

## Nature and Extent of Participation of Farm Women and their Economic Contribution in Agriculture - A Case Study in Hilly District of West Bengal

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### ABSTRACT

*Women play a significant and crucial role in agricultural development and allied fields. It is most unfortunate that the role of women and their contribution in farm activities are yet to be recognised. Although they perform almost all the activities in farm but by and large they have been remained as invisible workers. They are suppose to be considered the equal partner of their male counterpart, they are victim of gender biasness at their workplace. Considering the importance of detailed information regarding the level and extent of participation of women in agricultural activities in different agro-climatic situations, the present study has been conducted to study the level and extent of work performed by women in agriculture in the hill of West Bengal i.e. in three sub-division of Darjeeling district. A total of 300 farm women selected as respondents through probability proportion method of sampling. The selected respondents were interviewed personally using pre-tested well structured interview schedule. Participation of farm women in agriculture was significantly influenced by socio economic variables like family size, education of respondents, average family education, land holdings, material possession, personal cosmopolite, mass media exposure, social participation level of awareness, level of knowledge and level of skill.*

**Keywords:** Participation; Agricultural activities; Economic contribution; Correlation co-efficient;

**I**n India, women being considered as the invisible farmers are the backbone of the work force working at the farm sectors. Farm women play a significant and crucial role in agriculture and allied fields like crop production, livestock production, horticulture, post harvest operation, fisheries etc. The 2001 census data indicates that 38.9 per cent of women are working as agricultural labourers, 32.9 per cent as cultivators and 6.5 per cent as household industry workers. (*Primary Census Abstract: Census of India 2001*). It has been estimated that women represent 50 per cent of population and have contributed about 10 per cent of income and owe less than 1 per cent of world's property (*Badiger and Huilgol, 2004*). *Jamal, S et al. (2005)* found that women play a vital role in nation building and economic development, since they are 49.6 per cent of the total population of Pakistan. Their participation in agriculture is 75 per cent however, women participation in livestock is more visible than their participation in crop production.

Women in Asia play important roles in farming systems. Although they are visibly integrated into various production and income-earning activities as farm managers and wage labourers, consideration of their roles has not yet been integrated into research and into technology development. Studies in Indonesia, Philippines, and other Asian countries showed that women provide more than 30-50 per cent of the total labour in agriculture (*Sajogyo and Paris, 1989*). *Fabiyi, E.F et al. (2007)* showed that women were involved in all farm activities from land clearing to harvesting, processing and marketing of produce. *Zend, J.P et al. (2009)* observed that the activities such as weeding, cotton picking, dibbling etc. were solely performed by women. Women spent more than six hours per day in the field. They performed all agricultural tasks in traditional manner and were unaware of the new technologies. *Pattanaik, T (1994)* found that farm women are more involved in harvesting and storage of grain than in other agricultural activities, such as fertilizer and pesticide application and crop decision making.

*Rangnekar, S (1999)* estimated that 78 per cent of India's economically active women are involved in agriculture, 35 per cent as cultivators and 43 per cent as labourers.

Although women participate in agricultural largely but their extent of participation in different agricultural activities get influenced mostly by different socio-economic and socio-personal variables. *Pandey et al., (1988)* revealed that female labour employment was higher in small and medium farms. Female family labour decreased with increase in farm size. Factors positively related to rural female employment were size of operational holdings and percentage of cash crops to the total cropped area. *Olojede, J.C et al. (2007)* found that the occupation, farm size and level of expected income exerted positive and significant influence on agricultural production by women farmers. As farm size and level of expected farm income increased, the agricultural output also increased.

Beside their participation, the economic contribution of the women working in agriculture is also worth mentioning. But it is most unfortunate that the role played by women in agro-sector has not been highlighted and they have remained invisible workers. Over the years women participation are wrongly interpreted as economically inactive and they play only a supportive role in agro-sector as farmer's wives (*Samanta; 1977*). They also are the softest target at the work place of their male counterpart or their employer in terms of assigning most unglamorous task, giving them lower wage rate and many others. The situation is graver at disadvantaged agro climatic situations, like, hill areas, desert areas etc. Keeping this in view a study has been conducted in relation with women's participation in agriculture and their economic contribution in a disadvantaged agro climatic situation i.e. all three hilly sub-divisions of Darjeeling district of West Bengal.

