



Research in

ISSN : P-2409-0603, E-2409-9325

**AGRICULTURE, LIVESTOCK and FISHERIES**

An Open Access Peer-Reviewed International Journal

Article Code: 0323/2021/RALF  
Article Type: Research Article

Res. Agric. Livest. Fish.  
Vol. 8, No. 1, April 2021: 41-50.

## WOMEN FARMERS' KNOWLEDGE AND PRACTICES ON ORGANIC FARMING

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### ARTICLE INFO

### ABSTRACT

**Received**  
16 March, 2021

**Revised**  
22 April, 2021

**Accepted**  
27 April, 2021

**Online**  
May, 2021

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**Key words:**

Organic farming  
Knowledge  
Practices  
Women farmers

The main purpose of the study was to investigate the knowledge and practices of women farmers on organic farming. The study was conducted in two union of Nilphamari Sadar upazila namely Lakshmi Chap and Palashbari under Nilphamari district. Ninety-two (92) women farmers were randomly selected as sample from an updated list of 120 women farmers. Data were collected by a pre-tested interview schedule during 1<sup>st</sup> to 30<sup>th</sup> October 2020. Simple and direct questions with different appropriate scales were used to obtain information. Descriptive statistics, correlation and multiple regression analysis was used for the present study. Majority of the respondents know about rotating crops, using different wastes, composting, limiting the use of synthetic/ chemical fertilizers, trap method, and mulching as part of organic farming practices. Majority of the respondents opined that they were practicing more than once 'Using organic fertilizer', 'using plant waste', and 'using kitchen waste' for the last 12 months. Slightly above four-fifths (83.7 percent) of the women farmers had medium practices on organic farming, while 14.1 percent women farmers had high practices on organic farming, and only 2.2 percent women farmers had low practices on organic farming. Thus, a proportion of 85.9 percent of the women farmers low to medium practices on organic farming. Correlation analysis indicated that among nine socio-economic profile educational qualifications, farm holding, training received, extension media contact and innovativeness of women farmers had significant positive relationship with their practices on organic farming. However, age, organic farming experience, annual family income and cosmopolitanism had no significant positive relationship with their practices on organic farming. Regression analysis indicated that education qualification, farm holding, extension media contact, and innovativeness of the respondents had significant positive contribution with their practices on organic farming.

**To cite this article:** Goswami P., M. R. A. F. Noman and S. Huda, 2021. Women farmers' knowledge and practices on organic farming. Res. Agric. Livest. Fish., 8 (1): 41-50.



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## INTRODUCTION

Organic farming may be a good choice as cost-effective method that can trim down rural poverty and curb pollution (Hussein, 2001). It is also the need in the present-day context of serious threat to our ecology and environment. The farming method is the best means to make sure air, water and soil unpolluted leaving the environment safe for the present and future generations. For a sound future, organic farming offers a dynamic interaction among soils, plants, humans, ecosystem and environment which ultimately protect natural and agricultural resource bases from further degradation and to ensure long term sustainability in agricultural system (Parvez, 2016). Organic farming is a holistic or integrated agricultural production system characterized by the high inputs of capital, organic fertilizers, labor or labor-saving technologies such as pesticides relative to land area (Purushothaman *et al.*, 2015). It is in contrast with extensive farming which involves a low input of materials and labor with the crop yield largely depending on the naturally available soil fertility, water supply or other land qualities. Now-a-days, intensive crop-based agriculture, involving the use of mechanical ploughing, chemical fertilizers, herbicides, fungicides, insecticides, plant growth regulators and/or pesticides. Agricultural mechanization also increases with its association (Patidar and Patidar, 2015). Although numbers of organic growers are increasing, it is still very small portion of the whole agriculture. Organic farming is one of the widely used methods, which is thought of as the best alternative to avoid the ill effects of chemical farming like environmental pollution, soil health degradation, human health hazards and biodegradation. As a result, there is enormous potential in practicing organic farming in growing lands, because organic agriculture is productive and sustainable (Thamaraiselvan *et al.*, 2012).

