



## Research Article

# ASSESSING THE CAUSE-EFFECT MECHANISM OF PARTICIPATION OF FARM WOMEN IN AGRICULTURAL ACTIVITIES IN MADHYA PRADESH

SINGH SARITA<sup>1</sup>, CHOUHAN SANDEEP<sup>2\*</sup> AND SINGH S.R.K.<sup>3</sup>

<sup>1</sup>ICAR - Central Institute of Agricultural Engineering, Bhopal, 462038, Madhya Pradesh

<sup>2</sup>ICAR - Krishi Vigyan Kendra, Sehore, 462043, Madhya Pradesh

<sup>3</sup>ICAR-Agriculture Technological Application Research Institute, Adhartal, Jabalpur, 482004, Madhya Pradesh

\*Corresponding Author: Email-sandeep.chouhanmp@gmail.com

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**Abstract-** India is agrarian economy in which agriculture has been the main driving force for growth and gross domestic product of the country. For bringing equity and equality, participation of the work force is deciding factors for speed up the economic growth. 43 % of the world agricultural labour force is women and support for women can increase productivity and revenue by upto 20 percent. Ex-post-facto research design based study was conducted in Gwalior district of Madhya Pradesh. Total 200 farm women were selected randomly and data was collected by personal interview using a pre-tested interview schedule. Analyzed data revealed that according to mean score of the participation, harvesting had highest score (79.66) and ranked first followed by weeding (79.33), cleaning of grain (78.3), storage (76), sowing (75), winnowing (74.66), cleaning of field (72.66), thinning (72), grading (71), marketing (70.66), irrigation (69.33), spray of chemical (68.33), application of fertilizer (67.33), leveling of field (56.66) and ploughing of field (45). However, there was least participation of farm women in operations like ploughing (score 45.00), leveling of field (score 56.00), fertilizer application (score 67.33) and spray of chemicals (score 68.33). These operations were an exclusive domain of males in the area under study. On overall basis, about half (51%) of farm women had medium level of participation in agricultural activities. Data further revealed that these variables viz. education status, family size, family type, annual income, and economic motivation taken together explained the variation in participation of farm women in agricultural activities to the extent of 75.78 percent. The farm women are mostly associated with harvesting, weeding and cleaning of seed. Women had less participation in marketing. The study indicates the planners and policy makers for women empowerment should give a serious attention to the given aspects and make the suitable strategy for reducing the drudgery of the women in the more participated areas. This can result into the improving the work efficiency of the farm women which in turn may lead to the health of the households and society.

**Keywords-** Participation, Farm women, Rainfed, Agricultural activities, Cause-effect

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## Introduction

Agriculture is a driver of economic development and food security. Women make crucial contributions to the agricultural and rural wealth in all developing countries. The International Development Community has recognized that agriculture is an engine of growth and poverty reduction in countries where it is the main occupation of the poor [1]. Agriculture needs manpower, if the manpower split into gender wise, astounding fact is that the women contribution is greater or equal to men. As we know that, India is a developing country, having extensive and diverse rural sector and primarily agrarian socio-economic setup. Farming is mainly a family occupation in India. All most family members are acutely engaged in farming. The farming capabilities for taking appropriate and sound decisions by the farm families have a direct bearing on the agricultural development in country. This was a position in most of counties till recently and India is no exception. Majority of the population directly or indirectly depends on agriculture and it employs 50 per cent of the country's labor force. About more than 70 per cent of community living in rural areas, depends on farming. It also, provides raw material to factory and serve as market for industrial goods. Women play a major role in agriculture activities along with their family responsibilities and socio-cultural obligations.

Women are involved in various field operations as observed by Singh (2012), Kumar (2014), Singh (2013), Rajan (2013), Pandey (2012), Chouhan (2012) during their study on various aspects of the agricultural operations [4-9]. Pandey *et al.* (2012) [3] studied farmers' concern with the weeding and their socio-economic status i.e. cost included in the weeding along with the weeding efficiency under wheat cultivation is important for the sustaining the wheat production in the area.

