

Can Small Industries Reduce Dependence on Agriculture? Evidence from Rural Households in West Champaran, Bihar

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Abstract—In rural Bihar, agriculture remains a major source of employment, while opportunities for livelihood diversification can be provided by small and household-based industries. This study examines whether such activities can reduce agricultural occupational dependence in West Champaran, Bihar. Using Census of India 2011 employment data, the study finds that **77.72% of the district's 797,544 main workers** were cultivators or agricultural labourers, while **22.28%** were in non-agricultural occupations. Household-industry workers accounted for **19,043 workers (2.39%)**, representing **10.72% of non-agricultural main workers**. Agricultural occupational dependence was higher among female workers (**81.93%**) than male workers (**76.58%**). According to the findings of the study, small industries can support rural livelihood diversification, but their observed scale in 2011 was too limited to replace agriculture as the main source of employment. Therefore, a complementary strategy combining agricultural development with stronger rural enterprises, skills, finance, infrastructure, and market access is supported by the study.

Keywords: small industries; household industries; agricultural dependence; rural employment; livelihood diversification; West Champaran; Bihar.

I. INTRODUCTION

Agriculture is a significant part of rural economies and provides work and income to many people. However, problems may arise with heavy dependence on agriculture. Work may be seasonal. Income may also depend on weather, land size, and labour demand.

Small industries can provide other work opportunities. They can use local labour, skills, and raw materials. Household enterprises can also allow people to work near their homes. This can help rural households diversify their livelihoods [3,4].

Development theory suggests that economic growth usually involves a gradual movement of workers from agriculture to manufacturing and services [1,2].

India has also experienced changes in rural employment. Non-farm work has become an important part of rural livelihoods. However, access to such work is not equal for all households. Education, assets, location, and other factors can affect access to non-farm employment [7,8].

In this process, small industries are very important and this includes food processing, textiles, handicrafts, repair work, and other local activities. Such enterprises may require less capital than large industries and providing jobs within rural areas.

Bihar provides an important setting for studying this issue. Rural households often depend on more than one source of income. Studies from Bihar show that farm households also engage in non-farm activities [10,11]. This suggests that rural livelihoods are not based on agriculture alone.

West Champaran has a strong agricultural base. It also has various small-scale and agro-based activities [12]. This makes the district useful for studying the role of small industries in rural employment diversification.

The main question of this study is simple: **Can small industries help reduce dependence on agriculture in West Champaran?**

Census of India 2011 employment data is used by the study to examine this question. It measures the share of workers in agricultural occupations and the share working in household industries. Household-industry employment is used as a **narrow proxy for small-industry activity**.

The study does not measure household income directly. Therefore, agricultural dependence in this paper means **dependence on agricultural occupations among main workers**. The analysis is descriptive.

Understanding the **scale and possible role of small industries** in creating alternative employment in West Champaran is the main purpose of the study.

II. REVIEW OF LITERATURE

Lewis [2] explains that economic development involves a gradual movement of workers from traditional activities to more productive sectors. Johnston and Mellor [1] also show that agriculture plays an important role in economic development. At the same time, new employment opportunities can be created with growth in manufacturing and services.

Rural households often depend on more than one economic activity. Ellis [4] explains that households may combine farming, wage work, trade, services, and small businesses. Such diversification can help reduce income risk. It can also provide work when agricultural employment is low.

An important part of this process is the rural non-farm economy. Lanjouw and Lanjouw [3] show that it includes manufacturing, trade, services, and other rural activities. Haggblade et al. [5,6] argue that the non-farm economy can support rural growth and poverty reduction. However, its success depends on factors such as markets, infrastructure, skills, and productivity.

Studies on India also show the importance of non-farm employment. Lanjouw and Shariff [7] found that access to non-farm work differs across households. Education, assets, and location can affect such opportunities. Lanjouw and Murgai [8] also found links between agricultural wages, poverty, and non-farm employment.

