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FARMERS' ATTITUDE TOWARDS ORGANIC AGRICULTURE: A CASE OF RURAL SRI LANKA

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SUMMARY

Organic agriculture has the potential to reduce the negative impacts of conventional agricultural practices and enhance rural economic development. Since research on Sri Lankan farmers' attitude towards organic agriculture has been rare, this research aims to explore the farmers' viewpoint on organic agriculture. Two main rural districts were purposely selected for this investigation since these districts have a high potential for organic agriculture. Two Divisional Secretariat (DS) divisions from each district and 75 farmers from the farming community of each DS division were randomly selected to form a sample of 300 farmers. Data were collected from July 2017 to April 2018 and analyzed using descriptive statistics and binary logistic regression. The results revealed that a majority of the farmers (74%) were well-aware of organic agriculture and agricultural extension programs, while training was the primary information source in both districts. As per the mean analysis, the farmers had a positive attitude towards health-related and environmental protection aspects. However, they had a negative attitude towards the complexity of organic agriculture and unavailability of a suitable market for organic products. Results of the binary logistic regression revealed that the education level of the farmers significantly affect their attitude towards organic agriculture. The availability of traditional knowledge and technology relevant to organic agriculture, favorable climatic condition, and some government support were the main potentials, while labor intensiveness was the main challenge. Thus, creating better marketing facilities for organic products, providing the required amenities for producing organic food, processing, and value addition will promote organic agriculture among more farmers, supporting sustainable development.

Key words: *Organic agriculture, farmers' attitude, farming community, potentials, challenges, rural Sri Lanka*

Abbreviations: IFOAM - International Federation of Organic Agriculture Movement; DS Division - Divisional Secretariat Division; USA - United States of America; SLEDB - Sri Lanka Export Development Board

INTRODUCTION

Organic agriculture is rapidly becoming more popular throughout the world. According to the International Federation of Organic Agriculture Movement (IFOAM), organic agriculture is a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity, and cycles adapted to local conditions, rather than the use of inputs that may have adverse effects in many ways (IFOAM, 2007).

Attitudes are critical determinants responsible for human behavior, providing direction and purpose to people's behavior and performance (Liaghati et al., 2008). Thus, information gathering and attitudes of farmers are also important in their decisions (Genius et al., 2006).

The development trend of organic agriculture in the world during the past decade has been positive. As an example, the USA and Canada have a rapidly booming organic food market with 20% increase, while Europe has 7.8% increase per year. Nevertheless, Australia is currently the country with the largest organic area, with around 35,645,037 hectares (Paull & Hennig, 2018), while the area of organically managed farmlands in Europe is about 12.6 million hectares (European Commission, 2019).

In Sri Lanka**,** organic farming is a longstanding tradition. Earlier, local farmers trusted traditional planting strategies such as astrology, different types of biodynamic applications, specific time schedules, pest and disease control methods like "*Kem"* methods, and so on (SLEDB, 2015). To provide a sustainable solution, the government of Sri Lanka launched a national program titled 'Vasa Visa Nethi Ratak' in 2016, with a view to making the country free of poisonous agrochemicals, and thereby free of poisoned or polluted food materials including rice, vegetables, and fruits. However, studies on awareness of organic agriculture in the country is low, and the dissemination is at an unsatisfactory level (Ranasinghe, 2016).

Badulla and Rathnapura districts of Sri Lanka have a high potential for organic farming compared to other cultivated areas in the country. The crops cultivated organically in these areas include tea, coconut, spice crops (cinnamon, clove, nutmeg, ginger, and pepper), vegetables (tomato, wing beans, snake gourd, etc.) and fruits (banana, papaya, etc.) (Ranasinghe et al., 2015). Sri Lanka is a major organic farming country in Asia (Vidanapathirana & Wijesooriya, 2014). Organic foods are generally available at urban supermarkets in Sri Lanka. Domestic production is rich with organic fruits, fruit drinks and rice varieties, which are widely available. Seven percent of the organic food produced here is exported annually. Sri Lanka's major export destinations are European countries, USA, Japan and Australia. There is also a booming market for Sri Lankan organic foods in the Middle East (Vidanapathirana & Wijesooriya, 2014).