Organic farming systems differ from conventional systems in several aspects such as no artificial pesticides or fertilizers are used on organic farms, organic farms generally have a wider crop rotation scheme, and also have larger areas of non-crop habitats (Seyed *et al.*, 2010). Some scholars hold that organic farming is not only a potent method of overcoming the harmful effects of chemical farming (Ramdwar and Siew, 2018), but also an environmentally friendly way of achieving optimal and sustainable food production (Darnhofer *et al.*, 2013). According to IFOAM, organic farming composed of four principles such as health, ecology, fairness and care. The principle 'health' is intended to produce quality and safe food for human consumption. Ecology is concerned to maintain ecological balance, whereas fairness means to ensure the food sovereignty for present and future generations. Finally, care means taking precaution before adopting new technologies such as genetic engineering (Tuomisto *et al.*, 2012). The major goal of organic farming as a sustainable pathway is to produce quality and nutritional foods that are free from chemicals without damaging the environment in a sustainable manner for both plants and animals and thus, enhancing farmers' livelihood through the income generated from the sales of the products (Paschke, 2017). Organic agriculture is one of the most important areas of sustainable agriculture (SPAR, 2012). According to Hartmann *et al.* (2012) Organic agriculture is a production management system that promotes the sustainability of agricultural ecosystems and ensures the production of safe healthy foods. On these considerations, the present researcher felt necessity to conduct this research on "Women Farmers' Knowledge and Practices on Organic Farming". The study was conducted with the following objectives; i) to describe some socio-economic profile of the women farmers; ii) to investigate the knowledge of women farmers on organic farming; iii) to determine the practices of women farmers on organic farming; iv) to explore the contributions of the socio-economic profile of the of the women farmers with their practices on organic farming.

## MATERIALS AND METHODS

### Selection of the Study Area

The study was conducted in two union of Nilphamari Sadar upazila namely Lakshmi Chap and Palashbari under Nilphamari district.

### Population and Sample

The women farmers who are getting support from Udayankur Seba Sangstha (USS) of Lakshmi Chap and Palashbari union of Nilphamari Sadar upazila was the population of the study. An updated list of 120 women farmers was collected from Udayankur Seba Sangstha (USS) office record who practice organic farming constitutes the population. From the entire population, 92 women farmers were taken as a sample size through using following standard formula (Dionco-Adetayo, 2011) with 5% marginal error and selected them by random sampling method. A reserve list of 9 respondents

was also prepared so that the farmers of the list could be used for interviewing if the farmers included in the original sample were not available during data collection period.

$$n = \frac{N}{1 + NE^2}$$

Where: n = sample size

N = population size

E = margin of error or error tolerance

1 = is a constant value

### Research Instrument and Data Collection

A draft interview schedule was prepared for collecting data from the women farmers. The schedule was pre-tested in actual field situation. Necessary corrections, additions and modification were made in the interview schedule based on the experiences of the pre-test and expert opinion. The interview schedule was then finalized for the collection of data.

### Data Processing and Analysis

First of all, the collected data were coded, summarized and processed for analysis. All possible errors and inconsistencies were eradicated for verification of the data. Then the collected data were analyzed with a computer-based software - SPSS (Statistical Package for Social Sciences) version 22, and tables and graphs were prepared with MS Excel (Microsoft Excel 2010).

