



Role of Women of Farmers' Families in Primary Activity, Especially in Agricultural Activity: A Study of Ghatal Sub-Division, Paschim Medinipur, West Bengal

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Abstract: *Agriculture is a primary economic activity, and those involved in this work are called red-collar workers. In developing countries, the majority of the population is engaged in agriculture. Since India is a developing country, most of its people are also involved in agricultural activities. The present study area is the Ghatal subdivision, which is located in the West Medinipur district. This subdivision is highly advanced in agriculture, and agricultural production is supplied to various cities of West Bengal, including Kolkata. The rural and marginalised people of the Ghatal subdivision are engaged in agriculture as their profession. In farming families, it is observed that women, alongside men, are also involved in this work. Along with raising children, they are taking up agricultural work to increase the family's financial stability, and this trend is visible throughout the Ghatal subdivision. The survey revealed that 79 percent of women in farming families are directly or indirectly associated with agriculture. They play an active role in all areas, including sowing seeds, weeding, harvesting, and selling produce. The presence of women as vendors in rural vegetable markets is particularly noteworthy. This study also highlights the various reasons why women from farming families in this subdivision are engaging in agricultural work. A regression model has been used to understand the main cause to engage in agricultural activity. Additionally, indicators such as cropping intensity have been used to demonstrate that this area is agriculturally advanced.*

Key Words: *Agriculture, Cropping Intensity, Women Role in Agriculture, Regression Analysis.*

1. Introduction: Agriculture was the first step in the expansion of modern civilisation. Humans were settled by this activity rather than being vagrants. In the modern era, agriculture not only make out cultivation, but also it includes animal rearing, dairy production, afforestation, irrigation, restraints of pesticides and insecticides, etc. This economic activity is known as a primary activity. People who are engaged in this activity are known as red-collar workers. Women are recognised globally as the backbone of rural economies, providing essential labour that secures food sovereignty and sustains community livelihoods. Despite their critical contributions, these labourers frequently contend with systemic inequities, including restricted access to land, credit, and technological resources (Salunke et al., 2025). In the Ghatal Sub-Division of West Bengal, characterized by a fertile alluvial landscape and intensive cropping patterns, women are central to pre-harvest and post-harvest operations, yet their economic agency remains inadequately quantified. While existing literature highlights the significance of female labour in regions like

Maharashtra and Odisha, there is a notable research gap regarding the application of multi-regression models to isolate the socio-economic determinants of this workforce participation in the Ghatal context (Bhujbal et al., 2025; Parida, 2025). This study addresses this empirical void by quantifying the influence of diverse factors—ranging from household income to educational attainment—on the intensity of women’s involvement in local farm activities (Ray & Debnath, 2020). Furthermore, this analytical approach provides a robust statistical baseline to evaluate how specific variables, such as farm size and educational level, drive the degree of agricultural engagement among the local female population (Kaliravna & Godrara, 2023). This research specifically interrogates how the interplay between demographic factors and economic necessity shapes labour allocation patterns, mirroring the multi-regression approaches utilized to understand female labour dynamics in other agrarian systems (Adawiah et al., 2023), (Mohiuddin et al., 2020). Ultimately, this research fills the critical empirical void by synthesizing unit-level data to delineate the specific regressors—including age, marital status, and household land ownership—that exert a statistically significant impact on the intensity of female labor force participation within this specific agro-ecological zone (Bhattacharya & Dasgupta, 2025; Das, 2025).

2. Literature Review: Global literature consistently characterizes women as “invisible workers” who perform the majority of labour in production and post-harvest operations while facing significant systemic barriers, including restricted land ownership and limited decision-making agency (Maji et al., 2025; Nishi & Chowdhury, 2023). Within the context of South and Southeast Asia, this “feminization of agriculture” is often driven by shifting labour dynamics, yet it frequently lacks a corresponding increase in women’s autonomy regarding resource management (Oloo et al., 2023). In West Bengal, this pattern of under recognition persists despite the substantial contribution of women to the state’s agricultural productivity, where they comprise a significant share of the workforce yet often remain relegated to the status of marginal labourers (Maji et al., 2025; Patra, 2023). Empirical research in the state’s hill districts suggests that this participation is heavily contingent upon socio-demographic variables, including household landholding size, educational attainment, and the temporal commitment of male counterparts (Rai, 2018). Furthermore, specific studies on the South 24 Parganas district underscore that while women are central to the agrarian economy through continuous daily field engagement, they endure pervasive neglect concerning fair wage remuneration and social visibility (Mahato, 2023). Furthermore, research in West Bengal indicates that constraints such as inadequate knowledge of modern systems and the physical drudgery of traditional farming further restrict the potential for women to diversify their livelihoods effectively (Banerjee, 2024).