Non-farm work can therefore support rural poverty reduction when it provides regular and productive employment [14]. It can also reduce the pressure on agriculture by creating additional sources of work.

Evidence from Bihar supports this view. Kumar et al. [10] found that farm households in selected villages of Bihar had income from different sources. Dutta and Dhar [11] also found differences in livelihood diversification among rural households, including households in West Champaran.

Recent research from the Gandak Diara region of West Champaran also shows that rural households combine agricultural and non-agricultural activities [15]. This indicates that livelihood diversification is already present in parts of the district.

Small industries can support this diversification. They can use local labour and resources. Agro-processing can also connect agriculture with local production and create additional employment [12]. Government programmes such as PMEGP also recognise the role of micro-enterprises in employment generation [16].

Overall, the literature shows that agriculture and small industries do not have to be competing sectors. Additional employment and income opportunities can be provided, with small industries working alongside agriculture. However, their impact depends on their size, productivity, finance, skills, infrastructure, and access to markets.

II.I. RESEARCH GAP

Previous studies show that rural non-farm activities can support employment and income diversification [3–8]. Studies from Bihar also show that rural households often use more than one source of income [10,11]. However, there is still a need to examine the **scale of household-industry employment at the district level**.

This study focuses on West Champaran. Using census data, agricultural employment can be compared with household-industry employment. The study asks whether the existing scale of household industries is large enough to provide a meaningful alternative to agriculture.

Household-industry workers are used as a narrow and measurable proxy for small-industry activity by this study. It also avoids treating all MSME activities as household industries.

Therefore, **a simple district-level assessment of employment diversification is provided** in West Champaran, which is the main contribution of the study. The importance of small industries and the limits of their present employment scale are presented by the study.

III. OBJECTIVES AND RESEARCH QUESTIONS

The main objective of this study is to examine whether small industries can provide alternative employment to agriculture in West Champaran, Bihar.

The study has the following objectives:

1. To study the main-worker employment structure of West Champaran.
2. To measure agricultural occupational dependence.
3. To measure the share of household-industry employment.
4. To compare agricultural and household-industry employment by gender.
5. To identify the role of small industries in rural livelihood diversification.
6. To suggest suitable policy measures for expanding rural non-farm employment.

Research Questions

The study addresses the following questions:

1. What share of main workers in West Champaran depends on agricultural occupations?
2. What is the share of household-industry employment?
3. Is household-industry employment large enough to provide a significant alternative to agriculture?
4. Does the employment pattern differ between male and female workers?
5. What policies can help small industries create more rural employment?

III.I. ANALYTICAL PROPOSITION

The study proposes that additional employment outside agriculture can be provided by small industries. This may reduce the need for rural households to depend only on agricultural work.

The proposition is:

Greater participation in small and household industries may be associated with lower occupational dependence on agriculture.

Statistical test of this proposition is not done by the test. District-level and cross-sectional level data are available. Therefore, the consistency of the proportion with the employment pattern is only examined by the analysis.

Direct reduction in agricultural employment by the small industries is not claimed by the study. It only examines their **observed employment share and possible role in rural diversification**.

IV. DATA AND METHODOLOGY

This study uses **secondary data**. The main source is the **Census of India 2011** for Pashchim Champaran (West Champaran), Bihar [18,19]. The study also uses the district industrial profile and government sources for background information [12,16,17].

The data on main workers, cultivators, agricultural labourers, household-industry workers, and other workers is provided by the census, providing a simple basis for comparing agricultural and non-agricultural employment.

Main workers are used by the study as the main unit of analysis. Main workers are preferred because a consistent base for comparing the four employment categories is provided by them.

A key point is that household income is not directly measured by this study. Therefore, instead of income dependence, the term **agricultural occupational dependence** is used. It shows the share of main workers engaged in cultivation or agricultural labour.

Similarly, household-industry workers are used as a **narrow proxy for small-industry activity**. A clear and reproducible measure from the Census data is provided by the household-industry workers.

