

Beyond Agriculture: Distress-Driven Rural Nonfarm Employment and Household Welfare in Bihar, India

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Abstract

This paper investigates the dynamics of rural nonfarm employment (RNFE) in Bihar, a state marked by agrarian distress, land fragmentation, and weak industrialisation. The central objective is to assess whether diversification into nonfarm activities reflects opportunity-led transformation or distress-driven survival. The study's novelty lies in combining evidence from wages and household consumption while applying Heckman's two-step selection model.

The analysis uses unit-level data from NSSO Employment–Unemployment Surveys and the PLFS rounds. Descriptive evidence suggests nonfarm workers earn more than agricultural workers; however, corrected estimates reveal adverse selection into RNFE, with many landless and poor households entering low-wage casual construction, petty trade, or informal services. Only a small minority- better educated and socially advantaged- secure regular salaried jobs that drive upward mobility. Caste, religion, and gender further mediate access, with Scheduled Castes, Muslims, and women disproportionately concentrated in vulnerable employment.

The findings demonstrate that Bihar is caught in a “distress-led diversification trap,” where labour shifts out of agriculture without corresponding expansion of productive nonfarm industries. Policy recommendations include promoting agro-processing and rural industries, strengthening vocational education, extending social protection for casual workers, and addressing structural barriers faced by disadvantaged groups. By integrating wages, consumption, and econometric corrections, this paper contributes to debates on structural transformation and informalisation, highlighting the limits of RNFE as a pathway to inclusive rural development.

JEL Code: J22, J24, J46

1. Introduction and Background

The process of rural structural transformation in developing economies has long been theorised as a shift of labour from low-productivity agriculture into higher-productivity sectors, primarily manufacturing and services (Lewis, 1954; Kuznets, 1973; Chenery & Syrquin, 1975). In the Indian context, this trajectory has unfolded unevenly across states, with Bihar representing one of the most challenging cases. Despite India's rapid growth since the 1990s, Bihar's economy continues to be marked by high dependence on agriculture, low levels of industrialisation, and limited urbanisation (Himanshu et al., 2011; Mohanty, 2016). The state records some of the lowest per capita incomes and highest rates of poverty in India (Himanshu, 2017; Drèze & Khera, 2017), making it a critical site to study the dynamics of rural transformation, particularly the role of the rural nonfarm economy (RNFE).

The rural nonfarm sector has expanded significantly across India in recent decades, contributing to both income diversification and poverty reduction (Vaidyanathan, 1987; Lanjouw & Shariff, 2004; Haggblade, Hazell, & Reardon, 2010). However, the character of this transformation remains contested. Some studies highlight opportunity-driven diversification into higher-return activities, including salaried services and enterprises (Reardon, 1998; de Janvry & Sadoulet, 2005; Lanjouw & Murgai, 2009). Others emphasise distress-driven participation in insecure, low-wage nonfarm work such as construction and petty trade (Papola, 1992; Unni, 1996; Abraham, 2009; Himanshu et al., 2013; Hashmi, 2024). For Bihar, with its weak agricultural base, land fragmentation, and high incidence of landlessness, the expansion of RNFE raises critical questions about whether nonfarm jobs provide pathways out of poverty or reproduce vulnerability through informalisation.

This study is motivated by three considerations. First, while there is substantial research on the RNFE at the all-India level (Bhalla, 2002; Chadha, 2002; Abraham, 2009; Himanshu et al., 2011), focused evidence from Bihar remains scarce despite its distinctive agrarian and social structure. Second, most analyses rely either on income/wage data (Lanjouw & Stern, 1998; Kijima, 2006) or on consumption-based indicators of wellbeing (Lanjouw & Shariff, 2004; Himanshu,

2017), but rarely both. Third, rural labour markets in Bihar are shaped by strong selection processes, whereby participation in nonfarm work is non-random and influenced by education, caste, gender, and household constraints. Standard wage regressions may therefore yield biased estimates of returns (Heckman, 1979; Wooldridge, 2010). Addressing these gaps, this paper examines the dynamics of rural nonfarm employment in Bihar using both earnings and consumption evidence, applying OLS and Heckman's two-step selection model to correct for sample selection bias.

The contribution of this study is threefold. Empirically, it provides one of the few integrated analyses of wages and household consumption across employment categories in rural Bihar. Methodologically, it applies econometric corrections for selection, offering more robust estimates of wage determinants compared to standard regressions. Conceptually, it situates Bihar's experience within wider debates on structural transformation, informalisation, and labour market segmentation (Lanjouw, 1999; Barrett et al., 2001; Himanshu et al., 2013). Together, these contributions advance our understanding of how nonfarm diversification is reshaping the rural economy of Bihar and the extent to which it can be considered opportunity-enhancing or distress-driven.

The remainder of the paper is organized as follows. The next section outlines the data sources and methodology, highlighting the use of unit-level PLFS data and the application of econometric models to examine wage differentials and employment outcomes. This is followed by an overview of the agrarian situation in Bihar, which sets the context for understanding the dynamics of rural transformation. The subsequent section analyses the industrial distribution of the rural workforce, with a focus on the rise of nonfarm employment. Building on this, the paper investigates wage differentials across sectors and employment statuses to uncover the segmentation of rural labour markets. A further section supplements this analysis with evidence from consumption quintiles, demonstrating how employment categories map onto household welfare outcomes. The results and discussion section integrates descriptive, econometric, and consumption-based evidence to interpret the processes of informalisation, segmentation, and structural transformation in Bihar's rural economy. The subsequent section also addresses the limitations of the study. The final section concludes with reflections on the policy implications of these findings.

2. Theoretical and Literature Review

The theoretical underpinnings of rural nonfarm employment can be traced to classical models of structural transformation. The seminal dual-economy framework of Lewis (1954, 1955) posits that economic development occurs through the transfer of surplus labour from the subsistence agricultural sector to the modern capitalist sector, where capital accumulation fuels productivity growth and rising wages. In a similar vein, Kuznets (1973) underscored the role of sectoral reallocation in shaping growth and inequality trajectories. Chenery and Syrquin (1975) further conceptualised structural change as a multifaceted process involving diversification of production, employment, and income sources. Subsequent contributions have refined these ideas: Clark (1940) anticipated that, once demand for manufactured goods stabilises, economic dynamism would increasingly shift towards services, while Baumol (1967) provided a supply-side explanation in which differential sectoral productivity growth inevitably reallocates labour to services. More recent syntheses emphasise the complexity of this transformation, noting that the rural nonfarm economy can serve both as an engine of upward mobility and as a coping strategy in contexts of agrarian distress (Reardon, 1998; Barrett, Reardon, & Webb, 2001; Herrendorf, Rogerson, & Valentinyi, 2014).

The Indian experience, however, has diverged in important respects from these stylised models. Although the share of services in GDP expanded rapidly, agriculture continues to absorb a disproportionately large share of the workforce, highlighting a pattern of "jobless growth" (Rao, 1975; Bhattacharya & Mitra, 1997; Papola, 2013; Dev, 2008; Ghose, 2004). With structural change in output only partially mirrored by changes in employment, the labour market has undergone uneven transitions. A growing body of scholarship has examined these shifts in detail, revealing not only

sectoral reallocation but also profound limits to its depth and quality. Papola and Sahu (2012) highlight that after liberalisation, despite brisk GDP growth, employment growth lagged-growth was jobless in many nonfarm sectors, and new jobs were often informal or casual. Mehrotra et al. (2014) similarly report that during 1993–2004, while agriculture's share in employment declined and service, trade, and transport jobs expanded, much of this was in low-productivity activities. Building on this, Mehrotra and Parida (2021) find that India is confronting an employment crisis: labour force participation has continued to decline even as unemployment and discouraged workers rise; structural transformation has stalled, especially for skilled labour in nonfarm sectors; real wages have stagnated; and supply-side issues such as skill mismatches and educational deficits limit absorption of workers. Shaw (2013) shows that while rural workers are moving out of agriculture, the nonfarm transition is often distress-driven, marked by gender and regional disparities. Evidence from Uttar Pradesh supports this: in the west, educated and landowning groups access higher-return nonfarm jobs, while in the south, stagnation in rural manufacturing has led to casualisation and distress-driven diversification (Hashmi, 2025). Together, these studies suggest that India's structural transformation in employment is weakly progressive: shifts away from agriculture are happening, but benefits are uneven and often insufficient to improve livelihoods in any robust way. These studies converge on the finding that employment has shifted away from agriculture towards nonfarm activities, but often in a distress-driven manner, particularly in rural areas (Abraham, 2009).

At the same time, some scholars highlight the potential of rural nonfarm diversification to generate new opportunities. Misra (2014) argued that RNFE can create supplementary employment for underemployed rural workers, contribute to poverty reduction, empower disadvantaged groups, and even reduce income disparities. However, evidence from India suggests a more nuanced picture. Foster and Rosenzweig (2004) showed that while nonfarm opportunities can raise rural wages and reduce poverty, the benefits are disproportionately captured by better-educated and better-connected households. Similarly, Himanshu (2011) documented that RNFE growth in India has often widened gaps between social groups, as the poor remain concentrated in low-return casual work while higher-income households move into more remunerative sectors. International comparative studies also confirm that while nonfarm employment can serve as an engine of upward mobility, it often functions as a coping strategy in contexts of agrarian crisis, reproducing inequalities rather than alleviating them (Reardon, 1998; Barrett et al., 2001; Lanjouw & Lanjouw, 2001). Thus, the welfare effects of RNFE are uneven and highly contingent on household assets, education, and regional connectivity.