3. Objectives: The main objectives of the present study are-

- To discuss women’s engagement in specific agricultural activities in the study area.
- To discuss the major factors or determinants which are responsible for women’s engagement in agricultural activity.

4. Methodology: The Multi-Stage Sample have used in this study. Purposive sampling was used to determine the treatment or target group and control group, and simple random sampling was used for the household survey. 127 samples were collected in this study.

5. Study Area: The present study area is the Ghatal sub-division of Paschim Medinipur district. It consists of 5 blocks, such as Ghatal, Chandrakona - I, Chandrakona - II, Daspur - I & Daspur- II. The area of the Ghatal Sub-division is 974.44 sq kilometres.

6. Demography of the Ghatal Sub-Division:

Table: 1 - Block-wise Demographic Distribution of Ghatal Sub-Division

Block	Population	Male	Female	Sex Ratio	Literacy Rate (%)		Literacy Gap
					Male	Female	
Chandrakona- I	136006	96820	66186	948	75.59	64.48	11.11
Chandrakona-II	123269	63180	60089	951	72.94	61.67	11.27
Daspur- I	203987	103757	100230	966	80.74	68.25	12.49
Daspur- II	238529	121742	116787	959	77.91	67.42	10.49
Ghatal	219955	113119	106356	940	78.22	64.71	13.51

Source: Census of India, 2011

Sex Ratio, Literacy Rate & Literacy Gap – Calculated by the Author

Analysis of Result: The data presents a demographic and educational profile of five community development blocks—Chandrakona-I, Chandrakona-II, Daspur-I, Daspur-II, and Ghatal. While the first table provides population metrics, the second table starkly reveals the gender-based literacy gap within these regions. A comprehensive analysis uncovers a paradox: despite moderate overall literacy rates and a relatively balanced sex ratio, female literacy is alarmingly low, indicating deep-seated socio-cultural barriers. The blocks show significant variation in population, with Daspur-II being the most populous (238,529) and Chandrakona-II the least (123,269). The sex ratio is relatively balanced, ranging from 940 in Ghatal to 966 in Daspur-I. This suggests that female infant mortality or sex-selective practices are not as pronounced as in other parts of India, offering a seemingly positive demographic foundation. Literacy Achievement vs. Disparity: The overall literacy rates are moderate, with Daspur-I leading at 80.74% and Chandrakona-II trailing at 72.94%. However, the second table deconstructs these figures, revealing a profound gender gap. Male literacy rates are consistently high, ranging from 61.67% to 68.25%. In stark contrast, female literacy rates are disastrously low, hovering between 10.49% and 13.51%. The most striking finding is the extreme disconnect between the moderate overall literacy rate and the abysmal female literacy rate. This indicates that the “Literacy Rate (%)” in the first table is heavily skewed by male literacy, essentially representing a male-centric figure. For instance, in Ghatal, while the overall literacy is a respectable 78.22%, female literacy is a mere 13.51%. This implies that nearly 86% of women in Ghatal are illiterate, a reality masked by the aggregate data. The literacy gap is the defining feature of this data. It is most acute in Ghatal (where male literacy is 64.71% and female is 13.51%, a gap of 51.2 percentage points) and least severe, though still critical, in Daspur-II (a gap of 56.93 percentage points, calculated from 67.42% male vs. 10.49% female). This gap is not a minor discrepancy but a chasm, suggesting systemic exclusion of girls from education. Such a profound gender disparity in education has multi-generational consequences. It limits women’s economic independence, perpetuates cycles of poverty, and hampers overall community development. Educated mothers are more likely to educate their own children, so current low female literacy rates foreshadow continued educational challenges for future generations.

7. Intensive Agriculture of the Ghatal Sub-division: Crop Intensity is the ratio between gross cropped area and net sown area. Generally, it is expressed as a percentage value. It is used to understand the intensity of agriculture because, with this index, we can measure how frequently the same cultivable land is used during a year. I have used cropping intensity to determine the intensity of agriculture in the study area.

