Original Research Article

PARTICIPATION OF RURAL WOMEN IN ORGANIC FARMING

ABSTRACT

The study assessed the participation of rural women in organic farming and to explore the relationship between selected characteristics of the rural women and their extent of participation in organic farming. This investigation was a survey type of research involving descriptive and diagnostic type of research design. The study was conducted at seven unions of Batiaghata Upazila under Khulna district namely Amirpur, Gangarampur, Jalma, Batiaghata, Baliadanga, Bhanderkote and Surkhali. Data were collected from randomly selected 140 respondents during the period of 20th January to 15th February, 2019. Correlation(s) test was used to ascertain the relationships between the concerned independent variables and the dependent variable and simple linear regression was done to determine the effect of the selected five independent variables (agricultural training, knowledge, attitude, practice and problem) on participation. Majority (52.1%) of the women had medium participation followed by high (44.3%) and low (3.6%) participation. Considering broadly selected 7-aspects of organic farming, the rural women's participation was highest in land management while it was lowest in marketing the product. Among 24 issues women were found to be greatly involved in collection of organic product from their own residence while it was least in case of collection of organic product from farm. Agricultural training, knowledge, attitude and practice showed positive significant relationship out of fifteen selected characteristics of rural women and only problem showed negative significant relationship with their participation in organic farming. In case of simple linear regression 7%, 14.44%, 18.85%, 18.96% and 8.69% of the participation can be explained by the variables as agricultural training, knowledge, attitude, practice and problem respectively. It can be concluded that women participation was confined only in small scale crop production and there is a need for further enhancement of the extent of participation of rural women in organic farming.

Key words: Agricultural activities, organic farming, rural women, participation.

1. INTRODUCTION

Organic farming is the production of crops and livestock without the use of synthetic chemicals and inorganic fertilizers. Organic agriculture aims at human welfare without any harm to the environment which is the foundation of human life itself (Hoque, 2012). The US Department of Agriculture defines organic farming as "Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives" (FiBL, 2019). Bangladesh is basically an agricultural country. The economy of Bangladesh is largely dependent on agriculture. Agriculture contributes about 14.74% to country's total GDP (BBS, 2017). In 2018, the growth of GDP of Bangladesh was 7.86%. Rice export contributed a good share to this growth. The Executive Committee of the National Economic Council (ECNEC) reported on March 2019 that, the growth of GDP expanded to 8.13%, and the contribution of agriculture to this growth is also tremendously increasing (http://www.thedailystar.net, March 19, 2019). In Bangladesh, the

modern agriculture is truly accompanied with traditional organic form of agriculture from the time immemorial where women are typically and functionally contributing from the very beginning. That experience of organic farming can be an option for economically and ecologically sound farming in Bangladesh.

The growing participation of women in agriculture has made a big change in our rural economy, making them a big contributor to country's overall economy. 10% rise in women workforce raised Bangladesh's GDP by 1% in 2017. The overall contribution of women workforce in our GDP is 34%; it would take the country forward in attaining higher GDP growth in line with achieving the SDGs by 2030 (http://www.dhakatribune.com, March 8, 2017). The major SDGs for Bangladesh, such as "*end poverty*", "*end hunger*", "*gender equality and women empowerment*" etc. could be better addressed by ensuring the functional participation of rural women in production activities in both agricultural and non-agricultural sectors (Bangladesh Planning Commission, 2018).

Empowerment puts a name to the process of change in women's sense of self-confidence and ability to deal with the world, changes which can be seen on the ground. The empowerment of rural women in organic and sustainable farming sector must take into account the interrelatedness between biodiversity, local and indigenous knowledge. Women are playing a crucial role in the organic food cultivation processes. Sustainable women farmers appear to have had more success in becoming part of and contributing to the development of sustainable farming system. On the farm, women are very important for saving seeds, maintaining biodiversity, production of traditional crops and livestock, which in turn provides healthy and safe food and good nutrition. Food security as a priority for organics may also enabling women's empowerment since they hold, in most cultures, a central role in providing nutrition for the household.