## Materials and Methods

Gwalior district of Madhya Pradesh is selected for study. In this study Ex-post-facto research design was used. This design is appropriate because the phenomenon has already occurred [2]. In this study, total 200 farm women were selected randomly from 10 villages situated in two blocks namely Bhitwar and Morar. An interview-schedule was developed for getting the data from the selected farm women.

## Participation of farm women in agricultural activities:

In the present study, participation of farm women in agricultural activities was considered as a dependent variable and operationally defined as active

involvement of farm women in various agricultural activities on their farm.

For measuring the participation of farm women in agricultural operations, the important agricultural management practices of crop production was selected after consultation and discussion with the specialist of subject concerned and other experts. The extent of participation in agricultural activities by a farm woman was rated on the extent of a woman's participation in all of the selected 11 agricultural activities. Respondents were asked to what extent they were involved with these 11 agricultural activities. A 3-point rating scale was used to measure the extent of participation in agricultural activities by the women. They were asked the frequency of their participation is frequently, occasionally, and never. Points were awarded for each response, with sufficient scoring as the frequent to no participation (2, 1 and 0, respectively). A respondent's score could range from 0 to 33, where 0 indicated never participation and 33 indicated the highest participation in agricultural activities. Frequency counts of responses were also recorded to compute the Participation Index (PI) of a woman for each of the agricultural activities. Participation Index of agricultural activities was computed by using the following formula:

$$PI = (N_1 \times 2) + (N_2 \times 1) + (N_3 \times 0)$$

Where,

PI = Participation Index of agricultural activities

N<sub>1</sub> = Number of women who participate in the farm activity frequently

N<sub>2</sub> = Number of women who participate in the farm activity occasionally

N<sub>3</sub> = Number of women who never participate in the farm activity

Based on total scores, the respondents has been classified into three categories i.e. low, medium and high participation of farm women in agricultural activities by using mean and standard deviation as a measure of check. For collection of data semi structured interview schedule was prepared keeping in view the objectives of the study and selected variables.

## Results and Discussion

### Participation of farm women in agricultural activities:

A total number of fifteen different agricultural activities related to various stages of cultivation were indentified to study the extent of participation of farm women. Data in [Table-1] indicated that according to mean score of the participation, harvesting got highest score (79.66) and ranked first followed by weeding (79.33), cleaning of grain (78.3), storage (76), sowing (75), winnowing (74.66), cleaning of field (72.66), thinning (72), grading (71), marketing (70.66), irrigation (69.33), spray of chemical (68.33), application of fertilizer (67.33), leveling of field (56.66) and ploughing of field (45).

Data in [Table-1] also indicated that there was least participation of farm women in operations like ploughing, leveling of field, application fertilizer, spray of chemicals. These operations were an exclusive domain of males in the area under study. The farm women are found associated with harvesting, weeding and cleaning of seed. Women had less participation in marketing.

Data in [Table-1] also indicated the practices wise participation in agricultural activities.

In case of ploughing of field, majority (60%) of the farm women participated some time, whereas 36 per cent did not participate in ploughing of field while, only 9 per cent farm women were participated in ploughing of field.

Similarly, in case of cleaning of field, majority of the farm women (64%) participated some time, while 25 per cent of them did not participate in cleaning of field and only 13.5 per cent farm women were participated in cleaning of field.

Similarly, in case of leveling of field, majority of the farm women (65%) participated some time, whereas only 25 per cent farm women were participated in leveling of field, while 10 per cent of them did not participate in leveling of field.

In case of sowing majority (62.5%) of the farm women participated some time in sowing, whereas one fourth (25%) of them participated regularly, while only 15.5 per cent did not participate in sowing.

Similarly, in case of application of fertilizers, majority (65%) of the farm women were participated some time, while 18 per cent participated regularly and 17 per cent did not participate in application of fertilizers.

