

Women in Agriculture: A Micro-Level Study on Women's Participation in Agricultural Work in Rohtak District of Haryana (India)

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Abstract: *Women equally take part in agricultural work, particularly in rural India, but they are mostly unpaid, unrecognized, and limited by economic and social constraints. This paper focuses on the amount of women's involvement in agricultural activities in the Rohtak district of Haryana and how the factors affect their involvement. This paper relies on primary data that will be gathered from 107 women who are involved in farming and associated practices in chosen villages in various blocks of the district. The patterns of participation and the role of different socio-economic factors are understood by means of descriptive analysis and a multiple linear regression model. The results reveal that the level of education, social category and size of landholding are the primary factors that determine the level of participation of women in agriculture. The effect is negative and significant implying that the more educated the women are, the less likely they are to engage in manual agricultural work as they seek better non-farming employment. There is a positive impact of social category, with women in Scheduled Castes and Other Backward Classes being more engaged in farm labor because of economic necessity and lack of alternative sources of livelihood. The size of land-holding also has a negative correlation, with women of small and marginal agriculture families more engaged in agricultural activities than those of large landholding families with hired labour, and commonly used machines. There is no significant impact on other factors like age, marital status, household size, distance to workplace, and per capita income. In general, the research findings indicate that the involvement of women in agriculture in Rohtak is a matter of need and not choice. The results imply that there should be policies to aid in skills development, access to resources and income-generating opportunities to enhance the role and well-being of women in agriculture.*

Keywords: Women's participation, Agriculture, Socio-economic factors, Rohtak district (Haryana) etc.

1. Introduction

Women have a significant and diversified role in agriculture which comprises a substantial part of the total world agricultural labor and makes significant contribution to the food production and rural livelihoods. The **FAO (2011)** notes that women make up approximately 43 percent of the total agricultural workforce in the world, and even more in the developing world. Females in India and a range of South Asian states also play an essential role in agricultural life, as they not only become cultivators and agricultural workers but also participate in other activities related to agriculture, such as livestock raising, horticulture, fisheries, poultry farming, and post-harvest (**Chaudhary, 2025; Mishra et al., 2022; Kumari and Roy, 2023**). Time-use research has repeatedly demonstrated that the responsibilities of women in the farm are predominantly labor-intensive, which include sowing, weeding and harvesting, in addition to a disproportionately high level of unpaid household and care work. Women have been experiencing structural inequalities although they are key players in essential performances. Women across the world are also less than 15 percent of the total agricultural land and tend to be relegated in the less-paid, seasonal, informal jobs contributing to the characterization of women as invisible farmers in policy and institutional settings (**FAO, 2011; Kumari and Roy, 2023**). Feminization of agriculture is being more pronounced with a rise in number of females operated farms in the developing and developed world, India, the United States and Australia (**Mishra et al., 2022**). The women farmers will also have greater chances of developing sustainable and environment

friendly farming practices that are more resilient to climatic changes. Gender inequality at the agricultural workforce participation at region is evident in India. Micro-level researches indicate the high contribution of women in agricultural activities in India, where they do 60-75 percent of farm related activities like sowing, weeding, harvesting and post-harvest activities (**Seetha Lakshmi et al., 2017**). Though a majority of rural women are doing farming activities, the distribution of their work is not well spread among the various activities carried out in the farms, and some of the activities occurring in the farm have been socialized to be male dominated. The data given by **NSSO 68th Round (2012)** show that in Uttar Pradesh, female workers in agriculture are only about 17 percent (**Renu, 2023**). The participation of Scheduled Caste women and Scheduled Tribe women is high as compared to the General and Other Backward Classes. Participation is highly dependent on age, sources of household income, accumulation of land and education. Outside farm production, women also contribute within the value addition and agro-processing processes which is inversely related to education meaning with higher education they do not engage in farm work (**Renu, 2023**). The purpose of the study by **Kowsalya et al. (2017)** was to determine the attitude of 120 trained farm women in the Mandya district, Karnataka, to value-added products of ragi. The researchers discovered that 41.7 percent of the women had a highly positive attitude towards such products, and the attitudes were positively affected by innovative proneness, extension participation, extension contact, and mass media exposure. Rural women are currently being identified as major agents of agrarian

change in India in the wider national context. In India, agricultural production utilizes almost 80 percent of the rural women, and their empowerment is important in food security, the reduction of poverty, and sustainable development (Patel and Sethi, 2022).

BetiBhaoBetiPadhao, National Livelihoods Mission, PMKVY, PMEGP and PMMVY are some of the government programs to increase the access of women to education, skills, health and livelihood. Inclusive agricultural growth and the Sustainable Development Goals of 2030 still requires the assurance of women their land rights, access to credit and technology, and representation in decision-making processes to ensure their inclusion.