The general objective of the present research work is to study the level and extent of women's participation and their economic contribution in agriculture. The specific objectives of the present study are :

1. To study the level and extent of participation and economic contribution of farm women working in Agriculture.
2. To ascertain the relationship between different socio-economic variables with the level of women participation in agriculture and their economic contribution

## METHODOLOGY

The study was conducted in the hilly district of West Bengal i.e., Darjeeling district to analyze the participation of farm women working in agriculture. For the study, all three sub-division under hilly tract of Darjeeling district of West Bengal, namely, Kurseong, Darjeeling and Kalimpong were selected. From each sub-division two blocks were randomly selected. Out of six blocks of three subdivisions two villages from each block were selected in consultation with the Block Office and local Panchayat in respect of their cropping pattern and active participation of the farm women in agriculture.

A sample of 300 farm women was selected from the pre-selected villages by following probability proportion method of sampling. The samples were taken on the basis of percentage of population of general caste, scheduled caste and scheduled tribe from cluster of two villages from each blocks in an equal proportion which is given below. The researcher had to take 2 per cent large category women farmers in the sample, but they were not found working in the field. So, these were taken from medium land holding group. The details of selection of samples of farm women are given in tabular form.

After having that sampling it was found that by selecting the respondents through probability proportion method taking into account a percentile distribution of social class i.e. general, SC and ST as well as taking into account the different farming categories like, Marginal, Small and Medium in the study district, the total number of sample respondents per Block were very less for the Small and Medium farming categories. For Small category the total sample per Block was 19 and for Medium it was only 13 (even after adding up 2 extra sample respondent in this group because of non availability of large category of respondents). This small number of sample is not suitable for analysis and fruitful generalisation of the results. Hence, for the present study both the small and medium category sample respondents were clubbed together under the nomenclature 'small – medium' for analysis and presentation of the results.

The main focus of the present research work is to ascertain level and extent of participation of farm women and their economic contribution in agriculture. The term 'participation' is conceived as active involvement of the individual in different activities by their physical presence in different agricultural activities. Exhaustive list of activities for agriculture was prepared for the purpose.

Pre-tested interview schedule was employed for collection of data. Percentile distribution, correlation and regression analyses were done for fruitful generalisation of results.

RESULTS AND DISCUSSION

The percentile distribution of respondent farm women against different broad activities of agriculture, mean participation level of respondent farm women in different study sub-divisions and result of chi-square analysis were given below.

*Participation of Farm Women in Agriculture:* The Table 1 depicts the level and extent of participation of sample farm women for all three sub-divisions and for both the farming categories against sixteen selected agricultural activities. In some of these activities such as, seed preservation, seed selection, seed preparation, seed treatment, nurserybed raising, manure and fertilizer application, topdressing of fertilizer and plant protection, less than 50% of the marginal farm women were found to have participated. In these agricultural activities, in case of marginal category respondents, as minimum as 10.4 per cent (for seed treatment/seed dressing at

Kurseong sub-division) and as maximum as 47.3 per cent (for processing of farm produce at Kalimpong sub-division) were found to have participated.

In case of plant protection activities, none of the respondents of both the categories were found to have participated. In case of other agricultural activities like, seed sowing, land preparation, uprooting of seedlings, bringing seedlings to the main fields, transplanting, intercultural operation and harvesting, more than 50 per cent of the marginal category respondents found to have participated. The table shows that as minimum as 52.2 per cent of the marginal farm women of kurseong sub-division participated in land preparation activities and as maximum as 80.2 per cent of Kalimpong sub-division participated in transplanting and intercultural operation.

When taking all the agricultural activities together the average participation of marginal farm women in different agricultural activities was found to be as minimum as 41.26 per cent in case of Kurseong sub-division and as maximum as 44.2 per cent in case of Kalimpong sub-division. No significant sub-division wise variation was found in this regards.