In case of weeding, majority (70%) of the farm women participated some time, while one fourth (24.5%) of them did not participate in weeding, whereas only 5.5 per cent farm women were participated in weeding.

In case of thinning, majority (64%) of the farm women participated some time, while 22 per cent of them did not participate in thinning whereas only 14 per cent farm women were participated in thinning.

Similarly, in case of irrigation, majority (62%) of the farm women were participated some time, while 21 per cent participated regularly and 17 per cent did not participate in irrigation.

Regarding spray of chemical, majority (64.5%) of the farm women were participated some time, while 19 per cent participated regularly and 16.5 per cent did not participate in spray of chemical.

In case of harvesting, majority (59.5%) of the farm women were participated some time, while 30 per cent participated regularly and 10.5 per cent did not participate in harvesting.

Regarding winnowing, majority (67%) of the farm women were participated some time, while 22.5 per cent participated regularly and 10.5 per cent did not participate in winnowing.

In case of cleaning of grain, majority (55.5%) the farm women were participated some time, while 31 per cent participated regularly and 13.5 per cent did not participate in cleaning of grain.

Similarly, in case of grading, majority (72.5%) of the farm women were participated some time, while 17.0 per cent participated regularly and 13 per cent did not participate in grading.

As regards the storage, majority (67%) the farm women were participated some time, while 23 per cent participated regularly and 12.5 per cent did not participate in storage.

Similarly, in case of marketing, majority (66%) the farm women were participated some time, while 20 per cent participated regularly and 14 per cent did not participate in marketing.

**Table-1** Participation of farm women in agricultural activities (n = 200)

| S. No. | Agricultural activities    | Participation |           |          | Mean Score | Rank |
|--------|----------------------------|---------------|-----------|----------|------------|------|
|        |                            | Regularly     | Some time | Never    |            |      |
| 1      | Ploughing of field         | 18(9)         | 120(60)   | 72(36)   | 45.00      | XV   |
| 2      | Cleaning of field          | 45(25.0)      | 128(64.0) | 27(13.5) | 72.66      | VII  |
| 3      | Leveling of field          | 20(10)        | 130(65)   | 50(25)   | 56.66      | XIV  |
| 4      | Sowing                     | 50(25.0)      | 125(62.5) | 25(12.5) | 75.00      | V    |
| 5      | Application of fertilizers | 36(18.0)      | 130(65.0) | 34(17.0) | 67.33      | XIII |
| 6      | Weeding                    | 49(24.5)      | 140(70)   | 11(5.5)  | 79.33      | II   |
| 7      | Thinning                   | 44(22.0)      | 128(64.0) | 28(14.0) | 72.00      | VIII |
| 8      | Irrigation                 | 42(21.0)      | 124(62.0) | 34(17.0) | 69.33      | XI   |
| 9      | Spray of chemical          | 38(19.0)      | 129(64.5) | 33(16.5) | 68.33      | XII  |
| 10     | Harvesting                 | 60(30.0)      | 119(59.5) | 21(10.5) | 79.66      | I    |
| 11     | Winnowing                  | 45(22.5)      | 134(67.0) | 21(10.5) | 74.66      | VI   |
| 12     | Cleaning of grain          | 62(31.0)      | 111(55.5) | 27(13.5) | 78.33      | III  |
| 13     | Grading                    | 34(17.0)      | 145(72.5) | 26(13.0) | 71.00      | IX   |
| 14     | Storage                    | 47(23.5)      | 134(67.0) | 25(12.5) | 76.00      | IV   |
| 15     | marketing                  | 40(20.0)      | 132(66.0) | 28(14.0) | 70.66      | X    |

Figures in parenthesis indicate percentage

### Level of participation of farm women in agricultural activities:

The data presented in [Table-2] indicated the distribution of respondents according to their level of participation in agricultural activities.

It is clear from data given in [Table-4] that out of the 200 farm women, about half (51%) of farm women had medium level of participation in agricultural activities, while 28 per cent had low and 21 per cent had high level of participation in agricultural activities.