The global literature highlights wide variation in the developmental role of RNFE. In Sub-Saharan Africa and Latin America, nonfarm diversification often reflects coping responses to agricultural shocks, limited access to land, or the seasonality of farm work (Reardon, 1997; Barrett, Reardon, & Webb, 2001; Lanjouw, 1999; Elbers & Lanjouw, 2001; Haggblade, Hazell, & Reardon, 2010). Studies from Africa document that nonfarm income is often used as a risk-management strategy, particularly in contexts of agricultural market failures and climatic variability (Reardon, 1997; Barrett et al., 2001; Haggblade, Hazell, & Reardon, 2010; Nagler & Naudé, 2017). In Latin America, Lanjouw (1999) and Elbers & Lanjouw (2001) show that RNFE contributes significantly to household income, but remains segmented between high-return entrepreneurial activities and low-return survivalist employment.

In Asia, the evidence is similarly mixed. De Janvry and Sadoulet (2005) demonstrate that nonfarm income improved rural livelihoods and reduced poverty in China, consistent with other studies that highlight the role of township and village enterprises (TVEs) in raising rural incomes (DeBrauw et al., 2002; Park, 2008). In contrast, South Asian evidence often points to the persistence of low-productivity and informal activities. For example, evidence from Nepal and the Himalayan region identifies casual services, transport, and petty trade as dominant forms of diversification (Micevska & Rahut, 2008; Gautam & Andersen, 2016; Davis, 2003). In Bangladesh, nonfarm employment has played a crucial role in poverty reduction, with rural manufacturing, construction, and services significantly improving household welfare and reducing the depth of poverty (Sen & Ali, 2015; Hossain, 2004). Evidence from Pakistan is more nuanced: while

nonfarm activities contribute positively to incomes through trade, services, and small manufacturing, their benefits are uneven across regions, with low-productivity informal jobs persisting among the poor (Malik, 2008; Arif et al., 2000). In Southeast Asia, too, the welfare effects of RNFE are heterogeneous; Vietnam and Thailand show strong positive impacts of rural industrialization and services on income diversification and poverty (Hoang et al. 2014; Bui & Hoang, 2021; Rigg, 2006), while in Cambodia and Laos, participation remains concentrated in low-return activities such as petty trade and casual services (Micevska, & Rahut, 2012; Martin & Lorenzen, 2016). These findings reinforce the view that while Asian economies have witnessed rising RNFE participation, its welfare effects are uneven, with opportunities clustered in better-connected regions and disadvantages persisting for landless and socially marginalised groups.

In India, nonfarm employment has grown steadily since the 1970s. Early contributions by Vaidyanathan (1987), Unni (1991, 1996), and Papola (1992) noted the rising share of nonfarm jobs, often linked to agricultural distress and rural inequality. Bhalla (2002) and Chadha (2002) pointed to regional variation, with RNFE being stronger in agriculturally advanced states. Lanjouw and Shariff (2004) provided influential evidence that RNFE contributed to poverty reduction, though unevenly, while Lanjouw and Murgai (2009) highlighted its role in income diversification. Furthermore, recent studies underscore that the bulk of RNFE expansion has been concentrated in casual construction and low-end services that rather than upwardly mobile opportunities (Abraham, 2009; Himanshu et al., 2011; Himanshu et al., 2013; Lanjouw & Murgai, 2009; Eswaran, Kotwal, & Ramaswami, 2009). This literature consistently finds segmentation between a minority accessing regular salaried or entrepreneurial jobs and the majority engaged in casual, insecure nonfarm labour.

The literature on Bihar, however, is sparse. The state exemplifies the challenges of distress-driven diversification due to its weak agricultural base, characterised by land fragmentation, low productivity, and indebtedness, and its high rates of outmigration (Datt et al., 2016; Datta, 2020). For instance, Singh & Singh (2013) document that despite a doubling of agricultural labour, net sown area and gross cropped area have stagnated, and productivity per agricultural worker has declined sharply. Ahmad, Singh, & Sinha (2020) find very low crop diversification indices and attribute this partly to erratic rainfall, weak assured irrigation, and deficit in quality inputs. Further, a panel study of selected Bihar villages (Kumar et al., 2015) finds that cultivation contributes only one-quarter of farm household income; non-farm income sources and transfers are increasing but vary greatly by landholding, assets, and education. Access to non-farm employment is shown to be limited by socio-economic divides such as sex, gender, and educational attainment (Gurpreet Singh, 2020; Sabreen & Behera, 2020). Caste and religion further stratify access to nonfarm work, reinforcing segmentation and inequality (Kijima, 2006; Thorat & Newman, 2012; Hashmi, 2025). Yet few studies integrate wage and consumption evidence or apply econometric methods to correct for selection bias, leaving important gaps in understanding the welfare implications of RNFE in Bihar.

This uneven trajectory underscores the importance of sub-national analyses. States such as Bihar, with limited urbanisation and a predominantly rural economy, represent critical sites for examining the dynamics of rural nonfarm employment. Understanding the state-level experience allows for a more nuanced interpretation of how structural transformation theories apply-or fail to apply-in the Indian context. This study therefore contributes to the literature by situating Bihar's rural nonfarm transformation within broader theoretical debates on structural change, dual labour markets, and informalisation. By integrating both income and expenditure perspectives and employing robust econometric techniques, it provides fresh insights into whether Bihar's RNFE represents an opportunity-enhancing transformation or a distress-driven extension of agrarian precarity.

3. Data Sources and Methodology

This study uses unit-level survey data for rural Bihar drawn from the National Sample Survey Office (NSSO) Employment–Unemployment Surveys (EUS) and the Periodic Labour Force Survey (PLFS). Specifically, the analysis pools four quinquennial NSS rounds (1993–94, 1999–00, 2004–05, and 2009–10) with the PLFS round for 2021–22 to capture long-run trends and the most recent structure of rural employment. The sample is restricted to rural households and to individuals aged 15–59 years (the working-age population used). Unit-level NSS/PLFS data provide detailed, nationally and regionally representative information on employment status, industry of work, employment status (self-employed, regular, casual), wages, and household consumption (MPCE). These surveys furnish information on various socio-demographic and economic factors, including household size, religious and caste affiliations, monthly per capita expenditure (MPCE) on food and non-food items, and asset ownership. Furthermore, they provide granular data on individual family members within each household, such as age, gender, educational background, training, employment status at both primary and secondary levels, job contract types, access to social security benefits, payment methods, and unemployment rates. The repeated cross-section nature of the surveys allows trend analysis across decades.

To examine the determinants of rural wages in Bihar, we adopt two complementary approaches: the ordinary least squares (OLS) estimation of a Mincerian earnings function and the Heckman two-step selection model. The former provides a baseline estimate of wage determinants, while the latter corrects for potential selection bias that may arise because wages are observed only for employed individuals, and participation in nonfarm work is likely non-random.

Mincerian Earnings Regression (OLS)

The standard Mincerian specification models the natural logarithm of individual earnings as a function of sex, age, education, experience, and other socio-demographic controls:

$$\ln(Wage_i) = \beta_0 + \beta_1 Educ_i + \beta_2 Exp_i + \beta_3 Exp_i^2 + \beta_4 Female_i + \beta_5 FarmNonfarm_i + \beta_6 X_i + \epsilon_i$$

where:

- - $\ln(Wage_i)$ is the log of daily wages of individual i ;
- - $Educ_i$ represents years of schooling or categorical dummies for education levels;
- - Exp_i is proxied by age, with Exp_i^2 capturing nonlinear effects of experience;
- - $Female_i$ is a gender dummy;
- - $FarmNonfarm_i$ indicates sector of employment;
- - X_i includes household and locational characteristics (household size, caste, religion, marital status, etc.);
- - ϵ_i is the error term.

OLS provides a simple and widely used benchmark for wage determination, allowing comparison with existing literature. However, it assumes that wages are observed randomly across individuals. This assumption may not hold in Bihar's rural labour market, where participation in nonfarm work is influenced by education, gender, caste, and other household factors. If these same factors also affect wages, OLS estimates may suffer from sample selection bias.

Heckman Selection Model

To address potential selection bias, we estimate the Heckman two-step selection model (Heckman, 1979). The model consists of two equations:

(a) Selection Equation (Probit model of nonfarm participation)

$$FarmNonfarm_{i^*} = Z_i\gamma + U_i, \quad FarmNonfarm_i = 1 \text{ if } FarmNonfarm_{i^*} > 0$$

where $FarmNonfarm_i$ is a binary indicator of whether the individual is in nonfarm employment, and Z_i includes variables affecting participation (education, age, gender, caste, religion, marital status, household size, and relation to household head).

(b) Outcome Equation (Wage determination conditional on selection)

$$\ln(Wage_i) = X_i\beta + \epsilon_i \text{ observed only if } FarmNonfarm_i = 1$$

The two equations are estimated jointly. The selection equation generates the inverse Mills ratio (λ), which is included in the outcome equation to correct for sample selection bias. A significant λ indicates that unobserved factors influencing sectoral participation are correlated with unobserved determinants of wages, making OLS estimates biased.

Identification Strategy

Since variables included in both equations can create collinearity, at least one exclusion restriction is required; a variable that affects the probability of being in nonfarm work but not wages directly. Given data limitations in PLFS (which lacks landholding and distance-to-town information), we employ marital status, household size, and relation to household head as exclusion restrictions. These variables plausibly affect intra-household labour allocation and sectoral participation but are unlikely to directly influence wages once an individual is employed. This strategy is consistent with established practices in labour economics using household survey data with limited asset measures.