**Table 1. Nature of Participation of Farm Women in Agriculture**

Activities	Distribution of Respondents (%)							
	Kurseong		Darjeeling		Kalimpong		Total	
	Mar	Small-Med	Mar	Small-Med	Mar	Small-Med	Mar	Small-Med
	N=68	N=32	N=68	N=32	N=68	N=32	N=204	N=96
Seed preservation	22.4	35.0	21.4	38.2	26.4	41.2	23.4	38.1
Seed selection	34.4	46.2	33.5	44.2	30.8	44.5	32.9	45.0
Seed Preparation	34.4	46.2	33.5	44.2	30.8	47.5	33.0	44.6
Seed treatment, seed dressing	10.4	17.5	13.4	20.0	11.6	15.0	11.7	17.5
Nursery bed raising	15.0	47.5	19.7	43.6	18.6	49.5	17.8	49.2
Seed sowing	53.4	58.5	59.5	52.4	55.4	56.2	53.7	52.3
Land preparation	52.2	56.0	53.9	64.5	54.5	56.9	52.4	59.2
Uprooting of seedling	72.4	68.4	69.5	73.4	78.4	74.6	73.4	72.2
Bringing seedling to the main field	72.4	68.4	69.5	73.4	78.4	74.6	72.4	72.2
Transplanting	76.4	82.5	71.5	76.2	80.2	73.4	76.1	77.2
Manure and fertilizer application	21.7	52.5	26.2	58.9	28.8	63.4	25.6	58.4
Top dressing of fertilizer	18.7	52.5	22.2	55.9	26.8	60.4	22.5	53.0
Intercultural operation	76.4	82.5	71.5	76.2	80.2	73.4	76.1	77.2
Plant protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Harvesting	55.7	66.5	57.1	63.5	58.6	71.7	56.8	67.7
Processing of produce	44.4	52.3	39.6	56.2	47.3	55.6	50.1	54.7
Average participation (%)	41.26	52.0	41.3	52.5	44.2	53.6	42.3	52.4

In case of small-medium category, it was found that less than 50 per cent of respondents from all the sub-divisions participated in agricultural activities like seed preservation, seed selection, seed preparation, seed treatment, nursery bed raising etc. In these activities as minimum as 15 per cent of small-medium respondents of Kalimpong sub-division participated in seed treatment/seed dressing activities and as maximum as 49.5 per cent of the same sub-division participated in nursery bed raising.

In other agricultural activities except plant protection like, seed sowing, land preparation, uprooting of seedlings, bringing seedlings to the main field, transplanting, manure and fertilizer application, top dressing, intercultural operation, harvesting, more than 50 per cent of the small-medium category farm women found to have participated. It was found that as minimum as 52.3 per cent of small-medium respondents of Kurseong sub-division participated in processing of farm produce and as maximum as 82.5 per cent each has participated in transplanting and intercultural operation. When considering the average participation of small-medium respondents in all sixteen agricultural activities, it was found that as minimum as 52 per cent of the respondents of Kurseong sub-division and as maximum as 53.6 per cent of Kalimpong sub-division have actively participated. No significant sub-divisional difference was observed in this regards.

When taking individual activities into account, it was found that both marginal and small-medium respondents of all three study sub-divisions together participated most in case of transplanting and intercultural operation (76.1 % each for both activities for marginal and 77.2% each for both activities for small-medium respondents). The other activities in descending order of participation by the marginal respondents were uprooting seedlings (73.4%), bringing seedlings to main fields (76.1%), harvesting (56.8%),

seed sowing (53.7%), land preparation (52.4%) and processing of farm produce (50.1%).

The other activities except transplanting and intercultural operation in descending order of participation by the small-medium category respondent were uprooting of seedlings and bringing seedlings to main field (72.2% each), harvesting (66.7%), land preparation (59.2%), manure and fertilizer application (58.4%), processing of farm produce (54.7%), top dressing of fertilizer (53%) and seed sowing (52.3%).

Activitywise level of participation of farm women differed to some extent. Farm women might have preferences for some of the agricultural activities or they might have assigned some of the selected activities in which they have participated most.

*Level and Extent of Participation of Farm Women Working in Agriculture* : The Table 2 gives the result of level and extent of participation of women working in agriculture activities and their hours of participation per year. Sixteen agricultural activities such as seed preservation, seed selection, seed preparation, seed treatment, nursery bed raising, seed sowing, land preparation for main land, uprooting of seedling, bringing seedling to the main field, transplanting, manure and fertilizer application, top dressing of fertilizer, intercultural operation, plant protection, harvesting and processing of produce were considered for the purpose. From the table it can be observed that marginal farm women participated in as minimum as 8 agricultural activities and as maximum as 14 activities. These figures were 6 and 12 respectively in case of small-medium category. While taking both the category together the respondents were found participated as minimum as 6 and as maximum as 14 agricultural activities. The mean participation levels of respondent farm women of all these study sub-divisions were found more than 10 agricultural activities with a total mean of 10.42. From