### Correlation coefficient of selected socio-personal, economic, communication and psychological attributes of farm women with their participation in agricultural activities:

The coefficient of correlation of each of the socio-personal, economic,

communication and psychological variables with participation of farm women in agricultural activities have been furnished in [Table-3].

**Table-2** Distribution of farm women according to their level of participation in agriculture activities

| S.No. | Category            | Frequency | Percentage | Mean  | SD   |
|-------|---------------------|-----------|------------|-------|------|
| 1     | Low (< 30.29)       | 56        | 28.0       | 35.54 | 5.25 |
| 2     | Medium(30.29-40.79) | 102       | 51.0       |       |      |
| 3     | High(> 40.79)       | 42        | 21.0       |       |      |

It could be observed from [Table-3] that among 16 independent variables twelve variables viz. age, education status, family size, family type, annual income, mass media exposure, extension agency contact, extension participation, information seeking behaviour, level of knowledge, economic motivation and scientific orientation showed positive and significant relationship at 0.01 level of probability. However remaining variables viz. farm size, socio-political participation, material possession, and cosmopoliteness did not show any significant relationship with participation of farm women in agricultural activities.

**Table-3** Correlation between socio-personal, economic, communication and psychological characteristics of the farm women and their participation in agriculture activities

| S.No.                           | Characteristic                 | Correlation Coefficient "r" |
|---------------------------------|--------------------------------|-----------------------------|
| <b>A</b>                        |                                |                             |
| <b>Socio-Economic variables</b> |                                |                             |
| 1                               | Age                            | 0.2626**                    |
| 2                               | Educational Status             | 0.6599**                    |
| 3                               | Farm Size                      | 0.0825ns                    |
| 4                               | Family Size                    | 0.6995**                    |
| 5                               | Family Type                    | 0.4956**                    |
| 6                               | Annual income                  | 0.8298**                    |
| 7                               | Socio- Political Participation | 0.1225ns                    |
| 8                               | Material possession            | -0.0603ns                   |
| <b>B</b>                        |                                |                             |
| <b>Communication variables</b>  |                                |                             |
| 1                               | Mass media exposure            | 0.5792**                    |
| 2                               | Extension Agency contact       | 0.2300**                    |
| 3                               | Extension participation        | 0.4975**                    |
| 4                               | Cosmo politeness               | -0.0296 ns                  |
| 5                               | Information seeking behavior   | 0.2961**                    |
| <b>C</b>                        |                                |                             |
| <b>Psychological variables</b>  |                                |                             |
| 1                               | Level of knowledge             | 0.5638**                    |
| 2                               | Economic motivation            | 0.801**                     |
| 3                               | Scientific orientation         | 0.5971**                    |

\* Significant at 0.05 level of probability.

\*\* Significant at 0.01 level of probability.

#### Multiple regression analysis of socio-personal, economic, communication, and psychological attributes of farm women and their participation of agricultural activities:

Multiple regression analysis was carried out for determining the contribution of independent variables with participation of farm women in agricultural activities thus obtained, have been furnished in [Table-4].

The data presented in [Table-4] revealed that variables viz. farm size, family type, and extension participation has positive and highly significant contribution in participation of farm women while economic motivation has positive and significant contribution. However, remaining variables viz. age, farm size, socio-political participation, material possession, mass media exposure, extension agency contact, extension participation, cosmopoliteness, information seeking behaviour, level of knowledge did not show any significant contribution with participation of farm women in agricultural activities.

The analysis also indicated that the coefficient of determination ( $R^2$ ) of all the

independent variables was 0.7670. It indicated that 76.7 per cent of total variation in participation of farm women in agricultural activities was explained by the 16 independent variations. The F value was found to be highly significant.