Table: 2 - Cropping Intensity of Ghatal Sub-Division

Block	Net Cultivated Area in Hector	Gross Cultivated Area in Hector	Cropping Intensity in Percentage
Chandrakona- I	17000	29827	175
Chandrakona-II	13100	22426	171
Daspur- I	13200	26026	197
Daspur- II	13000	25127	193
Ghatal	17900	34226	191

Source: District Human Development Report, 2010

Analysis of Result: The three metrics presented—Net Cultivated Area, Gross Cultivated Area, and Cropping Intensity—paint a comprehensive picture of both the scale and efficiency of agricultural practices in each region. Net Cultivated Area refers to the total physical expanse of land, measured in hectares, that is actually used for growing crops. It excludes land that is fallow, barren, or occupied by non-agricultural use like settlements or infrastructure. In this dataset, Ghatal block possesses the most extensive net cultivated area, totalling 17,900 hectares. This suggests that Ghatal has a larger geographical base dedicated to farming compared to its neighbours. Following Ghatal, Chandrakona-I has a net cultivated area of 17,000 hectares. The remaining three blocks—Chandrakona-II (13,100 ha), Daspur-I (13,200 ha), and Daspur-II (13,000 ha)—have remarkably similar and smaller net cultivated areas, indicating a comparable scale of available farmland. Gross Cultivated Area is a more dynamic figure. It represents the total sown area across all cropping seasons within a year. If a single hectare of land is used to grow two different crops in succession (e.g., a monsoon crop followed by a winter crop), it is counted twice in the gross cultivated area. Therefore, this metric reflects the total cropped area and the intensity of farming activity. Ghatal again leads with a gross cultivated area of 34,226 hectares, meaning its 17,900 net hectares are being utilized to their maximum potential. Chandrakona-I follows with 29,827 hectares, showing a significant jump from its net area. The most analytically valuable metric is Cropping Intensity, calculated as $(\text{Gross Cultivated Area} / \text{Net Cultivated Area}) * 100$. It is a key indicator of agricultural efficiency and land-use intensity. A figure exceeding 100% signifies that land is being cropped more than once a year. All five blocks demonstrate intensities well above the baseline, confirming the prevalence of multiple cropping practices, likely facilitated by irrigation and favourable growing conditions. The data reveals a clear dichotomy in agricultural intensification. The Daspur blocks exhibit the highest efficiency. Daspur-I tops the list with a cropping intensity of 197%, meaning its land is cultivated nearly twice over the course of a year. Daspur-II is a close second at 193%, and Ghatal is not far behind at 191%. This high intensity in the Daspur region suggests advanced farming systems, assured irrigation, and a focus on maximizing output from every available plot of land. Conversely, the Chandrakona blocks show comparatively lower cropping intensity. Chandrakona-I stands at 175%, while Chandrakona-II is the lowest in the group at 171%. While these figures still indicate multiple cropping, they are noticeably lower than their counterparts.

8. Role of Women of the Farmers Family in Agricultural Activity:

8.1. Engagement of Women in Agricultural Activity:

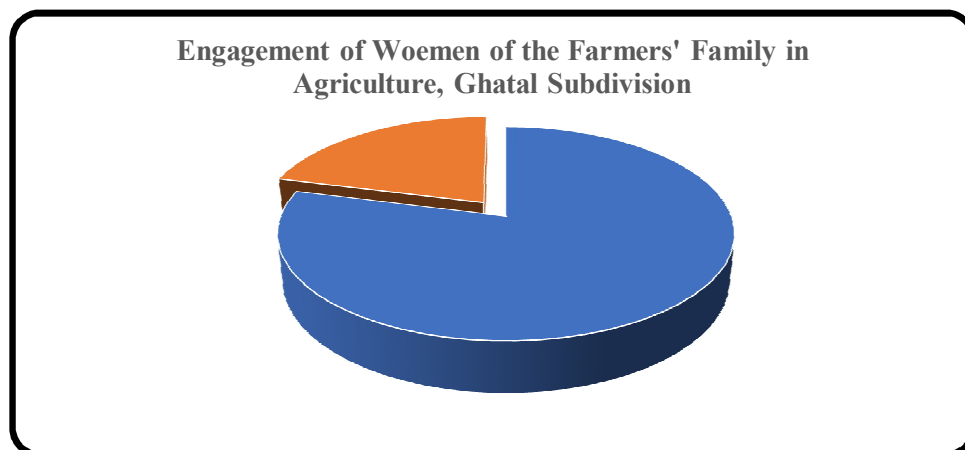


Fig. – 1

Analysis of Result: The figure presents the engagement of women from farmer families in agricultural activities in the Ghatal Subdivision. A total of 127 women were surveyed, of whom 100 women (79%) are actively involved in agriculture, while 27 women (21%) reported that they do not participate in agricultural work. The findings clearly indicate that a large majority of women contribute significantly to farming and allied activities. The high level of participation reflects the crucial role of women in sustaining agricultural production and supporting household livelihoods. Women are involved in a wide range of farm operations, including seed sowing, transplanting, weeding, irrigation, harvesting, threshing, storage of crops, livestock management, and post-harvest processing. Their labour not only supplements family income but also ensures the smooth functioning of agricultural activities throughout the farming season.