**Table 2. Level and Extent of Participation of women working in Agriculture**

Variable	Range						Sub-Division		Mean	Total	$\chi^2$	Asym.
	Marginal		Small		Total		Mean					
	Min	Max	Min	Max	Min	Max	Kur.	Dar.				
Participation in Ag. (16 activities)	8	14	6	12	6	14	10.53	10.03	10.69	10.42	6.37	0.041
Duration of Participation in agricultural activities (hr/year)	1136	1520	1264	1568	1136	1568	1352	1380	1368	1366	5.73	0.057

the chi-square result it can be stated that there was no major sub-divisional variation in this case (*asymmetrical significant 0.041*).

From the table it can also be observed that the total annual hours of participation of sample farm women in sixteen (16) agricultural activities as mentioned above. This shows that marginal farm women participated for as minimum as 1136 hours annually in agricultural activities and as maximum as 1520 hours. These figures were 1264 and 1568 hours in case of small-medium category. While taking both the category together the respondent were found participated as minimum as 1136 hours annually and as maximum as 1568 hours in agricultural activities. The mean annual participation hours of respondent farm women were found to be more than 1350 in agricultural activities with a total mean of 1366 hours. From the chi-square result it can be stated that there was no major sub-divisional variation in this case (*asymmetrical significant 0.057*).

*Economic contribution of Farm Women in Agriculture:* The word ‘economic contribution’ is conceived as the annual income generated by the farm women themselves by participating in agriculture, as well as working as hired labour in the field of agriculture. The hours of participation of farm women was converted into ‘man days’ by dividing total hours of participation by 8 (as ‘man day’ is conceived as 8 hrs. of continuous work) to get the total man days of participation by farm women per year. Then the man days were multiplied with the government wage rate i.e. Rs. 120 per day resulted into total annual contribution of farm women. Based on the total annual income of the individual, the respondents were categorized under five levels of annual economic contribution, like, annual economic contribution of Rs. 2501 – Rs. 5000, Rs. 5001 – Rs. 10000, Rs. 10001 – Rs. 15000, Rs. 15001 – Rs. 20000 and Rs. 20001 & above.

**Table 3. Economic Contribution of Farm Women**

Income	Distribution of Respondents (N=300)			
	Marginal (N=204)		Small Medium (N=96)	
	No.	%	No.	%
2501-5000	0	0.0	0	0.0
5001-10000	0	0.0	0	0.0
10001 -15000	175	85.8	78	81.2
15001 - 20000	26	12.7	14	14.6
20001 & above	3	1.5	4	4.2

From Table 3 it can be observed that 85.8 per cent of marginal and 81.2 small-medium categories of farm women contributed to the tune of Rs. 10001 to Rs. 15000 annually through participating in different agricultural activities. Another 12.7 per cent of marginal farm women and 14.6 per cent of small-medium farm women contributed annually to the tune of Rs. 15001 – Rs. 20000 through their participation in different agricultural activities.

*Relationship Between Socio-economic Variables of Farm Women and their Participation in Agriculture :* Besides other parameters, participation in agricultural activities also depends on socio-economic-personal variables of individuals. To study relationship between the socio-economic variables of farm women and their participation in agricultural activities, correlation coefficient was calculated, in which ‘Age of the respondent’ ( $X_1$ ), ‘Family size’ ( $X_2$ ), ‘Education of respondent’ ( $X_3$ ), ‘Family educational status’ ( $X_4$ ), ‘Land holdings’ ( $X_5$ ), ‘Materials possession’ ( $X_6$ ), ‘Personal cosmopolitaness’ ( $X_7$ ), ‘Mass media exposure’ ( $X_8$ ), ‘Social participation’ ( $X_9$ ), Level of awareness ( $X_{10}$ ), Level of knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were taken as the independent variables. Total participation score regarding different agricultural activities of each respondent were taken as the dependent variable (Y). The total score of participation in agricultural activities of respondent farm women was calculated against 16 identified activities as mentioned above. Respondents were asked to mention whether they participate in the above stated agricultural activities in ‘Yes / No’ format with the corresponding score of 1 and 0. The total score obtained by individuals against sixteen agricultural activities was considered as the ‘participation score’ of the respondents.

