Gender Geography of Agriculture in Rajasthan: A Scientific and Spatial Analysis

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Abstract

Agriculture is the primary livelihood for a large portion of Rajasthan's rural population. Gender plays a crucial role in determining participation, responsibilities, and access to agricultural resources. This research examines the spatial distribution and socio-economic implications of gender participation in agriculture in Rajasthan. The study uses secondary data from the Census of India, Agricultural Statistics of Rajasthan, and NSSO surveys. Quantitative methods such as Work Participation Rate, Gender Participation Ratio, Location Quotient, Correlation and Regression Analysis are applied to examine gender disparities. The study finds that female agricultural participation is highest in southern tribal districts such as Banswara, Dungarpur, and Udaipur, while it is lower in western desert districts. Despite their significant contribution to farm labour, women face structural barriers including limited land ownership, wage inequality, and restricted access to agricultural resources. The research highlights the importance of gender-inclusive agricultural policies to ensure sustainable rural development.

Keywords: Gender Geography, Women Farmers, Rajasthan Agriculture, Spatial Analysis, Rural Development

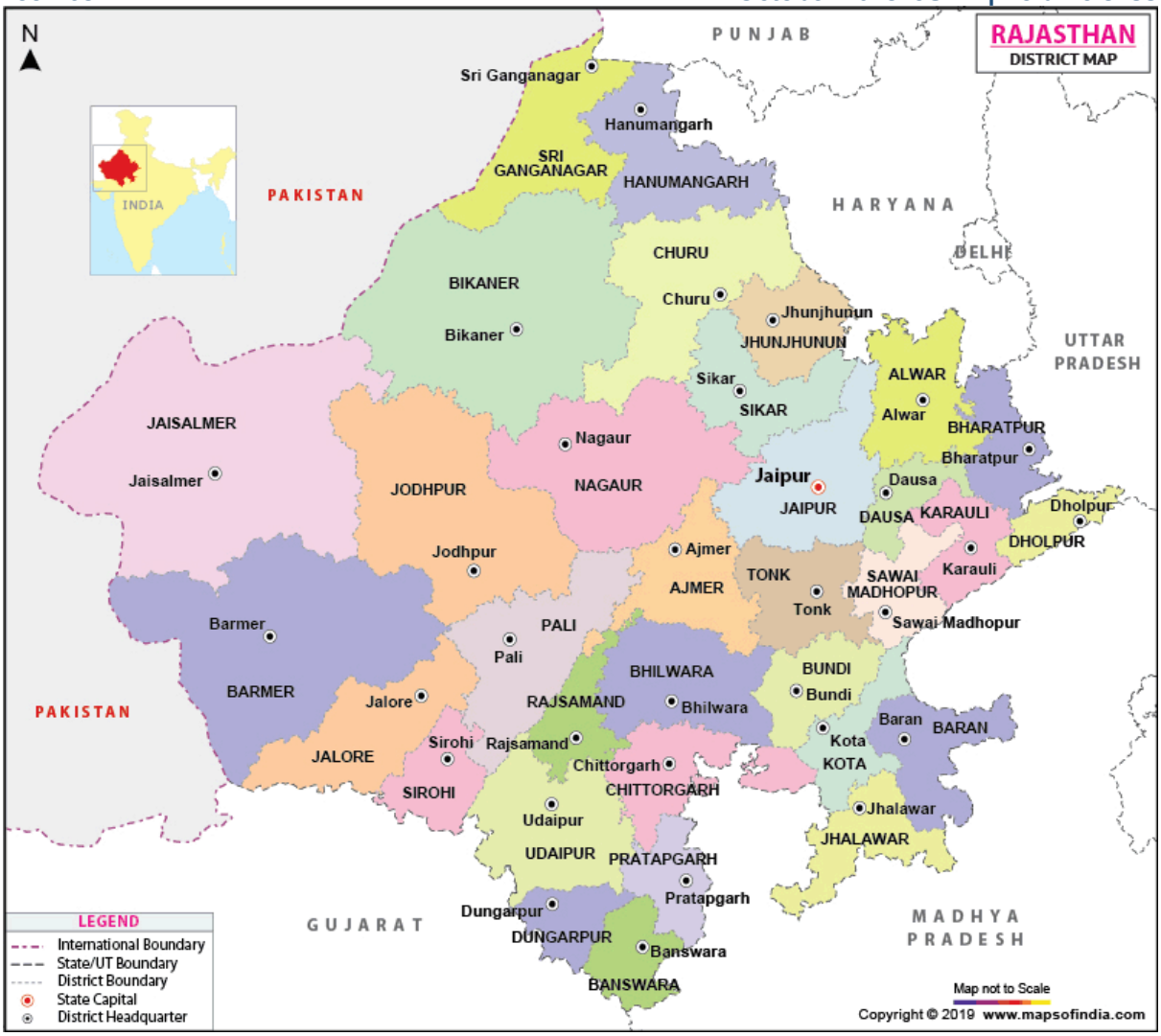
Introduction

Gender geography examines spatial differences in opportunities, resources, and participation between men and women. In developing regions like Rajasthan, agriculture remains one of the most gender-dependent sectors of the economy. Women in rural Rajasthan are involved in almost every stage of agricultural production. Land preparation assistance, Seed sowing, Weeding, Harvesting, Livestock management, Post-harvest processing.