Conventional farming, also known as inorganic farming, has become the primary focus in the Sri Lankan agricultural sector, as there is a need to produce a large quantity of food items to meet the local requirements. However, the demand for organic food products is steadily increasing at local and international levels. Therefore, there is an important and timely need to find out the farmers' attitude towards organic farming in the areas where there is high potential for organic agriculture in the country.

This study is aimed at evaluating the farmers' attitude towards organic agriculture in rural Sri Lanka. Two rural districts were selected as study areas for this purpose. At present, the number of farmers doing only organic farming is small in the whole country, including these two areas. As it is difficult to find a sufficient number of organic farmers for this type of study, farmers involved in conventional farming were chosen as respondents. Specific objectives of the study included: determining the socio-economic characteristics of the farmers, identifying the level of knowledge of the farmers involved in organic agriculture, evaluation of the farmers' attitude towards organic agriculture, and studying the existing potential and challenges for organic agriculture in these areas.

MATERIAL AND METHODS

The study area of the research was rural Sri Lanka, specifically Badulla and Rathnapura districts, where many agricultural activities are carried out. Two DS divisions, Kandaketiya and Meegahakiula, were randomly selected out of 15 DS divisions in Badulla district, and two DS divisions, Waligepola and Opanayaka, were chosen out of 17 DS divisions of the Rathnapura district. A sample of 300 farmers, including 75 farmers from each DS division, was selected by applying a stratified random sampling method from the existing list of the farming community of the relevant DS divisions. A few statistical methods were used to analyze the data. Percentage and frequency analysis were used to find out the socio-economic characteristics of the farmers and their level of knowledge. The farmers' attitude was measured as a mean score of the responses for 15 attitudinal statements made on a five-point Likert scale. Points for the statements were scored as: strongly agree (SA) = 5; agree (A) = 4, neutral (N) = 3; disagree (DA) = 2; and strongly disagree (SDA) = 1. The mean value was calculated using the following equation in mean value analysis:

$$\bar{x} = \frac{5 \times SA + 4 \times A + 3 \times U + 2 \times DA + 1 \times SDA}{300}$$

Where,

$\bar{x}$ = Mean value

SA = Respondents expressing their attitude 'Strongly Agree' for the statements

A = Respondents expressing their attitude 'Agree' for the statements

U = Respondents expressing their attitude 'Undecided' for the statements
DA = Respondents expressing their attitude 'Disagree' for the statements
SDA = Respondents expressing their attitude 'Strongly Disagree' for the statements

The farmers' attitudes were determined according to the mean value for the statements, which was obtained by referring to cutoff values (see Table 4). The relationship between the farmers' socio-economic characteristics and their attitude towards organic agriculture was checked via binary logistic regression. Statistical Package for Social Sciences (SPSS) version 21.0 was used as the data analysis software.

RESULTS AND DISCUSSION

Socio-economic characteristics of the farmers

The main socio-economic characteristics of the farmers, such as gender, age, marital status, level of education, and total monthly income, were identified and analyzed within real situations. Table 1 presents the findings relevant to the farmers' socio-economic characteristics.

Table 1. Socio-economic characteristics of the farmers (n=300)

Factor	Category	Frequency	Percentage (%)
Gender	**Male**	**239**	**79.7**
	Female	61	20.3
Age	18-36 Years	59	20.0
	37-55 Years	**171**	**57.0**
	Above 55 Years	70	23.0
Marital status	**Married**	**272**	**90.7**
	Unmarried	12	4.0
	Other	16	5.3
Educational level	Primary	102	34.0
	O/L	**134**	**44.6**
	A/L	48	16.0
	Diploma	11	3.7
	Graduate	5	1.7
Monthly total income (US $)	< 85.00	36	12.0
	85.00-170.90	**147**	**49.0**
	171.00-256.90	63	21.0
	257.00-342.90	39	13.0
	>343.00	15	5.0

Source: Field survey, 2018 (1 US $ = 175 LKR)

Table 1 shows that the majority of the respondents were male (79.7%), belonging to the age category of 37-55 years (57%). Also, most respondents were married (90.7%) and had an education level up to GCE O/L (Ordinary Level) (44.6%). The monthly income of most respondents (49%) was in the range of 85.00–170.90 US $. In rural areas, most farmers were males, while females helped their male partners. Considering the marital status, the "other" category was indicated as "widows" in the sample. The thirty-year war and the revolutionary situation in the country caused the increase the number of widows in the sample.

