the number of years of education of the household head, the participation in non-farm activity increases by about 3 per cent. An increase in the level of education improves the human capital and hence the participation in rural non-farm activity. Coefficients of age of household head and worker population ratio were statistically insignificant, and thus these factors did not have an impact on the participation of rural households in non-farm activities. While the worker population rate shows a positive association, it was not significant, suggesting that overall labour force engagement doesn't significantly predict non-farm participation.

V

CONCLUSIONS AND POLICY IMPLICATIONS

Rural employment in Punjab showed a varied pattern. Rural men of Punjab have greater employment diversity compared to rural women, who were largely involved in casual labour and agricultural activities. Employment diversity was more significant in villages located nearer to urban centres. Moreover, employment diversification towards the non-farm sector declined, and the dependence on farming increased considerably with an increase in the landholding status of rural households. Tobit estimates of this study revealed that an increase in land size and years of education squared had a significant negative impact on employment diversification. Contrarily, the influence of an increase in family size, worker population ratio and higher education on employment diversity was found to be positive. Logit regression model finds that family size, proximity to urban areas and education of head are important factors that enhance participation in non-farm activities by rural households, while households that are land-rich and belong to higher castes usually have lower engagement in non-farm employment.

The study highlights the low participation of women in the labour force, which poses a significant obstacle to economic expansion. Women with stable employment are more likely to invest in their children's education and healthcare, which can further drive long-term economic development in rural areas. Therefore, it is important to address barriers that women face in the labour market, such as limited

access to education and training, inadequate infrastructure, and social and cultural constraints. By creating supportive policies and providing resources and opportunities for women, rural areas can harness the full potential of their populations, leading to more vibrant and resilient local economies. Support for affordable childcare and elderly care support, education and skill development, improving working conditions, addressing the gender pay gap and training in business and entrepreneurship skills are some of the measures to increase female labour force participation.

Promoting the non-farm sector in order to ensure better income and employment opportunities for rural households is necessary. To effectively pursue opportunity-driven diversification, it is crucial to develop skills, enhance education, and create stable, higher-income prospects within the non-farm sector. This will position non-farm employment as a feasible and sustainable livelihood option. Improving rural access to education and establishing training centres is a strategic approach to overcoming skill barriers. Informal vocational training programs, incentives for the informal trainers for training the rural youth, can help rural youth undertake self-employment as well as regular employment activities. Therefore, promoting the non-farm sector, enhancing education, promoting vocational skills and increasing female labour force and workforce participation are key factors to ensure better employment opportunities for rural households.

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