Women in our rural area greatly contribute through their household and agricultural work but their work has hardly been recognized by measuring their participation extents in a formal research approach (Biswas et al., 2019, Islam et al., 2018). Considering this fact the researchers persuaded to conduct the present research**.**

In order to proper direction to the research the following specific objectives were formulated:

i. To determine and describe the personal socioeconomic characteristics of the rural women.
ii. To determine extent of participation of rural women in organic farming.
iii. To explore the relationships between selected characteristics of rural women and extent of participation in organic farming practices.
iv. To identify those inhibiting factors associated with participation.

2. METHODOLOGY

The study was conducted at seven unions **(**Amirpur, Gangarampur, Jalma, Batiaghata, Baliadanga, Bhanderkote and Surkhali) of Batiaghata Upazila in Khulna District under which eleven villages were selected for this research which is situated at the convenient distance from Khulna University. Batiaghata Upazila under Khulna District possesses 248.32 sq km of area, bounded by the latitude from 22°34′ to 22°46′ north latitudes and in between 89°24′ to 89°37′ east longitudes. This upazila has an average literacy rate of 53.18%, having agriculture (57.45%) as major source of income with 51.92% inhabitants residing in rural villages (Banglapedia, 2019). The rural women of the study area who were participating in organic farming were treated as population of this study. The primary data were collected through the use of interview schedule. In total 140 women were selected through Purposive random sampling technique who cultivated crops organically in their homestead area or in farm.

Table 1. Sampling plan for the study

Upazila	Union	Selected village	No. of selected rural women
Batiaghata	Amirpur	Narayankhali	20
	Gangarampur	Debitola	20
		Katialangla	20
	Jalma	Guptomari	20
		Sachibunia	20
	Batiaghata	Hatbati	20
		Kismot fultola	20
	Baliadanga	Birat talbunia	20
		Talbunia	20
	Bhanderkote	Lokkhikhola	20
	Surkhali	Surdara	20
Total			**140**

Reviewing related studies, the researcher considered 15 personal, socioeconomic and psychological characteristics of rural women as independent variables such as, personal (age, education, family size, farming experience, organic farming experience), economic (annual income, farm size), social (organizational participation, agricultural training, cosmopolitanism, extension contact), psychological (knowledge, attitude, practice and problem related to organic farming) (Table 2) and participation of rural women in organic farming (Table 3) was treated as dependent variable. Seven important broad aspects along with 24- issues (Table 4) were considered for measuring women participation in organic farming. The seven broad aspects were land management, seed management, fertilizer management, intercultural operation, harvesting the product, collecting organic product, marketing the product (Table 4).

The researcher converted all qualitative data to quantitative form by means of applying some appropriate scoring technique. A coding plan was developed and code numbers were given to each category of measurements. For determining the extent of participation of rural women in organic farming they were categorized into three groups as low participation (≤24), medium participation (25-48) and high participation (>48). A rating scale was used to determine the extent of participation where 'extreme', 'moderate', 'rarely' and 'not at all' were assigned for 3, 2, 1 and 0 scores respectively. So, the score of the women could range from "0 (=0×24) to 72 (=3×24)" where score "0" indicating no participation and score "72" indicating highest level of participation of rural women in organic farming. To compare the level of participation in seven major aspects as well as 24 issues participation score (PS) and participation index (PI) for each of the seven major aspects and 24 issues were calculated by using the following formula:

$PS = (N_1 \times 0) + (N_2 \times 1) + (N_3 \times 2) + (N_4 \times 3)$

Where,

PS = Participation Score

N_1= No. of respondents participated not at all

N_2= No. of respondents participated rarely

N_3= No. of respondents participated occasionally

N_4= No. of respondents participated regularly

$$\textbf{Participation score} = \frac{\textbf{Observed participation score}}{\textbf{Possible highest participation score}} \times \mathbf{100}$$

The score for extent of individual participation in each aspect of organic farming by rural women could be ranged from "0 (=0×60) to 420 (=3×140)" where "0" means no participation and "420" means regular participation. The status of rural women for organizational participation, cosmopolitanism, extension contact, knowledge, attitude, practice and problem faced in organic farming were computed following standard procedures (Sheel et al., 2019; Pervin et al., 2018; Shiduzzaman et al., 2018; Islam et al., 2018 and Biswas et al., 2019).