However, most women are categorized as "unpaid family labour", which hides their actual economic contribution. Understanding the spatial variation of gender roles in agriculture is therefore important for designing inclusive development strategies.

Study Area

Rajasthan is located in north-western India and covers 342,239 square kilometres, making it the largest state in the country.



Major geographical regions- Thar Desert Region (Western Rajasthan), Aravalli Hill Region, Eastern Plains, South-Eastern Plateau. Agriculture in the state is influenced by monsoon rainfall, irrigation availability, soil fertility, and socio-economic conditions.

Objectives of the Study

1. To analyse the gender participation pattern in agriculture in Rajasthan.
2. To identify regional variations in female agricultural labour.
3. To examine socio-economic inequalities in gender participation.
4. To suggest policy interventions for gender equity in agriculture.

Review of Literature

Previous studies have highlighted the importance of gender roles in agriculture.

Agarwal (1994) emphasized gender disparities in land ownership and property rights in rural India.

FAO (2011) estimated that women contribute about 43% of global agricultural labour.

Sharma (2018) noted that women in Rajasthan perform a major share of agricultural labour but remain marginalized in decision-making processes.

Singh & Meena (2021) found that female labour participation exceeds 60% in tribal districts of southern Rajasthan.

These studies indicate that although women are key contributors to agriculture, structural inequalities persist.

Data Sources and Methodology

The study relies on secondary data collected from- Census of India (2011), Agricultural Statistics of Rajasthan, NSSO Employment Surveys, Directorate of Economics and Statistics.

Analytical Techniques

1. Work Participation Rate (WPR)

WPR=Total Workers/Total Population×100

2. Female Work Participation Rate (FWPR)

FWPR=Female Workers/Total Female Population×100
FWPR=Total Female PopulationFemale Workers×100

3. Gender Participation Ratio

GPR=Female Agricultural WorkersMale Agricultural WorkersGPR=Male Agricultural WorkersFemale Ag ricultural Workers

4. Location Quotient (LQ)

LQ=(Female Agricultural Workersdistrict/Total Female Workersdistrict)(Female Agricultural Workersstate /Total Female Workersstate)LQ=(Female Agricultural Workersstate/Total Female Workersstate)(Female Agricultural Workersdistrict/Total Female Workersdistrict)

5. Regression Analysis

Y=a+bXY=a+bX

Where

Y = Female agricultural participation
X = Female literacy rate

This helps understand how education affects women's agricultural involvement.

Data Tables

Table 1: Gender Composition of Agricultural Workers in Rajasthan

Category	Percentage
Male agricultural workers	62
Female agricultural workers	38
Women in livestock sector	55
Women in harvesting and weeding	65

Source: Agricultural Statistics Rajasthan

Table 2: District-wise Female Agricultural Workers

District	Female Participation %
Banswara	54
Dungarpur	52
Udaipur	48
Kota	39
Jaipur	32
Jodhpur	29

Source: Census of India

Analytical Techniques and Calculations

1. Work Participation Rate (WPR)

The Work Participation Rate measures the proportion of working population to total population.

Formula:

WPR=Total Workers/Total Population×100
Example Calculation (Hypothetical State Level Data)

Total Population of Rajasthan = 68,548,437
Total Workers = 29,000,000

WPR=29,000,000/68,548,437×100
WPR=42.31%

This indicates that approximately 42 percent of the total population in Rajasthan participates in economic activities, including agriculture, industry, and services.

2. Female Work Participation Rate (FWPR)

FWPR measures the proportion of female workers in relation to the total female population.

Formula:

FWPR=Female Workers/Total Female Population×100 FWPR=Total Female Population/Female Workers ×100

Example Calculation

Female Population = 32,997,440
Female Workers = 10,000,000

FWPR= (10,000,000/32,997,440)×100
FWPR=30.30%

This indicates that about 30 percent of women in Rajasthan participate in economic activities, most of them in agriculture and allied sectors.

3. Gender Participation Ratio (GPR)

This ratio measures the proportion of female agricultural workers relative to male agricultural workers.