Knowledge of the respondents on organic farming

In order to measure the knowledge level of the respondents on organic agriculture, their responses were analyzed. Table 2 presents the results related to the farmers' knowledge of organic farming.

Table 2. Level of knowledge of respondents on organic agriculture (n=300)

Level of knowledge	Frequency	Percentage (%)
I don't know anything about organic agriculture	12	04
I have only heard of the term 'organic agriculture'	27	09
I have little knowledge of organic agriculture	39	13
I have good knowledge of organic agriculture	**204**	**68**
I have very good knowledge of organic agriculture	**18**	**06**

Source: Field survey, 2018

The results in Table 2 indicate that most respondents [74% = (68% +06%)] have a good level of knowledge on organic agriculture. Since most respondents have a sufficient level of education, they can understand the importance of the information on organic agriculture in accordance with the current requirements of the society. Also, they have received the basic knowledge related to organic agriculture from Agriculture Instructors (AI) in the area, and the indigenous knowledge, passed onto them by their parents and grandparents.

Sources of information on organic agriculture used by the farmers

Determining the sources of information on organic agriculture is especially important at present. Therefore, significant sources were analyzed, and the relevant information is presented in Table 3.

Table 3. Information sources used by the farmers at present (n=300)

Information source	Frequency	Percentage (%)
Agriculture extension programs & trainings	**195**	**65**
Parents, friends, & relatives	108	36
Newspapers & magazines	96	32
Exhibitions	84	28
Radio	60	20
Television	45	15
NGOs and private organizations	09	03

Source: Field survey, 2018

Table 3 shows that the first three information sources accessed by the respondents were Agricultural extension programs and trainings, Parents, friends, and relatives, and Newspapers and magazines. Badulla district is a more remote area than Rathnapura district. The government agricultural extension service is working up to a satisfactory level in both districts. The use of printed materials such as magazines, books, and newspapers is higher in both districts than the use of electronic sources like television and the internet. The internet facilities are still not available in most rural areas of Sri Lanka.

The farmers' attitude towards the statements regarding organic agriculture

In order to evaluate the farmers' attitude towards organic agriculture, firstly, the mean score for each statement was calculated. Secondly, the level of attitude was determined based on the mean value for each statement, referring to the cutoff values. The results are presented in Table 4.

Table 4. The farmers' attitude towards organic agriculture (n=300)

No.	Statement	SA	A	U	DA	SDA	Mean Score	Level of Attitude*
01	Organic farming protects the good health of a farmer and farm family	162	132	06	00	00	4.52	SA
02	Organic food does not have any harmful residue	158	134	08	00	00	4.5	SA
03	Nutritional quality of organic food is higher than non-organic food	119	160	20	00	01	4.32	A
04	Organic farming maintains long-term soil fertility	150	148	02	00	00	4.49	SA
05	Organic farming is more complex than conventional farming	86	117	31	04	01	4.26	A
06	Organic farming is eco-friendly	152	146	02	00	00	4.50	SA
07	There is not a good market for organic products	81	150	20	37	12	3.84	A
08	Consumers pay a premium price for organic food	69	38	73	105	04	3.14	U
09	Consumers prefer to buy organic food rather than non-organic food	87	89	40	76	10	3.55	A
10	Government support is greater for organic farming than conventional farming	18	15	27	173	66	2.31	U
11	Organic farming cannot be continued due to its lower productivity	53	104	46	86	11	3.34	U

12	Cost of production for organic farming is higher than conventional farming	16	21	82	155	56	2.51	U
13	Profit earned by organic farming is greater than conventional farming	20	39	92	133	16	2.71	U
14	Organic farming helps the use and exchange of local resources	86	117	31	05	00	4.28	A
15	Organic farming helps to generate employment opportunities in villages	98	168	29	05	00	4.20	A

*Cutoff values for different attitudinal levels: 4.50 - 5.00 = Strongly Agree, 3.50 - 4.49 = Agree, 2.50 - 3.49 = Undecided, 1.50 - 2.49 = Disagree, and 1.00-1.49 = Strongly Disagree
Source: Field survey, 2018

Table 4 indicates that the farmers have a high mean score for the attitude towards health-related aspects and environment-protecting aspects of organic agriculture. They have strongly agreed with these two aspects. In addition, the farmers have agreed and have a positive attitude towards complexity, nutritional quality of organic products, and consumers' preference for organic food, generation of employment for rural people, and contribution towards the exchange and usage of local resources. However, as their notion about the subject is vague, they have a neutral attitude towards payment of a premium price for organic products, government support for organic agriculture, productivity level, profit margin of organic agriculture, and challenges in organic agriculture.