The researcher collected data through face to face interview during the free time of the respondents. Statistical treatments such as range, means, standard deviation, maximum, minimum, rank order, etc. were used to interpret data. Correlation(s) test was used to ascertain the relationships (for ratio data Pearson's product moment correlation score "***r***" and for ordinal data Spearman's rank order correlation score "***ρ***" was used) between the concerned independent variables and the dependent variable. Simple linear regression was done to determine the contributing effects of the independent variables on participation. Statistical Package for Social Science (SPSS) version 20.0 was used for data analysis.

3. RESULTS AND DISCUSSION

3.1 Selected characteristics of the rural women

Young women (58.6%) were highly involved in organic framing followed by middle aged (29.3%) and old aged women (12.1%). That means young aged women were more motivated towards organic farming than old aged women. Highest proportion (47.1%) of women had secondary level of education while 22.1% women could sign their name only and 18.6% of women had higher secondary level of education. Majority (52.1%) of rural women possessed small size family followed by medium size (36.4%) and large size family (11.4%). Majority of women (58.6%) had low farming experience where 32.1% of farmers had medium farming experience and 9.3% had high farming experience (Table 2)

Majority of the rural women (59.3%) had lower experience followed by 32.9% had medium and only 7.9% possessed higher experience in organic farming. Highest proportion of the respondents (52.9%) had high income while 25% had low income and only 22.1% had medium income. Majority (85.7%) of women had their revenue source from crop sector and only 14.3% were involved in other income sectors. More than half (57.1%) of the respondents had small farm size and only 0.7% had large farm size. However, 11.4% of the respondents had medium farm size and 27.9% of the respondents had marginal farm size where only 2.9% of the respondents were landless (Table 2).

Among 140 of respondents, 42.1% of respondents had no interest towards participation in any organization where 57.9% of the respondents had low participation. Highest proportion of women (58.6%) had no agricultural training followed by 32.9% had low training and 8.6% had medium training opportunity. In case of agricultural training exposure, majority of the women (57.1%) did not get the opportunity to participate in agricultural training program where as more than one-third of the women (36.4%) had training exposure followed by medium (4.3%) and only 2.1% of women had high training exposure. In case of participation in different agricultural training majority (56.25%) of women participated in rice cultivation followed by 47.5% in livestock rearing, 13.5% in fertilizer management, 12.5% in fish culture, 8.75% in integrated pest management, 3.75% in water management and 8.75% of women get their training in other sectors (Table 2)

Majority (55%) of the rural women had low cosmopolitanism compared to 43.6% and 1.4% having medium and high cosmopolitanism respectively. The highest proportion (47.9%) of the rural women had low extension contact as compared to 25.7% had medium extension contact where there were no

women who possessed higher extension contact. Two-third (65%) of the rural women had medium knowledge on organic farming compared to 25% and 10% having low and high knowledge on organic farming respectively. The highest proportion (70.7%) of the rural women had highly favorable attitude towards organic farming compared to 29.3% having moderate attitude. There were no women who showed low attitude towards organic farming. Above three-fourth of the women (80.7%) belonged to medium practice categories followed by 15.0% in low practice category and only 4.3% women highly practice organic techniques (Table 2).

The majority of the women belonged to medium problem category classified highest proportion (85.7%) followed by 8.6% as low problem and (5.7%) as high problem category (Table 2). Weeds problem, lack of available information, poor research- extension-farmers linkage, lack of training, inadequate credit support were the major problems faced by organic farmers ranked by Poddar *et al.* (2017).

Participation of rural women in organic farming ranged from 18-69 against the possible range of 0-72, with a mean of 45.36 and standard deviation of 10.15 (Table 3). Based on categorization above half of the rural women (52.1%) of the study area had medium participation in organic farming activities compared to 44.3% and 3.6% having high and low level of participation in organic farming (Table 2). Data present in Table 3 show that rural women had medium to high participation in organic farming.