Estimation Procedure and Model Specification

The Ordinary Least Squares (OLS) model is estimated using robust standard errors clustered at the village (Primary Sampling Unit, PSU) level to account for intra-cluster correlation. The Heckman selection model is estimated using the two-step procedure, which offers a clear correction term. A comparison of the OLS and Heckman results enables an assessment of the extent of sample selection bias in the determination of wages in rural Bihar.

The Table 1 presents the key variables included in the OLS Mincerian wage regression and the Heckman selection model, along with their definitions and expected signs.

Table 1
Description of Variables

Variable	Definition	Role in Model	Expected Sign
Log of Daily Wage (ln_wage)	Natural logarithm of daily earnings	Dependent variable in OLS & Heckman outcome equation	—
Education (Educ)	Years of schooling or categorical dummies	Key explanatory variable in both models	+
Age	Age of individual (proxy for experience)	Explanatory variable	+
Age squared	Square of age	Explanatory variable to capture nonlinearity	—
Female	1 if female, 0 if male	Explanatory variable	—
FarmNonfarm	1 if nonfarm worker, 0 if farm worker	Dummy in OLS; dependent variable in Heckman selection equation	+
Caste	Caste categories (SC, ST, OBC, Others)	Control variable in both models	SC/ST negative vs upper castes
Religion	Religion categories (Hindu, Muslim and Others)	Control variable	Mixed
Household size	Number of household members	Exclusion restriction in selection equation	+ (selection only)
Marital status	1 if married, 0 otherwise	Exclusion restriction in selection equation	+ (selection only)
Relation to household head	1 if household head, 0 otherwise	Exclusion restriction in selection equation	— (selection only)

4. Agrarian situation in Bihar

Agriculture in Bihar remains marked by persistent distress and structural vulnerabilities. In 2018–19, the average monthly income of a farming household in the state was only ₹6,278¹, substantially below the national average of ₹8,337, underscoring the dismal agrarian scenario (Govt of India, 2022). According to the Agriculture Census (2015–16), small and marginal farmers constitute an overwhelming 96.9% of landholdings and cultivate nearly 76% of the operational area (Gol, 2019). Despite the centrality of agriculture, only about 44.4% of rural households are directly engaged in farming, and nearly 40% of them are indebted. Much of this indebtedness arises from borrowing through informal channels that charge exorbitant interest rates, aggravating farmers' financial strain. The predominance of small and marginal landholdings, compounded by poverty, limited education, and capital scarcity, constrains the adoption of improved agricultural practices and perpetuates low productivity and vulnerability.

Kannan and Pohit (2021) attribute Bihar's sluggish agricultural growth to structural deficiencies in agricultural markets. Price volatility and limited crop diversification reflect the inadequate density and functioning of markets, stemming from poor private investment in infrastructure and weak institutional frameworks. Public procurement of food grains remains negligible, leaving cultivators dependent on private traders who often dictate unfair prices. The absence of reliable markets not only depresses farm-gate prices but also reinforces income insecurity.

Agricultural growth trends further illustrate these challenges. Between 2011–12 and 2021–22, Bihar's agricultural sector grew at an annual rate of only 2.24%, far below the national average of 3.9% (at 2011–12 constant prices). As

shown in Fig. 1, this growth trajectory has been highly volatile, closely tracking climatic shocks such as recurrent floods and droughts. Years of contraction in agricultural output correspond almost directly to years of severe flooding or drought conditions. Such climatic vulnerability, combined with structural constraints in landholding patterns, market institutions, and access to credit, highlights the precariousness of Bihar's agrarian economy.

Source: Agricultural Statistics at a Glance 2022, GoI

Distribution of farming income

Bihar is predominantly characterized by small landholdings, with notable disparities in both the size of these holdings and the productivity of farms. The state records one of the smallest average operational landholding sizes in India, at 0.39 hectares, compared to the national average of 1.08 hectares. Within Bihar, 78.8 percent of landholdings are categorized as marginal, 18.8 percent as small, and a mere 1.4 percent of farmers own more than two hectares of land. Additionally, the National Statistical Office (NSO) 2019 report, titled "Situation Assessment of Agricultural Households and Land and Livestock Holdings of Households in Rural India 2019," indicates that 57 percent of the total income for agricultural households in rural Bihar is sourced from farming activities.

The report underscores that agricultural households with small landholdings experience diminished farming income. Specifically, those possessing less than 0.01 hectares of land predominantly rely on wage income, with a mere 2.8 percent of their income derived from farming activities. For households with landholdings between 0.01 and 0.4 hectares, the proportion of income from farming increases to 17.6 percent. This share further escalates to 45.75 percent for those with landholdings between 0.4 and 1 hectare. Similarly, for households with landholdings ranging from 1 to 2 hectares, farming income constitutes 66.48 percent of their total income. As previously noted, only 3.13 percent of farmers own more than two hectares, indicating that the majority of farmers have a low share of farming income due to their limited land sizes. The stark reality for most agricultural households is the very low levels of both farm and total household income. Consequently, these households are increasingly reliant on wages and other income sources to meet their needs (Appendix I). Therefore, it can be posited that most diversification efforts are driven by economic distress.

The distribution of loans sourced from both institutional and non-institutional lenders across different landholding categories illustrated in Appendix II. It is noteworthy that in Bihar, landless and small-scale farmers predominantly secured loans from non-institutional sources, which generally impose higher interest rates compared to institutional lenders. In times of urgent need, small and marginal farmers frequently turn to these non-institutional loans.

Appendix III presents an analysis of the debt levels among farming households categorized by landholding sizes in Bihar and various Indian states. Marginal farmers, defined as those possessing less than one hectare of land, exhibit the highest levels of indebtedness, followed by small and medium-scale farmers. In Bihar, 83.8% of marginal farmers are indebted, representing the highest percentage among all the states analysed. This underscores the challenges and vulnerabilities confronting agricultural households in Bihar, as a substantial proportion of them are ensnared in a cycle of debt.

From the analysis above, it is evident that a significant portion of agricultural households in Bihar consists of marginal and small-scale farmers, who earn a relatively small share of agricultural income. Additionally, these farmers often face a heavy debt burden or depend on informal credit sources to cover their expenses. This scenario highlights the widespread distress experienced by agricultural households in Bihar.

5. Industrial and Employment Distribution of Workforce

The Bihar exhibits lowest level of urbanisation, with urban population comprising only 11.3% of the total population as of 2011 (Census, 2011). This has been coupled with a significant shift in the rural workforce, transitioning from agricultural to non-agricultural sectors, as well as a change in the industry-wise distribution from 1993-94 to 2021-22. Table 1 illustrates the importance of various sub-sectors in the rural Bihar. The data shows that whilst agricultural activities continue to employ a substantial portion of rural workers, their relative significance has markedly decreased by nearly 35.5 percentage points between 1993-94 and 2021-22. Specifically, the proportion of workers involved in agriculture declined from 83.62 per cent in 1993-94 to 48.1 per cent in 2021-22. Further analysis of the table indicates that the reduction in agriculture's share of rural employment is primarily due to male workers (38 percentage points) rather than female workers (11.5 percentage points) leaving agricultural occupations.

The state exhibits pronounced variations in the industrial composition of rural nonfarm employment, as illustrated in Table 1. Key observations from the data include the following:

Rise in Construction Sector

The employment profile of rural Bihar reveals that the diversification of the labour force away from the primary sector has largely taken the form of informalization rather than formal sector absorption. The most striking evidence comes from the rapid expansion of construction, which rose from just over 1 percent of rural employment in the early 1990s to more than 20 percent by 2021–22. This growth, however, represents predominantly casual, low-paid, and migration-driven work, underscoring the lack of stable and skill-intensive opportunities in rural areas. Similarly, the rise of low-end service activities such as petty trade, hospitality, and transport reflects a shift towards highly fragmented and informal occupations. Thus, while Bihar's rural economy is diversifying, it is doing so within the confines of informal and insecure work arrangements, reinforcing structural vulnerabilities rather than alleviating them.