Simple percentages and comparisons are used by the analysis. The available data are district-level aggregates and do not provide enough independent observations for a reliable causal analysis and therefore, no registration model is required.

IV.I. DATA USED

The main figures used in the analysis are:

Table 1. Data used

Indicator	Number
Total main workers	797,544
Cultivators	155,114
Agricultural labourers	464,772
Household-industry workers	19,043
Other workers	158,615
Male main workers	627,289
Female main workers	170,255

Source: Census of India 2011, Pashchim Champaran [18,19].

These figures are used to calculate agricultural occupational dependence, household-industry employment, and gender differences.

IV.I. MEASUREMENT OF AGRICULTURAL OCCUPATIONAL DEPENDENCE

The shares of main workers who are either **cultivators or agricultural labourers** are used to measure the agricultural occupational dependence.

The formula is:

$$\text{Agricultural Occupational Dependence (\%)} = \frac{\text{Cultivators} + \text{Agricultural Labourers}}{\text{Total Main Workers}} \times 100$$

For West Champaran:

$$\frac{155,114 + 464,772}{797,544} \times 100 = 77.72\%$$

Thus, **77.72% of the main workers were engaged in agricultural occupations.**

This measure does not show the share of household income coming from agriculture. The share of main workers whose principal occupation was related to agriculture is only represented by this measure.

IV.II. MEASUREMENT OF SMALL-INDUSTRY ACTIVITY

The study uses **household-industry workers** as a narrow proxy for small-industry activity.

The formula is:

$$\text{Household-Industry Share (\%)} = \frac{\text{Household-Industry Workers}}{\text{Total Main Workers}} \times 100$$

For West Champaran:

$$\frac{19,043}{797,544} \times 100 = 2.39\%$$

Thus, household-industry workers represented **2.39% of all main workers.**

Household-industry employment is compared with total non-agricultural employment by the study.

$$\text{Non-Agricultural Main Workers} = 19,043 + 158,615 = 177,658$$

Therefore:

$$\frac{19,043}{177,658} \times 100 = 10.72\%$$

Household industries accounted for **10.72% of non-agricultural main workers.**

This measure is only a **Census-based indicator of household-level industrial employment** and should not be interpreted as the total size of the MSME sector.

IV.III. GENDER COMPARISON

Employment patterns between male and female main workers are also compared by the study. This helps to understand whether agricultural dependence and household-industry employment differ by gender.

For each group, agricultural occupational dependence is calculated using:

$$\text{Agricultural Dependence (\%)} = \frac{\text{Cultivators + Agricultural Labourers}}{\text{Main Workers}} \times 100$$

For male workers:

$$\frac{480,394}{627,289} \times 100 = 76.58\%$$

For female workers:

$$\frac{139,492}{170,255} \times 100 = 81.93\%$$

The share of household-industry workers among male and female main workers can be calculated using the same approach.

Table 2. Gender-wise Data Used for Analysis

Indicator	Male	Female
Main workers	627,289	170,255
Cultivators + agricultural labourers	480,394	139,492
Household-industry workers	13,367	5,676
Other workers	133,528	25,087
Agricultural occupational dependence (%)	76.58	81.93
Household-industry share (%)	2.13	3.33

Source: Author's calculations from Census of India 2011 [18,19].

The gender comparison is descriptive and does not explain why the differences exist. It only shows the employment pattern observed in the Census data.

IV.IV. ANALYTICAL APPROACH

The analysis follows three simple steps.

First, the share of main workers in agricultural and non-agricultural occupations is calculated by the study.

Second, the share of household-industry workers in total and non-agricultural employment is measured by the study.

Third, the indicators between male and female workers are compared.

Percentages, ratios, and simple comparisons are used, and no regression or causal model is used. This is because the available data are aggregate district-level data and do not provide enough observations for a reliable statistical test.

Therefore, rather than proving a causal relationship, the results are used to identify the **scale and possible role of small industries in rural employment diversification**.