The Table 4 presents the result of coefficient of correlation between the twelve independent variables with the dependent variable i.e. participation in agriculture ( $Y_7$ ). The table revealed that family size ( $X_2$ ) of marginal category was found to be negatively and significantly correlated with participation in agriculture at 5% level ( $r = 0.12552$ ). It was found insignificant in case of small-medium category and overall respondents.

Education ( $X_3$ ) of marginal and overall respondents were found to be significantly and positively correlated at 5% and 1% level ( $r = 0.13896$  and  $0.25058$  respectively) with participation in agriculture. It was found insignificant in case of small-medium category.

Significant and positive correlation at 1 per cent and 5 per cent level of significant were found for participation of marginal, small-medium and total respondents in agriculture with the independent variables like Family education status ( $X_4$  - where  $r = 0.21010$ ,  $0.16180$  &  $0.32482$  respectively), Land holding ( $X_5$  - where  $r = 0.23544$ ,  $0.41048$  &  $0.51778$  respectively), Materials possession ( $X_6$  - where  $r = 0.38745$ ,  $0.44241$  &  $0.51290$  respectively), Social participation ( $X_9$  - where  $r = 0.38308$ ,  $0.33481$  &  $0.44211$  respectively), Level of awareness ( $X_{10}$  - where  $r = 0.63211$ ,  $0.57002$  &  $0.68478$  respectively), Level of knowledge ( $X_{11}$  - where  $r = 0.73687$ ,  $0.77278$  &  $0.83291$  respectively) and level of skill ( $X_{12}$  - where  $r = 0.73572$ ,  $0.84932$  &  $0.85509$  respectively). Personal cosmopolitanness ( $X_7$  -  $r = 0.20237$ ) in case of small-medium category was found to be positively and significantly correlated with participation in agriculture at 1 per cent level. It was found insignificant in case of marginal and total respondents.

Mass media exposure ( $X_8$ ) was found to be positively and significantly correlated with participation in agriculture (Y) of small-medium and all respondents ( $r = 0.27708$  and  $0.31985$ ) respectively at 1 per cent level. It was found insignificant in case of marginal category.

Further a regression analysis was done taking farm women's participation in agriculture as the dependent variable and 'Age of the respondent' ( $X_1$ ), 'Family size'

( $X_2$ ), 'Education of respondent' ( $X_3$ ), 'Family educational status' ( $X_4$ ), 'Land holdings' ( $X_5$ ), 'Materials possession' ( $X_6$ ), 'Personal cosmopolitanness' ( $X_7$ ), 'Mass media exposure' ( $X_8$ ), 'Social participation' ( $X_9$ ), Level of awareness ( $X_{10}$ ), Level of knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) as the independent variables.

From the Table 5 it can be observed that Materials possession ( $X_6$ ), Mass media exposure ( $X_8$ ), Social participation ( $X_9$ ), Level of Knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be positively associated with participation in agricultural activities in case of marginal category farm women. This shows that materials possession, mass media exposure, social participation, level of knowledge and level of skill have significant relationship and positive influence with participation of farm women in agricultural activities.

In case of small-medium category, Family size ( $X_2$ ), Education of respondent ( $X_3$ ), Family educational status ( $X_4$ ), Land holding ( $X_5$ ), Materials possession ( $X_6$ ), Mass media exposure ( $X_8$ ), Social participation ( $X_9$ ), Level of Knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be significantly and positively associated with participation in agricultural activities. Socio-personal variables such as family size, education of respondent, family educational status, land holding, materials possession, mass media exposure, and social participation, level of knowledge and level of skill have significant relationship and positive influence with participation of farm women in agricultural activities.

The table further shows that Education of respondent ( $X_3$ ), Family educational status ( $X_4$ ), Land holding ( $X_5$ ), Social participation ( $X_9$ ), Level of awareness ( $X_{10}$ ), Level of Knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be significantly and positively associated with participation in agricultural activities for total respondent farm women. Socio-economic-personal variables such as education of respondent, family educational status, land holding, social participation, level of awareness, level of knowledge and level of skill have significant relationship and positive influence in participation in agricultural activities. The  $R^2$  value of the marginal, small-medium and total respondents were 0.8244, 0.8041 and 0.8172 respectively.