Table 1
Sectoral Distribution of Usual (Principal+Subsidiary) Status Rural Workers in Bihar (in percentage)

Sectors	1993-94	1999-00	2004-05	2011-12	2018-19	2019-20	2021-22
Rural Persons							
Primary Sector	83.62	80.82	78.66	67.6	50.69	50.86	48.1
Secondary Sector	5.67	8.55	8.84	15.23	23.92	25.38	27.16
Mining & Quarrying	0.54	0.68	0.1	0.14	0.41	0.02	0.15
Manufacturing	3.48	5.68	6.02	4.43	5.22	4.55	6.18
Electricity,Gas, & Water	0.28	0.04	0.05	0.01	0.23	0.06	0.5
Construction	1.37	2.15	2.67	10.65	18.06	20.75	20.33
Tertiary Sector	10.72	10.64	12.5	17.17	25.37	23.75	24.75
Trade,Hotels & Restaurants	4.63	4.49	6.71	8.08	12.17	11.97	12.42
Transport Communication	1.1	1.35	2.12	2.5	4.86	5.23	4.17
Other Services	4.99	4.8	3.67	6.59	8.34	6.55	8.16
Total Nonfarm	16.39	19.19	21.34	32.4	49.29	49.13	51.91
Rural Males							
Primary Sector	80.95	80.07	76.08	66.17	49.31	46.89	43.13
Secondary Sector	6.07	8.63	8.98	15.91	25.03	27.82	30.58
Mining & Quarrying	0.59	0.71	0.14	0.16	0.44	0.02	0.17
Manufacturing	3.4	5.64	5.28	4.06	5.33	4.29	6.47
Electricity,Gas, & Water	0.36	0.07	0.06	0.01	0.25	0.07	0.58
Construction	1.72	2.21	3.5	11.68	19.01	23.44	23.36
Tertiary Sector	12.97	11.3	14.93	17.92	25.67	25.28	26.3
Trade,Hotels & Restaurants	5.52	4.97	8.09	8.66	12.67	13.03	13.55
Transport Communication	1.45	1.52	2.77	2.81	5.14	5.95	4.78
Other Services	6	4.81	4.07	6.45	7.86	6.3	7.97
Total Nonfarm	19.04	19.93	23.91	33.83	50.7	53.1	56.88
Rural Females							
Primary Sector	91.96	81.54	86.98	78.94	74.83	79.71	79.37
Secondary Sector	4.36	8.45	8.39	9.79	4.91	7.61	6.29
Mining & Quarrying	0.37	0.65	0.00	0.00	0.00	0.00	0.00
Manufacturing	3.71	5.72	8.39	7.29	3.36	6.42	5.24
Electricity,Gas, & Water	0.03	0.00	0.00	0.00	0.00	0.00	0.09
Source: Computed from different rounds/periodic surveys of NSSO, Govt. of India							

Sectors	1993-94	1999-00	2004-05	2011-12	2018-19	2019-20	2021-22
Construction	0.25	2.08	0.00	2.5	1.55	1.19	1.05
Tertiary Sector	3.68	10.01	4.64	11.27	20.27	12.67	14.33
Trade,Hotels & Restaurants	1.84	4.02	2.24	3.53	3.51	4.28	4.82
Transport Communication	0.02	1.19	0.02	0.03	0.00	0.02	0.08
Other Services	1.82	4.8	2.38	7.71	16.76	8.37	9.43
Total Nonfarm	8.04	18.46	13.03	21.06	25.18	20.28	20.63
Source: Computed from different rounds/periodic surveys of NSSO, Govt. of India							

During this time, the implementation of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2005 led to substantial construction work aimed at enhancing rural connectivity. Consequently, the construction sector became the primary source of rural nonfarm employment. Data reveals that male workers were more heavily involved in this sector, with 23.36% engaged in construction compared to only 1% of female workers in 2021-22. Conversely, other segment of the secondary sector, such as mining and quarrying, electricity, gas, and water, experienced low and stagnant employment growth for both male and female workers throughout the period, as shown in Table 1.

Manufacturing and Service Sector Dynamics

A closer examination of sectoral patterns highlights the stagnation of rural manufacturing and the reliance on construction and services as absorbers of surplus labour. Manufacturing employment has remained almost unchanged, fluctuating between 5–6 percent over three decades, indicating its limited role in creating productive rural livelihoods. By contrast, construction has emerged as the largest component of the secondary sector, absorbing workers in casual and often migration-linked roles. The tertiary sector has also expanded substantially, rising from about 11 percent in the early 1990s to nearly 25 percent in recent years. Yet this growth is concentrated in petty trade, transport, and personal services, which are predominantly informal in character. These trends suggest that Bihar’s structural transformation is bypassing industrialization; instead, it is characterized by a construction- and service-led pathway, where most employment remains precarious and low-productive.

Gender Disparities in Employment: The gendered distribution of rural employment highlights significant inequalities in access to emerging opportunities. Male workers have diversified considerably into construction, trade, and transport, with more than half engaged in nonfarm activities by 2021-22. In contrast, female workers remain largely excluded from this process: nearly four out of five women are still engaged in agriculture, and only about one-fifth participate in nonfarm activities. Within the secondary sector, women’s roles are limited to small-scale, home-based manufacturing, while their participation in construction is negligible. In the services sector, women are increasingly present in petty trade and personal services, but remain almost absent from transport and communication. This persistent gender gap reflects barriers such as mobility restrictions, lack of training, and entrenched social norms, which constrain women’s ability to benefit from rural nonfarm diversification. As a result, while men are moving into new but informal opportunities, women remain disproportionately tied to low-productive agricultural and marginal service work

The employment structure of rural Bihar reflects a process of diversification away from agriculture, but this transformation has unfolded within the confines of informality. Table 1 highlights the long-term decline of the primary sector in rural employment, from more than four-fifths of the workforce in the early 1990s to less than half by 2021-22, accompanied by a substantial rise in construction and services. At first glance, this suggests a classic structural shift from farm to nonfarm activities. However, Table 2 reveals the character of this transition: rather than leading to stable

or productive works, the expansion of the nonfarm economy has largely intensified the informalisation of the rural workforce.

Table 2
Percentage distribution of usually working persons in usual status by broad Status in Employment for each industry of work in rural Bihar, 2021-22

Sectors	Self-employed	Regular wage/salary	Casual labour	All
Primary Sector	73.84	0.2	25.96	100
Secondary Sector	26.525	25.82	47.66	100
Mining and Quarrying	18.22	0	81.78	100
Manufacturing	52.72	27.66	19.62	100
Electricity, gas & water	24.84	75.01	0.15	100
Construction	10.32	0.6	89.08	100
Tertiary Sector	65.85	27.86	6.29	100
Trade, hotels and Restaurants	85.62	11.53	2.86	100
Transport & Communication	70.97	19.91	9.12	100
Other Services	40.97	52.14	6.89	100
Source: Calculated from unit level data of PLF survey, 2021-22				

The secondary sector is dominated by construction, which now absorbs over one-fifth of rural workers, but nearly all of them are engaged as casual labourers. This points to the overwhelming dependence on short-term, insecure work with limited prospects for upward mobility. Even manufacturing, often considered a pathway to industrialisation, remains fragmented: more than half of its workforce is self-employed in small household enterprises, while regular wage employment accounts for barely one-quarter. Similarly, the expansion of the tertiary sector, which employs about one-fourth of rural workers, is driven by petty trade and small-scale transport services where self-employment predominates. Regular salaried jobs are concentrated only in a limited segment of “other services” such as education, health, and administration, which cannot accommodate the wider rural workforce.

Taken together, the evidence demonstrates that the transformation of Bihar’s rural economy is not one of formalisation or structural upgrading, but rather one of extending informality beyond agriculture into construction and services. The reduction in agricultural dependence has been accompanied not by the rise of secure employment, but by the proliferation of casual and own-account activities. This trajectory indicates that rural Bihar’s diversification is reinforcing the precarious and fragmented nature of employment, thereby deepening the informalisation of the workforce instead of generating stable and productive nonfarm livelihoods.

The employment status trends depicted in Fig. 2 highlight a distinct trajectory of Bihar’s rural structural transformation. Over the past three decades, the nonfarm sector has expanded its role in absorbing rural workers, but the distribution of employment status reveals the predominance of informal employment. Self-employment has consistently accounted for the largest share of nonfarm work, reflecting the persistence of small-scale, low-capital activities such as petty trade, transport services, and household-based enterprises. This indicates that much of the nonfarm diversification has been driven by survival-oriented, own-account activities rather than entrepreneurial or growth-enhancing ventures.

A striking feature of the period is the decline in regular wage employment, which fell from about 24 percent in 1993-94 to just 17 percent in 2021-22. This contraction of stable jobs suggests that Bihar's rural nonfarm economy has failed to create durable employment opportunities, particularly in manufacturing or organized services, where wage work could have been expected to expand. In contrast, casual employment witnessed a surge during the 2000s, mainly linked to the construction boom and other short-term activities, before stabilising at a relatively high level. The persistence of casual work signals that surplus labour from agriculture is being absorbed into insecure, low-wage, and often migration-dependent occupations.

Overall, the figure demonstrates that Bihar's rural structural transformation has not followed the classical trajectory of industrialisation-led formalisation. Instead, the shift from agriculture to nonfarm activities has coincided with a shrinking share of regular employment and a consolidation of self-employment and casual labour. This pattern underlines the limited capacity of the rural nonfarm sector to generate secure, productive employment, reinforcing the informal character of Bihar's labour market

Source: Computed from different rounds/periodic surveys of NSSO, Govt. of India

6. Wage-Differential in sectors and economic activities

The earnings profile of rural Bihar reveals stark inequalities across both employment status and sectoral composition. Figure 3 shows that regular wage employment generates the highest monthly earnings across all sectors, underscoring the premium attached to stable, salaried jobs. However, as earlier evidence indicates, the share of such jobs has been shrinking, leaving only a minority of rural workers able to access these higher incomes. By contrast, self-employment yields moderate returns in secondary and tertiary activities but extremely low earnings in the primary sector, where subsistence cultivation continues to dominate. Casual employment, which absorbs a significant share of Bihar's rural workforce, particularly in construction, remains the most insecure form of work, yet it often provides relatively higher earnings than agricultural work. This income advantage helps explain the steady transition of workers out of agriculture and into nonfarm casual activities. While such works may reduce short-term income vulnerability compared to agricultural work, they still lack stability, social security, and prospects for upward mobility, thereby reinforcing the broader informal character of Bihar's rural economy.