### Measurement of Variables

The nine socio-economic profiles of the women farmers namely age, educational qualification, farm holding, organic farming experience, annual family income, training received, cosmopolitaness, extension media contact and innovativeness constituted the independent variables of this study. These socio-economic profiles were measured by appropriate measurement techniques. Knowledge on organic farming was investigated through simple-dichotomy statements (i.e. True/ False). Practices of women farmers on organic farming were dependent variable of the study. Based on pre-test experience and through consultation with relevant experts 15 practices on organic farming were consider for this study. The respondents were asked to indicate their extent of practice for the last 12 months with three alternative responses as never, once, and more than once basis. Score were assigned to the alternative responses as 0, 1 and 2 respectively (Assis and Islam, 2011). Practices on organic farming to the respondents were computed by summing up all the scores obtained by them from all the 15 practices. Thus, the possible range of practice on organic farming score was 0 to 30, while 0 indicated no practice and 30 indicated highest practice on organic farming. The practice indices of organic farming were measured through frequency-determination statements (Assis and Islam, 2011). To determine the significant difference among the responses against each practices chi-square test was done.

## RESULTS AND DISCUSSION

### Socio-Economic Profile of the Women Farmers

Socio-economic profile of women farmers is presented in Table 1. It was found that the majority (87.0 percent) of the women farmers were young aged. This is due to that young aged woman farmers exchanged from conventional farming to organic farming. Slightly above half (55.4 percent) of the women farmers had secondary education. Mandal (2016) and Uddin (2008) also found similar findings in their studies. Education helps them to be alert of these health-related risks and understand many aspects of organic cultivation practices. Slightly above half (52.2 percent) of the respondents had marginal sized farms. Overwhelming majority (93.5%) women farmers had low organic farming experience. There is only 2.2 percent high experienced women farmer in the study area. Majority (90.2 percent) of the women farmers had medium annual family income. Rashed (2018), Mandal (2016) and Uddin (2008) also found close findings in their studies. Main source of their annual family income comes from organic farming and income generating activities. Slightly below three-fourths (70.7 percent) of the farmers had medium training received. Providing adequate training on organic farming is likely to increase the knowledge and practice of the women farmers. Uddin (2008) also found similar findings in his study. Slightly above four-fifths (84.8 percent) of the women farmers had low cosmopolitaness. None of the respondents was found high cosmopolitaness. The findings are consistent with Uddin

(2008). As social condition does not support women farmers to travel randomly. Majority (88.0 percent) of the women farmers had medium extension contact. Extension media contact is a very efficient and influential source of getting info about various innovative and sustainable practices. Rashed (2018), Shanto (2011) and Uddin (2008) also found close findings in their studies. Below three-fourths (69.6 percent) of the women farmers had medium innovativeness. Innovativeness helps the women farmers to adopt new concepts and practices on organic farming.

**Table 1.** Socio-economic profile of the women farmers (N=92)

Parameters	Scoring method	Range		Categories	Respondents		Mean	SD
		Possible	Observed		No.	Percent		
Age	No. of year	Unknown	20-45	Young ( $\leq 35$ )	80	87.0	29.04	5.64
				Middle aged (36-50)	12	13.0		
				Old ( $\geq 51$ )	0.0	0.0		
Educational qualification	Year of schooling	Unknown	0.5-15	Can sign only (0.5)	19	20.7	5.71	3.35
				Primary level (1-5)	20	21.7		
				Secondary level (6-10)	51	55.4		
Farm holding	Hectare	Unknown	0.04-3.89	Above secondary level ( $\geq 11$ )	2	2.2	0.58	0.49
				Landless ( $\leq 0.20$ )	5	5.4		
				Marginal (0.21-0.50)	48	52.2		
Organic farming experience	No. of year	Unknown	2-18	Small (0.51-1.0)	32	34.8	3.93	2.63
				Medium (1.01-3.0)	6	6.5		
				Large ( $> 3.0$ )	1	1.1		
Annual family income	('000' Tk.)	Unknown	35.00-782.00	Low ( $\leq 6$ )	86	93.5	184.84	133.31
				Medium (7-12)	4	4.3		
				High ( $> 12$ )	2	2.2		
Training received	Days	Unknown	0-10	Low ( $\leq 52$ )	2	2.2	3.90	2.19
				Medium (52.01-318)	83	90.2		
				High ( $> 318$ )	7	7.6		
Cosmopolitaness	Score	0-18	1-8	No (0)	6	6.4	4.59	1.77
				Short (1-2)	10	10.9		
				Medium (3-6)	65	70.7		
Extension media Contact	Score	0-30	5-20	Long ( $> 6$ )	11	12.0	13.62	2.63
				Low ( $\leq 6$ )	78	84.8		
				Medium (7-12)	14	15.2		
Innovativeness	Score	0-30	1-24	High ( $> 12$ )	0.0	0.00	12.91	4.21
				Low ( $\leq 10$ )	11	12.0		
				Medium (11-20)	81	88.0		
				High ( $> 20$ )	0.0	0.00		
				Low ( $\leq 10$ )	23	25.0		
				Medium (11-20)	64	69.6		
				High ( $> 20$ )	5	5.4		