8.2. Engagement of Women in Specific Agricultural Activity:

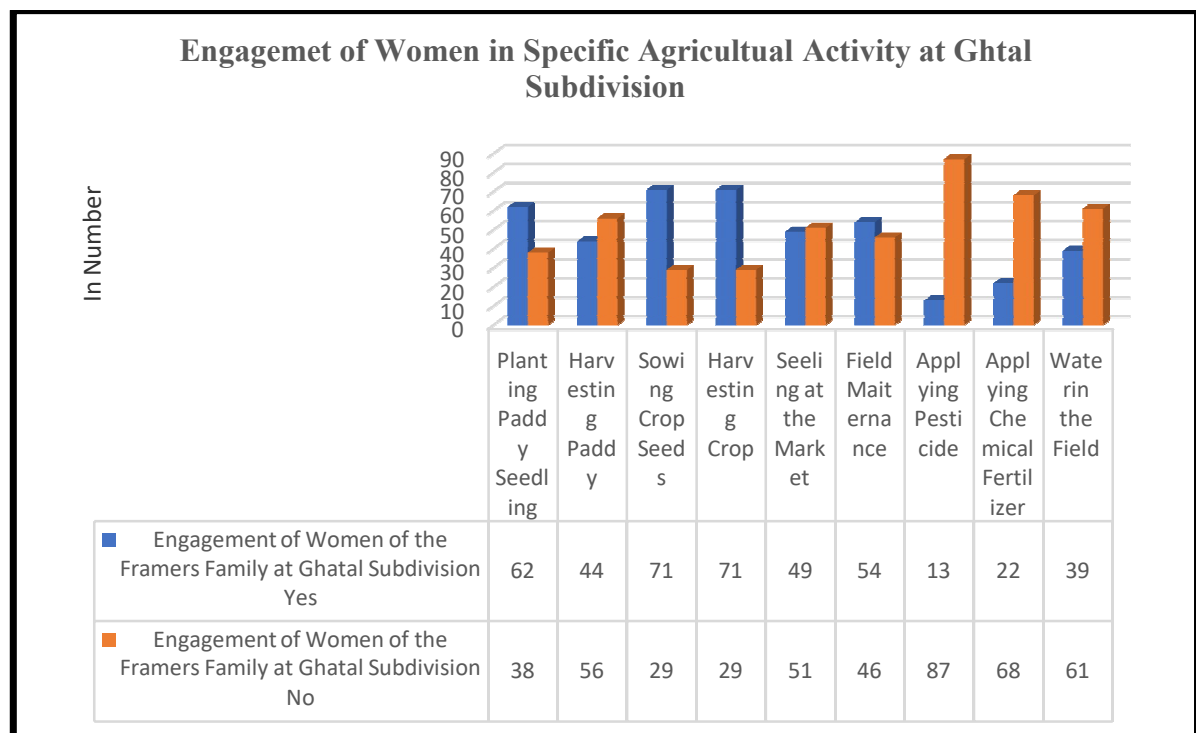


Fig. – 2

Analysis of Result: The figure illustrates the engagement of women from farmers' families in different agricultural activities in the Ghatal Subdivision. The data are based on responses from 100 respondents, with the figures representing the percentage of women participating ("Yes") and not participating ("No") in each activity. The findings clearly demonstrate that women make significant contributions to agriculture, although their level of involvement varies across different farming operations.

The highest participation of women is found in sowing crop seeds (71%) and harvesting crops (71%), indicating that these are the primary agricultural activities performed by women. A considerable proportion of women also participate in planting paddy seedlings (62%), which is another labour-intensive task requiring patience and skill. More than half of the respondents (54%) reported women's involvement in field maintenance, while 49% stated that women take part in selling agricultural produce in the market. This suggests that women contribute not only to production but also, to some extent, to post-harvest marketing. In contrast, women are less involved in activities requiring technical expertise or involving greater physical and health risks. Only 13% of the respondents reported women's participation in applying pesticides, making it the least common activity among all categories. Similarly, 22% of women are involved in applying chemical fertilizers, and 39% participate in watering or irrigating fields. These activities are generally dominated by men due to the use of machinery, chemicals, and heavy physical work.