2. Objectives of the Study

The purpose of this study is to analyze the role of women in agriculture activities in the district of Rohtak, Haryana and to learn the socio-economic aspects that determine the role of women. It aims at laying out the major determinants of factors such as education, social group, land possession, and household attributes that facilitate women roles in farm work.

3. Hypotheses of the Study

According to the research objectives of the study, certain hypotheses have been established to analyze the issues that affect the involvement of women in agricultural activities. The null hypothesis in the first case is that age, education, marital status, and household size are socio-economic factors that are not of a significant effect on women in agricultural activities. The second null hypothesis is that there is no statistically significant influence of the size of landholding and per capita income on the participation of women in agriculture. However, contrary, the alternative hypothesis suggests that a set of socio-economic and demographic variables affect the involvement of women in agricultural activities significantly.

4. Data Source

The current research is founded on primary data that was gathered by way of field survey within the chosen villages of Rohtak district of Haryana. The respondents who participated in the study were 107 females that were actively involved in the agricultural activities. The respondents representing various socio-economic classes were provided to make sure that there was sufficient variation and representativeness. The survey was conducted in various blocks and villages of the district. The villages under each block are the following: Jassia of **Rohtak Block**; Nonand and GarhiSampla of **Sampla Block**; Lakan Majra and Gughaheri of **LakanMajra Block**; Nigana of **Kalanaur Block**; and Bhainisurjan and Bharan of **Meham Block**. The choice of villages across various blocks was meant to reflect the regional variation in terms of agricultural activities, as well as, the pattern of women participation. The respondents reflected the different age groups, social classes (Scheduled Castes, Other Backward Classes and Others), size of landholdings and were engaged in a large variety of agricultural practices which included cultivation, animal husbandry and other related activities. This heterogeneous

sample allowed fully evaluating the character and degree of the participation of women in the agricultural labor force and making significant conclusions about the socio-economic reasons that impacted it.

5. Methodology

The paper employed both **descriptive and econometric approach** to investigate the predictors of women involvement in farm activities in the Rohtak district in Haryana. The distribution of female workers in various agricultural activities and the socio-economic features of these workers was analyzed using descriptive statistics. To investigate the factors behind the extent of participation, an econometric model was used that is a multiple linear regression model.

5.1 Sampling and Data Collection

Field survey was used to gather primary data, based on the structured schedule/questionnaire which was specifically developed to be used in the study. The survey contained data on individual features, family background, farmland, earnings, and the type of engagement in several activities in agricultural processes. The researcher personally visited the farms and households of the chosen respondents and gathered their information through face to face interviews, making sure that there is clarity and reliability of responses. A total of sampled 107 female agricultural workers and cultivators were sampled across the various locations within the Rohtak district in various blocks and villages in year 2023-24. This stratification was selected arbitrarily and helped to reduce selection bias and offered representation of women who were involved in various agricultural activities within the district.

5.2 Data Processing and Analysis

The responses were subsequently coded, classified and tabulated systematically after data collection. The obtained processed data were analyzed at the initial stage with the help of descriptive statistics to evaluate the patterns of participation in various agricultural activities and social-economic communities. It was then followed by the implementation of multiple linear regression model to determine the most important factors that affected the participation of women in agriculture. Specification of **Regression Model**. Dependent variable in the regression model is the extent of women involvement in agricultural activities. These independent variables were age, education, marital status, social category, household size, distance to workplace, per capita income and landholding size. The trends and the extent to which this group of variables would influence the participation of women in agricultural work was calculated using the model. Such methodological approach allowed systematic and empirical evaluation of the socio-economic factors on the participation in the workforce in the agricultural sector by women in the study region.

6. Results and Discussion

Primary data used was in the form of a *multiple linear regression analysis* of the research carried out on the

participation of women in agricultural activities in the Haryana district of Rohtak using a population of 107 female agricultural workers and cultivators. The entire findings show that the model is an excellent explanation of the participation of women. The value of R^2 is 0.303 which indicates that the chosen socio-economic and demographic variables explain the agricultural labour of women by approximately 30 percent. The *F-statistic* is significant, which proves that the variables involved in the model have a

joint influence on the participation of women in agricultural operations.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.55
R Square	0.3032
Adjusted R Square	0.2463
Standard Error	12.899
Observations	107