Relationships between socio-economic factors of the farmers and their attitude towards organic agriculture

As the majority of the farmers have a positive attitude towards organic agriculture, it is essential to check relationships between the farmers' attitude and their socio-economic factors; age, gender, marital status, level of education, and income level.

Table 5. Model summary of binary logistic regression analysis

Model Summary			
Step	**-2 Log likelihood**	**Cox & Snell R Square**	**Nagelkerke R Square**
1	370.397[a]	.135	.181

As shown in Table 5, under the model summary of this study, the -2 Log-Likelihood statistics is 370.397, which is distant from one. This statistics measure how the model predicts the farmers' attitude in positive status. The result of Cox and Snell R^2 indicates that 13.5% of the variation in the dependent variable is explained by the predictor variable.

Table 6. Goodness-of-fit (Model diagnostic); Hosmer and Lemeshow test

Step	Chi-square	df	Sig.
1	5.337	8	0.721

According to Table 6, the P-value 0.721 is higher than the value of significance 0.05; hence, it can be concluded that the data fit the model well.

Information in the table "Variables in the Equation" (Table 7) was used to observe the probability of an event occurring based on a one-unit change in a particular independent variable when all other independent variables relevant to the socio-economic data of the respondents were kept constant.

Table 7. Variables in the equation

Variables in the Equation									
		B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**95% C.I. for EXP(B)**	
								Lower	**Upper**
Step 1[a]	Gender (1)	-0.264	0.344	0.589	1	0.443	0.768	0.392	1.507
	18-36 years (ref)			1.218	2	0.544			
	37-55 years	0.373	0.342	1.190	1	0.275	1.452	0.743	2.838
	Above 55	0.346	0.417	0.691	1	0.406	1.414	0.625	3.198
	Married (ref)			3.913	2	0.141			
	unmarried	-1.540	0.847	3.304	1	0.069	0.214	0.041	1.128

	other	0.526	0.744	0.500	1	0.480	1.692	0.394	7.273
	Primary (ref)			23.340	4	0.000*			
	O/L	0.506	0.286	3.118	1	0.077	1.658	0.946	2.906
	A/L	1.850	0.455	16.518	1	**0.000***	**6.358**	2.606	15.514
	Diploma	3.295	1.089	9.151	1	**0.002***	**26.987**	3.191	228.249
	Graduate	1.057	1.006	1.104	1	0.293	2.877	0.401	20.650
	<15,000			8.112	4	0.088			
	15,000-30,000	0.237	0.300	0.623	1	0.430	1.267	0.704	2.279
	30,001-45,000	-0.395	0.385	1.048	1	0.306	0.674	0.317	1.434
	45,001-60,000	-0.023	0.735	0.001	1	0.975	0.978	0.231	4.128
	>60,000	1.221	0.555	4.831	1	0.028	3.390	1.141	10.068
	Constant	-1.015	0.406	6.240	1	0.012	0.363		

a. Variable(s) entered on step 1: Gender, Age, Marital status, Education, and Income.
Source: Field survey, 2018

Table 7 depicts that the farmers' education level is a highly significant factor because the P-values (0.000 and 0.002) are lower than 0.05. The estimated odds ratio 6.358 and 26.987 (Exp. B) indicates that the farmers who received a high level of education are 6.358 and 26.987 times more likely to have a positive attitude towards organic agriculture, compared to the farmers who have a low level of education, controlling other variables in the model. Therefore, a significant relationship is noted between the farmers' attitude and their education level.

Potential for organic farming in Sri Lanka

Table 8 presents different potentials for organic agriculture in the study areas.