**Table-4** Regression analysis of socio-personal, socio-economic, communication and psychological characteristics of the farm women and their participation in agriculture activities

| S.No. | Factor                  | Beta   | Percentile | Standard | t-value |
|-------|-------------------------|--------|------------|----------|---------|
| 1.    | Age                     | -0.003 | -0.100     | 0.024    | 0.069   |
| 2.    | Educational Status      | 0.148  | 12.717     | 0.177    | 2.780** |
| 3.    | Farm Size               | -0.003 | -0.031     | 0.104    | 0.076   |
| 4.    | Family Size             | 0.151  | 13.815     | 0.296    | 2.513** |
| 5.    | Family Type             | 0.131  | 8.467      | 0.504    | 2.858** |
| 6.    | Annual income           | 0.560  | 60.587     | 0.192    | 9.401** |
| 7.    | Socio- Political        | 0.001  | 0.015      | 0.051    | 0.024   |
| 8.    | Material possession     | -0.045 | 0.351      | 0.075    | 1.099   |
| 9.    | Mass media exposure     | 0.045  | -3.864     | 0.377    | 0.949   |
| 10.   | Extension Agency        | 0.048  | 1.443      | 0.0450   | 1.229   |
| 11.   | Extension participation | -0.032 | -2.094     | 0.100    | 0.676   |
| 12.   | Cosmo politeness        | -0.011 | 0.043      | 0.098    | 0.292   |
| 13.   | Information seeking     | 0.019  | 0.752      | 0.237    | 0.483   |
| 14.   | Level of knowledge      | 0.050  | 3.642      | 0.125    | 0.978   |
| 15.   | Economic motivation     | 0.77   | 0.804      | 0.064    | 2.027*  |
| 16.   | Scientific orientation  | 0.044  | 3.452      | 0.99     | 0.820   |

$R^2 = 0.7670$  Multiple R = 0.8758\*\* F-value= 37.64 with 16 and 183 DFS

#### Optimum model of multiple regression analysis of selected socio –personal, economic, communication and psychological attributes of farm women and their participation in agricultural activities:

To identify set of independent variables contributing maximum toward participation of farm women in agricultural activities, the step wise multiple regression with backward eliminating procedure was carried out. As a result, out of 16 independent variables, were identified as most contributing factors toward participation of farm women in agricultural activities [Table-5].

It could be revealed from [Table-5] that these five variables viz. education status, family size, family type, annual income, and economic motivation taken together explained the variation in participation of farm women in agricultural activities to the extent of 75.78 percent.

**Table-5** Step-down regression analysis of selected characteristics of the farm women and their participation in agriculture activities

| S.N | Factor                    | Beta  | Beta x R Percentile contribution | Standard partial regression coefficient "b" | t-value |
|-----|---------------------------|-------|----------------------------------|---------------------------------------------|---------|
| 1.  | (X2 ) Educational Status  | 0.166 | 14.457                           | 0.159                                       | 3.477   |
| 2.  | (X4 )Family Size          | 0.150 | 13.869                           | 0.258                                       | 2.863   |
| 3.  | (X5)Family Type           | 0.135 | 8.807                            | 0.452                                       | 3.275   |
| 4.  | (X6)Annual income         | 0.567 | 62.026                           | 0.167                                       | 10.946  |
| 5.  | (X15) Economic motivation | 0.080 | 0.842                            | 0.60                                        | 2.222   |

$R^2 = 0.7578$  Multiple R = 0.8706\*\* F-value 121.50 with 5 and 194 DFS

\* Significant at 0.05 level of probability.\*\* Significant at 0.01 level of probability.

#### Conclusion

Participation of farm women is an important aspect for agricultural activities and farm operations. The findings indicated the differential participation of farm women and related factors contributing for the same. There is need to relook the matter and identify the real cause of the less participation attitudinal or mechanical, so that the participation could be increased in other areas of agriculture too. This may need the knowledge and skill up-gradation in the various farm operations, which could be accelerated through the training and skill development in the selected areas. In long run, this would result into the more labour availability as well the enhanced production due to more ease and comfort of the women force. In turn, this will enhance the adaptation of the agro-technology with climate resilience.

**Conflict of Interest: None declared**

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