### Knowledge of Women Farmers on Organic Farming

Table 2 shows the number of respondents who answered the 12 'true/ false' statements correctly. These 12 'true/ false' statements were asked to the respondents and the respondents have to give their responses to each of these statements whether the statement is 'true' or 'false' in relation to the organic farming. Majority of the respondents know that rotating crops, using different wastes, composting, limiting the use of synthetic/ chemical fertilizers, trap method, and mulching as part of organic farming practices. But majority of the respondents did not know that using biological control agents to control pests, intercropping/ mixed cropping are also considered as part of organic farming practices. They also misheard when they answered that chemical fertilizers, chemical insecticides, and chemical herbicides are permitted in organic farming. This shows that the women farmers still not knowledgeable enough to understand the concept and the practices of organic farming. However, 9 out of 12 statements were answered correctly by more than half of the respondents so that it can be concluded that the women farmers know the general concept of organic farming.

**Table 2.** Knowledge indices of women farmers on organic farming

Knowledge	Count	Percent
Rotate crops to control weed, pest and also to improve soil fertility	88	95.6
Use different wastes (kitchen wastes, plant wastes and animal wastes) to fertile soil	84	91.3
Do composting to improve soil fertility and water conservation	83	90.2
Limit the use of synthetic fertilizers to fertilize plants	81	88.0
Use trap methods to control pests and diseases	84	91.3
Do mulching to control weed	77	83.7
Do green manuring or plant cover crop to reduce soil erosion and increase soil fertility	72	78.3
Use chemical fertilizers to increase plant growth	60	65.2
Limit the use of chemical pesticides to control pests	54	58.7
Use chemical herbicides to control weed	41	44.6
Do not practice intercropping / mixed cropping system because it can reduce soil fertility and water conservation	31	33.7
Use biological control agents to control pests	24	26.1

### Practices of Women Farmers on Organic Farming

The result presented in Table 3 showed that majority (72.8 percent) of the respondents opined that they were practicing more than once 'Using organic fertilizer' as organic farming practice. The computed *Chi square* value (70.46\*\*) indicate significant difference among the opinions of the respondents (Table 3). As majority (72.8 percent) of the respondents opined that they were practicing more than once the 'Using organic fertilizer' as organic farming practice hence it can be said that 'Using organic fertilizer' is identified as most important organic farming practice.

Majority (71.7 percent) of the respondents opined that they were practicing more than once the 'Using plant waste' as organic farming practices. The computed *Chi square* value (73.19\*\*) indicate significant difference among the opinions of the respondents (Table 3). As majority (71.7 percent) of the respondents opined that they were practicing more than once the 'Using plant waste' as organic farming practice hence, it can be said that 'Using plant waste' is identified as 2<sup>nd</sup> most important organic farming practice.

Majority (64.2 percent) of the respondents opined that they were practicing more than once the 'Using kitchen waste' as organic farming practices. The computed *Chi square* value (47.89\*\*) indicate significant difference among the opinions of the respondents (Table 3). As majority (64.2 percent) of the respondents opined that they were practicing more than once the 'Using kitchen waste' as organic farming practice hence, it can be said that 'Using kitchen waste' is identified as 3<sup>rd</sup> most important organic farming practice.