*Relationship between Socio-economic Variables of Farm Women and their Economic Contribution in Agriculture* : Besides other parameters, economic contribution also depends on some socio-economic-personal variables of individuals. To study relationship

**Table 4. Relationship between socio-economic variables of farm women and their Participation in Agriculture**

Variables	Participation in Agriculture (Y)		
	r Marg. (n=204)	r Small-Med (n=96)	r Total (N=300)
Age ( $X_1$ )	-0.03397	0.06063	0.01970
Family Size ( $X_2$ )	-0.12552*	-0.03696	-0.03745
Education Level ( $X_3$ )	0.13896*	0.09405	0.25058**
Family Edu. Status ( $X_4$ )	0.21010**	0.16180*	0.32482**
Land holding ( $X_5$ )	0.23544**	0.41048**	0.51778**
Materials Possession ( $X_6$ )	0.38745**	0.44241**	0.51290**
Cosmopolitanness ( $X_7$ )	0.01651	0.20237**	0.04904
Mass Media ( $X_8$ )	-0.08091	0.27708**	0.31985**
Social Participation ( $X_9$ )	0.38308**	0.33481**	0.44211**
Level of Awareness ( $X_{10}$ )	0.63211**	0.57002**	0.68478**
Level of Knowledge ( $X_{11}$ )	0.73687**	0.77278**	0.83291**
Level of Skill ( $X_{12}$ )	0.73572**	0.84932**	0.85509**

\*\*significant at 1%

\* significant at 5%

**Table 5. Multiple Linear Regression Analysis**

Variables	Marginal (N=204)			Small Medium (N=96)			Total (N=300)		
	Std. Error	t	Sig.	Std. Error	t	Sig.	Std. Error	t	Sig.
<i>Independent variables :</i>									
Intercept	3.49530	1.55	0.1241	3.83689	1.10	0.2755	1.34615	2.94	0.0036
Age(X <sub>1</sub> )	0.03361	-1.69*	-0.0926	0.02521	-1.71*	-0.0906	0.14007	-2.24*	-0.0493
FamilySize (X <sub>2</sub> )	0.14605	-0.57	0.5675	0.21206	1.66*	0.0998	0.14383	0.89	0.3741
Education of Respondents (X <sub>3</sub> )	0.11257	1.05	0.1814	0.18967	2.16*	0.0329	0.10562	2.60**	0.0074
Family educational status (X <sub>4</sub> )	0.38892	1.67	0.0961	0.27706	2.33*	0.0411	0.17132	3.38**	0.0054
Land holding (X <sub>5</sub> )	0.50707	-0.24	0.8087	0.29927	2.12*	0.0248	0.18105	2.07*	0.0214
Materials possession (X <sub>6</sub> )	0.19534	2.27*	0.0247	0.23487	2.58*	0.0231	0.11717	2.38*	0.0232
Cosmopolitaness (X <sub>7</sub> )	0.09766	-1.41	0.1595	0.12517	1.14	0.2588	0.12497	-0.30	0.7653
Mass Media (X <sub>8</sub> )	0.14812	2.35*	0.0201	0.19836	2.10*	0.0386	0.11691	1.98*	0.0453
Social Participation (X <sub>9</sub> )	0.34254	2.81**	0.0056	0.51861	1.96*	0.0433	0.28818	2.00*	0.0465
Level of Awareness (X <sub>10</sub> )	0.08306	1.90	0.0590	0.10066	-0.24	0.8145	0.06303	2.86**	0.0030
Level of Knowledge (X <sub>11</sub> )	0.06580	4.89**	<.0001	0.07854	4.17**	<.0001	0.04934	5.90**	<.0001
Level of Skill (X <sub>12</sub> )	0.06104	6.50**	<.0001	0.07102	7.60**	<.0001	0.04540	10.91**	<.0001
<i>Dependent Variable: Participation in Agril. activities (Y7)</i>									
Root MSE	2.13187	R <sup>2</sup> 0.8244		2.50494	R <sup>2</sup> 0.8041		2.41512	R <sup>2</sup> 0.8172	
Dependent Mean	19.93889	Adj R <sup>2</sup> 0.8047		24.60000	Adj R <sup>2</sup> 0.7692		21.80333	Adj R <sup>2</sup> 0.8055	
Coeff. Var.	10.69203			10.18269			11.07682		