ANOVA					
	df	SS	MS	F	Significance F
Regression	8	7097.5386	887.19232		
Residual	98	16306.218	166.38998	5.332006	1.45E-05
Total	106	23403.757			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	15.202	10.890	1.396	0.166	-6.409	36.814	-6.409	36.814
Age	-0.221	0.156	-1.417	0.160	-0.531	0.089	-0.531	0.089
Education	-3.361	0.940	-3.575	0.001	-5.226	-1.495	-5.226	-1.495
Marital Status	6.221	3.280	1.896	0.061	-0.289	12.730	-0.289	12.730
Social Category	9.740	4.229	2.303	0.023	1.347	18.133	1.347	18.133
Household Size	-0.044	1.115	-0.040	0.968	-2.258	2.169	-2.258	2.169
Distance	-0.108	1.181	-0.091	0.927	-2.451	2.235	-2.451	2.235
Per Capita Income	0.000	0.000	-0.885	0.378	0.000	0.000	0.000	0.000
Landholding	-0.621	0.261	-2.376	0.019	-1.140	-0.102	-1.140	-0.102

Source: Calculated by researcher from primary data

6.1 Effects of Ages and Marital Status

The age appeared to have a moderately negative influence on the involvement of women in agriculture in Rohtak district, which is not statistically significant. That is to say, the elderly women are rather less likely to participate in farm work, primarily, due to the fact that most of the activities related to agriculture such as plowing, planting, weeding, and harvesting are physically exhausting. Nonetheless, age alone does not have a powerful impact on the participation of a woman in farming. How much the rural households rely on the contribution of women is expressed by many, older women working in agriculture due to financial need, family duties and due to the unavailability of other types of jobs. The tendency is even the same in Uttar Pradesh, the more a woman is aged, the higher the stage of life and physical capabilities, the less likely she is to do farm work (**Renu, 2023**). Participation is positively influenced by marital status though insignificantly. Independent women tend to be more engaged in farming activities as compared to married women. This is a true picture of the rural life, where women who are married are sometimes used to supplement the income in the house particularly in small or marginal farms. Their work continues to extend past field labor to involve activities such as post-harvest processing, animal care and household food provisions.

These observations are supported by other studies. **Badodiya (2016)** established that age, as well as marital status, did not have a significant influence on the role of women in participating in agriculture, indicating that other variables (including education, land area, household earnings, and resources access) are more significant. Similar results were also established by **Mishra (2013)** and **Bhattacharjee (2015)** who indicated that age and marital

status by themselves are not very strong predictors of the extent to which women work on the farm.

6.2 Role of Education

Education turns out to be one of the most influential ones, in regards to women involvement in agriculture. This is because the regression analysis demonstrates a negative and statistically significant correlation between education and Rohtak district participation. This implies that with the level of education women are less involved in agricultural activities. Women with education will find it easier to either pursue non-agricultural working opportunities, or move to the urban areas in search of better working opportunities or pull out of work when they cannot find suitable farming jobs. This is one of the main issues of rural development that education raises the expectation and skills, but due to the lack of an equivalent job opportunity in agriculture, educated women tend to lose their interest in the sector and the educated women are unlikely to rise in the sector instead of staying in the sector. This trend has been reported in a number of studies in India. It is also a well-known fact that education is one of the most significant factors that determine the female involvement in agricultural activities. As a matter of fact, it is estimated that a 52-75% of the women in the country are involved in farming are illiterate a fact that speaks volumes to the reliance of the less-educated women on agricultural work as a source of livelihood (**Chowdhry, 1993; Tangka, Jabbar, and Shapiro, 2000**). **Waris, Nirmala, and Kumar (2016)** also identified an important negative relation between education and agricultural participation, which means that education can become a push factor out of low paid farming instead of a facilitator of acquisition of better agricultural jobs. These findings are proven by region-specific data. Indicatively, in

Uttar Pradesh, the **NSSO 68th round** indicates that 67% of women engaged in agriculture are illiterate and most literate women involved in farming have only primary education. The more a woman is educated, the less she is involved in the activities of the agricultural sector (**Renu, 2023**). This trend is more prominent in small and marginal farming families, where there are uneducated women who are still greatly engaged in the daily activities of the farm, such as sowing, weeding, harvesting, post-harvest farm processing, and animal farming. This trend has many implications. Although education can empower women and provide them with increased career opportunities, it also decreases the labor force in the conventional farming. Interventions which include skill training, facilitating mechanization, availing agribusiness opportunities as well as agribusiness value addition should be used with an aim of keeping educated women in agriculture. These programs can make agriculture a more desirable and viable source of livelihood among educated women and help in closing the gap between desire and access.