Source: Author's own estimation based on unit level data of PLFS, 2021-22

The sectoral breakdown in Fig. 4 reinforces this picture by highlighting the variation in daily wages across specific activities. Cultivation and construction, which together employ the largest segment of rural workers, are also at the bottom of the wage hierarchy, reflecting the persistence of under-remuneration in agriculture and the precarious nature of construction work. Slightly higher but still modest earnings are found in petty trade, hospitality, and small-scale transport services, which are dominated by self-employment. In contrast, relatively better wages are observed in manufacturing, other services, and especially in utilities such as electricity, gas, and water, but these sectors employ only a small minority of rural workers and thus have limited developmental reach. The coexistence of a few high-paying but narrow employment niches with a large base of low-wage activities underlines the uneven character of Bihar's rural transformation.

Taken together, the two figures reveal that diversification out of agriculture has not been accompanied by significant improvement in earnings for the majority of workers. Instead, the expansion of construction, petty services, and agricultural self-employment has left most rural households dependent on insecure and low-income sources of livelihood. At the same time, the slightly higher earnings in nonfarm casual employment compared to agricultural

labour highlight the income-driven rationale for this transition, even though such work ultimately reinforces the persistence of informalisation and wage inequality in Bihar’s rural labour market.

Source: Calculated from unit level data of Periodic Labour Force Survey of NSSO, 2021-22

Further, Table 3 indicates the nature of contracts for both regularly and casually employed individuals in rural Bihar during 2021-22. This result highlights that a significant proportion (69.15% of regularly employed individuals) did not have a written contract detailing their job tenure and benefits. Furthermore, only 25.32% of regularly employed workers have written contracts for more than three years, implying that their jobs are permanent in nature. By contrast, 99.77% of casually employed workers do not have a written contract, which exposes the vulnerability of these workers without job security and other benefits. This demonstrates the extent of informality in rural employment, which is more pronounced in casual employment. Although a proportion of regular employment includes contracts, a significant proportion lacks written contracts, indicating the increasing vulnerability of rural workers.

Table 3
Nature of job contracts in rural Bihar, 2019-20

Job Contract	Regularly-Employed	Casually-Employed
No Written Contract	69.15	99.77
Written contract for one year or less than a year	1.26	0.02
Written contract for more than one year to three years	4.28	0
Written contract for more than three years	25.32	0.21
Total	100	100
Source: Calculated from unit level data of Periodic Labour Force Survey, 2021-22		

Source: Calculated from unit level data of Periodic Labour Force Survey, 2021-22

Figure 5 demonstrates the proportion of workers in regular and casual employment who received social security benefits, further indicating the extent of informality in the labour market. Approximately 71% of regular workers did not receive any social security benefits, which illustrates the vulnerability within regular employment itself. In casual employment, the proportion is even higher, with 98% of workers not receiving any social security benefits such as paid leave, pensions, maternity leave, and health care leave. The absence of social protection coverage for workers impedes their access to healthcare and income security, thereby exacerbating poverty, increasing vulnerability, and diminishing decent work conditions. Consequently, workers in rural Bihar face labour market informality that is not conducive to sustainable and improved livelihood conditions.

7. Consumption Patterns and Employment Segmentation in Rural Bihar

The quintile distribution of monthly per capita consumption expenditure (MPCE) across employment categories provides an important welfare-based perspective on the role of different income sources in rural Bihar. Unlike wage data, which reflect returns to labour at the individual level, consumption patterns capture household-level wellbeing and thus help assess how employment structures translate into livelihood security.

In the lowest quintile (average MPCE of ₹1,195), households rely heavily on agriculture (43.8%), divided between cultivation (27.6%) and agricultural wage labour (16.2%). The remainder is drawn largely from nonfarm casual labour

(26.8%) and petty nonfarm self-employment (22.4%). These activities, while crucial for survival, are precarious and low-return, underscoring that diversification into nonfarm work at the bottom is largely distress-driven (Table 4).

Table 4
Monthly Consumption Expenditure in Rural Bihar by Usual Monthly Consumption quintile, 2021-22

Lowest	Cultivation	AWCL	NFSE	NFRE	NFCL	Total RNFE	Average Monthly Consumption Per Capita (₹)
	27.6	16.2	22.39	6.99	26.81	56.19	1194.7
Q2	42.43	8.67	23.16	8.91	16.84	48.91	1747.6
Q3	48.47	9.17	22.31	9.49	10.57	42.37	2264.4
Q4	47.33	5.51	22.6	15.71	8.85	47.16	2977.17
Highest	42.23	0.16	8.1	49.52	0	57.62	4936.76
Total	35.52	12.49	22.43	8.82	20.74	51.99	2624.12
Source: Calculated from unit level data of Periodic Labour Force Survey of NSSO, 2021-22							

AWCL- Agricultural wage labour, NFRE- Nonfarm Regular employment, NFSE-Nonfarm self-employment, NFCL- Nonfarm casual employment

As households move into the second and third quintiles (₹1,748 and ₹2,264), the share of cultivation rises steadily to nearly half, while agricultural wage dependence declines. Nonfarm self-employment remains around 22–23%, suggesting its persistence as a buffer for households, but it does not expand with upward movement. By contrast, regular nonfarm jobs gradually gain share (9–10%), while casual labour falls from 16.8% to 10.6%. These shifts suggest that modest upward mobility in rural Bihar is linked to escaping agricultural wage labour and casual nonfarm work, and gaining access to more stable sources of income.

In the fourth quintile (₹2,977), nonfarm regular employment plays a stronger role, rising to 15.7%, while cultivation remains high (47.3%). Self-employment is stable at 22.6%, but casual labour continues its decline to 8.9%. This stage reflects households that supplement agriculture with increasingly secure nonfarm earnings, with regular employment serving as a crucial driver of rising consumption. The highest quintile (₹4,937) exhibits a clear structural break. Nonfarm regular jobs dominate with nearly half of household consumption (49.5%), while cultivation falls to 42.2%. Nonfarm self-employment shrinks sharply to 8.1%, and casual labour disappears entirely. This pattern indicates that high-consumption households in rural Bihar are disproportionately concentrated in regular salaried employment, with petty self-employment and casual labour largely confined to the poor.

Taken together, these patterns highlight the segmented nature of rural nonfarm employment. Casual labour and petty self-employment provide a fragile consumption floor for the poorest households but do not enable upward mobility. Their declining share across quintiles reinforces their survivalist character. By contrast, access to nonfarm regular employment is strongly correlated with higher consumption and affluence, emerging as the single most important driver of household welfare in the top quintile. Cultivation persists across the distribution but shifts from subsistence reliance among the poor to a supplementary role among the better-off.

The evidence thus supports the argument that Bihar's nonfarm economy is characterised by a dualism of distress-driven and opportunity-driven employment. For the poor, nonfarm diversification is dominated by low-productivity, insecure activities that barely sustain consumption. For the better-off, prosperity is linked to access to stable, salaried

nonfarm work, which provides the basis for higher and more secure household welfare. This duality explains why rising nonfarm employment has not uniformly translated into broad-based rural development in Bihar.

8. Results and Discussion

Wage Determination in Rural Bihar: OLS Baseline Estimates

The OLS estimation of the Mincerian wage function provides an initial view of how individual and household characteristics shape earnings in rural Bihar. Consistent with much of the Indian labour market literature, women face a pronounced wage penalty, earning on average 42 per cent less than men. Education appears to improve wages in the baseline model, with secondary schooling and graduation associated with significantly higher daily earnings. Age also displays the expected concave relationship, with wages rising with age but at a diminishing rate, suggesting that experience is modestly rewarded (Table 5).

Caste and religious affiliations exhibit stratifying effects: members of upper castes earn a small wage premium compared to Scheduled Tribes, while Muslims face a negative, though weak, earnings differential. Household size, interestingly, shows a small positive association with wages, possibly reflecting economies of scale in household labour allocation. Most notably, nonfarm employment is associated with about 22 per cent higher wages than agricultural work, underscoring the income pull that encourages workers to transition into nonfarm activities.

Table 5
Determinants of Log Daily Wages in Rural Bihar

Sex (Female = 1, Male = 0)	OLS	Heckman Two Step
	-0.540^{***} (0.0766)	-0.345 (0.239)
Age	0.0457 ^{***} (0.0104)	0.00697 (0.0147)
Age squared	-0.000532 ^{***} (0.000133)	0.000107 (0.000229)
Education Below Primary	-0.0481 (0.0625)	-0.116 (0.133)
Middle/Primary	0.0613 ^{**} (0.0307)	-0.0525 (0.0984)
Secondary Education	0.103 ^{***} (0.0375)	-0.0528 (0.116)
Graduate & above	0.231 ^{***} (0.0518)	0.0946 (0.134)
Nonfarm	0.221 ^{***} (0.0301)	-
Scheduled Tribe (Base cat. =SC)	0.00526 (0.0861)	0.0998 (0.146)
Other Backward Class	0.000931 (0.0349)	0.151 [*] (0.0906)
Others	0.117 ^{**} (0.0489)	0.212 ^{**} (0.0956)
Muslim	-0.0308 (0.0391)	-0.200 [*] (0.108)
Others	0.507 ^{**} (0.234)	0.281 (0.356)
Household Size	0.0214 ^{***}	-
Standard errors in parentheses		
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$		

Sex (Female = 1, Male = 0)	OLS	Heckman Two Step
	-0.540*** (0.0766) (0.00721)	-0.345 (0.239)
Marital Status (Married = 1, Otherwise = 0)	-0.0610 (0.0586)	-
Relation to Head of Household	0.0457 (0.0424)	-
Constant	4.634*** (0.173)	5.966*** (0.495)
Inverse Mills Ratio (λ)	-	-0.718* (0.422)
R2/Pseudo R2	0.28	-
No. of Observations	3328	3680
Standard errors in parentheses		
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$		

At first glance, the OLS results suggest that human capital in the form of education and experience raises earnings, and that movement into nonfarm employment offers higher returns. Yet such findings rest on the assumption that observed wages are not biased by selection into employment type. In the rural labour markets of Bihar, where participation in nonfarm work is strongly structured by household and community-level factors, this assumption may be unrealistic. Hence, the Heckman selection model provides a more rigorous framework.

