

## **Female Farmers' Agricultural Information Needs and Food Production: A Case Study of Imbulpe ds Division in Sri Lanka**

**Abstract.** The study was conducted to find out female farmers' agricultural information needs and their impact on food production, in the Imbulpe DS Division in Sri Lanka. Of the female farmers in the area, 238 were taken as the sample for the study from seven selected Grama Niladhari (GN) divisions in the area. Female farmers were selected by using a simple random sampling method from these purposively selected GN divisions. A pre-tested, interviewer-administered questionnaire survey was used as the primary data collection method from March to July 2019. Data analysis was done by using descriptive statistics and chi-square analysis. The result revealed that the majority (62.6%) of respondents were middle aged (40-59 years), married, and belonged to families with 4-5 members. Most respondents (64.3 %) had studied up to junior secondary education level. Their average farm land size is 0.84 acres and they have farming experience of about 15 years. Most of the respondents mentioned that they had obtained higher levels of information needs about improved crop varieties. In addition, female farmers reported that they moderately need information on application of agrochemicals, improved market systems and modern farming technologies. Extension agents and other female farmers act as their major sources of agricultural information and ICT equipment acts as the least important agricultural information source in this area. Moreover, there is a significant positive association between the agricultural information needs and food production. Therefore, providing necessary agricultural information and enhanced utilization of ICT tools for agricultural information sources, and encouraging female farmers to participate in farming societies will lead to enhanced food production in this area.

**Key words:** agricultural information, Imbulpe, information needs, Sri Lanka, women farmers

**JEL Classification:** Q1, Q16

### **Introduction**

Women constitute nearly half of the global population. They are the co-builders of civilization. Yet they are underprivileged in many countries around the world, especially in developing countries (World Bank, 2021; Rahman et al., 2007).

Nowadays, gender equity or female empowerment is considered as the key to achieving sustainable development of a particular country (United Nations-UN, 2020; UNDP, 2017; Khan et al., 2017). In many countries, female contributions are often invisible when assessing the social development of the country. That is the root cause for evaluating the contribution of women for the development of a country through their agricultural information need and food production (FAO, 2011; UN, 2010).

The performance of agricultural activities such as planting, weeding, harvesting and post-harvest activities by women have increased to the same level as farming activities of

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men, due to the movement of men's labor from agriculture to the urban sector (International Labor Organization-ILO, 2018; Ibarhokanrhowa, 2016; Malkanthi, 2016). Rural women dominate in the agricultural sector in developing countries. In developed nations, farming operations are mechanized and women's involvement is considerably low (Ibarhokanrhowa, 2016).

As agriculture modernized, male activities considerably increased and overall labor requirements significantly decreased. Men highly upgraded their level of education and access to technical knowledge as well as to agricultural information (FAO, 2018). An improved information and knowledge flow in the agricultural sector are key components to improving small-scale agricultural production and linking increased production to the agricultural markets. This leads to improvements in yield, rural livelihoods, food quality, food security and national economies. However, only a certain amount of agricultural information is available to rural farmers, despite the large body of knowledge available in research institutions, universities, public offices and libraries. This situation is largely attributed to the weak linkages between research, extension, not-for-profit and non-profit organizations, libraries etc.

Most of the developing countries suffer from gender inequality, which is a key factor to be addressed under the sustainable development goals. Gender inequality increases the knowledge barrier for female farmers (Rathnachandra & Malkanthi, 2020; Mojaki & Keregero, 2019). In Sri Lanka, the share of employed women is only 18% of the total population. Among them, about 80% of the economically active women come from the rural sector. (Madurawala, 2018; Annual labor force reports, 2017). Female contribution to agriculture-related activities is gradually increasing in the national economy of Sri Lanka. The majority of rural women contribute their efforts to the agricultural sector rather than the industrial sector (Annual Labor Force Reports, 2017).

The Imbulpe DS Division is basically dominated by the agriculture sector rather than the industrial or service sector, and women conduct farming activities more or less similar to men (Census and Statistics of Agriculture base report-Rathnapura District, 2013/14). Therefore, most of the women are engaged in agricultural-related activities in this area. Imbulpe DS Division has 50 GN divisions under administrative distribution in Sabaragamuwa Province. A considerable level of agricultural knowledge and experience is available in the Sabaragamuwa university and the Agrarian Service Center of the study area. Therefore, the agricultural information gap can be overcome by establishing proper linkages between female farmers and agricultural information sources in a timely manner. In addition, agricultural information needs should be properly assessed to effectively disseminate agricultural information within the study area. Doing so would have considerable impact on the food production of female farmers. However, no proper studies have been conducted to identify the agricultural information needs and food production of rural female farmers in this area.