Organic farming is a traditional system of farming followed by rural women from a long time back. They choose organic farming as a sustainable source of income, easy method of farming, good and healthy source of nutrient.

Table 2. Distribution of rural women according to their selected characteristics (N= 140)

Parameter	Category	Score	Respondents (N=140)		Mean	SD	Min	Max
			Number	Percentage				
Age	Young	≤35	82	58.6				
	Middle	36-55	41	29.3	36.76	11.26	17	65
	Old	>55	17	12.1				
Education (Schooling years)	Illiterate	0	5	3.6				
	Sign	0.50	31	22.1				
	Primary	1-5	26	18.6				
	Secondary	6-10	66	47.1	6.20	4.25	00	18
	HSC	11-12	8	5.7				
	BSc	13-16	2	1.4				
	MSc	>16	2	1.4				
Family size (No. of members)	Small	≤4	73	52.1				
	Medium	5-7	51	36.4	5.01	2.22	2	16
	Large	>7	16	11.4				
Farming experience (Years)	Low	≤10	82	58.6				
	Medium	10-20	45	32.1	10.23	7.56	1	35
	High	>20	13	9.3				
Organic farming experience (Years)	Low	≤10	83	59.3				
	Medium	10-20	46	32.9	9.6	6.74	1	32
	High	>20	11	7.9				
Annual income (BDT)	Low	≤120000	35	25.0				
	Medium	120001-180000	31	22.1	233828.89	153135.00	50600	750000
	High	>180000	74	52.9				

Farm size (ha)	Landless	<0.02	4	2.9	0.60	1.08	0.01	11.55
	Marginal	0.02-0.20	39	27.9				
	Small	0.21-1.0	81	57.9				
	Medium	1.01-3.0	16	11.4				
	Large	>3	0	0				
Organizational Participation (Score)	Low	≤6	81	57.9	1.74	0.80	1	4
	Medium	7-12	0	0				
	High	>12	0	0				
Agricultural training (No. of training)	No	0	82	58.6	1.04	1.42	0	5
	Low	≤3	46	32.9				
	Medium	4-5	12	8.6				
Cosmopolitanism (Score)	Low	≤8	77	55.0	8.15	3.05	2	17
	Medium	9-16	61	43.6				
	High	>16	2	1.4				
Extension contact (Score)	Low	≤11	67	47.9	9.02	5.31	1	21
	Medium	12-22	36	25.7				
	High	>22	0	0				
Knowledge (Score)	Low	<6.5	35	25.0	8.96	3.29	2	17
	Medium	6.51-13	91	65.0				
	High	>13	14	10.0				

Table 2. *Continued…*

Parameter	Category	Score	Respondents (N=140)		Mean	SD	Min	Max
			Number	Percentage				
Attitude (Score)	Low	≤28	0	0	47.26	5.51	29	62
	Medium	29-44	41	29.3				
	High	>44	99	70.7				
Practice (Score)	Low	≤10	21	15	14.44	3.62	4	22
	Medium	11-20	113	80.7				
	High	>20	6	4.3				
Problem (Score)	Low	≤20	12	8.6	30.84	7.04	11	47
	Medium	21-40	120	85.7				
	High	>40	8	5.7				

*SD- Standard deviation, Min.- Minimum, Max.- Maximum *Source: Field survey, 2019*

Table 3. Participation distribution of rural women based on participation score

Categories	Score	Respondents (N=140)		Mean	SD	Min.	Max.
		Number	Percentage				
Low participation	Up to 24	5	3.6	45.36	10.15	18	69
Medium participation	25-48	73	52.1				
High participation	Above 48	62	44.3				
Total		140	100				

Source: Field survey, 2019

3.2 Extent of participation of rural women in selected 7-aspects along with 24-issues under 7-aspects in organic farming

To measure the participation of women in organic farming the activities were arranged in twenty four issues under seven aspects where participation Score (PS) and Participation Index (PI) were calculated (Table 4). PI was ranged from 0 to 97.62. According to PI, collection of organic product from own residence (PI= 97.62), collection of material (Animal manure, agricultural residue, household garbage) (PI= 97.38) and decomposing of compost (PI= 91.43) were ranked as 1st, 2nd and 3rd respectively and so on.