Majority of the respondents opined that they were practicing once 'Crop rotation' (78.2 percent), 'Using animal manure' (73.9 percent), 'Intercropping / mixed cropping' (66.3 percent), Using trap method to control pests (64.1 percent) 'Manual weeding or hand weeding' (63.0 percent), 'Green manuring or planting cover crop' (60.9 percent), and 'Mulching' (58.7 percent). The computed *Chi square* value indicates significant difference among the opinions of the respondents (Table 3). As majority of the respondents opined that they were practicing once these organic farming practices hence, it can be said that these practices are identified as important organic farming practices.

**Table 3.** Practices indices of women farmers on organic farming

Practices	Never		Only once		More than once		Chi-square Value
	Count	Percent	Count	Percent	Count	Percent	
Crop rotation	3	3.3	72	78.2	17	18.5	86.76**
Manual weeding or hand weeding	1	1.1	58	63.0	33	35.9	53.24**
Intercropping/ mixed cropping	2	2.2	61	66.3	29	31.5	56.89**
Using animal manure	23	25.0	68	73.9	1	1.1	76.07**
Using plant waste	2	2.2	24	26.1	66	71.7	73.19**
Using organic fertilizer	3	3.3	22	23.9	67	72.8	70.46**
Mulching	17	18.5	54	58.7	21	22.8	26.89**
Green manuring or planting cover crop	20	21.7	56	60.9	16	17.4	31.65**
Using kitchen waste	5	5.4	28	30.4	59	64.2	47.89**
Using Integrated Pest Management (IPM)	40	43.5	27	29.3	25	27.2	4.33 <sup>NS</sup>
Using botanical pesticide to control pest	37	40.2	27	29.3	28	30.4	1.98 <sup>NS</sup>
Using trap method to control pests	26	28.3	59	64.1	7	7.6	45.15**
Using beneficial insects to control pests	29	31.5	34	37.0	29	31.5	0.54 <sup>NS</sup>
Using hand net to control insects	85	92.4	7	7.6	0	0.0	66.13**
Using different natural inputs for ripening fruits and storing their seeds and other harvested crops	35	38.0	29	31.5	28	30.4	0.93 <sup>NS</sup>

NS= Not Significant

Data shows in the Figure 1 revealed that slightly above four-fifths (83.7 percent) of the women farmers had medium practices on organic farming, while 14.1 percent women farmers had high practices on organic farming, and only 2.2 percent women farmers had low practices on organic farming. Mondal (2014) and Uddin (2008) also found

close findings in their studies. Thus, a proportion of 85.9 percent of the women farmers low to medium practices on organic farming. This finding due to that woman farmers are indifferent of the significance of organic farming and adopted these practices on their homestead cultivation or land near to the homestead only.

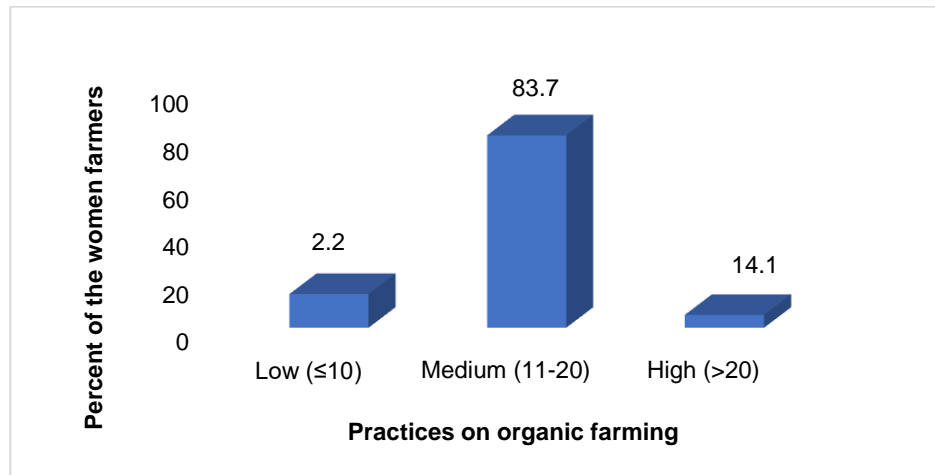


Figure 1. Distribution of the women farmers according to their overall practices on organic farming