Agricultural information can help to empower female farmers and increase their production capacity. Thus, this study was aimed at the agricultural information needs of rural female farmers in the Imbulpe DS division, in hopes of identifying its impact on their food production. The study also aims to identify the sources of agricultural information and to assess the impact of agricultural information needs on food production in this area.

## **Research methodology**

Imbulpe DS Division is a rural farming area situated in the Rathnapura district in Sabaragamuwa province of Sri Lanka. In this region, a considerable percentage of men have moved to urban areas searching for jobs. Therefore, most of the women are carrying out agricultural activities. The area is located close to the Sabaragamuwa University of Sri Lanka, which conducts some agricultural extension activities and awareness programs from time to time. This study is also the result of a situation analysis of the area before conducting an agricultural extension program.

Out of the fifty GN divisions of the Imbulpe DS division, seven GN divisions were purposely select for the study, namely: Halpe, Seelogama, Kinchigune, Puwakgahawela and Muttettuwegama, Imbulpe and Karagastalawa. These GN divisions represent higher numbers of women farmers who are registered under the regional Agrarian Service Center than is found in other GN divisions. 238 female farmers were randomly selected from those seven GN divisions as the sample. A pre-tested, interviewer-administered questionnaire survey was used as the primary data collection method from March to July 2019.

Data analysis was conducted using descriptive statistics and chi-square analysis. Results revealed that a list of possible areas of agricultural information needs of the female farmers had been identified through the pilot study. Then, female farmers mentioned their agricultural information needs based on a prepared list of information needs. The level of agricultural information needs were indicated by ranking them as high (3), moderate (2) and low (1). These categories were based on the studies of Ikwuakam et al (2016) and Okwu and Umoru (2019). The weighted average was calculated to identify the levels and types of agricultural information needed by female farmers in this area. In addition, the sources of agricultural information were analyzed by ranking the provided list of agricultural information sources based on the findings of the pilot study. Results of the Chi-square analysis showed the impact of agricultural information needs on food production in Imbulpe DS division. Food production increment capacity was measured by categorizing it in a yes (1) and no (0) manner, for the subject of further data analysis.

## **Results and discussion**

### **Socio-economic factors of the respondents**

Important socio-economic factors of female farmers are presented in Table 1. The age most women farmers (62.6%) was between 40-59 years. It is clear that most of the women farmers represent the economically active age range and there is a considerable potential to enhance their agricultural information as a way to increase their levels of agricultural production. Furthermore, 90.3% of respondents were married and most of them (64.3%) had received Junior Secondary education (GCE Ordinary level) as their level of education. Therefore, based on the findings of the FAO (2014), they have the ability to access and adopt new technologies that can improve their agricultural production, credit facilities and also reduce their agricultural information needs.

Table 1. Socio-economic factors of respondents (n = 238)

Factor	Category	Frequency	Percentage (%)
Age	20-39 Years	40	16.8
	40-59 Years	149	62.6
	> 60 Years	49	20.6
Marital status	Single	09	3.8
	Married	215	90.3
	Widowed	14	5.9
Educational level	No Primary education	08	3.4
	Primary education	68	28.6
	Junior secondary education (O/L)	153	64.3
	Senior secondary education (A/L)	09	3.8
Monthly income (LKR)	Less than 20,000	61	25.6
	20,001 – 40,000	156	65.5
	40,001 – 60,000	21	8.8
Number of family members	less than 4	79	33.2
	4 – 5	128	53.8
	more than 5	31	13.0

Source: Field survey, March to July 2019.

The majority of the respondents reported that they have 4-5 members within their families. Moreover, 0.84 acre was recorded as their average size of farm land, and the average duration of farming experience is about 15 years. While 65.5% of female farmers have received LKR 20,001 – 40,000 as the monthly income, 25.6% of them reported their monthly income as below LKR 20,000. Thus, a low level of monthly income shows the importance of agricultural information needs within the study area.

### **Agricultural information needs of female farmers in the area**

According to the findings of Table 2, most respondents (57.7%) reported that they need information about improved crop varieties. They also need information on the application of agrochemicals (55.3%), improved market systems (47%) and irrigation systems (45.1%).

Table 2. Areas of agricultural information needs by the respondents (n = 238)

Areas of information need	Frequency	Percentage (%)
Irrigation methods	114	45.1
Suitable storage facilities	54	22.5
Application of agrochemicals	140	55.3
Improved livestock varieties	44	18.6
Modern farming technologies	80	33.6
New cropping systems	30	12.7
Improved crop varieties	146	57.7
Improved market systems	112	47.0

Source: Field survey, March to July 2019.