On the other hand, participation Score (PS) of respondents was ranged from 79 to 347. On the basis of participation score land management ($\bar{x}$ = 347) followed by harvesting the product ($\bar{x}$ = 325), fertilizer management ($\bar{x}$ = 313.71), intercultural operation ($\bar{x}$ = 259.5), seed management ($\bar{x}$ = 232.75), collecting the product ($\bar{x}$ = 105.25) and marketing the product ($\bar{x}$ = 79) were ranked gradually from 1st to 7th.

Desai (2013) found that women of North Dry Zone of Northern Karnataka preferred to involve in different part of organic farming activities like seed preservation, transplanting, weeding, vermicompost preparation, storage etc.

Table 4. Relative position (Rank order) of the selected 7-aspects along with 24-issues of rural women in case of participation in organic farming based on participation score (PS) and participation index (PI) (N=140)

Activities	Degree of participation				PS	PI	Rank (24-issues)	Rank (7-aspects)
	Regularly (3)	Occasionally (2)	Rarely (1)	Not at all (0)				
A. Land Management								
1. Land selection	95×(3)	30×(2)	7×(1)	8×(0)	352	83.81	6th	
2. Land preparation	87×(3)	37×(2)	7×(1)	9×(0)	342	81.43	9th	
$\bar{X}$ of A					347			1st
B. Seed Management								
3. Seed collection	106×(3)	17×(2)	8×(1)	9×(0)	360	85.71	5th	
4. Seed treatment	2×(3)	1×(2)	4×(1)	133×(0)	12	2.86	21st	
5. Seed sowing	103×(3)	15×(2)	6×(1)	16×(0)	345	82.14	8th	
6. Seed preservation	58×(3)	17×(2)	6×(1)	59×(0)	214	50.95	15th	
$\bar{X}$ of B					232.75			5th
C. Fertilizer Management								
a. Preparation of fertilizer at home								
7. Collection of material (Animal								

manure, Agricultural residue, kitchen garbage)	132×(3)	6×(2)	1×(1)	1×(0)	409	97.38	2nd
8. Decomposing	122×(3)	7×(2)	4×(1)	7×(0)	384	91.43	3rd
9. Moistening and turning the compost	107×(3)	11×(2)	8×(1)	14×(0)	351	83.57	7th
10. Maintaining the compost	102×(3)	13×(2)	9×(1)	16×(0)	341	81.19	10th
11. Harvesting the compost	101×(3)	14×(2)	8×(1)	17×(0)	339	80.71	11th
12. Applying the Compost	97×(3)	16×(2)	7×(1)	20×(0)	330	78.57	12th
b. Directly purchase the compost	7×(3)	9×(2)	3×(1)	121×(0)	42	10	20th
$\bar{X}$ of C					313.71		3rd

199

200

201 Table 4. *Continued…*

Activities	Degree of participation							
	Regularly (3)	**Occasionally (2)**	**Rarely (1)**	**Not at all (0)**	**PS**	**PI**	**Rank (24-issues)**	**Rank (7-aspects)**
D. Intercultural Operation								
13. Irrigation	120×(3)	9×(2)	4×(1)	7×(0)	382	90.95	4th	
14. Weeding	91×(3)	20×(2)	9×(1)	20×(0)	322	76.67	13th	
15. Thinning	59×(3)	24×(2)	9×(1)	48×(0)	234	55.71	14th	
16. Pest control	16×(3)	18×(2)	16×(1)	90×(0)	100	23.81	17th	
$\bar{X}$ of D					259.5			4th
E. Harvesting the Product	96×(3)	14×(2)	9×(1)	24×(0)	325	77.38		2nd
F. Collecting organic product								
17. Directly from farm	2×(3)	2×(2)	1×(1)	135×(0)	11	2.62	22th	
18. From own residence	135×(3)	2×(2)	1×(1)	2×(0)	410	97.62	1st	
19. From other's residence	0×(3)	0×(2)	0×(1)	140×(0)	0	0		
20. From local businessman	0×(3)	0×(2)	0×(1)	140×(0)	0	0		
$\bar{X}$ of F					105.25			6th
G. Marketing the Product								
21. Packaging	11×(3)	10×(2)	2×(1)	117×(0)	55	13.09	18th	
22. Transporting	8×(3)	11×(2)	4×(1)	117×(0)	50	11.90	19th	