#### Contribution of Socio-Economic Profile of Women Farmers with their Practices on Organic Farming

Table 4. Coefficient of correlation (r) between socio-economic profile of women farmers with their practices on organic farming (n = 92)

	Socio-economic profile	Correlation Value of 'r' with 90 df
Practices of women farmers on organic farming	Age	0.083
	Educational qualification	0.465**
	Farm holding	0.332**
	Organic farming experience	0.110
	Annual family income	0.196
	Training received	0.253*
	Cosmopoliteness	0.108
	Extension media contact	0.528**
	Innovativeness	0.328**

\*\* , Correlation is significant at the 0.01 level, \* , Correlation is significant at the 0.05 level.

Co-efficient of correlation was computed in order to explore the relationships between each of the socio-economic profile of the women farmers and their practices on organic farming. The relationships between each of the socio-economic profile of women farmers and their practice on organic farming shown in Table 4. The findings indicated that age of the women farmers had no significant relationship with their practices on organic farming. Mandal (2016) found that age of the watermelon farmers had no significant relationship with their practice of watermelon cultivation. Mondal (2014) also observed in her study age of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation. Educational qualification of the women farmers had significant positive relationship with their practices on organic farming. This study indicates that organic farming practices had significantly increased with increased educational qualification. Uddin (2008) also found similar findings in his study. Farm holding of the women farmers had significant positive relationship with their practices on organic farming. Rahman (2018) found that farm size of farmers had a significant positive relationship with their practice of agricultural mechanization. Organic farming experience of the women farmers had no significant relationship with their practice of



organic farming. Mandal (2016) found that watermelon cultivation experiences of the watermelon farmers had no significant relationship with their practice of watermelon cultivation. Mondal (2014) observed in her study experience of farmers in strawberry cultivation had no significant relationship with their practice of strawberry cultivation. Annual family income of the women farmers had no significant relationship with their practices on organic farming. Rahman (2004) found that there was no significant relationship with annual family income and practice of vegetable cultivation. Training received of the women farmers had significant positive relationship with their practices on organic farming. This means that women farmers who were more trained they have more practices of organic farming and that helped them to increase the organic farm production. Mandal (2016), Rahman (2006), and Sana (2003) found significant and positive relationship between watermelon cultivation practice, prawn culture, and shrimp culture with training exposure respectfully. Cosmopolitaness of the women farmers had no significant relationship with their practices on organic farming. Uddin (2008) also found similar findings in his study. Extension media contact of the women farmers had significant positive relationship with their practices on organic farming. More extension contact helped the women farmers to expose them towards different source of information through direct contact with different persons which helped them to increase their practices. Mandal (2016) found that extension contact of the watermelon farmers had positive significant relationship with their practice of watermelon cultivation. Sana (2003) also found significant and positive relationship with extension contact and practice on shrimp culture. Innovativeness of the women farmers had significant positive relationship with their practices on organic farming.

**Table 5.** Multiple regression coefficients of socio-economic profile of women farmers with their practices on organic farming (n = 92)

Dependent variable	Independent Variable	$\beta$	P	R <sup>2</sup>	Adj. R <sup>2</sup>	F
Practices of women farmers on organic farming	Educational qualification	0.211*	0.025	0.45	0.41	13.79
	Farm holding	0.193*	0.028			
	Training received	0.093	0.268			
	Extension media contact	0.367**	0.000			
	Innovativeness	0.200*	0.018			