\*\* Significant at 1%

\* Significant at 5%

**Table 6. Relationship between Socio-economic Variables of Farm Women and their Economic Contribution.**

Variables	Economic contribution (Y)		
	r Marg. (n=204)	r Small-Med (n=96)	r Total (N=300)
Age(X <sub>1</sub> )	0.02963	-0.00890	0.02860
FamilySize (X <sub>2</sub> )	0.03588	-0.03219	0.00820
Edu. Level (X <sub>3</sub> )	-0.02154	0.14316*	0.09256
Family Edu. Status (X <sub>4</sub> )	0.04550	0.21723**	0.18261**
Land holding (X <sub>5</sub> )	0.19959**	0.27515**	0.28554**
Materials possession (X <sub>6</sub> )	0.13376*	0.23316**	0.24821**
Cosmopolitaness (X <sub>7</sub> )	0.04468	0.03380	0.03035
Mass Media (X <sub>8</sub> )	0.05142	0.21934**	0.21740**
Social Participation (X <sub>9</sub> )	0.00506	0.21125**	0.16554**
Level of Awareness (X <sub>10</sub> )	0.02255	0.17920**	0.21315**
Level of Knowledge (X <sub>11</sub> )	0.07959	0.27293**	0.27411**
Level of Skill (X <sub>12</sub> )	0.32158**	0.25576**	0.36274**

\*\*significant at 1%

\* significant at 5%

between the socio-economic variables of farm women and their economic contribution, correlation coefficient was calculated, in which all above stated independent variables (X<sub>1</sub> – X<sub>12</sub>) were considered. Total economic

contribution of each respondent was taken as the dependent variable.

The Table 6 presents the result of coefficient of correlation between the twelve independent variables with the dependent variable economic contribution (Y). The table shows that education of respondents (X<sub>3</sub>) of small-medium category was found to be positively and significantly correlated with economic contribution at 5% level (r = 0.14316). It was found insignificant in case of marginal category and total respondents.

The table also shows that family educational status (X<sub>4</sub>), Mass media exposure (X<sub>8</sub>), social participation (X<sub>9</sub>), level of awareness (X<sub>10</sub>) and level of knowledge (X<sub>11</sub>) of small-medium category and total respondents were found to be significantly and positively correlated at 1% level (r = 0.21723 & 0.18261, 0.21934 & 0.21740, 0.21125 & 0.16554, 0.17920 & 0.21315 and 0.27293 & 0.27411 respectively) with economic contribution (Y). It was found insignificant in case of marginal category.

The table further revealed that land holding (X<sub>5</sub>), materials possession (X<sub>6</sub>) and level of skill (X<sub>12</sub>) of marginal, small-medium and total farm women were found to be significantly and positively correlated at 1% and 5% level (r = 0.19959, 0.27515 & 0.28554,

0.13376, 0.23316 & 0.24821 and 0.32158, 0.25576 & 0.36274) respectively with economic contribution (Y). Further a regression analysis was done taking Economic Contribution of farm women as the dependent variable and the same set of independent variables ( $X_1 - X_{12}$ ) were considered.

The Table 7 presents the result of multiple regressions which shows that Land holding ( $X_5$ ), Personal cosmopolitanism ( $X_7$ ), Level of awareness ( $X_{10}$ ), Level of knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be positively associated with economic contribution of farm women. On the other hand, land holding, personal cosmopolitanism, level of awareness, level of Knowledge and level of skill have significant relationship and positive influence on economic contribution of farm women.

In case of small-medium category, Family size ( $X_2$ ), Family educational status ( $X_4$ ), Land holding ( $X_5$ ), Materials possession ( $X_6$ ), Personal cosmopolitanism ( $X_7$ ), Social participation ( $X_9$ ), Level of awareness ( $X_{10}$ ), Level of knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be positively associated with economic contribution of farm women. The variables like, family size, family educational status, land holding, materials possession, personal cosmopolitanism, social

participation, level of awareness, level of knowledge and level of skill had significant relationship and positive influence on economic contribution of farm women.