Table 8. Different potentials for organic agriculture in the study areas (n=300)

No.	Potential	Frequency	Percentage (%)
01	There are traditional knowledge and experience in organic farming	**252**	**84**
02	The climate of the area is appropriate for organic farming	246	82
03	The government provides support and encouragement towards organic farmers	222	74
04	NGOs encourage organic farming	213	71
05	Private organizations encourage organic farming	207	69
06	Promotion through advertisements supports organic farming	186	62
07	There are necessary seeds and planning materials	159	53
08	There is good demand for organic produce locally and internationally	153	51

Source: Field survey, 2018

According to Table 8, a significant number of farmers have traditional knowledge and experience in organic farming (84%). Sri Lanka has a historical record of great civilization and culture dating back to more than 2500 years ago (Sri Lanka tourism, 2018). In many areas of Sri Lanka, rural people, especially the older generation, have a vast pool of traditional knowledge and awareness on various aspects of organic farming such as high use of astrology, biodynamics, Buddhist religious applications and "kem" methods for farming, traditional methods of seed preparation, and products storage. Thus, there is significant potential for development of the organic agriculture sector in the selected areas. The next important factor is favorable climatic conditions that prevail in these areas for organic farming (82%). The third significant potential is the existing organic farming dissemination programs, training programs, and knowledge provided for them, promotions, and government support for farming (74%). In addition, support of the NGOs, private organizations, various promotions through advertisements, supports via exhibitions, competitions, media, availability of some necessary seeds and planning materials also provide encouragement for the farmers. Finally, there is increasing demand for organic produce both locally and internationally from health-conscious consumers.

Challenges for organic agriculture in the study areas in Sri Lanka

Table 9 presents different constraints related to organic agriculture faced by the farmers.

Table 9. Various constraints for organic agriculture (n=300)

No.	Constraint	Frequency	Percentage (%)
1	Organic farming is labor-intensive	243	81
2	It is difficult to find marketplaces for organic products	237	79

3	Organic farming is costly	228	76
4	It is difficult to win consumers' trust in organic food marketing	193	64
5	Organic farming is susceptible to pest incidences	186	62
6	Organic farming is vulnerable to adverse climatic conditions	174	58
7	It is difficult to find some seeds and planting materials for organic farming	165	55
8	Agrochemical shops have a negative attitude towards organic farming	162	54
9	There is no appropriate quality certification and branding for organic products	156	52

Source: Field survey, 2018

According to the results, nine constraints were identified. The majority of the farmers (81%) mentioned that 'labor intensiveness' was the major constraint faced by them. Also, finding marketplaces for organic products was the next constraint of 79% of the farmers, while the high cost of organic farming is a problem for 76% of the farmers. These three problems could be identified as major constraints of the farmers practicing organic agriculture. Marsh et al. (2017) have also obtained similar findings.

Moreover, 64%, 62%, and 58% of the farmers mentioned the following constraints: difficulties in winning consumers' trust for organic food, susceptibility of organic farming to pest and plant disease incidences, and vulnerability to adverse climatic conditions, respectively. Furthermore, finding seeds and planting materials required for organic farming was a problem for 55% of the farmers, and 54% of the farmers mentioned that agrochemical shop owners and relevant industries adopt a negative attitude towards organic farming. Also, the unavailability of quality certification and branding for organic products was a problem for 52% of the farmers in the study areas.

CONCLUSION

Assessing the socio-economic characteristics revealed that the majority of the respondents were males in the age range of 37-55 years, who were educated up to the GCE Ordinary Level. Sri Lankan rural culture is based on agriculture, and women support men in agricultural operations. Also, most of these farmers possess good traditional knowledge and experience related to organic farming, passed down by their parents. Besides, the Sri Lankan government takes much effort to disseminate knowledge and innovations relevant to organic farming through field-level agricultural extension officers.

Focusing on primary organic farming information sources, the most prominent information source for organic farming is agricultural extension programs, since the government conducts many organic extension programs for farmers. The second important source is parents/friends and relatives. Often, the present farmers receive instructions from their experienced parents, friends, and relatives, as these are readily available.

Analyzing the farmers' attitudes revealed that the farmers have a positive outlook towards several aspects of organic farming, including the health-enhancing, environment-protecting, employment-generating, and resource-exchanging ability of organic farming. There is also a significant relationship between the farmers' education level and positive attitudes towards organic farming.

Besides great potential, these areas also have some constraints for organic farming. The availability of traditional knowledge and experience in organic agriculture and favorable climatic conditions were the main potential, but labor intensiveness and lack of appropriate quality certifications for organic products were significant challenges.

Therefore, it is possible to conclude that the farmers can be motivated towards organic agriculture in these districts if the necessary conditions are provided. Creating sufficient and efficient marketing facilities and reasonable price levels for organic products, providing required facilities for producing organic food, developing a certification process, and a system for processing and value addition will promote organic agriculture among more farmers, thereby supporting sustainable development in these areas.

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