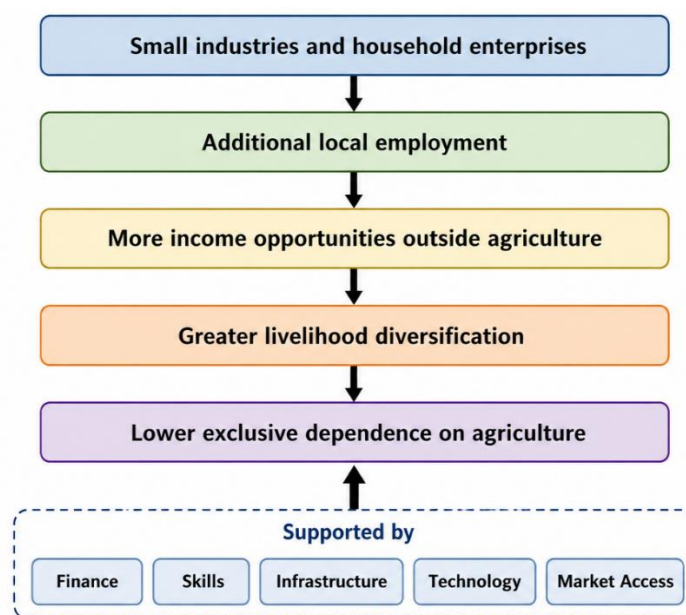


Figure 1. Conceptual Framework

Finance, skills, infrastructure, technology, and market access can support the process.

Source: Author's conceptualisation based on [1–6].

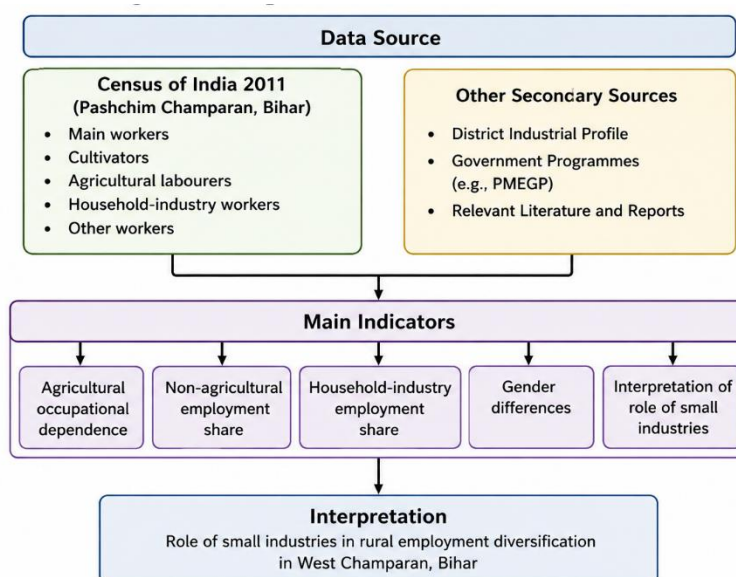


Figure 2. Empirical Measurement Framework

Source: Author's framework based on Census of India 2011 [18,19].

V. RESULTS AND ANALYSIS

V.I. OVERALL EMPLOYMENT STRUCTURE

West Champaran had **797,544 main workers** in 2011. Among them, **155,114 were cultivators** and **464,772 were agricultural labourers**. Together, they accounted for **619,886 workers**, or **77.72%** of all main workers.

Household-industry workers numbered **19,043**, or **2.39%** of main workers. Other workers accounted for **158,615**, or **19.89%**.

Thus, non-agricultural employment accounted for **22.28%** of main workers.

Table 3. Employment Composition of Main Workers, 2011

Employment category	Workers	Share (%)
Cultivators	155,114	19.45
Agricultural labourers	464,772	58.28
Household industry	19,043	2.39
Other workers	158,615	19.89
Agriculture total	619,886	77.72
Non-agriculture total	177,658	22.28
Total main workers	797,544	100.00

Source: Author's calculations from Census of India 2011 [18,19].