23. Selling the product	14×(3)	42×(2)	6×(1)	78×(0)	132	31.43	16th
$\bar{X}$ of G					79		7th

3.3 Relationship between the selected characteristics of rural women and extent of women participation in organic farming

3.3.1. Correlation coefficient

Coefficient of correlation was computed in order to explore the relationship between the fifteen selected characteristics of the rural women and their participation in organic agricultural activities. This correlation has been done by using Spearman's Rank Order Correlation Coefficient (ρ) (for ordinal type of data) as well as Pearson's Product Moment Correlation Coefficient (r) (for ratio type of data).

Among the 15 selected characteristics agricultural training, knowledge, attitude, practice showed a positive and significant relationship between those variables and participation of rural women in organic farming. Rana et al. (2017) found significant relationship between agricultural training of organic farmers and their attitude at 5% level of probability.

Only the value of coefficient of correlation ρ (-0.268^{**}) represented a negative and significant relationship between problem faced by women in organic farming and women participation in organic farming. This analyzed that participation of women might be declined in organic farming with the increase of problem.

3.3.2. Regression coefficient

Coefficient of simple linear regression was computed to predict the contribution effect of independent variables (agricultural training, knowledge, attitude, practice, and problem; the variables which were significantly correlated with the dependent variable) on the participation of rural women in organic farming practices. This result will give an understanding about how the value of dependent variable changes with the changes of any one in the independent variables when the others are held fixed.

In case of simple linear regression the participation of women increased with the increase of agricultural training, knowledge, attitude, and practice where 7%, 14.44%, 18.85% and 18.96% of the participation can be explained by the above variables respectively. On the other side women participation decreased with the increase of problems where participation can be explained by 8.69% of the problem.

Table 5. Correlation coefficient between the selected characteristics of rural women and extent of women participation in organic farming

Independent variable (Personal socio-economic characteristics)	Focus variable (Dependent variable)	Computed value	Type of correlation
Age	Participation of rural women in organic farming	-0.068^{NS}	r
Education		-0.038^{NS}	
Family size		-0.063^{NS}	
Farming experience		0.022^{NS}	
Organic farming experience		-0.011^{NS}	
Annual income		0.053^{NS}	
Farm size		0.090^{NS}	
Agricultural training		0.264^{**}	
Organizational participation		0.084^{NS}	

Cosmopolitanism	0.020 NS	
Extension contact	0.168 NS	
Knowledge	0.343**	ρ
Attitude	0.359**	
Practice	0.381**	
Problem	-0.268**	