Correcting for Selection Bias: Heckman Two-Step Estimates

The Heckman model jointly estimates the determinants of nonfarm participation (selection equation) and the wage function (outcome equation), allowing for correction of potential sample selection bias (Table 5). Several important contrasts with OLS emerge once this correction is applied.

First, the wage penalty for women becomes smaller and statistically insignificant in the Heckman outcome equation. This suggests that much of the gender wage gap observed in OLS arises not from direct discrimination within jobs, but from women's systematic exclusion from higher-paying nonfarm employment. Once this selection is accounted for, the residual gender gap in wages is reduced. Second, education no longer exerts a significant effect on wages within the nonfarm sector. While OLS suggested returns to secondary and higher schooling, the Heckman estimates reveal that the primary impact of education lies in shaping entry into nonfarm employment rather than in raising wages once inside it. In other words, education facilitates diversification out of agriculture but does not guarantee higher earnings in a labour market dominated by informal and low-skill jobs. Third, returns to experience (proxied by age and age squared) also vanish in the Heckman model. This finding reflects the absence of structured occupation progression in Bihar's informal labour markets, where daily wages in casual construction or petty services remain flat regardless of seniority. Finally, social identity plays a clearer role in the Heckman model. OBCs and upper castes earn wage

premiums relative to Scheduled Castes, while Muslims face significant wage penalties, despite being more likely to participate in nonfarm activities. These patterns point to persistent social segmentation of labour market opportunities.

Determinants of Nonfarm Participation

The selection equation results highlight the structural forces driving workers out of agriculture (Appendix IV). Education is the strongest predictor, with the probability of entering nonfarm employment rising steadily with each level of schooling. This aligns with Bihar's historical pattern where low educational attainment has trapped workers in subsistence agriculture, and even modest increases in schooling expand access to nonfarm work. Gender exerts a strong negative effect, with women significantly less likely to enter nonfarm activities. This reflects a combination of social norms, mobility restrictions, and the limited availability of suitable nonfarm jobs for women. Age also matters: younger workers are more likely to engage in nonfarm work, though the effect declines with older age, suggesting that nonfarm employment is often a strategy for the younger and more mobile segments of the labour force. Religion and caste also shape sectoral participation. Muslims are disproportionately represented in nonfarm employment, reflecting their historical concentration in petty trade, transport, and artisanal activities.

By contrast, OBCs and upper castes are less likely than SCs to shift to nonfarm jobs, consistent with the persistence of caste-linked occupational niches. Household characteristics such as size, marital status, and relation to household head influence participation but not wages directly, justifying their role as exclusion restrictions in the model.

Segmented Nature of Rural Nonfarm Employment in Bihar

A striking feature of the results is the apparent contradiction between descriptive statistics and econometric evidence. On the one hand, the descriptive profile of earnings shows that nonfarm workers earn, on average, more than their counterparts in agriculture. This points to an income advantage in nonfarm activities and is consistent with the broad shift of labour out of agriculture over the past two decades. On the other hand, the Heckman selection model reveals a negative and significant inverse Mills ratio, indicating adverse selection into nonfarm employment. In other words, individuals who move into nonfarm work are not those with the highest potential earnings but rather those who carry unobserved disadvantages that depress their wages relative to similar workers who remain in farm work.

This apparent paradox can be reconciled by recognising the segmented nature of rural nonfarm employment in Bihar. The sector contains a narrow set of relatively high-return niches, such as salaried services, skilled trades, or small-scale entrepreneurial activities, which drive up average nonfarm earnings in descriptive comparisons. However, entry into these segments is restricted to workers with higher education, social capital, or better networks. The majority of new entrants, particularly those from landless, poor, or socially disadvantaged households, are absorbed into the low-wage segments of the nonfarm economy, such as casual construction, petty trade, or transport services. For these workers, nonfarm employment does not represent upward mobility but rather a coping mechanism in response to declining viability of agricultural livelihoods.

Evidence from household consumption patterns presented in the preceding section reinforces this conclusion. The quintile distribution shows that nonfarm casual labour and petty self-employment are concentrated among the poorest households, providing only a fragile consumption floor. By contrast, upward mobility is strongly tied to access to regular salaried employment, which dominates in the highest quintile. Together, the wage and consumption evidence underscore the dualism of Bihar's nonfarm transformation: distress-driven activities sustain survival at the bottom, while a minority of households capture the benefits of secure, higher-return opportunities at the top.

The negative and significant value of the inverse Mills ratio (λ) further confirms the presence of adverse selection. Many of those who enter nonfarm jobs are driven by distress factors such as landlessness, poverty, or migration compulsion, and are absorbed into insecure casual work. Had they remained in agriculture, their potential earnings might have been higher, particularly if they had access to land or stable farm employment. This reinforces the conclusion that diversification into nonfarm work is not primarily opportunity-driven but necessity-driven.

This pattern is consistent with qualitative evidence from Bihar, where rural households often diversify into construction, petty trade, and low-end services as survival strategies rather than as investments in higher productivity livelihoods. While such activities may offer slightly higher wages than agricultural labour on average, they remain insecure, low-skill, and devoid of social protection, limiting their potential to serve as engines of broad-based rural transformation.

Broader Implications: Informalisation and Structural Transformation

Together, the OLS and Heckman results underscore the nature of rural Bihar's structural transformation. On the surface, the expansion of nonfarm employment offers higher earnings than agriculture. However, once selection bias is corrected, the evidence points to a labour market that is highly informalised, with weak returns to education, limited rewards to experience, and persistent social segmentation. The transition into nonfarm work in Bihar does not follow the classical path of industrialisation-led development, where labour shifts into higher productivity manufacturing and services. Instead, it reflects an informalisation of the workforce, with surplus agricultural labour absorbed into construction and casual services. These jobs provide modestly higher wages than agricultural labour, explaining the transition, but they do not offer durable pathways out of poverty. The results also highlight the gendered and social character of this transformation. Women remain largely confined to agricultural labour, excluded from higher-paying nonfarm opportunities. Muslims are more likely to enter nonfarm work, but face wage penalties once inside. Caste hierarchies continue to mediate access to better-paying jobs.

In sum, rural Bihar's structural transformation is not one of progressive formalisation but of distress-driven diversification. The wage dynamics captured in the Heckman model reveal the limits of nonfarm employment as a driver of inclusive rural development. While nonfarm diversification is occurring, it is reproducing rather than overcoming the inequalities and vulnerabilities of the rural economy.

9. Limitations

This study has several limitations for interpreting its findings. First, the reliance on cross-sectional PLFS data restricts causal inference and prevents tracking individual labour market mobility over time. Without longitudinal observations, it is impossible to establish whether transitions into nonfarm employment represent upward mobility or temporary adjustments to distress. Panel data for Bihar would strengthen the causal claims. Second, the PLFS lacks detailed information on landholding size and migration history, variables crucial for understanding selection into nonfarm work in agrarian economies. While landholding patterns and asset endowments shape household diversification strategies, these cannot be fully controlled for in the wage equations. Migration variables would help distinguish between local nonfarm employment and employment through migration, which have different welfare implications. Third, self-reported wages and employment statuses are subject to measurement error, particularly among casual workers whose earnings may be underreported, potentially causing downward bias in nonfarm casual wage estimates. Fourth, the analysis is limited by PLFS sectoral categories, which may not capture heterogeneity within employment groups, such as "self-employed" activities ranging from petty trade to skilled work. Fifth, while the Heckman selection correction addresses selection bias, the exclusion restriction's validity relies on untestable assumptions. Future

research using panel data and mixed-methods approaches could better identify pathways toward inclusive nonfarm employment.

10. Conclusion

The analysis of rural nonfarm employment (RNFE) in Bihar reveals a paradox. On the one hand, the steady decline of agricultural viability, marked by land fragmentation, low productivity, indebtedness, and recurrent agrarian distress, has compelled a growing share of the rural workforce to diversify into nonfarm activities. On the other, this diversification has not translated into broad-based welfare improvements. Instead, Bihar's RNFE is segmented and stratified: a small minority access regular salaried jobs that ensure stability, mobility, and higher household welfare, while the majority are absorbed into low-productivity, casual or petty self-employment. The econometric evidence underscores that participation in nonfarm activities is often distress-driven, with landless and marginal farmers overrepresented in insecure forms of casual work. These structural dynamics reinforce social inequalities: caste, religion, and gender continue to shape access to remunerative opportunities, with women and marginalised communities disproportionately concentrated in vulnerable RNFE segments.

This trajectory diverges from the stylised paths of structural transformation outlined in classical models, which envisioned a shift of labour into higher-productivity sectors as economies grew. In Bihar, the transition appears truncated; labour has moved out of agriculture, but without corresponding expansion of productive nonfarm industries capable of absorbing and upgrading the workforce. The result is what can be termed a “distress-led diversification trap”: workers exit farming not to seize opportunities but to survive, entering a nonfarm economy that is itself highly fragmented, informal, and exclusionary.