Agriculture was shown as the dominant source of employment by the results which involved more than three-fourths of main workers in agricultural occupations.

Therefore, this creates a major scale challenge for small industries, and if they are expected to change the overall employment structure, their expansion would need to be substantial.

V.II. SCALE OF HOUSEHOLD-INDUSTRY EMPLOYMENT

Household industries employed **19,043 workers**. This was only **2.39% of all main workers**.

However, their share was larger within non-agricultural employment.

Non-agricultural main workers:

$$19,043 + 158,615 = 177,658$$

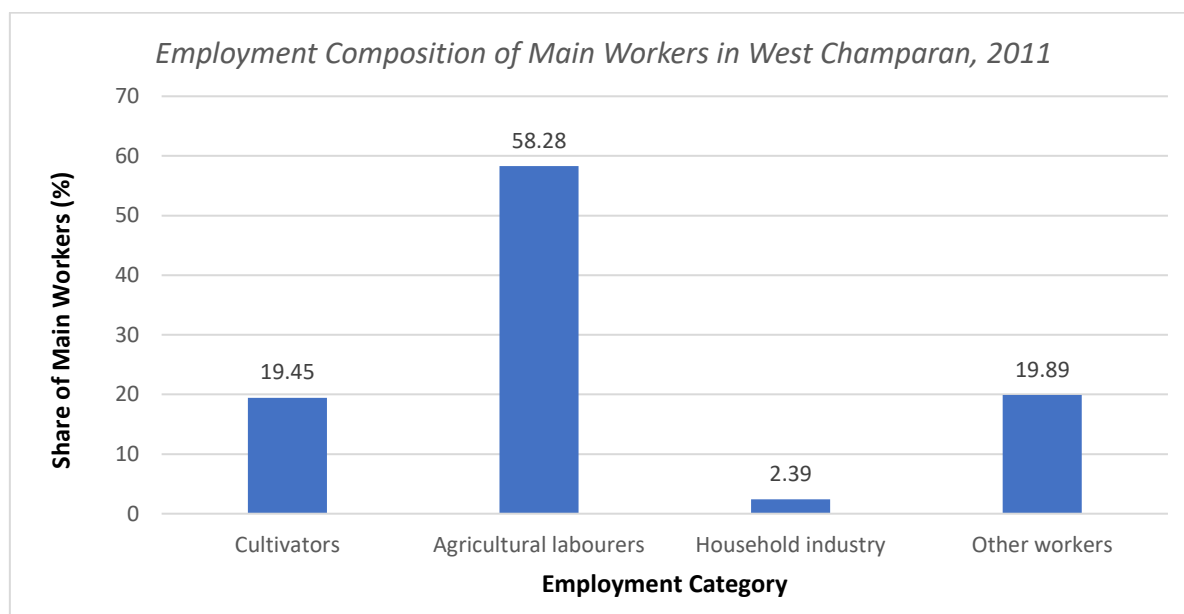
Household-industry share:

$$\frac{19,043}{177,658} \times 100 = 10.72\%$$

Thus, household industries represented **10.72% of non-agricultural main workers**.

Therefore, their main role may be **gradual livelihood diversification**, rather than complete replacement of agricultural work.

Chart 1: Employment Composition



Source: Author's calculations from [18,19].

V.III. GENDER DIFFERENCES IN AGRICULTURAL DEPENDENCE

The gender-wise data show some differences in employment patterns.

There were **627,289 male** and **170,255 female main workers**.

Among male workers, **480,394** were cultivators or agricultural labourers. Therefore, male agricultural occupational dependence was **76.58%**.

Among female workers, **139,492** were cultivators or agricultural labourers. Female agricultural occupational dependence was **81.93%**.

The female rate was therefore **5.35 percentage points higher** than the male rate.

Table 4. Gender-wise Employment Pattern, 2011

Indicator	Male	Female
Main workers	627,289	170,255
Agricultural workers	480,394	139,492
Household-industry workers	13,367	5,676
Other workers	133,528	25,087
Agricultural occupational dependence (%)	76.58	81.93

Household-industry share (%)	2.13	3.33
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Source: Author's calculations from Census of India 2011 [18,19].