However, they were less interested in information about improved livestock varieties (18.6%) and suitable storage facilities (22.5%). This is because most of the female farmers were engaged in small-scale farming rather than large-scale industrial farming operations. They had a moderate level of education and literacy and poor awareness about using ICT equipment to access agricultural information.

### Level of agricultural information needs of female farmers

Information about the level of agricultural information needed by female farmers in the study area are shown in Table 3.

Table 3. Level of agricultural information needed by respondents (n = 238)

Areas of information need	Yes						No	
	High		Moderate		Low			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Irrigation methods	66	57.9	35	30.7	13	11.4	123	51.6
Suitable storage facilities	8	14.8	22	40.7	24	44.4	184	77.3
Application of agrochemicals	85	52.1	64	39.3	14	8.6	75	31.5
Improved livestock varieties	22	27.5	30	37.5	28	35	103	66.4
Modern farming technologies	78	51.7	59	39.1	14	9.3	87	36.6
New cropping systems	76	58.5	38	29.2	16	12.3	108	45.4
Improved crop varieties	91	62.3	41	28.1	14	9.6	92	38.7
Improved market systems	70	55.1	43	33.9	14	11.0	111	46.6

Categorizations based on the Ikwaakam et al., 2016

Source: Field survey March to July 2019.

As per the results of Table 3, 62.3% of the female farmers indicated a high level of need for agricultural information on improved crop varieties, and a moderate level of agricultural information needs regarding the application of agrochemicals (39.3%), improved livestock varieties (37.5%), modern farming technologies (39.1%) and improved market systems (33.9%) in the study area. Suitable storage facilities (44.4%) obtained a lower level of agricultural information needs. The rest of the responses indicated that information on irrigation methods, suitable storage facilities and improved livestock varieties was rarely of interest for the female farmers of Imbulpe DS division.

### **Sources of agricultural information for the respondents**

The sources of agricultural information that are used by female farmers are presented in Table 4.

Table 4. Sources of agricultural information used by female farmers n = 238

Source	Frequency	Percentage (%)
Extension agent	114	47.9
ICT equipment (phones, internet etc.)	12	05.1
Contact farmers	37	15.5
Other female farmers	69	29.0
Other sources	06	2.1

Source: Field survey, March to July 2019.

Based on the findings of Table 4, most of the female farmers indicated that extension agents (47.9%) and other women farmers (29%) were their major sources of agricultural information. Agricultural information sources, contact farmers and ICT equipment were less important sources of information. Newspapers, farming societies and other family members were shown as the other sources of agricultural information. While use of ICT is low, they have higher levels of contact with the extension agents of the area. Another special feature is that a female extension agent is working in this area. And also, based on the study of Tharani et al. (2016), own farming experiences and other family members were shown as the agricultural information sources of the Vavunia district in Sri Lanka. Extension agents and ICT equipment usage was not used for gaining agricultural information in Vavunia district. Because of the impact of civil war in the north province of Sri Lanka, female farmers were less aware of the other information sources of agriculture. In addition, radio, field days, demonstrations, training programs and progressive farmers were mentioned as the conspicuous information sources of Batticaloa district in Sri Lanka (Geretharan and Sugirtharan, 2019).

Table 5. Comparison of level of education of female farmers and sources of agricultural information (n = 238)

Specification		Extension agent		ICT equipment		Contact farmers		Fellow women farmers		Other sources	
		f*	%	f	%	f	%	f	%	f	%
Educational level	No Primary education	0	0	0	0	2	0.84	6	2.5	0	0
	Primary education	0	0	0	0	24	10.1	38	15.9	6	2.5
	Junior secondary education (O/L)	107	44.9	10	4.2	11	4.6	25	10.5	0	0
	Senior secondary education (A/L)	6	2.5	2	0.84	0	0	0	0	0	0

\* - f = frequency, % = percentage

Source: Field survey, March to July 2019.

As per the results of Table 5, extension agents and ICT equipment were seen as the information source of female farmers who are educated up to senior secondary education. Basically, extension agents, ICT equipment, contact farmers and other female farmers were used as the information source of women farmers educated up to junior secondary level. When the respondents did not have an adequate level of education, ICT equipment was not used as an agricultural information source.

Table 6. Chi-square analysis of the impact of level of education of female farmers and sources of agricultural information

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	472.958 <sup>a</sup>	20	.000
Likelihood Ratio	473.754	20	.000
N of Valid Cases	300		
a. 17 cells (56.7%) have expected count less than 5. The minimum expected count is .16.			
Symmetric Measures <sup>c</sup>			
	Value	Approximate Significance	
Nominal by Nominal	Phi	1.256	.000
	Cramer's V	.628	.000
	Contingency Coefficient	.782	.000
No. of Valid Cases	300		
c. Correlation statistics are available for numeric data only.			