Such findings not only highlight the limitations of RNFE as a pathway to inclusive development in Bihar but also raise questions about the uneven geography of India's structural transformation. Bihar exemplifies a case where labour mobility into RNFE is necessary yet insufficient for poverty alleviation, unless accompanied by deliberate policies to address segmentation, improve productivity, and expand equitable access.

11. Policy Recommendations

Addressing Bihar's employment challenge requires interventions that go beyond expanding the volume of RNFE jobs and instead target their quality, inclusiveness, and productivity.

1. Strengthening productive nonfarm sectors

- Attract private and cooperative investment in rural industries, agro-processing, small-scale manufacturing, and value-added services.
- Create stronger farm–nonfarm linkages (storage, logistics, agro-inputs, food processing) to ensure that RNFE growth complements rather than substitutes agriculture.

2. Promoting skill development and education

- Expand vocational training programs aligned with high-demand sectors such as construction, repair services, logistics, and ICT-enabled services.
- Prioritise the inclusion of women and marginalised groups in technical and vocational training to address structural barriers to access.

- Improve secondary and technical education infrastructure in rural Bihar, given the strong role of education in determining access to higher-return RNFE.

3. Tackling social segmentation

- Introduce targeted policies to improve participation of Scheduled Castes, Scheduled Tribes, Muslims, and women in remunerative RNFE.
- Enforce labour rights and expand social security coverage for casual workers to reduce vulnerability and wage penalties.
- Strengthen self-help groups and collective organisations that enhance bargaining power and market access for disadvantaged groups.

4. Improving rural infrastructure and connectivity

- Expand rural roads, electrification, digital networks, and storage/market facilities to increase the reach of nonfarm opportunities.
- Promote rural–urban linkages through integrated district-level development plans to reduce the reliance on distress-driven outmigration.

5. Encouraging inclusive entrepreneurship

- Provide institutional credit, entrepreneurship training, and marketing support for small nonfarm enterprises, especially for women and landless households.
- Scale up rural cooperatives and producer enterprises to reduce entry barriers and spread risks across participants.
- Establish state-level labour observatories to capture not just participation in RNFE but also indicators of quality (formality, wages, social protection).

Declarations

Availability of Data and Materials: The raw dataset utilised for this study is accessible from the website of the Ministry of Statistics and Programme Implementation, Government of India (<https://microdata.gov.in/nada43/index.php/home>).

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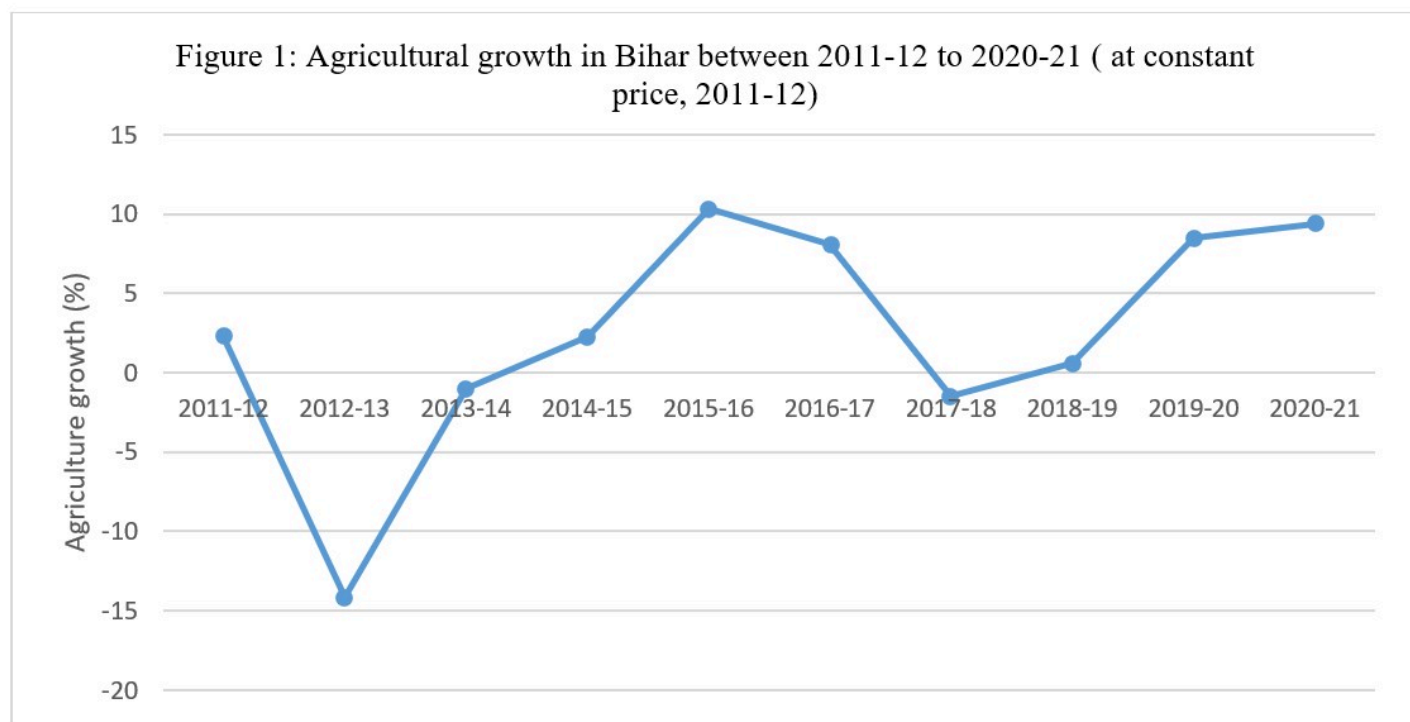
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Footnotes