8.3.Factors of Women Engagement in Agricultural Activity: Agricultural activity depends on so many factors, but the human factor is one of them. Agricultural activity in developing nations mainly involves physical labour. Women's role is very significant in this regard. The women of the farmer's family are engaged in different types of agricultural activity, which I have already mentioned here. They have mentioned various causes for their engagement in agricultural activity. I have used multiple regression models to understand which factors or determinants are most important for the engagement of women in agricultural activity.

<i>Regression Statistics</i>							
Multiple R		0.955572885					
R Square		0.913119538					
Adjusted R Square		0.906493062					
Standard Error		0.126909487					
Observations		128					
	<i>df</i>	<i>SS</i>	<i>MS</i>		<i>F</i>		
Regression	9	19.97448989	2.21938777		137.7986653		
Residual	118	1.900510109	0.01610602				
Total	127	21.875					
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>
Intercept	2.427	0.076	31.904	7.3218E-60	2.276	2.578	2.276
Income of the	-0.151	0.015	-9.603	1.74946E-16	-0.182	-0.120	-0.182

Family							
Amount of Land	-0.099	0.016	-5.862	4.23992E-08	-0.133	-0.065	-0.133
Family Members	0.016	0.014	1.150	0.252361646	-0.012	0.046	-0.012
No of Working Members	-0.040	0.018	-2.120	0.03607477	-0.077	-0.002	-0.077
Edn. Qualification	-0.081	0.033	-2.400	0.017914451	-0.148	-0.014	-0.148
No of Children	0.031	0.017	1.823	0.070788206	-0.002	0.065	-0.002
Distance between Farm & Household	-0.082	0.021	-3.832	0.000204575	-0.125	-0.039	-0.125
House Type	-0.001	0.023	-0.061	0.950956787	-0.048	0.045	-0.048
Ration Card Types	0.017	0.009	1.803	0.073928027	-0.001	0.036	-0.001

Source: Calculated by the author, 2025

Analysis of Result: Here, the F value is 137.80 & standard error is 0.1269 of all observations. The R-squared value is 91.30%, which means the nine predictors explain the vast majority of the variance in the dependent variable. So, the multiple regression model is statistically significant, and the model is fit. The p-values of family income, amount of land, number of working members of the family, qualification, and distance between farm and house are statistically significant. On the other hand, the p-values of the number of family members, no of children, and house type is not statistically significant. Overall, the findings indicate that socioeconomic and farm-related variables such as income, landholding, working members, educational qualification, and farm-household distance are the major factors or determinants for engagement of women in agricultural activity in the study area. In contrast, household size, house type, number of children and ration card type do not affect women's engagement in agricultural activity.

9. Major Findings:

- Most of the women in the farmers' families are engaged in agricultural activity in the study area.
- Women have a significant role in agricultural production and marketing in the study area.
- Many factors, like the income of the family, landholding size, number of working members of the family, etc are the major causes or determinants of their engagement in agricultural activities.

10. Conclusion: The demographic analysis shows moderate sex ratios ranging from 940 to 966 females per 1,000 males, with Daspur-I recording the highest sex ratio (966) and Ghatal Block the lowest (940). Although literacy levels are relatively high, female literacy remains consistently lower than male literacy in all blocks, with literacy gaps ranging from 10.49% to 13.51%, indicating the need for greater educational opportunities for women. The cropping intensity analysis reveals that agriculture in the region is highly intensive, varying between 171% and 197%. Daspur-I records the highest cropping intensity (197%), reflecting better utilisation of cultivable land, while Chandrakona-II has the lowest (171%). This indicates that multiple cropping is widely practised, increasing the demand for agricultural labour, including women's

participation. The survey findings further demonstrate that women are actively engaged in labour-intensive farm operations such as paddy planting, sowing crop seeds, harvesting crops, field maintenance, and seedling preparation. However, their participation is comparatively low in activities requiring technical knowledge or involving higher risks, such as pesticide application and chemical fertiliser use, where men continue to dominate. Variables such as family income, landholding size, number of working members, educational qualification, and distance between the farm and household significantly influence women's involvement. On the other hand, family size, house type, number of children, and ration card type do not have a statistically significant effect. Overall, the findings confirm that women of farmers' family are indispensable contribution to agriculture in the Ghatal Sub-Division. Strengthening female education, improving access to agricultural training, technology, and institutional support will further enhance their productivity, empowerment, and contribution to sustainable agricultural development.

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