\*\* Significant at  $p < 0.01$ ; \* Significant at  $p < 0.05$

In order to estimate the practices on organic farming, the multiple regression analysis was also used. Only those variables, which had significant relationship with practices on organic farming, were included in the multiple regression analysis. Thus, a total of five variables namely educational qualification, farm holding, training received, extension media contact and innovativeness were included in multiple regression analysis. The findings of the multiple regression analysis are presented in Table 5. The observed F ratio was 13.79 which was significant at 0.01 level of accuracy which was an indication that the combinations of the independent variables in practices of women farmers on organic farming was effective 45.0 percent ( $R^2 = 0.45$ ) of the variation in the respondents' practices on organic farming can be attributed to their education qualification, farm holding, extension media contact, and innovativeness, making contribution on extent of practices of women farmers on organic farming. However, each predictor may expound some of the variance in respondents' practices on organic farming conditions simply by chance. The adjusted R-square value penalizes the addition of external predictors in the model, but values of 0.41 still show that the variance in women farmers' extent of practices on organic farming can be attributed to the predictor variables rather than by chance and the F value indicate that the model was significant ( $p < 0.01$ ).

From Table 5 it was observed that educational qualification, farm holding, extension media contact, and innovativeness of the respondents had significant positive contribution with their practices on organic farming. Data also showed that extension media contact was most significant contributor at 1 percent ( $p < 0.01$ ) level of significance on practices of women farmers on organic farming. It was also showed that educational qualification, farm holding, and innovativeness had also significant contribution at 5 percent ( $p < 0.05$ ) level of significance on practices of women farmers on organic farming. Training received of the women farmers had no significant contribution with their practices on organic farming. Based on the above finding, it can be summarized that a women farmer had more education improved the capabilities to practices on organic farming. It can also be said that if women farmers' education will



increase then the women farmers' practices on organic farming will be increased. Education plays a vital role to advance more practices on organic farming in many cases. Education augments knowledge on many aspects such as training, extension contact and so on. Rashed (2018) found that education and extension contact of respondents had significant contribution with their use of best management practices.

## CONCLUSION AND RECOMMENDATIONS

The knowledge of the women farmers on organic farming concepts especially pertaining to the use of chemical insecticides, herbicides and biological control agents is still poor. Majority of the respondents opined that they were practicing more than once 'Using organic fertilizer', 'using plant waste', and 'using kitchen waste' for the last 12 months for making their farm lands fertile. Slightly above four-fifths (83.7%) of the women farmers had medium practices on organic farming. This result might be due to that organic farming is still practicing in a limited scale like only as homestead cultivation or land near to the homestead. This scenario in the study area might be due to that women farmers cannot be fully dependent on organic farming yet considering the economic output from per unit area of land comparing to conventional farming. They still believe that they wouldn't be benefited by practicing organic farming like conventional farming. Education qualification of the women farmers had significant positive relationship with their practices on organic farming. The women farmers who were more educated had higher practices of organic farming than those who had lower education. Farm holding of the women farmers had significant positive relationship with their practices on organic farming. It was therefore, concluded that women farmers having more farm area had more practices on organic farming. Extension media contact and innovativeness of the women farmers had significant positive relationship with their practice of organic farming. The women farmers who were more exposure of extension media contact and innovativeness had higher practices of organic farming than those who had lower exposure of extension media contact and innovativeness.

It is crucial to make conscious of the women farmers about benefits of organic farming to make the farming sustainable. Therefore, there is a need to arrange training and promotional events for increasing their knowledge and to become aware of sustainable organic farming with use of those agricultural methods which do not make hazards for the environment or jeopardize the health of soil, plants, animals, humans and ecosystems. The organic farming practices from which women farmers are getting benefitted should be outreach among the farming community through proper authority like DAE and others private organization who are working as extension organization.

## ACKNOWLEDGEMENT

The author profoundly acknowledges the cooperation and sincere help of the concerned personnel of Udayankur Seba Sangstha (USS) and women farmers in the research working area.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

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