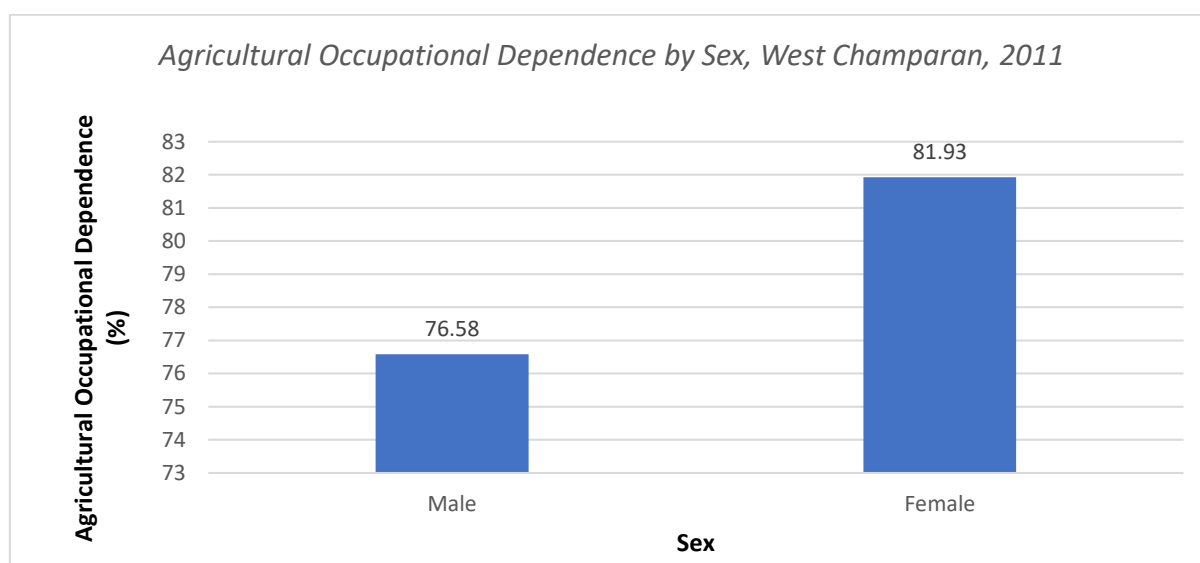
The figures show that female workers were more dependent on agricultural occupations than male workers.

At the same time, household industries represented **3.33% of female main employment**, compared with **2.13% of male main employment**.

Women also accounted for **29.81% of household-industry workers**, while they represented **21.35% of all main workers**.

V.IV. GENDER COMPARISON

Chart 2: Agricultural Occupational Dependence by Sex



V.V. WHAT DO THE RESULTS SAY ABOUT THE RESEARCH QUESTION?

The main question is whether small industries can reduce dependence on agriculture.

The results give a **qualified answer**.

Agricultural occupations accounted for **77.72% of main workers**. Household industries accounted for only **2.39%**.

Therefore, household industries were not large enough in 2011 to become a major substitute for agriculture at the district level.

However, household industries accounted for **10.72% of non-agricultural main workers**. This shows that they were already part of the rural non-farm economy.

Therefore, their likely role is to provide **additional employment and income opportunities**. Another important point is provided by the gender results. Female agricultural dependence was higher than male dependence. Among female main workers, household-industry employment was also relatively more important.

Overall, the view that small industries can contribute to diversification, is supported by the findings of the study, but their impact depends on their scale and ability to grow.

VI. DISCUSSION

The findings are consistent with the rural livelihood literature. Rural households often combine agriculture with non-farm activities [3–6]. They do not always move directly from agriculture to another sector.

A similar pattern is shown by West Champaran. Although, a smaller non-agricultural economy exists alongside, agriculture remains dominant.