1. Both the paid out expenses and imputed expenses were considered for working out net receipt on crop production

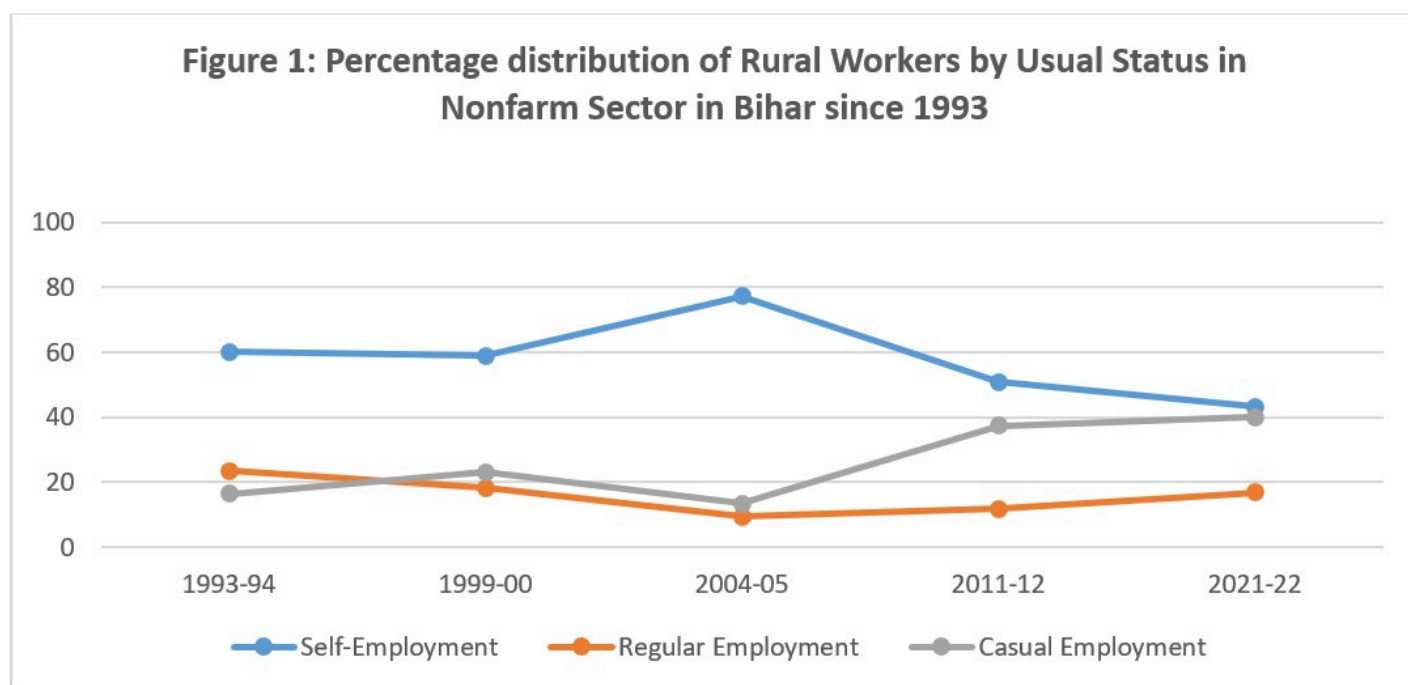
Figures



Source: Agricultural Statistics at a Glance 2022, GoI

Figure 1

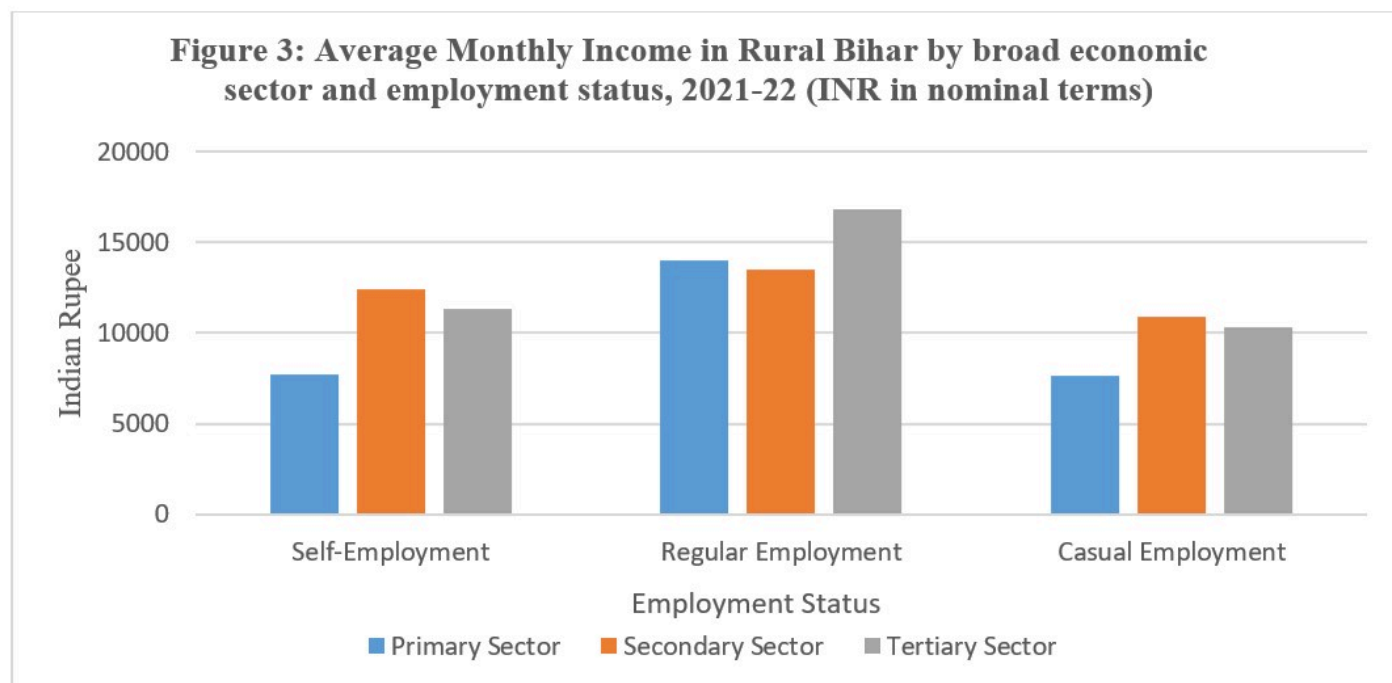
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Source: Computed from different rounds/periodic surveys of NSSO, Govt. of India

Figure 2

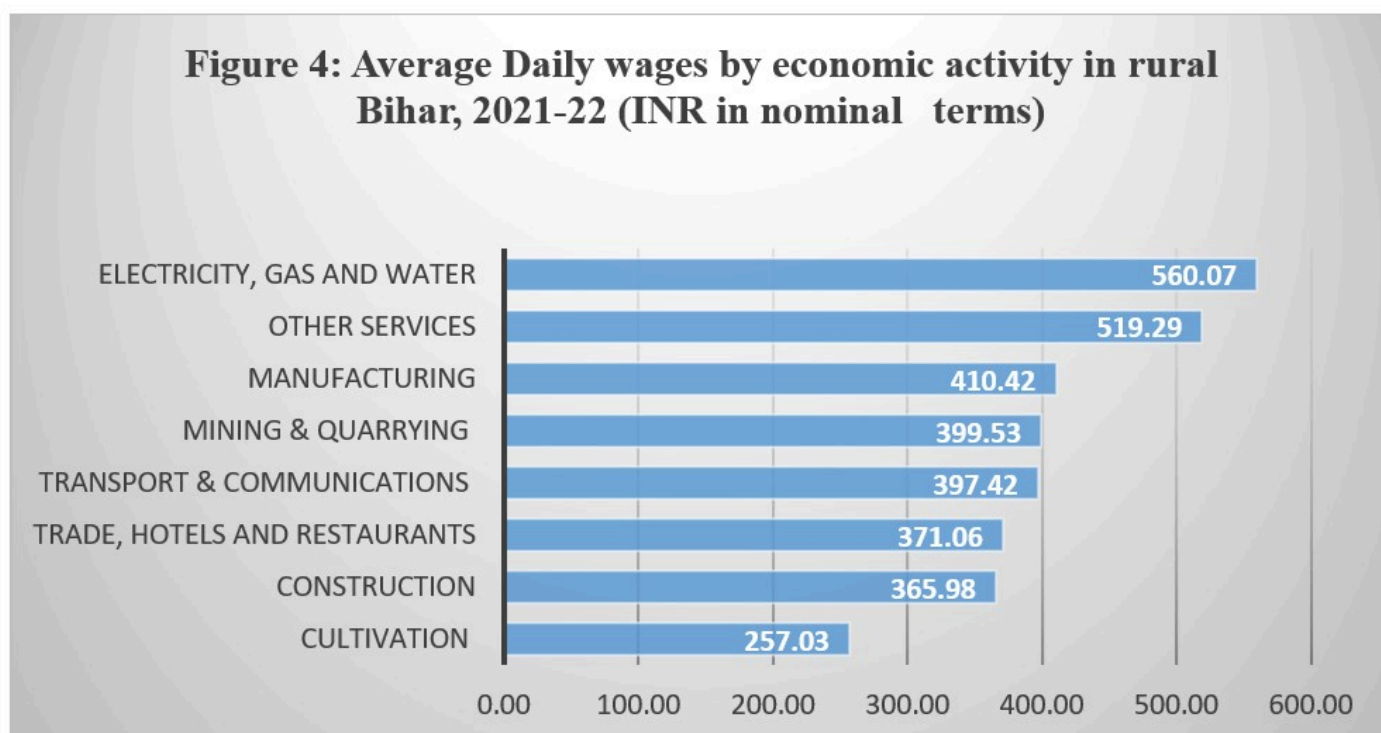
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Source: Author's own estimation based on unit level data of PLFS, 2021-22

Figure 3

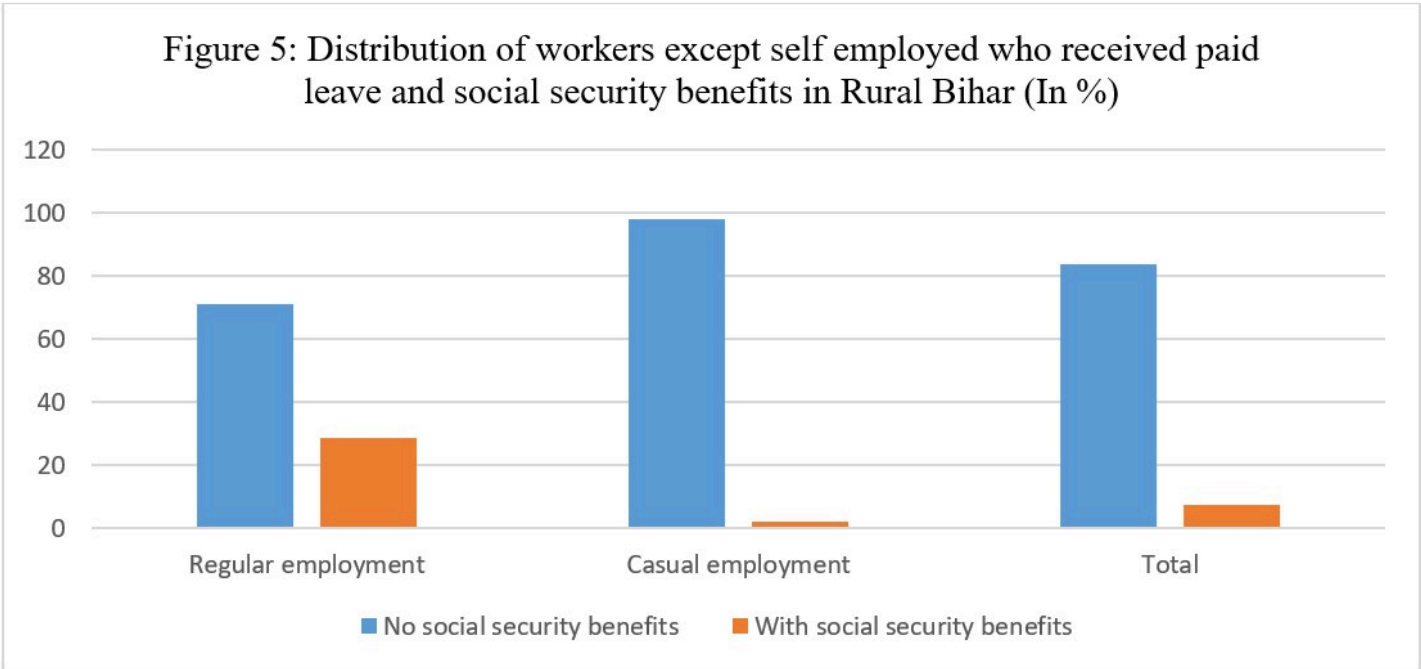
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Source: Calculated from unit level data of Periodic Labour Force Survey of NSSO, 2021-22

Figure 4

See image above for figure legend



Source: Calculated from unit level data of Periodic Labour Force Survey, 2021-22

Figure 5

See image above for figure legend

Supplementary Files

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