Source: Authors' own calculations.

As per the results of Table 6, the Cramer's V value of 0.628 shows a moderate level of positive relationship among two variables with statistical significance at 5% significance level. p value is less than 0.05. Therefore, it can be concluded that a statistically significant positive association exists between the level of education of female farmers and sources of agricultural information.

## **Impact of agricultural information on food production**

The impact of agricultural information needs on food production of female farmers was analyzed through chi-square analysis. The relevant results are shown in Tables 7 and 8.

Here, the dependent variable is food production and agricultural information needs was the independent variable. Food production increment capacity was measured in the categorical manner and agricultural information needs were measured through the ranking scale of their needs as low, moderate and high.

Table 7. Comparison between food production and agricultural information needs

Specification		Has your food production increased		
		No	Yes	Total
Agricultural information neediness	Low	15	8	23
	Moderate	19	52	71
	High	46	98	144
	Total	80	158	300

Source: Field survey, March to July 2019.

Comparison between respondents' agricultural information needs and food production is shown in Table 7. These findings revealed that most respondents had a higher level of agricultural information needs for the increment of food production. This is because they use the latest information, such as information about improved crop varieties, application of agrochemicals, new cropping systems, and irrigation systems in order to increase food production. However, they showed a lower level of interest regarding information about improved livestock varieties and suitable storage facilities. The low level of agricultural information needs and zero increment of food production that was found according to the survey statistics shows that there exists a very difficult situation. The low level of education, literacy and use of ICT equipment for agricultural activities results in a lack of proper dispersion of agricultural innovations and modern farming technologies to the rural women.



Table 8. Chi-square analysis of the impact of agricultural information needs of women farmers and food production

Specification	Chi-Square Tests		
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	301.012 <sup>a</sup>	6	.000
Likelihood Ratio	306.515	6	.000
N of Valid Cases	300		
a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 4.75.			
Specification	Symmetric Measures		
	Value	Approximate Significance	
Nominal by Nominal	Phi	1.002	.000
	Cramer's V	.708	.000
N of Valid Cases	300		

Source: Authors' own calculations.

As per the results of Table 8, the Cramer's V value of 0.708 shows a strong positive relationship among two variables with statistical significance at 5% significance level. p value is less than 0.05. Therefore, a statistically significant positive association exists between agricultural information needs and the level of food production. Makawia, 2018 has reported that there is an impact of agricultural information needs on food production based on the study of sesame producers in Morogoro district in Tanzania. And also, Ikwuakam et al., 2016 findings showed that agricultural information needs has an effect on sesame production according to the study of information needs of sesame farming households in selected agricultural zones of Katsina state, Nigeria.

## Conclusion

Most of the respondents noted that they need information about improved crop varieties. In addition, they reported that application of agrochemicals, improved market systems and modern farming technologies related information are more significant for them. But they showed less interest regarding information related to improved livestock varieties and suitable storage facilities. This is likely because the majority of female farmers are engaged in small-scale farming rather than industrial farming operations.

Most of the female farmers have indicated that extension agents and other women are their major sources of agricultural information. In addition, contact farmers provide a considerable level of agricultural information. ICT equipment serves as the least important agricultural information source in this area. Newspapers, husbands, farming societies and other family members were shown as the other sources of agricultural information. A moderately positive correlation was obtained between the level of education of female

farmers and sources of agricultural information. In addition, there is a statistically significant positive association between the agricultural information needs and food production in this area.

## Recommendations

Based on the findings of the study, the following recommendations can be made in order to improve the situation of female farmers in the region:

- Enhancing female farmer participation in workshops and training programs related to the application of agrochemicals, improved market systems and modern farming technologies to fulfill the agricultural information needs of the women farmers.
- Persuading women farmers to gain required agricultural information through use of ICT equipment and also the contact farmers for the build-up of basic skills and abilities to increase their food production.
- Encouraging female farmers to participate in farming societies and allowing them to discuss their farming issues by sharing their farming experiences.
- Persuading female farmers to utilize novel farming practices that are not solely based on traditional farming methods.

## Limitations of the research method

- The level of agricultural information needs was determined through the categories of the study of Ikwaakam et al (2016) as high, moderate and low. This measure was obtained in a categorical basis that prevents further in-depth analysis.
- The Imbulpe area consists of 50 GN divisions according to the administrative distribution. However, only seven GN divisions were selected, based on the higher representation of female farmers than in the other GN divisions of the study area.
- Food production increment was determined by a categorical manner. Therefore, this provides only a rough idea about the agricultural information needs and food production in Imbulpe DS division.

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