NS- Non-Significant; ** Significant at 1% level of probability

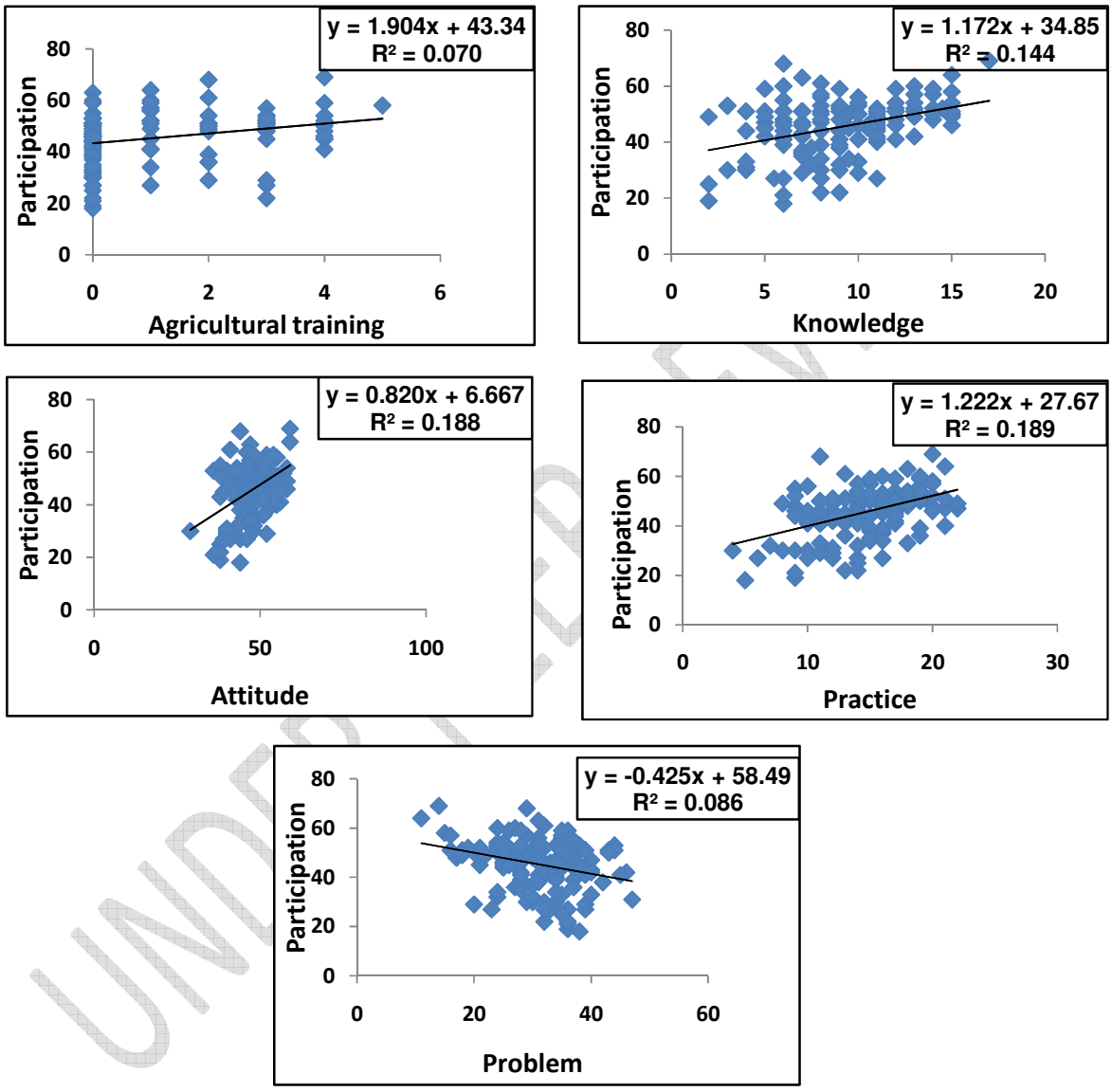

Figure 1. Simple regression analysis of training, knowledge, attitude, practice and problem on participation of rural women in organic farming

4. CONCLUSION

Based on the results and its logical interpretation it can be concluded that highest proportion of rural women had low to medium (55.7%) followed by high (44.3%) participation in organic farming. Among 7-aspects of participation, the participation was highest in land management $(\bar{X} = 347)$ followed by harvesting $(\bar{X} = 325)$, fertilizer management $(\bar{X} = 313.71)$, intercultural operation $(\bar{X} = 259.5)$, seed management $(\bar{X} = 232.75)$ and collection of product $(\bar{X} = 105.25)$, while it was least in marketing $(\bar{X} = 79)$. In case of 24-issues under 7-aspects of organic farming, the highest dominant area of participation by the women was collection of product from own residence $(\bar{X} = 97.62)$. Agricultural training, knowledge, attitude, practice showed a significant positive relationship with their participation in organic farming.

Thus, it might be concluded from the gist of findings mentioned above that, participation of women in organic farming is still not satisfactory and necessary steps concerning extension approach as well as adequate support should be provided to increase the participation by ensuring barrier free participation of rural women in organic farming.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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