The table further depicts that Family educational status ( $X_4$ ), Land holding ( $X_5$ ), Materials possession ( $X_6$ ), Personal cosmopolitanism ( $X_7$ ), Mass media ( $X_8$ ), Social participation ( $X_9$ ), Level of awareness ( $X_{10}$ ), Level of Knowledge ( $X_{11}$ ) and Level of skill ( $X_{12}$ ) were found to be positively associated with economic contribution of farm women. The variables like, family educational status, land holding, materials possession, personal cosmopolitanism, mass media, social participation, level of awareness, level of knowledge and level of skill have significant relationship and positive influence on economic contribution of farm women. The  $R^2$  value of the marginal, small-medium and overall respondents were 0.6839, 0.6851 and 0.6513 respectively

## CONCLUSION

From the present study it was revealed that farm women have participated to all the identified agricultural activities to a great extent irrespective of their different farming categories. It was found that farm women participated most in activities like transplanting and intercultural operation. The other major activities

**Table 7. Multiple Linear Regression Analysis**

Activities	Marginal (n=204)			Small-Medium (n=96)			Total (N=300)		
	Std. Error	t	Sig.	Std. Error	t	Sig.	Std. Error	t	Sig.
Intercept	2480.3608	3.93	0.0001	251.05294	4.81	<0001	906.59861	15.54	<0001
Age ( $X_1$ )	1.275663	0.36	0.7213	16.49233	-1.25	0.2129	94.33222	0.13	0.9004
Family Size ( $X_2$ )	103.63807	-0.04	0.9657	138.75416	1.93*	0.0567	96.86582	1.21	0.2275
Education Level ( $X_3$ )	79.88455	-1.47	0.1437	124.10091	0.53	0.5987	71.13165	0.69	0.4885
Family Edu. Status ( $X_4$ )	151.03500	0.61	0.5412	181.28312	1.92*	0.0574	113.11334	2.19*	0.0295
Land holding ( $X_5$ )	359.83045	2.02*	0.0111	195.81914	3.28**	0.0014	121.93528	2.74**	0.0066
Materials Possession ( $X_6$ )	138.61860	-0.25	0.7995	153.68013	2.75**	0.0072	78.90931	3.19**	0.0016
Cosmopolitanism ( $X_7$ )	69.30248	2.57*	0.0112	81.89944	3.87**	0.0002	84.16657	2.69**	0.0087
Mass Media ( $X_8$ )	105.10893	1.64	0.1036	129.78775	1.47	0.1451	76.02928	3.09**	0.0022
Social Participation ( $X_9$ )	243.07871	1.83*	0.0688	339.33062	2.20*	0.0454	173.87056	2.09*	0.0371
Level of Awareness ( $X_{10}$ )	58.93908	2.36*	0.0164	65.86346	2.08*	0.0359	42.45052	2.85**	0.0074
Level of Knowledge ( $X_{11}$ )	46.69044	2.62**	0.0066	51.38734	2.00*	0.0199	33.22995	2.11*	0.0270
Level of Skill ( $X_{12}$ )	43.31753	2.16*	0.0247	46.46805	2.99**	0.0051	30.57568	3.11**	0.0021
<i>Dependent Variable: Eco. contribution of women</i>									
Root MSE	1.51283509	R <sup>2</sup> -0.6839		1639.0176	R <sup>2</sup> -0.6851		1627.95631	R <sup>2</sup> -0.6513	
Dependent Mean	14.955	Adj R <sup>2</sup> -0.6538		15690	Adj R <sup>2</sup> -0.6755		15249	Adj R <sup>2</sup> -0.6333	
Coeff. Var.	10.11576			10.44648			10.67582		

\*\* Significant at 1% and \* Significant at 5%



performed by marginal farm women were uprooting of seedlings, bringing seedlings to the main field, harvesting, seed sowing, land preparation and processing of farm produce. For small-medium category of farm women the other major agricultural activities were bringing seedlings to the main fields, uprooting of seedlings, harvesting, land preparation, manure and fertilizer application, processing of farm produce and seed sowing. The results also revealed that the mean participation level of farm women were in more than 10 agricultural activities with a total mean of 10.42. It was also found that the total mean annual participation hour of respondent farm women was 1366 hours per year. 85.8 per cent of the marginal farm women and 81.2 per cent of small-medium farm women were found to have made

economic contribution to the tune of Rs. 10001 – Rs. 15000. The study also revealed that education of the respondents, family educational status, land holdings, materials possession, social participation, level of awareness, level of knowledge and level of skill had a positive and significant relationship with the extent of participation of agriculture. It was also found that family educational status, land holdings, materials possession, mass media exposure, social participation, level of awareness, level of knowledge and level of skill had positive and significant relationship with the economic contribution of farm women working in agriculture.

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