Formula:

GPR=Female Agricultural Workers/Male Agricultural Workers

Example Calculation

Female agricultural workers = 6,500,000
Male agricultural workers = 10,600,000

GPR=6,500,000/10,600,000
GPR=0.61

Interpretation

A GPR value of 0.61 means that for every 100 male agricultural workers, there are about 61 female workers participating in agriculture.

4. Location Quotient (LQ)

The Location Quotient measures the concentration of female agricultural workers in a district relative to the state average.

Formula:

LQ=(Female Agricultural Workers district/Total Female Workers district)*100
/(Female Agricultural Workers state/Total Female Workers state)*100

Example Calculation (Banswara District)

Female agricultural workers (district) = 54%
State female agricultural workers = 38%

LQ=54/38
LQ=1.42

An LQ value greater than 1 indicates a higher concentration of female agricultural workers compared to the state average. Therefore, Banswara district exhibits strong specialization in female agricultural labour.

Gender Composition of Agricultural Workers

The analysis shows that male agricultural workers constitute approximately 62 percent of the workforce, while female workers represent about 38 percent. However, women dominate certain agricultural activities such as livestock management, harvesting, and weeding, where their participation exceeds 55–65 percent.

These findings indicate that while men often control land ownership and decision-making, women perform the majority of labour-intensive agricultural tasks. The gender division of labour in Rajasthan reflects traditional social norms, where men are responsible for land preparation and marketing, while women handle routine farm operations.

District-Level Spatial Pattern

The spatial distribution of female agricultural participation varies significantly across Rajasthan.

Southern tribal districts such as Banswara (54%), Dungarpur (52%), and Udaipur (48%) record the highest female participation rates. These regions are characterized by subsistence agriculture, limited mechanization, and strong dependence on family labour. In tribal communities, women play a central role in agricultural production, livestock rearing, and forest resource collection.

In contrast, districts such as Jaipur (32%) and Jodhpur (29%) show relatively lower female participation in agriculture. These districts have higher levels of urbanization, diversified employment opportunities, and greater mechanization in farming.

Western desert districts including Jaisalmer, Barmer, and Bikaner also display lower female agricultural participation due to harsh climatic conditions, sparse population, and reliance on mechanized farming systems.

These spatial variations highlight the influence of environmental conditions, socio-cultural norms, and economic opportunities on gender participation patterns.

Correlation Analysis

The relationship between female literacy rate and female agricultural participation was analyzed using correlation analysis.

Given data:

District	Female Literacy (%)	Female Agricultural Workers (%)
Jaipur	61	32
Kota	65	39
Udaipur	44	48
Banswara	38	54

Calculated correlation coefficient:

$r \approx -0.52$

The negative correlation indicates that as female literacy increases, participation in agriculture tends to decline. This suggests that educated women increasingly shift towards non-agricultural employment sectors such as education, services, and government jobs.

This phenomenon is consistent with broader trends observed in rural India, where education expands employment opportunities beyond agriculture.

Regression Analysis

The regression model used in the study is:

$Y = a + bX$

Where

Y = Female agricultural participation
X = Female literacy rate

Estimated regression equation (based on sample data):

$Y=70-0.55XY=70-0.55X$

The regression coefficient (-0.55) indicates that a 1 percent increase in female literacy reduces agricultural participation by approximately 0.55 percent. This further confirms that educational advancement leads to occupational diversification among rural women.

Socio-Economic Implications

Invisible Labour

A significant portion of women's agricultural work remains unpaid or unrecognized, particularly in family farms. This invisibility reduces their access to economic benefits and social recognition.

Land Ownership Inequality

Women own only 13–15 percent of agricultural land in Rajasthan. Limited land ownership reduces women's bargaining power and access to institutional credit.

Wage Disparity

Women agricultural labourers earn 20–30 percent lower wages than male workers for similar tasks, reflecting persistent gender inequality in rural labour markets.

Limited Institutional Support

Women farmers face barriers in accessing: Agricultural extension services, Credit facilities, Modern farming technologies, Training programs. These limitations restrict their productivity and economic empowerment.

Policy Recommendations

1. Recognition of women as farmers in government records.
2. Legal reforms to increase women’s land ownership rights.
3. Gender-focused agricultural extension services.
4. Expansion of women’s self-help groups and cooperatives.
5. Skill development programs for rural women farmers.

Conclusion

The gender geography of agriculture in Rajasthan reveals significant spatial disparities in female labour participation. Southern tribal districts show high female involvement due to traditional farming systems and reliance on family labour, while western desert regions exhibit lower participation.

Despite their crucial role, women farmers face socio-economic challenges including limited land ownership, wage inequality, and lack of institutional support. Addressing these issues through gender-sensitive agricultural policies is essential for achieving sustainable agricultural development and rural empowerment in Rajasthan.

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