Household industries form part of this non-agricultural economy. Local employment can be provided and family labour and local resources can be used.

From a development perspective, this can be seen as a gradual process of diversification. Workers may first combine agricultural and non-agricultural activities before moving more fully into non-farm employment [2,8].

The district's agricultural base also creates opportunities for agro-processing. Food processing, packaging, storage and related activities can connect agriculture with local industry [12].

The main limitation is **scale**. Household industries accounted for only 2.39% of all main workers. Therefore, the large number of workers currently engaged in agriculture cannot be absorbed by themselves.

The policy focus should therefore be on improving the productivity and growth of rural enterprises. Finance, skills, infrastructure, technology and market access can help enterprises move beyond very small-scale activity [3,5,7].

The results also show why registered enterprise numbers alone may not provide a complete picture of rural employment. Many rural businesses operate at household or informal levels. Broader surveys such as ASUSE can provide additional information on the unincorporated sector [17].

VII. POLICY IMPLICATIONS

VII.I. SUPPORT SMALL ENTERPRISE GROWTH

Creating new enterprises should not be the only focus of the policy, but also helping existing enterprises grow. More stable employment can be created by productive enterprises.

VII.II. IMPROVE ACCESS TO FINANCE

Small enterprises often need working capital for raw materials, equipment and expansion. Better access to formal credit can support enterprise growth [16].

VII.III. STRENGTHEN SKILLS

Training should focus on practical skills. Rural enterprises can be strengthening using digital skills, bookkeeping, marketing, production techniques and business management.

VII.IV. PROMOTE AGRO-PROCESSING

West Champaran has a strong agricultural base. Links between agriculture and small industries can be created using local processing, packaging and storage.

VII.V. IMPROVE MARKET ACCESS

Rural enterprises can reach more customers using better roads, electricity, digital connectivity and market information.

VII.VI. SUPPORT WOMEN'S PARTICIPATION

Women accounted for **29.81% of household-industry workers**, compared with **21.35% of all main workers**. This suggests that household industries may offer an important local employment channel for women.

Women-owned and household enterprises become more productive by supporting finance, skills and markets.

VII.VII. Maintain Agricultural Support

Agriculture remains the main employment source. Therefore, small-industry development should complement agriculture rather than replace it.

Building a **diversified rural economy** is the most suitable approach where agriculture and non-farm activities support each other.

VIII. LIMITATIONS OF THE STUDY

This study has several limitations.

First, the main employment data are from **2011**. Therefore, the findings describe a historical employment structure and should not be treated as current district employment figures.

Second, the study measures **occupational dependence**, not household income dependence. It does not show how much household income comes from agriculture.

Third, household-industry employment is only a **narrow proxy for small-industry activity**. It does not cover every micro, small or informal enterprise.

Fourth, the data are district-level and cross-sectional. Individual workers moved from agriculture into small industries are not shown by them.

Therefore, a causal relationship between small industries and reduced agricultural dependence is not established by the study.

Further, village-level data or household surveys can be used for future research. Income, employment days, migration, enterprise participation and poverty can be examined using this research.

IX. CONCLUSION

This study examined whether small industries can reduce dependence on agriculture in West Champaran, Bihar.

The results show that agriculture remained the dominant source of main-worker employment in 2011. **619,886 of 797,544 main workers, or 77.72%, were cultivators or agricultural labourers.**

Household industries employed **19,043 workers**. They represented **2.39% of all main workers** and **10.72% of non-agricultural main workers**.

Therefore, a **complementary approach is supported** by the findings. Agriculture should continue to be strengthened while rural enterprises are expanded.

Small enterprises can grow using better finance, skills, infrastructure and market access. Stronger links between agriculture and local industry can be created using agro- processing.

The gender results are also important. Female workers had higher. The agricultural occupational dependence in female workers is higher than male workers.

Overall, agricultural dependence of small industries cannot be solved on their own. But additional employment and income opportunities can be provided by them. A more diversified rural economy in West Champaran can be supported by their gradual expansion.

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