6.3 Impact of Social Category

The impact of social category has positive statistically significant influence on the participation of women in agriculture in Rohtak. The women who are members of Scheduled Castes (SC), Other Backward Classes (OBC) are more engaged in agricultural activities than the women who belong to more advantaged social categories, including the General category. To a great extent, this trend is economically necessitated and not a matter of choice. The lack of alternative jobs, the increased reliance on paid work, and less economic resources in households force women in poor social classes to participate more actively in farming activities. The relationship between caste differences and participation in labor in rural communities still exists with women in the lower strata mostly being focused on labor participating activities in rural societies. Evidence from Haryana shows that female participation is higher among lower-caste groups, reflecting persistent socio-economic inequalities (**Patel and Sethi, 2021**). On the same note, according to the **Government of India (2011)**, the lower caste groups are also disproportionately represented in the number of female agricultural workers. This trend is supported by NSSO 68th round data on the state of Uttar Pradesh. The lowest percentage of women with regard to their engagement in different agricultural activities is the women in the General category (3.1%), OBC women (6.26%), and the SC women (6.6%). On the whole, 54, 27, 15, and 3.6 percent of the total female workforce that is engaged in agricultural activities in the state pertains to the OBC, SC, General category, and Scheduled Tribes respectively (**Renu, 2023**). These statistics tell us clearly that women in disadvantaged social groupings take an unequal burden of agricultural work and this has been a reflection of the role of caste and socio-economic status in determining the labor participation of women in rural India.

6.4 Household size, distance and income

There is no statistically significant effect of household size, distance to the workplace, and per capita income on women participation in agriculture. The insignificance of the

household size indicates that the more the household size is expanded, the less the burden of work of women, as household labor increases, along with farm labor. **Firafis Haile (2016)** also noted that most of the female respondents lived in large households, which does not necessarily show that women with large households are less engaged in farm activities. Conversely, other research indicates that higher family size can also lead to more access to the male workforce in the family, which can cause the comparative reduced level of female participation according to **Mohiuddin et al. (2020)**. The distance to work place does not seem to influence participation since most of the agricultural activities are done in the village or fields nearby hence proximity is a factor that can be ignored. On the same note, per capita income has no strong impact on the participation meaning that even households with relatively high income still depend on women labour especially in family farms. This trend is supported by evidence of Uttar Pradesh, which demonstrates that the level of female participation grows with the size of small and medium households but decreases dramatically with large households due to a complex interaction between the availability of family labor and the size of households (**Renu, 2023**). On the whole, these results underscore the idea that although household factors might play a role towards the extent of agricultural participation of women, economic neediness and the need to labor on the farm are the ultimate factors of participation.

6.5 Effect of Landholding Size

The size of land that is owned by women is heavily negatively affecting the involvement of women in agriculture. The women in the families, who have more land are usually less engaged in manual farming, largely attributed to increased dependency on hired labor, increased mechanization as well as the social beliefs that women are not supposed to perform labor-intensive agricultural chores in comparatively well-endowed families. On the other hand, women of small and marginal landholding households are more actively involved in agricultural activities to cut down the cost of labor and complement household earnings. This trend can be supported by the evidence of Uttar Pradesh where the percentage is the highest in households with marginal (74.61%), small (12.66%), and medium (4.22%)-landholdings. It means that the size of landholding and the participation of women in agricultural work have an obvious inverse relationship (**Renu, 2023**). A comparable finding was made by **Waris et al. (2016)**, who further noted that there is a strong negative correlation between the size of landholding and women working in the farms.

7. Conclusion

This assessment of women and agricultural activities in Rohtak district of Haryana indicates that women have joined farming due to the necessity of earning a living, reliance of the family and social restrictions and not to personal choice or empowerment. The multiple regression result shows that socio-economic and demographic variables describe the difference of women participation to be about 30 percent, thus underscoring the multi-factorial nature of interactions in labor dynamics of rural areas. The important findings

indicate that the age factor has a minor negative but insignificant impact whereas marital status has a minor impact which is positive but does not have a strong influence on the participation. Education is a significant factor, with the increase in education level, women take part in labor-intensive agricultural activities to a much lower level, since educated women tend to find other jobs without the need to be on the farm or to abandon the job when no other choices exist. The social category is also very important, and women belonging to the Scheduled Castes and Other Backward Classes are more active as they are forced by economic factors and the absence of alternative sources of livelihood. There is no significant effect on household size, distance to workplace and per capita income, which shows that the factors do not have a strong impact on participation. Lastly, the size of landholding is also negative influencing factor, since women in large households depend more on hired work and mechanization, and women in small and marginal landholdings are still very active during the farm operations to generate the required family wages.

On the whole, the results highlight the idea that women in agriculture do not work because they are empowered or chose to work, but because of the necessity. The policies to boost the female participation should be directed to the increase of access to education related jobs, development of skills, support to mechanization, land rights, and the value added agricultural opportunities. These interventions may assist in changing agriculture into a more viable and more satisfying form of livelihood to women, especially those who are better educated or belong to a disadvantaged social group, and hence, close the gap in aspiration and opportunity in rural India.

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